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

CONNECT ALASKA®

April 1, 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:

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

It is with highest regard that the collective stakeholders of Connect Alaska 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 Alaska has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit not just Alaskans, 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 Alaska: 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 (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2011 SBI data submission for the Connect Alaska program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 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 95.45 percent of the Alaska provider community, or 21 of 22 total providers. Of the 21 participating providers, 7 supplied an update to their network or coverage area(s), while 13 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 provider that is not represented in the attached datasets is currently in some form of progress toward data submission.

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

Connect Alaska has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Alaska conducts field validation efforts. To date, 16 (69.57 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

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

As an indicator of stakeholder penetration, the Connect Alaska website encountered 2,695 unique visits during this reporting period (10,462 total to date for the life of the grant awarded on June 1, 2010). Additionally, this pronounced Web activity netted 7 broadband inquiries over this same reporting period (46 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 Alaska website and the Connect Alaska 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 Alaska mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Alaska to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Alaska 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 Alaska Department of Commerce, Community and Economic Development, outreach was conducted during this data update reporting period by Connect Alaska to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Alaska website. During this reporting period Connect Alaska partnered with Roxie Mourant at the Alaska Department of Education to combine surveys and distribute them to district technology contacts in an effort to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. Connect Alaska will continue to build upon this new relationship and others over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

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

The Connect Alaska program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Alaska, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead.

Respectfully submitted,

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

DATA ACQUISITION: ALASKA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this fifth reporting period of the SBI, Connect Alaska, working in close coordination with the state of Alaska, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. During this reporting period Connect Alaska has continued to focus efforts on conducting outreach and raising awareness of this important project.

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

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

The survey can be accessed at this link: http://www.connectak.org/policy.

Connect Alaska conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Alaska continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Alaska works with the Alaska Department of Commerce, Community and Economic Development to identify existing relationships that can support CAI outreach.

Connect Alaska has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. Connect Alaska worked closely with the Alaska Department of Education by combining surveys to distribute to school technology contacts.

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

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

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	721	721	651	425	291	279
Libraries	128	128	128	46	44	44
Healthcare	295	295	89	191	189	6
Public Safety	323	323	323	3	3	3
Higher Ed Institutions	14	14	14	8	8	8
Other Government	568	568	565	23	18	17
Other Non-Government	447	447	440	6	7	4
Total	**2496**	**2496**	**2210**	**702**	**560**	**361**

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

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 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 state of Alaska.

Inventory of Deliverables, Connect Alaska: April 1, 2012

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Appendix A:	1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A:	3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A:	4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Alaska have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

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

Alaska Field Validation Methodology

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

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets 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 Alaska on the following providers: Ace Tekk Wireless Internet; AlasConnect, Inc.; Alaska Communications Systems Holding, Inc.; Alaska Power & Telephone, Inc.; AT&T, Inc.; Borealis Broadband; Clearwire Corporation; Copper Valley Telephone Cooperative, Inc.; Cordova Telephone Cooperative, Inc.; GCI Internet; Ketchikan Public Utilities; Matanuska Telephone Association, Inc.; SPITwSPOTS LLC; TelAlaska Long Distance, Inc.; Verizon; and Yukon Telephone Company.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 16 companies (out of a universe of 23 viable providers) totaling 69.57 percent within the state of Alaska.

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters. 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.

Alaska Communications Systems Holding, Inc. (ACS)
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative indicated that 10 Mbps service is available to anyone in the service area, but it is not advertised.

Matanuska Telephone Association, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Matanuska Telephone Association

INTERNET PACKAGES | available when you also have **MTA PHONE** service

Download Speed	Usage				
	10GB	25GB	40GB	70GB	100GB
256K	$25				
768K	$40	$45	$55	$65	$95
2M		$50	$60	$70	$100
5M		$60	$70	$80	$110
10M		$70	$80	$90	$120
Additional GB	$5		$4	$3	$2

SPITwSPOTS, LLC

Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises 12 Mbps service; screenshot below.

Internet Subscription Rates:

- 400k Service $20 monthly
- 2Mb Service $59 monthly
- 3Mb Service $90 monthly
- 4Mb Service $107 monthly
- 5Mb Service $128 monthly
- 6Mb Service $146 monthly
- 7Mb Service $162 monthly
- 8Mb Service $176 monthly
- 9Mb Service $189 monthly
- 10Mb Service $200 monthly
- 11Mb Service $210 monthly
- 12Mb Service $218 monthly

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.

Estimates derived from provider-validated data indicate that approximately 8.63 percent of Alaska households do not have terrestrial fixed broadband service available, and approximately 6.70 percent[1] of Alaska households have neither mobile nor fixed broadband service available.[2]

[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 state.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 17.03 percent of rural Alaska households do not have terrestrial fixed broadband service available, and approximately 13.55 percent[3] of rural Alaska 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).
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. 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).

[3] See footnote 1.

[4] See footnote 2.

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

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information 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 Alaska project has received a total of 7 inquiries (46 grant inception to date). As more inquiries are submitted to Connect Alaska, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

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 Alaska project launched BroadbandStat on September 1, 2010, and has received a total of 1,357 visits to date, of which 244 occurred this reporting period.

Speed Test Methodology

The 905 speed tests that are represented in the Connect Alaska Speed Test Report during this reporting period (2,193 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Alaska speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for 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 Alaska project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Alaska with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Alaska.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 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	650Net	http://www.650net.net	Offer dial-up only, except offer DSL as a reseller in California.
2	AAA Internet Service	http://aaainter.net/dsl	Dial-up service with nonfacilities-based DSL. Does not offer in Alaska on searches.
3	Access123.net	http://www.access123.net	Offer dial-up services only.
4	ACERX.NET	http://acerx.net	Nonfacilities-based reseller of 13 national companies with cable, DSL, and mobile wireless applications.
5	Airewaves Broadband, LLC	www.airewaves.com	Airewaves is an Internet media download center.
6	Alaska Wireless Cable	n/a	Provider is no longer in business; URL is inactive.
7	Alaska Wireless Systems	n/a	Provider is no longer in business; URL is inactive.

8	Angoon Cablevision	n/a	Provider is no longer in business; URL is inactive.
9	Arctic Slope Tel. Assn. Coop. Inc.	http://www.astac.net	Provider does not meet the broadband speed requirements in either upload or download.
10	Bay Cablevision	www.bristolbay.com	Provider does not meet the broadband speed requirements in either upload or download.
11	Bristol Bay Telephone Cooperative, Inc.	http://www.bristolbay.com/	Provider does not meet the broadband speed requirements in either upload or download.
12	Broadband National	http://www.broadbandnational.com	Nonfacilities-based reseller of 30 national companies with cable and DSL applications.
13	Bush-Tell Inc.	n/a	Per CSR, they are local exchange services only; no website.
14	Camino-Net Internet Services	http://www.camino-net.com	No longer in business; phone and website are both inactive.
15	Circle Telephone Co.	n/a	Per CSR, they are local exchange services only; no website.
16	Communications Unlimited	http://www.cuicable.com/	Communications services company; does not provide broadband.
17	Core Communications	http://www.corecomm.us/	Printer and visual communications supplier.
18	deluxehost.com	http://deluxe-host.com	Company delivers web hosting services.
19	Denali Wireless Television	http://www.denalitelevision.com/	Nonfacilities-based reseller.
20	DGUI	http://www.dgui.com/	No longer in business; phone and website are both inactive.
21	Dialer.net	http://international.dialer.net	England-based, international pay-as-you-go mobile wireless and hot spot reseller.
22	DTS-NET.COM	http://www.dts-net.com/	Nonfacilities-based reseller for over 30 companies.
23	Echostar	http://www.echostar.com/	Does not provide service in Alaska.
24	Eyecom Cable	www.telalaska.com	Subsidiary company of Tel Alaska and Eyecom; does not provide broadband service.
25	Freedom Internet	http://freedominternet.net/	Dial-up services only.
26	Haines Cable TV	http://www.hainescable.tvheaven.com/	Company offers cable TV services only.

27	High Frequency Wireless	http://www.hfwireless.com/	Company is a reseller of GCI Mobile Wireless and Clearwire along with an electronics repair depot.
28	Hoonah.Net	n/a	Information located on company is not viable; phone number inactive.
29	ICE Communications	http://www.ice-com.net	Information located on company is not viable; phone number inactive.
30	Imbris, Inc.	http://www.imbris.com	Nonfacilities-based web engine reseller for multiple companies.
31	IMGISP.NET	http://www.imgisp.net/	Nonfacilities-based web engine reseller for multiple companies.
32	Incredible Networks	n/a	Could not locate any information on company.
33	Interactiveinfo.com Inc.	http://interactiveinfoservice.com/	Performs internet search services.
34	iRadical	n/a	Could not locate any information on company.
35	ISPartner.net	n/a	Could not locate any information on company.
36	LCSisp.com	http://www.lcsisp.com/index.cfm	Dial-up services only.
37	Level 3 Communications, LLC	www.level3.com	Does not provide service in Alaska.
38	Lou's TV & Satellite Service, Inc.	http://www.lousatellite.biz/	Reseller of Wild Blue services.
39	MainBoard	http://www.mainboard.cc/internet.htm	Offer dial-up and are a nonfacilities-based reseller of DSL, cable, and wireless.
40	Maine Cable and Wireless	http://www.mainecableandwireless.com	Could not locate any information on company.
41	Marcin Company	n/a	Could not locate any information on company.
42	Microcom	http://www.microcom.tv/	Reseller of Hughesnet, Starband, and Spacenet.
43	Millenicom Inc.	http://www.millenicom.com	Reseller of 3G and 4G mobile wireless services.
44	Mitkof.net	n/a	Information located on company is not viable; phone number inactive.
45	Nanomega.Com	www.nanomega.com	Information located on company is not viable; phone number and URL inactive.
46	NetAccess, Inc.	http://www.nas.net/	Canada business only provider with an array of services.

47	NetSpeed Online	http://www.netspeed-online.net	Could not locate any information on company.
48	Nook Net	n/a	Information located on company is not viable; phone number inactive.
49	Nushagak Electric & Telephone Cooperative Inc.	http://www.nushtel.com/	Provider does not meet the broadband speed requirements in either upload or download.
50	Overarch Broadband	http://www.overarch.com	Provider does not offer service in Alaska; provider services Treasure Valley, Idaho.
51	Pacific Internet Exchange	http://www.pie.us/	Provider is a web hosting company.
52	PremoWeb	http://www.premoweb.com/about_us/contact_us.html	Dial-up services only.
53	Qwest Communications Company, LLC	www.qwest.com/	Provider does not offer service in Alaska.
54	Sea Lion International, LLC	http://www.sealioncompanies.com	Provider still working with securing funding and working out network design issues.
55	Simply Dialup A Metrogeek Company	http://www.simplydialup.com	Dial-up services only.
56	Skagway Cable TV	www.hainescable.tvheaven.com	Cable TV services only.
57	SkyFrames	http://www.skyframes.com	Information located on company is not viable; phone number and URL inactive.
58	Smith Cable Systems	n/a	Company is a contractor for the installation of cable; no ISP operations.
59	Surferz.Net	http://www.surferz.net	Dial-up services only.
60	The Summit Telephone and Telegraph Company of Alaska, Inc.	n/a	Provider does not meet the broadband speed requirements in either upload or download.
61	Total Access Networks, Inc.	http://www.totalaccess.net	Supplies in-home solutions for multiple types of home networking and other types of services.
62	TransAria	http://www.transaria.net	Website points to backhaul provider, Cutthroat Communications; does not serve Alaska.
63	TSISP.NET	www.tsisp.net	Website search engine.

64	University Corporation for Advanced Internet Development	n/a	Nationwide GBit network for anchor institutions; network under testing and construction; no website found.
65	VPM Global Internet Services, Inc.	http://www.vpm.com	Reseller of HughesNet services.
66	Wireless Roanoke, Inc.	http://www.wirelessroanoke.com	Information located on company is not viable; phone number and URL inactive.
67	wisbin	http://www.wisbin.com	Reseller of DSL Internet service in Wisconsin; does not serve Alaska.
68	www.AmericanAngel.us	http://www.americanangel.us	Information located on company is not viable; website is a social website.
69	YEYZOO.NET	http://t1.vedy.net	Provider is a nonfacilities-based reseller of backhaul.
70	YLISP (Your Local ISP)	http://www.itsyournet.com	Nonfacilities-based reseller for local ISP companies.
71	MCI Communications Services, Inc.	http://www22.verizon.com/	Company rep noted they do not offer service in AK at this time, but provided blank data because AK was solicited.

Broadband Provider Log

Complete	30
Non-Responsive/Refused	0
In Progress	2
Count of Datasets by Status	**32**
Total Unique Providers Represented	**23**

Provider Name	Platform	Status	NDA Execution Date	Notes
Alaska Communications Systems Holding,	DSL	Data Added to Statewide Inventory	6/2/2011	[MAR-05-12 Brian Dudek] Change/Correction: Provider provided entirely new dataset that was much more comprehensive. Previous dataset was subscriber-based.
AT&T Corp, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-03-12 Brian Dudek] Change: Provider expanded mobile territory in multiple areas, most noticeably in the Matanuska, Kenai and Valdez regions.
Copper Valley Telephone Cooperative, Inc	DSL	Data Added to Statewide Inventory	1/11/2010	[JAN-26-12 Brian Dudek] Change: Provider expanded DSL territory.
Copper Valley Telephone Cooperative, Inc	Mobile Wireless	Data Added to Statewide Inventory	1/11/2010	[JAN-25-12 Brian Dudek] Change: Provider added four additional transmission points and removed one. Increased maximum advertised download speeds on multiple towers.
Ketchikan Public Utilities	DSL	Data Added to Statewide Inventory	1/8/2010	[FEB-13-12 Brian Dudek] Change: Provider expanded DSL territory into Loring.
Ketchikan Public Utilities	Fiber	Data Added to Statewide Inventory	1/8/2010	[FEB-13-12 Brian Dudek] Change: Provider expanded fiber territory and increased maximum advertised upload speed to tier 4.
Matanuska Telephone Association, Inc.	DSL	Data Added to Statewide Inventory	6/15/2010	[JAN-25-12 Brian Dudek] Change: Provider upgraded speed capabilities in parts of their coverage area.
SPITwSPOTS LLC	Fixed Wireless	Data Added to Statewide Inventory		[MAR-06-12 Brian Dudek] Change: Provider added additional transmission points and upgraded infrastructure to higher upload speeds.
Kodiak Kenai Cable Company	Backhaul	Backhaul Provider Only Processing Complete	2/7/2011	
Ace Tekk Wireless Internet	Fixed Wireless	No Update to Provide		
Adak Eagle Enterprises, LLC	DSL	No Update to Provide	12/22/2009	
AlasConnect, Inc.	Fixed Wireless	No Update to Provide		
Alaska Communications Systems Holding,	Backhaul	No Update to Provide	6/2/2011	
Alaska Communications Systems Holding,	Mobile Wireless	No Update to Provide	6/2/2011	
Alaska Power & Telephone, Inc.	DSL	No Update to Provide	2/26/2010	
Alaska Power & Telephone, Inc.	Fixed Wireless	No Update to Provide	2/26/2010	
American Broadband Communications	DSL	No Update to Provide	6/7/2010	
ATCONTACT COMMUNICATIONS	Backhaul	No Update to Provide		
Borealis Broadband Inc.	Fixed Wireless	No Update to Provide	2/1/2010	
Borealis Broadband Inc.	Backhaul	No Update to Provide	2/1/2010	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Craig Cable TV, Inc.	Cable	No Update to Provide	7/27/2010	
GCI Internet	Backhaul	No Update to Provide	2/25/2010	
GCI Internet	Cable	No Update to Provide	2/25/2010	
GCI Internet	Mobile Wireless	No Update to Provide	2/25/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
OTZ Telephone Cooperative, Inc.	DSL	No Update to Provide		
Yukon Tech Inc	Cable	No Update to Provide	6/23/2010	
Yukon Tech Inc	Fixed Wireless	No Update to Provide	6/23/2010	
Cordova Telephone Cooperative, Inc.	DSL	No Update Provided - Use Last Submission Data		
MCI Communications Services, Inc.	Backhaul	Other	12/14/2009	[MAR-06-12 Wes Kerr] A company representative sent a message noting that these sites have been decommissioned and shouldn't be submitted any longer.

State Broadband Initiative
Mapping Methodology

For the State of Alabama
Revised March 30, 2012

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

The following documentation provides an overview of how the fifth required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Alabama.

This submission marks the first separation of distinct methodology deliverables for each state we work with. In terms of broadband data development and data presentation, we strive to maintain a consistent process across the States. This cross-state approach also helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning a sustainable program leadership to the respective states.

As our team enters the third year of the SBI program, more work has shifted to in state partners. Much of this work focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that our in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this third program year we also anticipate inState partners taking over the state web presence, both in terms of content and hosting.

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

Significant changes include additions covering:

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

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods
3. Provider advertised speed and coverage validation

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

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

We also note that the mapping deliverable is increasingly important to state policy makers as each of the states we work with continues to assess the policy ecosystem that supports the advancement of broadband access and adoption.

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

Purpose of This Manual

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

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

Data Sources

Developing the Provider List

Provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Independent web searches
- Interviews with key state staff members and important community influencers

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

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

As contact is made in each round, we qualify each provider by asking a series of questions regarding the type of service and speeds offered. If the provider does not meet the minimum specifications for a Broadband provider (as defined in the NOFA) we make a note of the change in status.[1] Providers remain on our list and are included in program communications so that in the event that their service is upgraded or expanded their status can be updated accordingly.

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

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

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

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

Provider Survey

Since four prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 5. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 5 survey process was designed to accommodate both new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

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

<u>Returning providers</u>: For Round 5 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 5 survey in early January 2012, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of January and February. The initial data submission deadline was set for February 17, but we continued to accept "straggler" submissions into March.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the vast majority of those we were unable to reach were providers who have simply ceased to exist[2].

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 5, given the data vintage of December 31, 2011, we began this process in January and the last submissions were accepted in March, 2012.

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

Third Party Data Used

Beyond the data obtained from providers, we acquired the following commercial/restricted use data products:

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- MapInfo ExchangeInfo, Professional. This data was used in the verification of telephone Broadband provider data. Where a public domain exchange boundary wasn't available, the MapInfo boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service. In very rough terms the contained boundaries were used to test the location of some provider data. FCC 477 restricted use data were analyzed to find valid providers within a given area.

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

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

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

lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

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

Geographic Data Files
US Census TIGER data[4]
Sources that helped isolate providers, identity management or provider service areas
NECA Tariff 4
State produced exchange boundaries
Carrier produced wirecenter boundaries (sometimes proprietary to provider)
FCC Coals reports (321/325)
FCC FRN API lookup tool
FCC/FAA Antenna Registration System
FCC FRN Lookup Tool (plain text search)
USAC High Cost FCC Filing Appendices
Sources that helped isolate anchor institutions
USAC Grant lookup tool
USAC High-Cost FCC Filing Appendices
HRSA data warehouse
NCES data lookup
State managed lists of schools (K-12), post-secondary institutions and libraries
List of museums, conventions, and visitors bureaus from www.onlineatlas.us
In state relationships to key stake holders.

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

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

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

[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.
[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

Confidentiality and the Use of Licensed Materials

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

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

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

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

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the state programs overall and engage more citizens in the work at hand. In addition to the various opportunities the public has to provide input via the online service coverage maps and the related ‘Broadband story’ process, our crowd sourcing efforts are grounded in a time tested telephone survey approach focused on the consumer market. In addition, we continue to advance our process to include certain initiatives centered in two social media outlets – Facebook and Twitter. These initiatives are discussed below.

Consumer Surveys

Working under contract for the state of Alabama in 2009, our initial consumer survey was performed before the NTIA SBI grant was in place. Subsequent consumer surveys funded by the SBI grant were hosted in 2010 for the states of Idaho, Wisconsin and Wyoming and then again in 2011 for Alabama (as noted below). These surveys will be repeated after two years to establish and evaluate trends. Survey results from the most recent effort in Alabama are currently under evaluation. These primarily telephone based surveys include two distinct and carefully scripted tracks: one for Internet users and one for non-users. The telephone survey approach allows us to reach the non-Internet user group as well as the current Internet user. A secondary online approach is also used to augment input from current Internet users. In the most recent Alabama survey we added a third tier to our approach as we equipped local field survey teams with an iPad-based survey tool and targeted their time to reaching the younger market. For non-users, the surveys help determine why they don’t have or don’t use Broadband. For current Broadband users, the survey helps determine the nature of their Broadband access and how they use that connectivity in their daily lives. In addition to our state-specific surveys a nation-wide survey was also hosted to provide a broader view of consumer views for comparison purposes. State-specific surveys are, where possible, framed to match the state’s regional Broadband planning structure (e.g., the updated consumer survey in Alabama was designed to produce results relevant to the state’s twelve Broadband planning regions).

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

Our ongoing consumer survey process adheres to a consistent process. For example, consistent with prior practice the 2011 Alabama survey was launched in June 2011 with a test number of survey calls to confirm (and adjust as needed) the structure of the survey and the underlying survey process. Our surveys typically run for three to four months. All telephone surveys are completely random beginning with the acquisition of a list of state-specific, randomly selected landline telephone numbers. Mobile phones are not typically included in the surveys. Upon evaluation of the survey statistics, auxiliary surveys are executed to ensure appropriate representation is achieved on both demographic and geographic fronts. For example and as noted above, the recent Alabama survey was augmented with a field effort to ensure the younger demographic (i.e., age 18 – 25) was adequately represented. This secondary step is required because of the continued migration (by younger markets) to non-landline based communications. This younger market is also surveyed by reaching out through social media outlets (primarily Facebook and Twitter) to encourage their participation in an online survey process.

Survey statistics from the Alabama update survey are currently being developed and evaluated. Survey statistics from our initial surveys in Idaho, Wisconsin and Wyoming were summarized in our last filing. Survey volumes are designed to achieve statistical validity.

As noted above, our telephone survey process is augmented by providing online access to the survey. Participation in the online survey is promoted on all of our state-specific public web sites and selected social media.

As a final relevant point with respect to the consumer survey process the length of the survey is noteworthy. By survey standards, these tend to be long surveys. The surveys typically average just over fifteen minutes. While this clearly contributes to the number of survey call attempts that were required to reach the level of statistical validity, it is not insurmountable.

Social Media

The phenomenon of social media is widely documented and yet still emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Different states have different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. As noted above, we are able to promote additional input on the consumer surveys through a social media outreach program aimed at our younger market segments.

In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners. As we move into program year 3, distinct tasks are migrating to the responsibility of our State partners.

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

Alabama plans to continue the transition process though the end of year 3 assuming more responsibility for the interactive State maps and website. In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs for this round. Other States are looking more towards the end of program year 3 and the in-State hire of a Broadband Coordinator as the initiation point to support their transition efforts. Broadband Coordinators were brought on board in both Idaho and Wyoming over the past six months. An open position is posted for Wisconsin and that position is expected to fill soon. Alabama has had a broadband coordinator in place for over a year.

Trends in Submitted Data

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

We note the following trends:

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

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

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

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio manufacturers specific to very high speed wireless services. Although the service can be deployed within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category.

Data Production Process

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

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

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

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

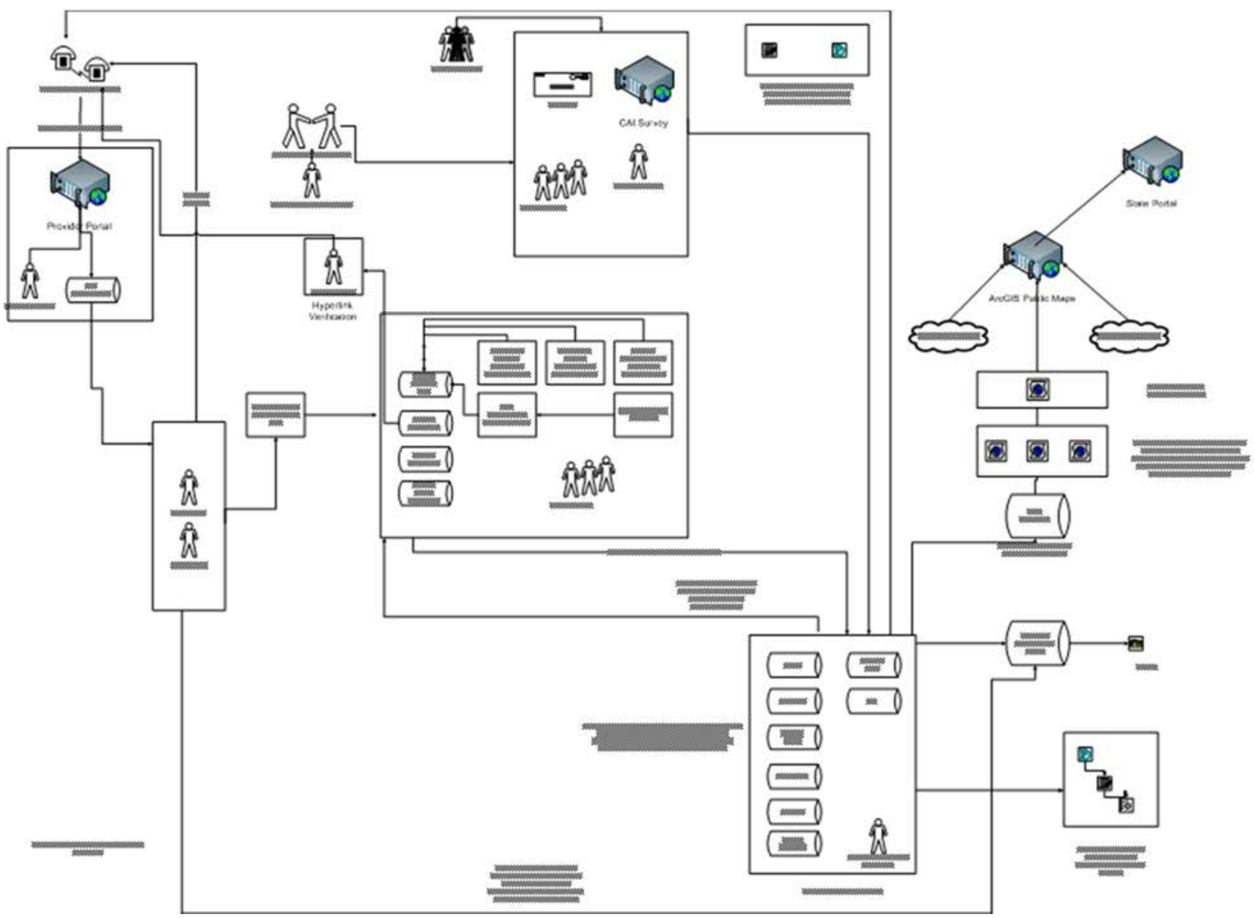

Figure 1—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

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

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

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

Data Production Methods

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

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

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

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

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

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

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

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

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

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Geo-referencing the data; QA the geo-referenced data
- Geoprocessing the geo-referenced response
- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

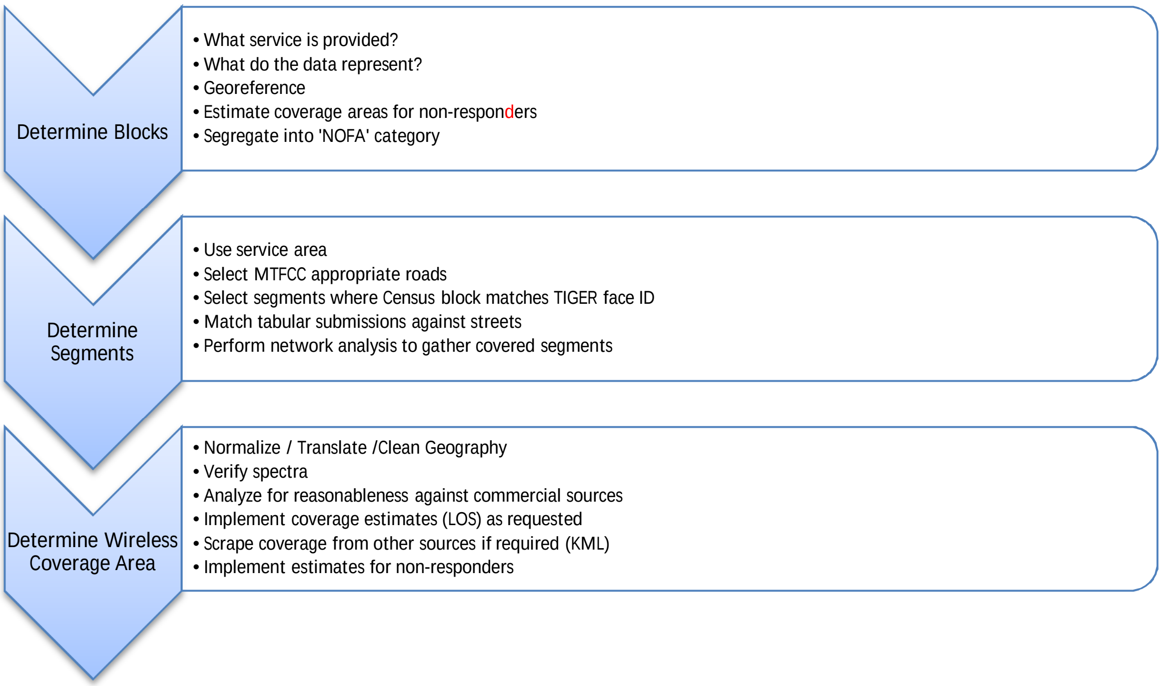


Figure 2-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 5.

Speed Examination

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

Based upon these conversations we learned

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

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

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

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers.

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

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

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

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

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

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

but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

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

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

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

After the Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[11]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

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

In most cases, in Round 5 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[12]

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to "belong" is highlighted. In this

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

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

case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

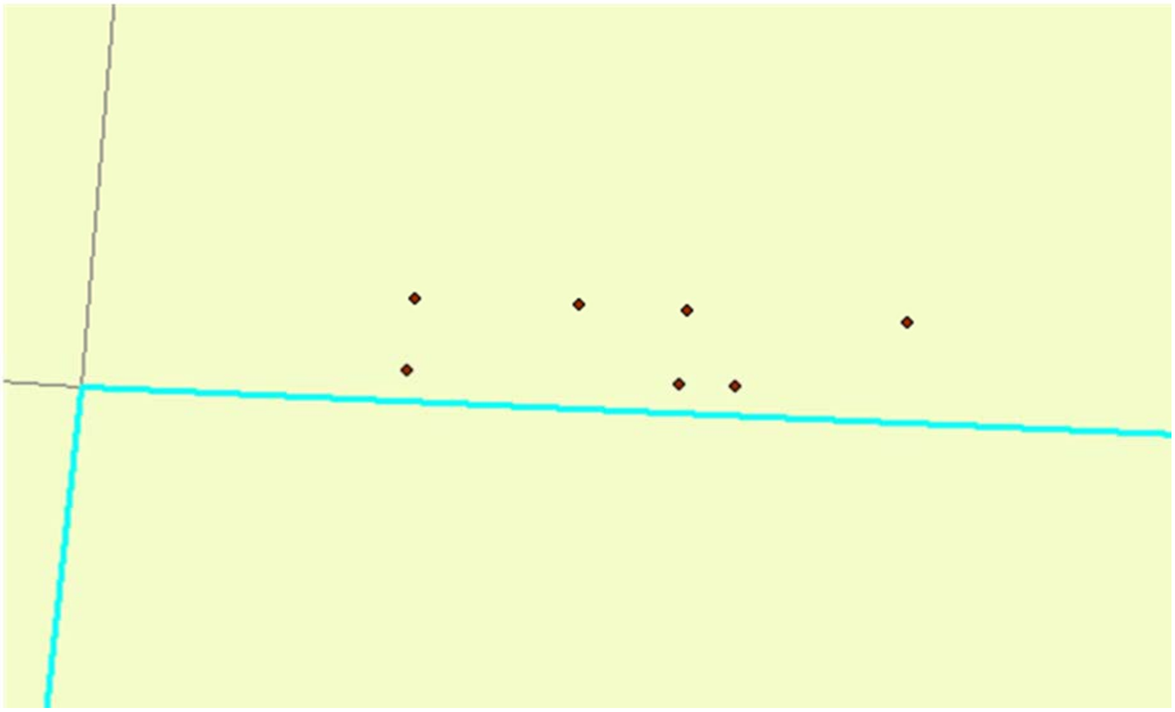


Figure 3-Internal inconsistency in submitted data

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

Figure 4-Block Coverage

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

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

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

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

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

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

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

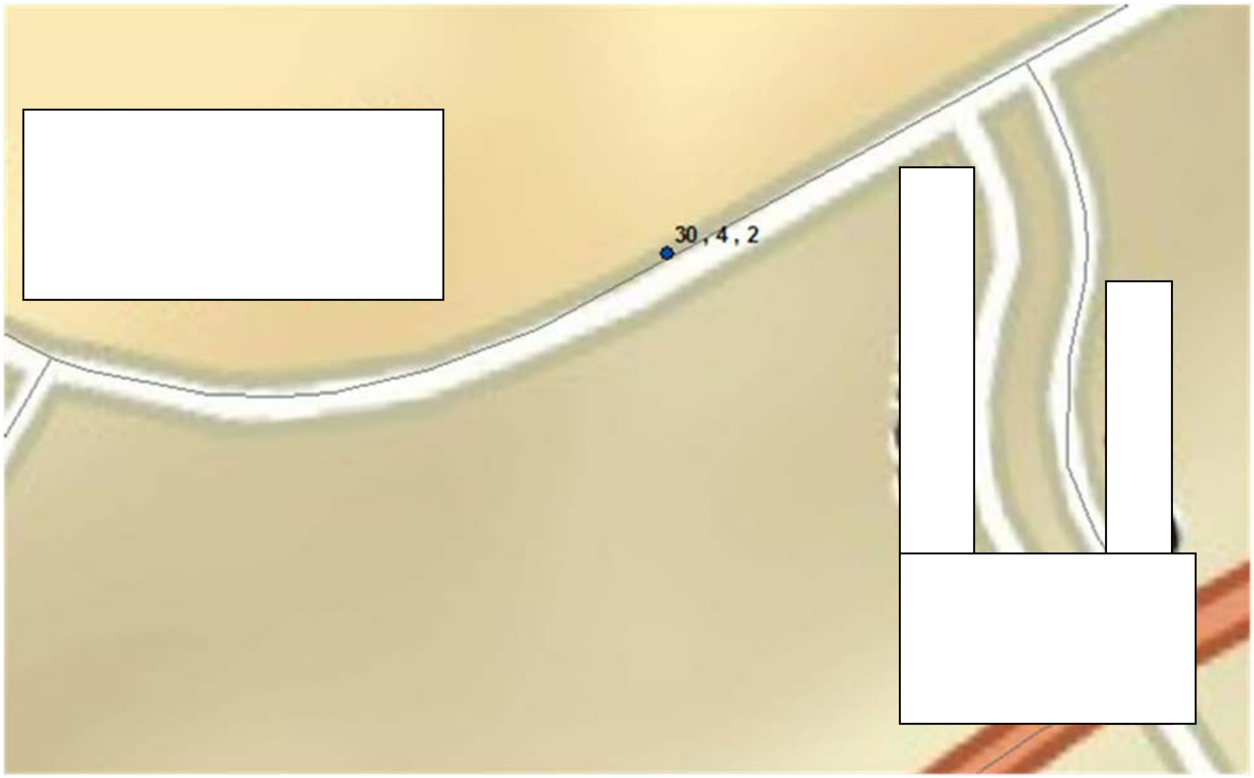


Figure 5-Plant Point level data

Coverage Derivation Using Linear Facilities Data

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

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

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

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a situation comparable to customer point level submission in that we have most of the network footprint captured.

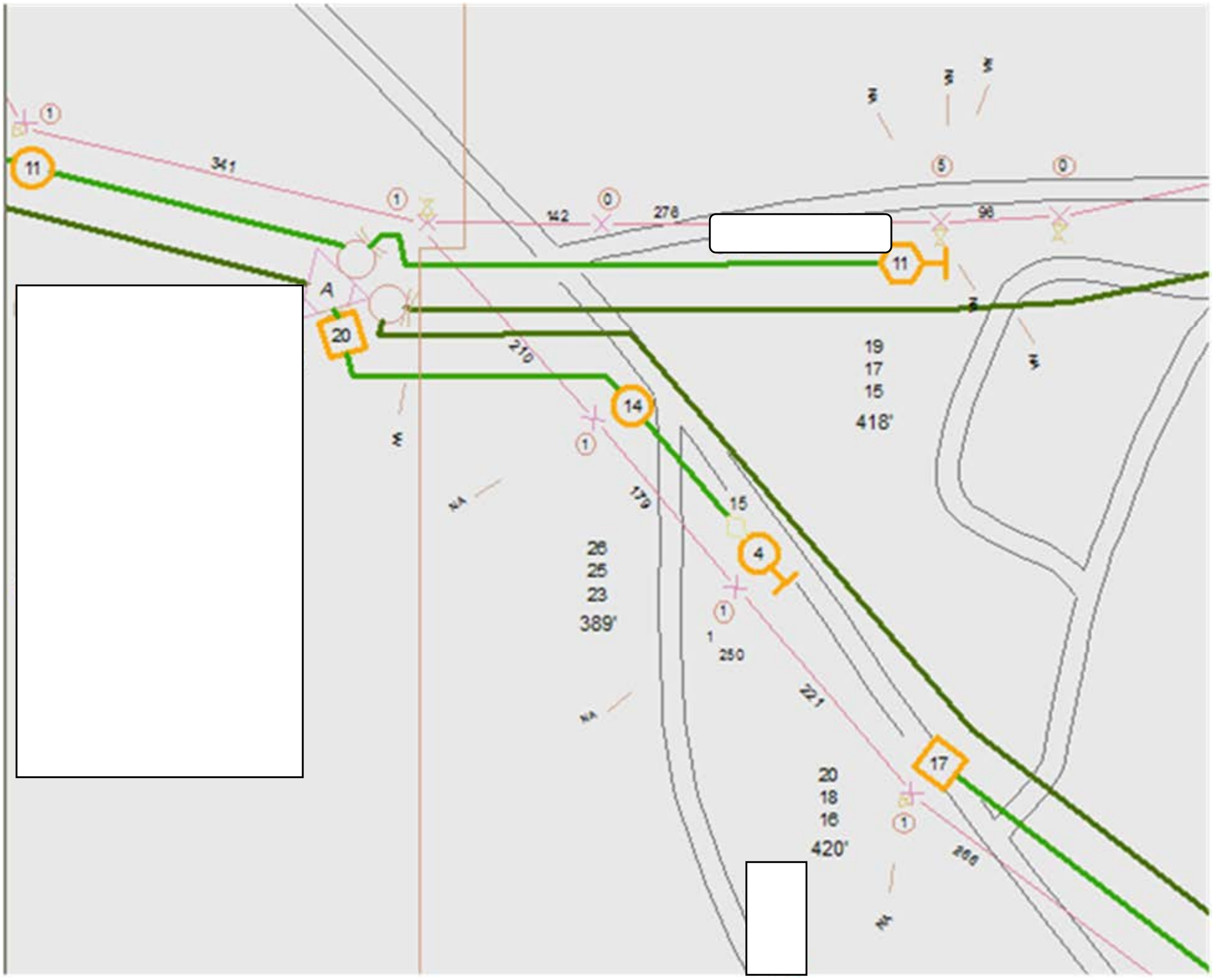


Figure 6-Georeferenced CAD information supplied by Broadband provider

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

Coverage Derivation Using Covered Street Segment Data

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

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

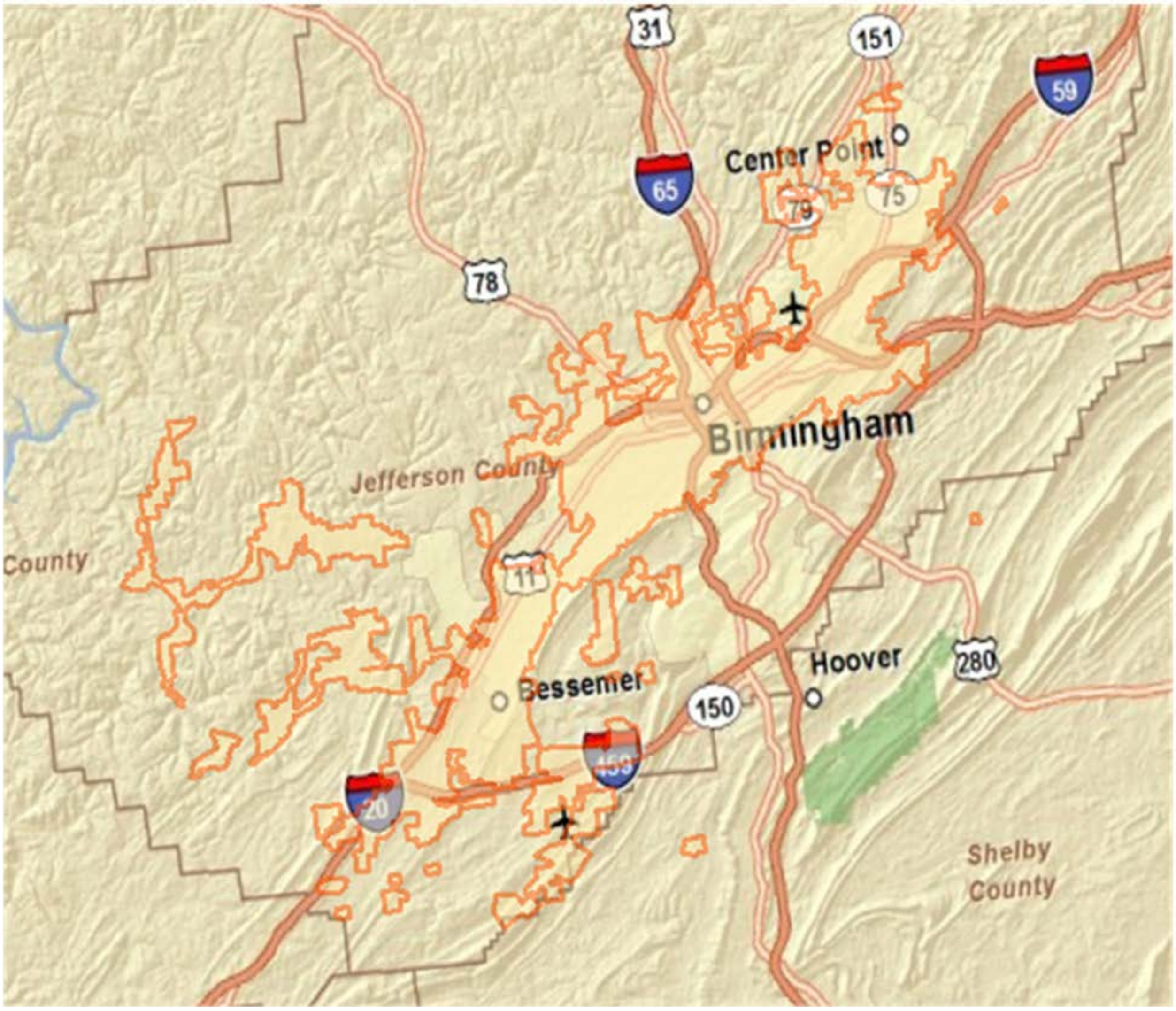


Figure 7-Coverage derived from street segments

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

Coverage Derivation Using Serving Area Point Submission Data

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

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

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

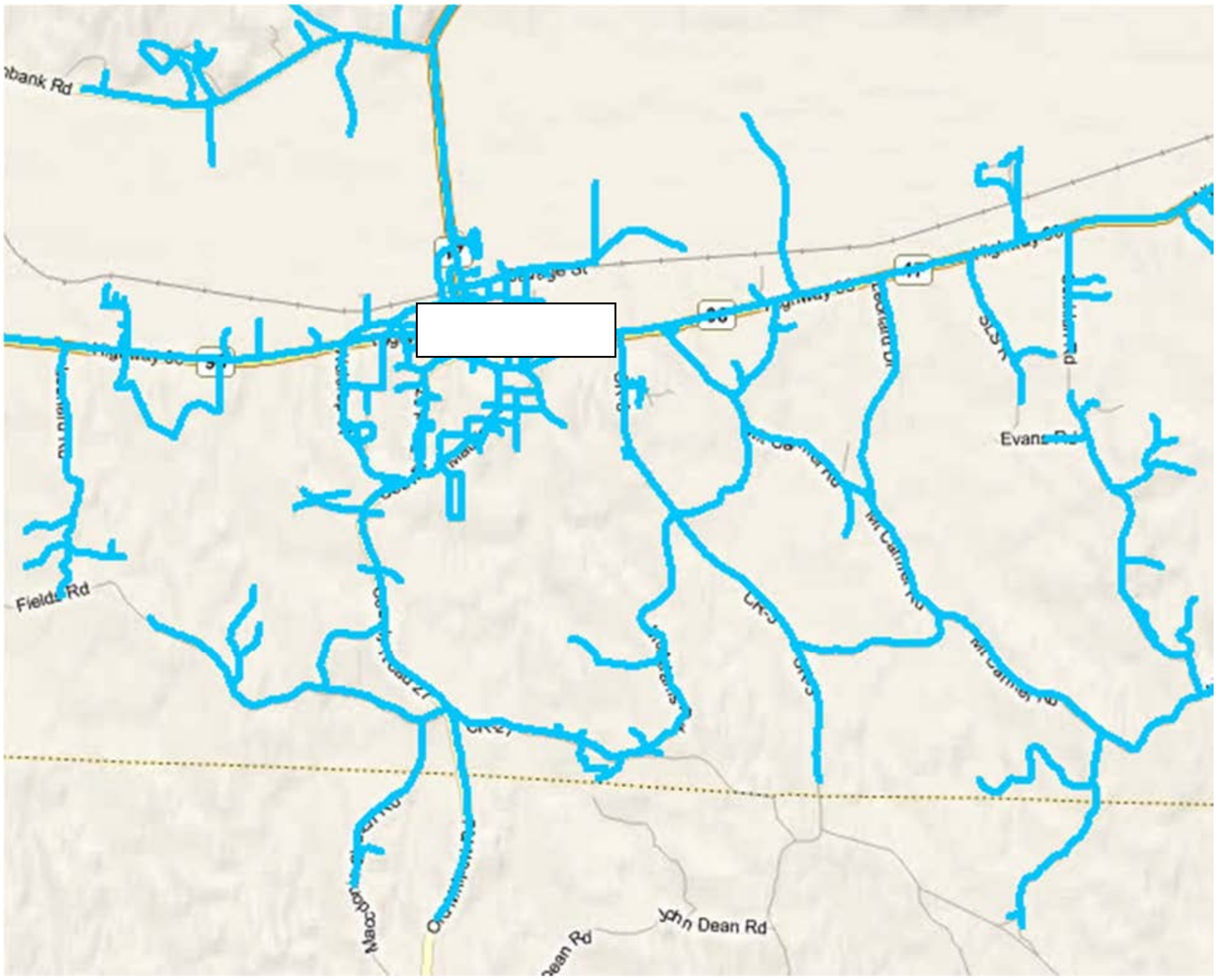


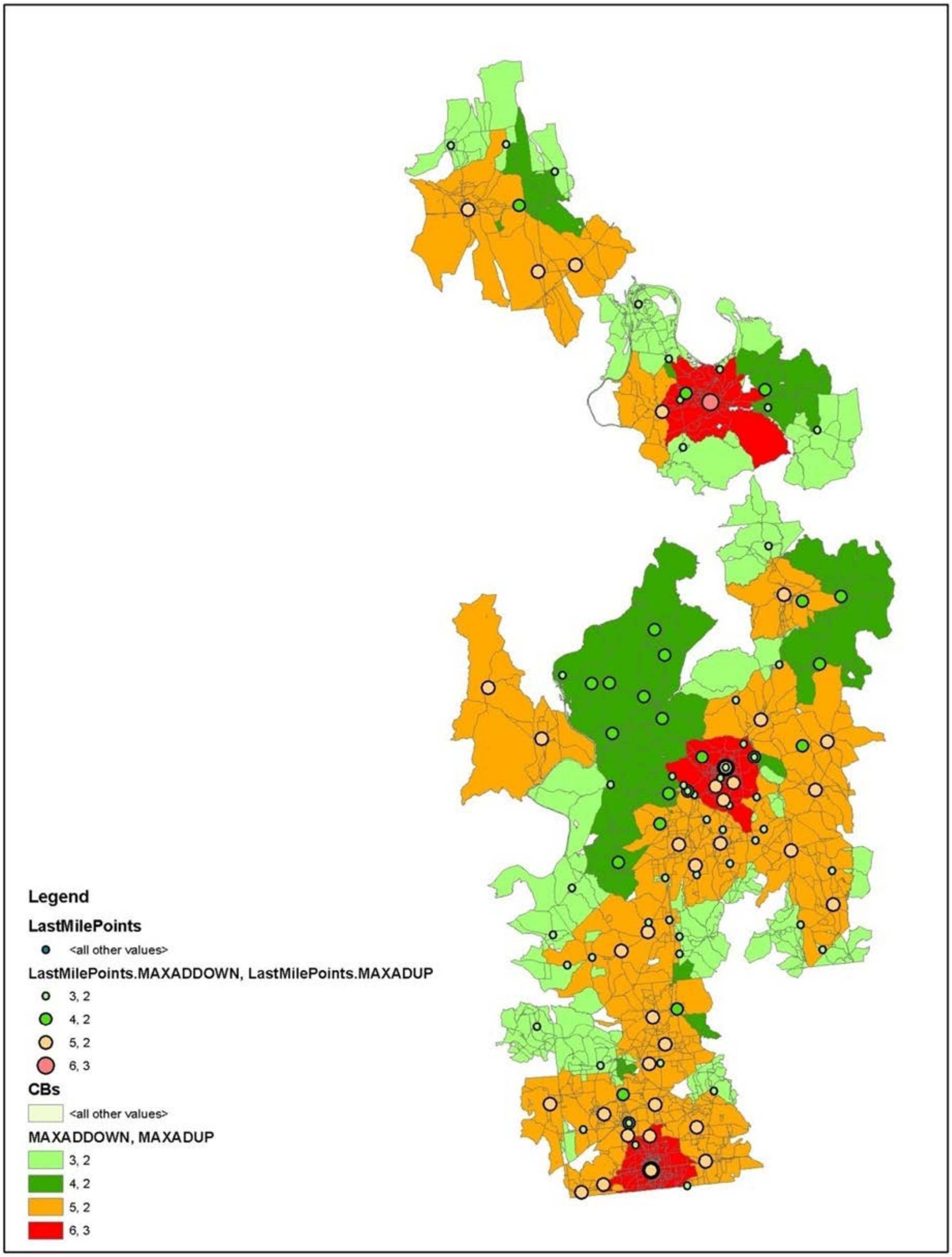
Figure 8-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[13]

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

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

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



Coverage Derivation Using Polygon/Polyline Serving Areas

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

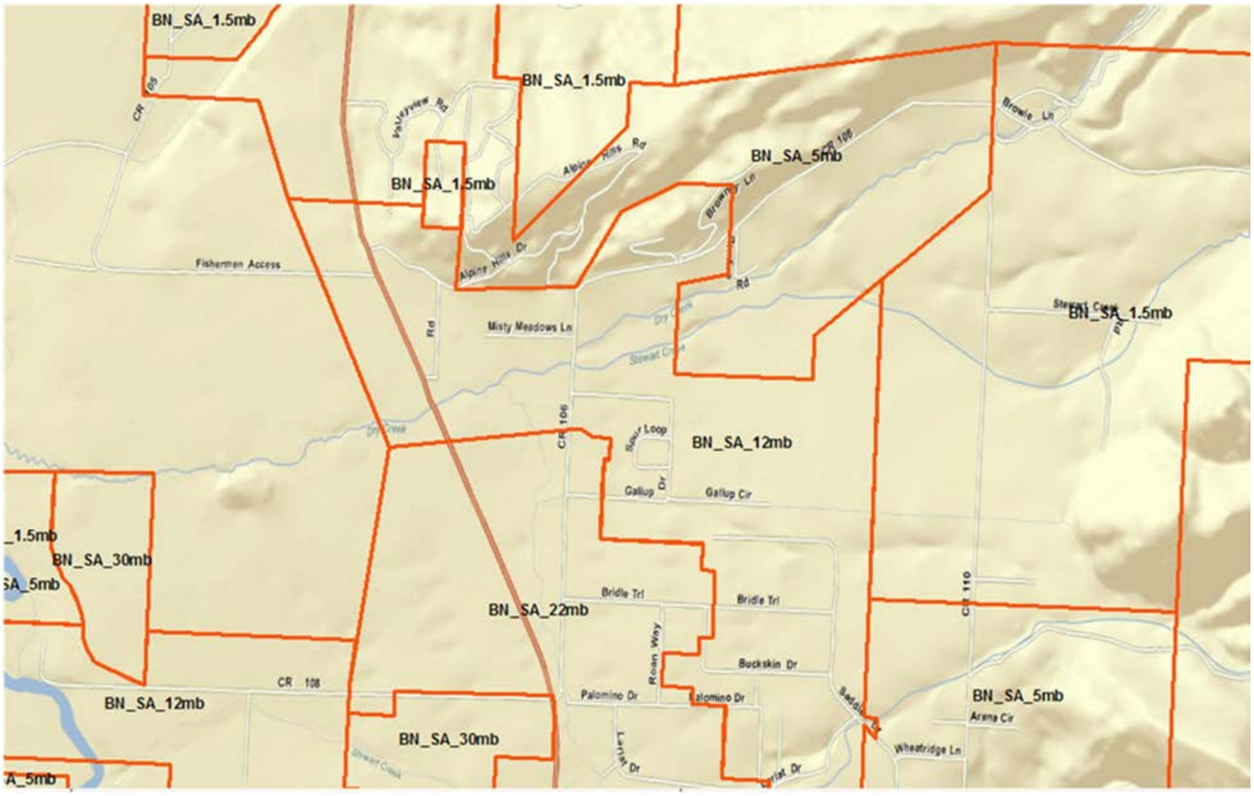


Figure 9-Coverage derived through serving area polygons

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

Street Segment Derivation, Large Blocks

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

With respect to segments we had four sources of data:

Covered large Blocks
Tabular street segments and address ranges for large Blocks
Geographic segments either with street attributes or without
Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format. Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded segment coverage pattern, like the image shown below.[14]

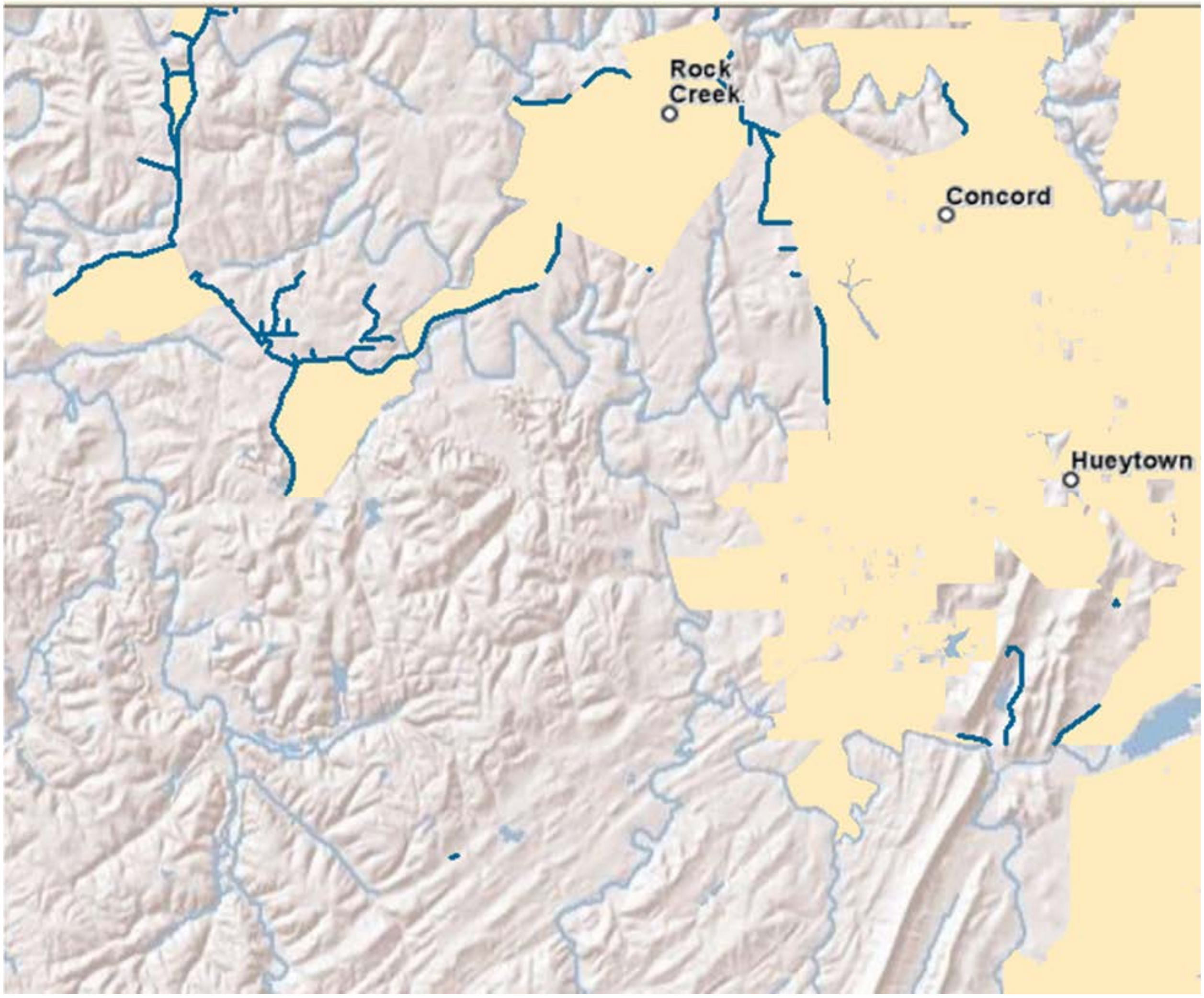


Figure 10-Blue road segments adjacent to peach covered small Blocks

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

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

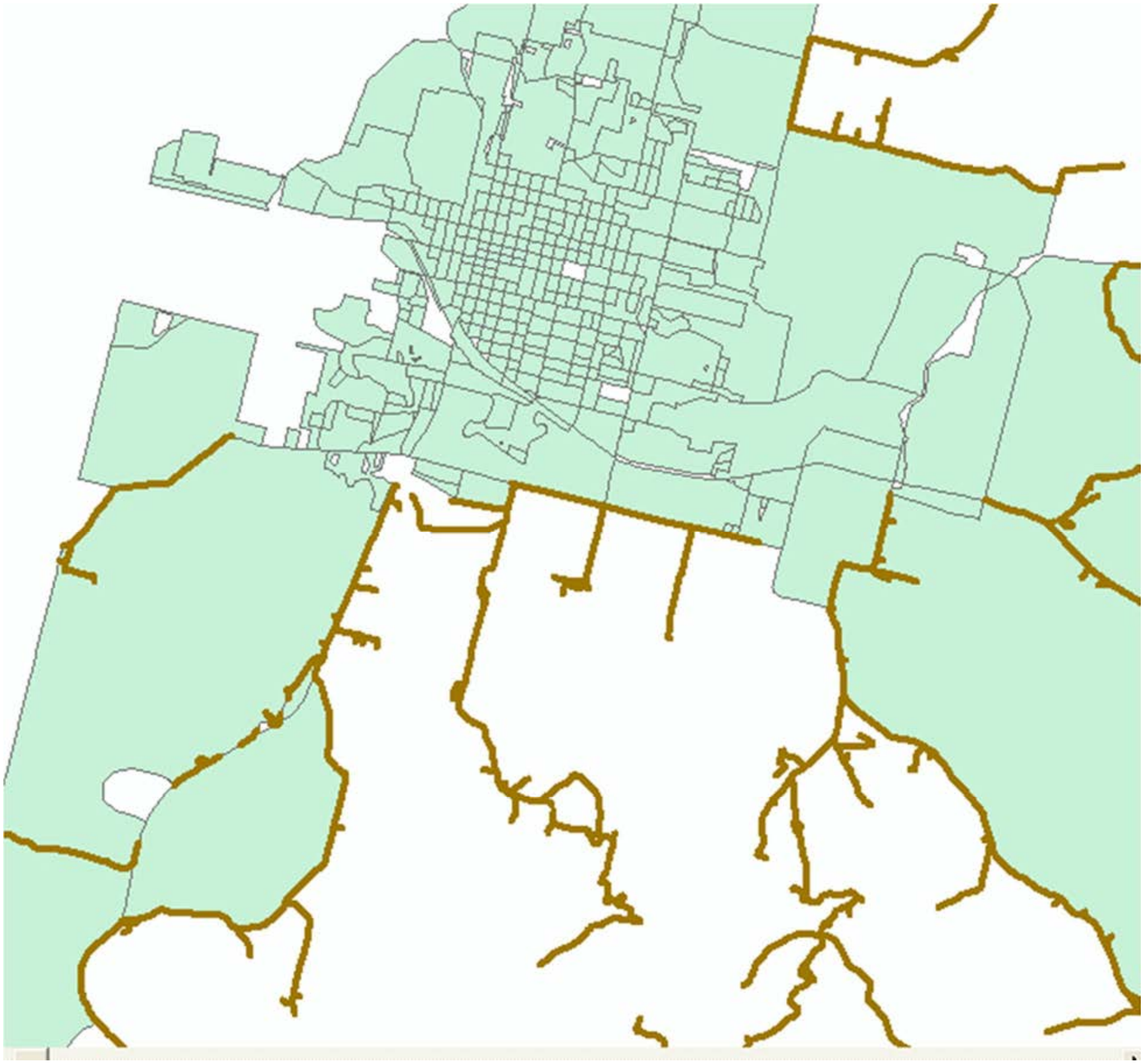


Figure 11-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

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

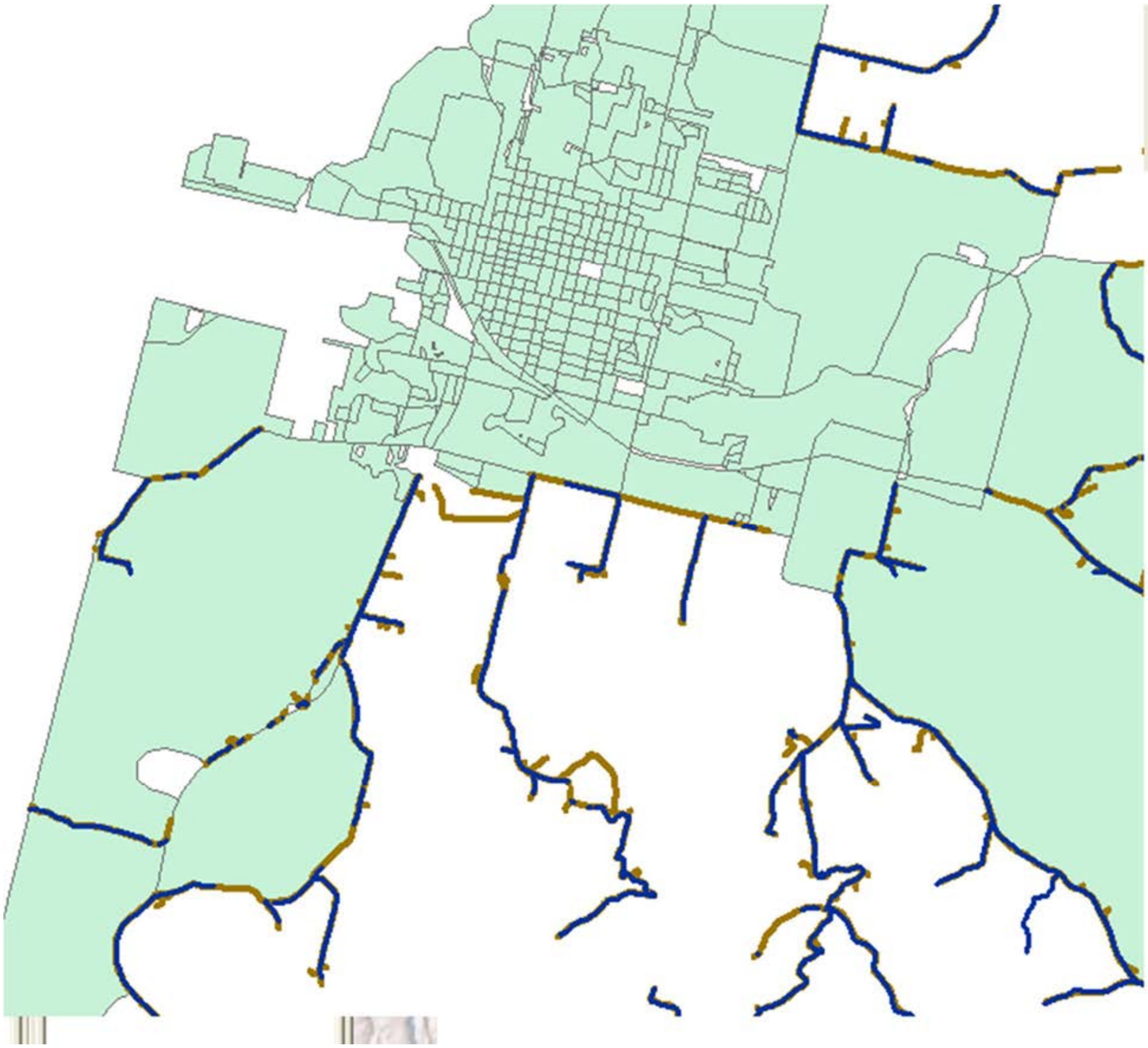


Figure 12-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

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

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

Select large covered Blocks by provider ID (from updated Large Block table)
Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider
Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
Join TIGER roads feature class to temporary table on TLID
Select covered segments (Python script)

Select service area polygons for provider
Clip selected facing segments with selected service area
Export clipped segments to staging feature class, keyed by providerID
In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[15]

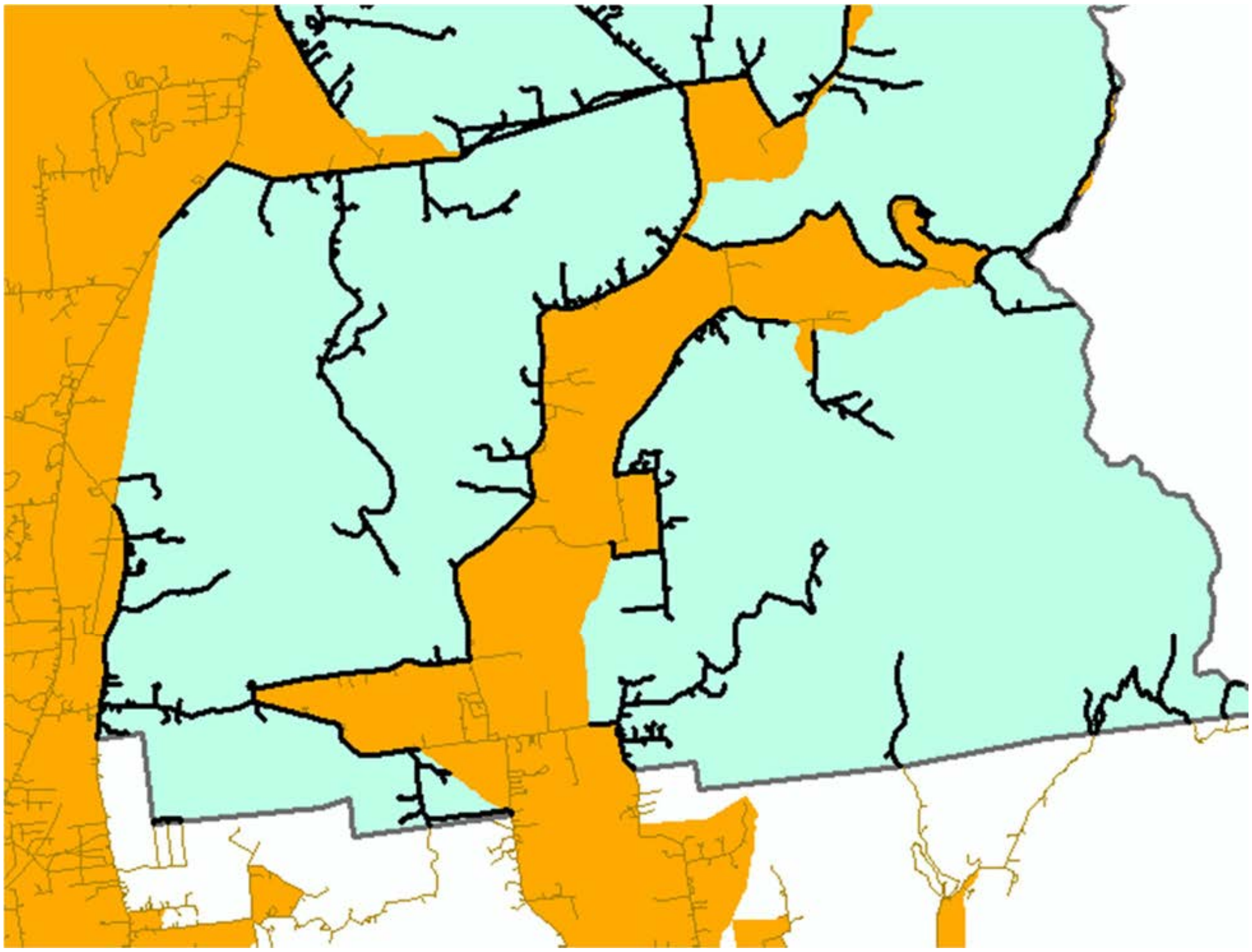


Figure 13-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[16]

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

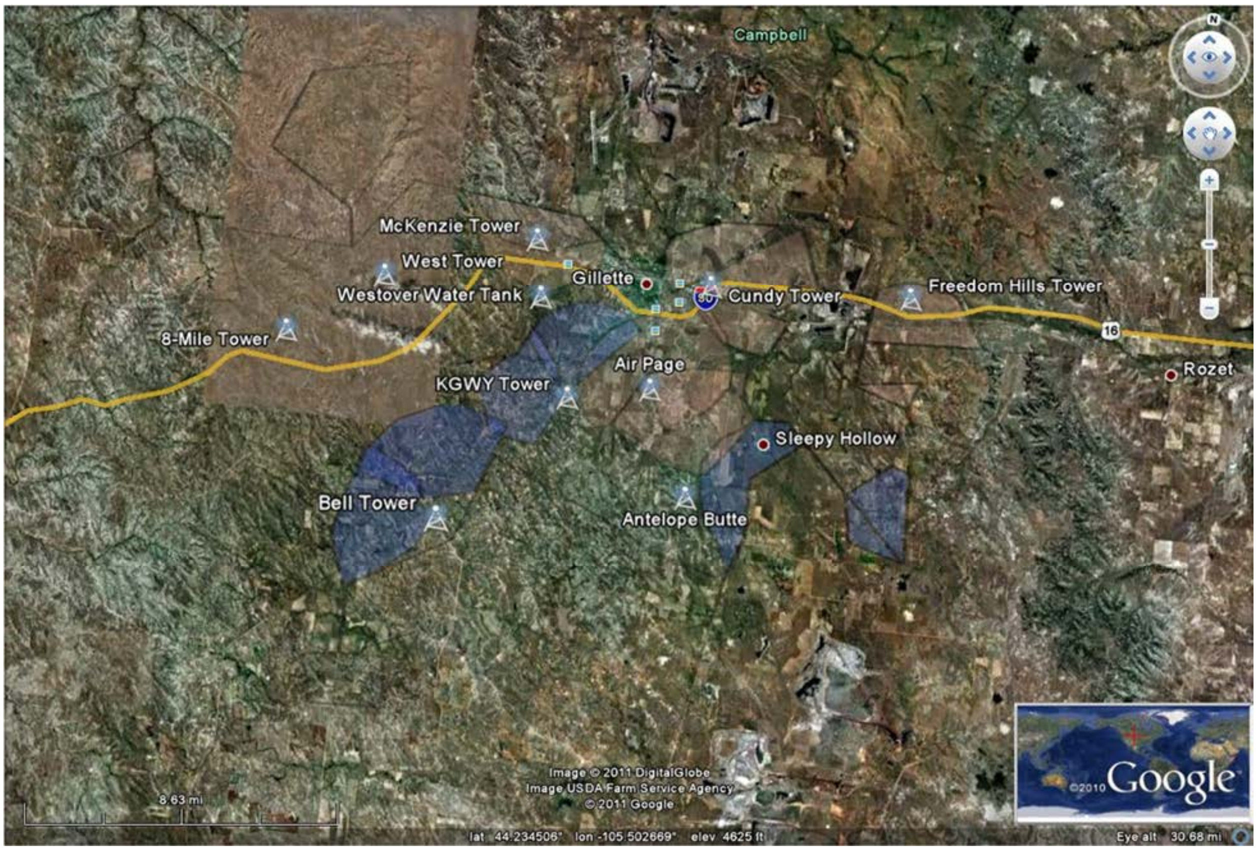
[15] An outcome not discussed here is how to handle address ranges on segments. As NTIA is asking for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are nullable data elements.
[16] Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.

In Round 5 fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored.

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

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



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

If the provider is advertising using this coverage they must have specific confidence in its accuracy.
If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information.

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

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary strength (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location.. Fourth, it was very difficult getting providers to identify spectra used for Broadband data services[17]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area.

Service Address Point Process

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

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

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

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[18] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[19].

We typically resorted to three possible estimation paths.

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

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

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

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[20] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[21]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be provided, we used a view shed analysis and estimated line of sight coverage at 10mi per tower[22]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

Speed

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

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

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

We continue to request advertised speed at the block level. Nevertheless we appear to be getting speeds that do not vary over a large geographic area – leading us to believe that providers may still be submitting the maximum speed advertised in local media for the entire market. For the most part, we have been unsuccessful in messaging that advertised speed should not correspond to a market area, but instead, the maximum speed, which can be provided to a household—what some may describe as a 'qualified speed.'[23]

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

[21] Central Office location was derived from MapInfo ExchangeInfo Professional. Wirecenter boundaries also came from this commercial product.

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

[23] As an example of a response to our request for Block level advertised speeds, we received the following comment from one anonymous provider, "This is and of itself does not require anything new of us – just states the NTIA supports efforts focused on getting that information on the CB level." It would be helpful to have broader messaging so that providers understand this new direction.

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

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

Middle Mile

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

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

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

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

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

A number of providers refused to answer the question on grounds of confidentiality[25]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of "other," we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for

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

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

public / private networks.[26] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is "data" (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL). In Round 5, the check submission script no longer accepts negative elevation values. For a number of providers who submitted negative elevation data (facilities buried underground) we changed the value to zero, per Program Office direction.

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

Mobile Wireless Coverage

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

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

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

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

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

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

Verification

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

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

submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats and expands in more depth on the confidence analysis within the data.

Verification Methods Summary

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

We believe three broad verification themes are important to consider

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

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

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

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

	Data Types			
Verification Method	Census Block, Road segment or, address specific service availability	Mobile wireless service availability	Middle mile infrastructure locations	Community anchor institutions
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review	METHOD USED			METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED

Telephone sampling	METHOD USED			METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

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

	Definition	Methodology	Purpose	Benefit
Provider Verification	Provider verification is the process of assembling a broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	Provider verification involves combining multiple data sources, interviewing providers and classifying the broadband provider type.	Without a consistent understanding of the provider 'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	The main benefit of this verification process is understanding who is providing broadband services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider	Most of this validation is performed using our spatial databases and running queries that compare	The purpose of this type of validation is to understand how things change over time and why.	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a

	data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission consistent with the technical specifications of the service offered.	submissions. We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations which are unusual relative to other data received across all states.	It also helps informs us for circumstances where we have data points which appear to be outside of the norm. If these outliers are detected, they can be pursued directly with the provider.	change.
External data consistency checks	An external data consistency check is a measure of the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	External validation can be performed by verifying supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to tower locations.	We don't believe a single, exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	External validation provides an external measure of data quality assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.

Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider to ensure that translation into NTIA formats is fair and appropriately accurate.	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	One of the more critical steps in broadband mapping is translating carrier supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) is a an important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to improve/validate	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The maps are also	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted data.	The benefit is to provide feedback and also display real time the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.

	the submitted data.	discussed within the context of planning teams within each state. We receive feedback from these meetings.		
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution broadband market.	We have used three methods to verify anchor institution data. The first is a targeted series of telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	As Anchor Institutions represent a different class of coverage information as well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of submission formats and innovative ways to supply	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven process making all the decisions.

		check on data from a second source—can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to understand ambiguous information in submissions.	broadband, it is always helpful to have multiple sets of eyes available to reduce errors from misunderstand ing.	
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information.
Purchased	See external data consistency			Also note that not all external data checks

Datasets	checks.			must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based surveys	Web based surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider information.	In the case where a web survey is a compliment to phone or in person a survey, instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application. We currently use both approaches depending on our goal.	The purpose in all cases is to gather additional information via the Web.	The benefits of web survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.
Field Surveys	A field survey is sending a team of skilled participants into	Field survey methods involve assigning a field team, equipping	Although expensive, field surveys are sometimes	The benefits to field work are significant. They can help us better understand the exact

	the field to verify submitted data or sample some aspect of the environment in a given area.	them with data acquisition hardware, ensuring they have a consistent skill basis and recording observations. To date most of our field survey work has been in engaging CAIs into the process. We have performed limited wireless testing and infrastructure verification.	the best way to verify information such as provider equipment presence or the strength of a wireless broadband signal.	phenomenon in a particular area.

Verification Standard

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

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

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

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

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

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

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

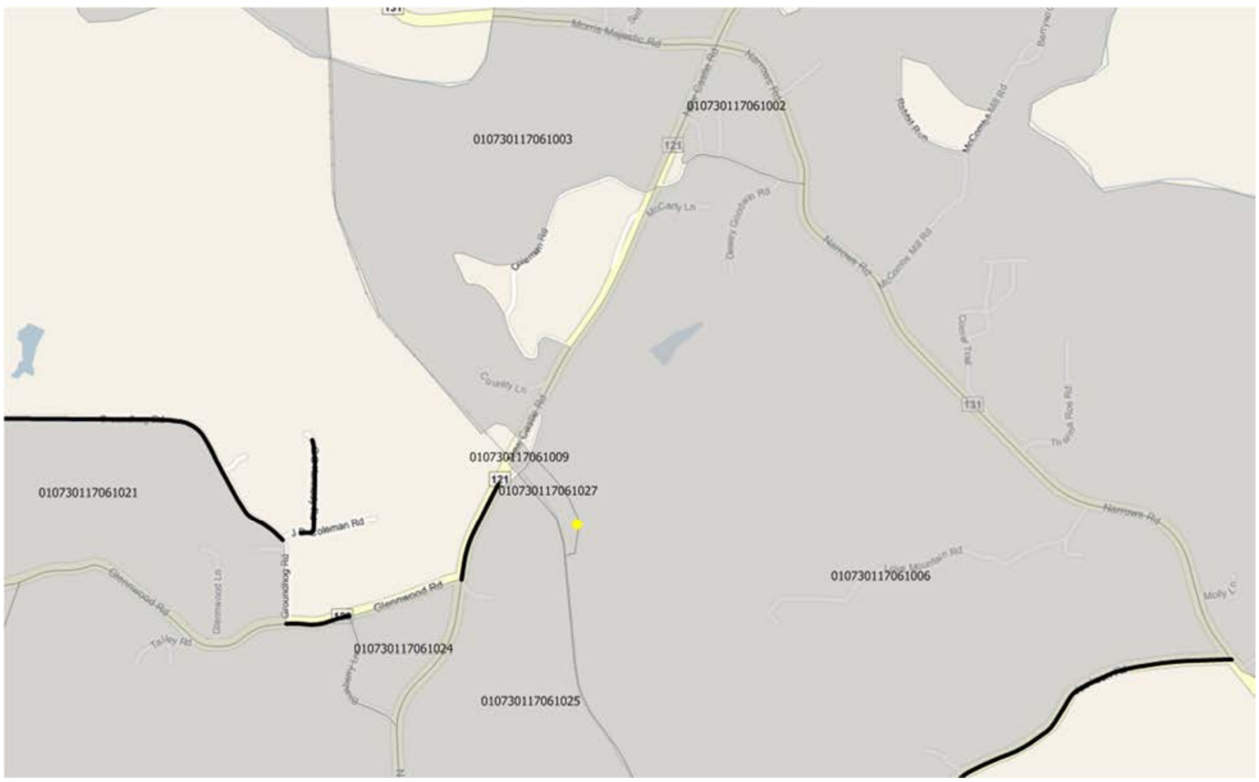


Figure 14--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer’s point of view, the map is inaccurate. This requires us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

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

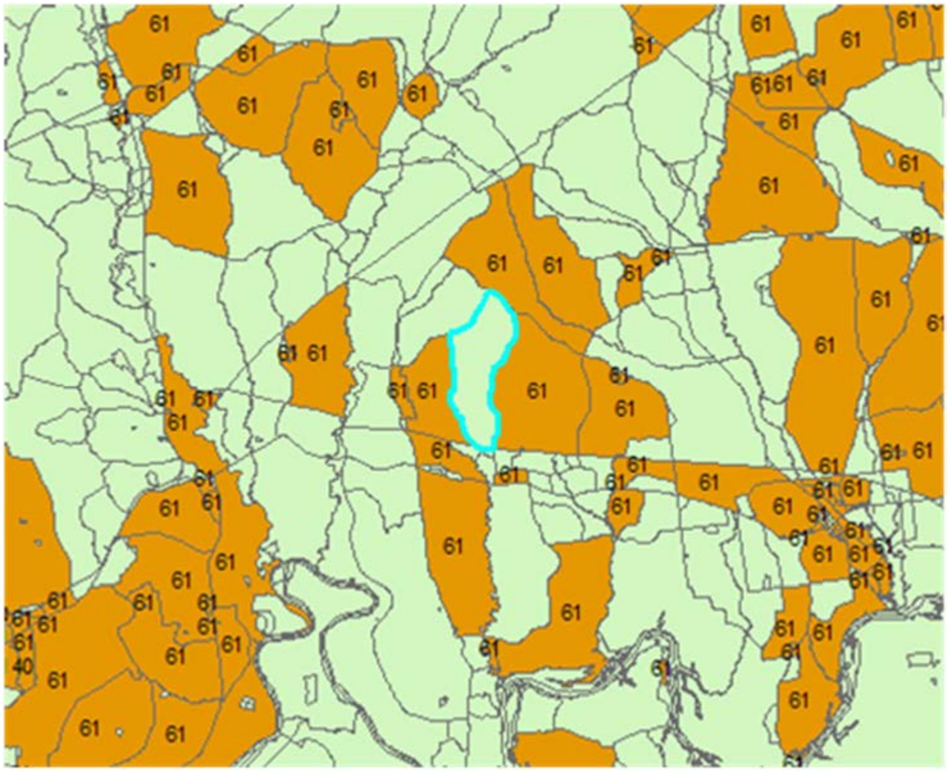


Figure 15--Dispersion in Submitted Data

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

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

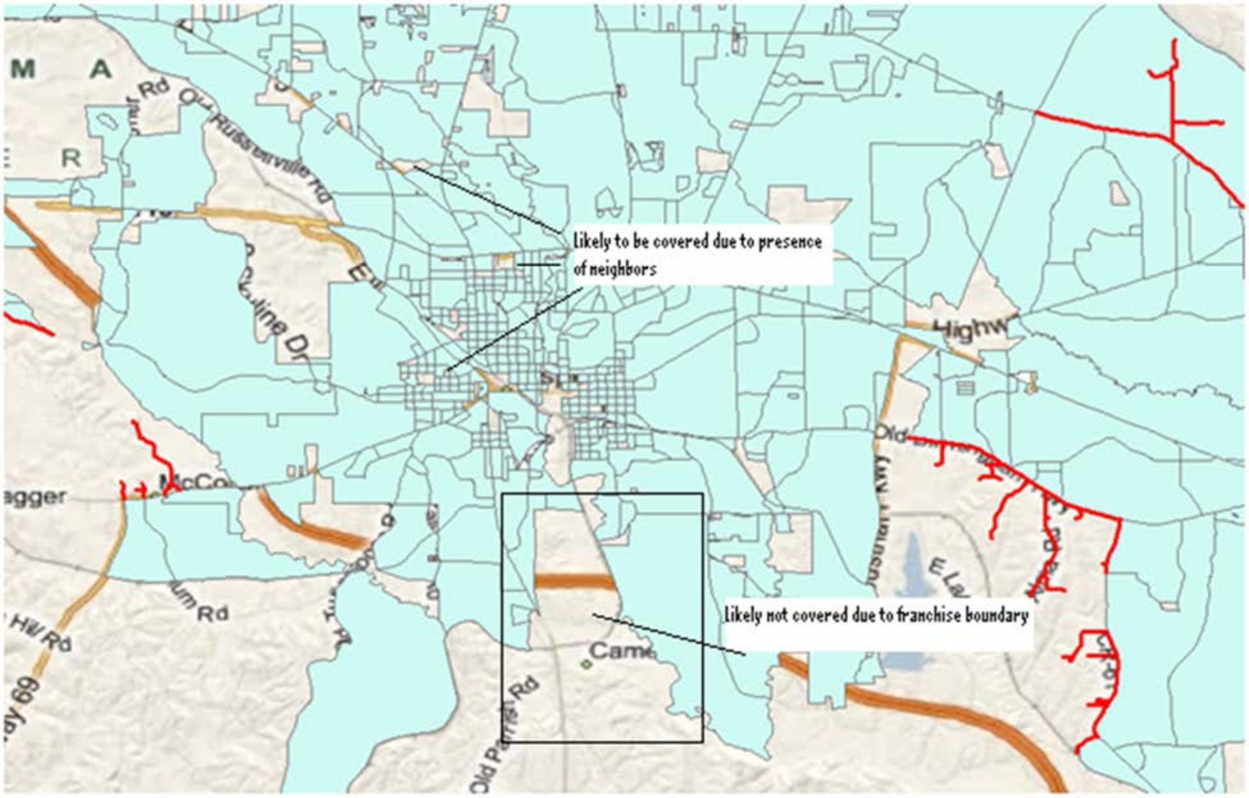


Figure 16-Where do you stop interpolating?

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

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

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

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

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

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

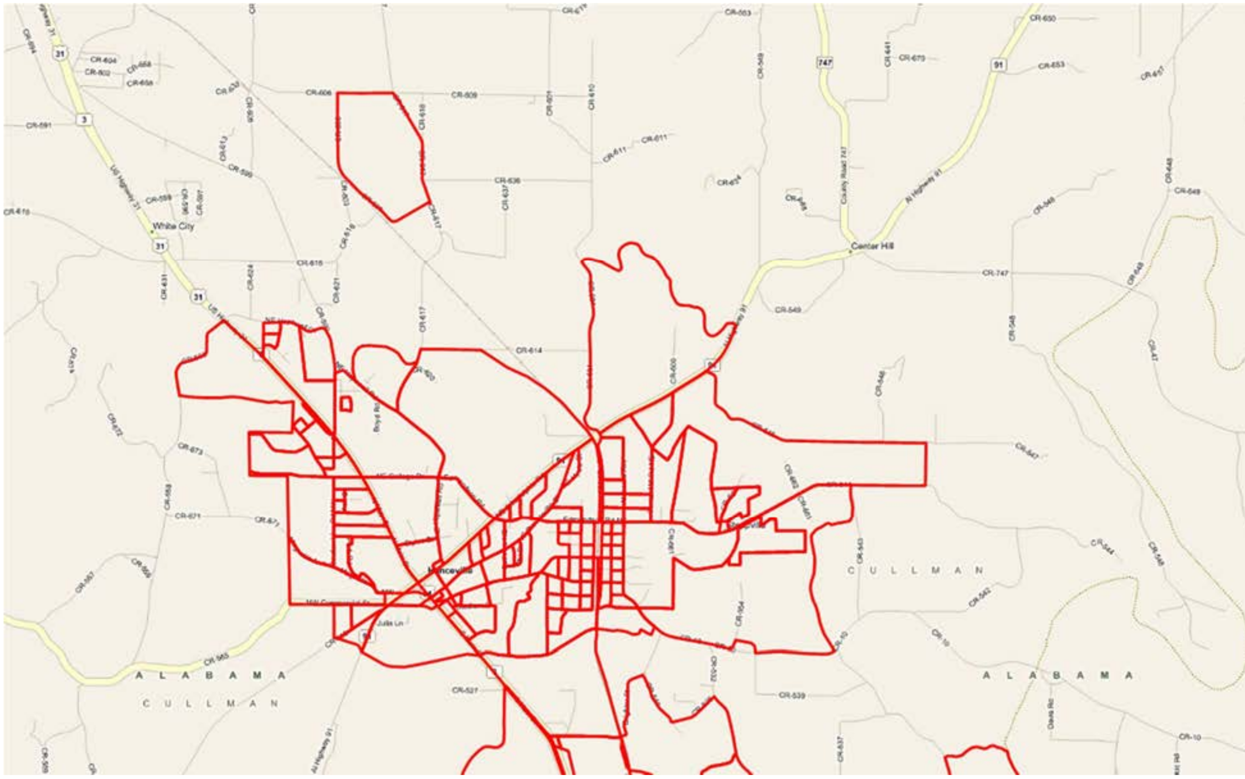


Figure 17-Dispersion in covered Blocks

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

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

Figure 18--DSL Coverage outside of exchange boundary

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

Verification Work Process

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

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

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

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

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

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

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

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

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

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to

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

make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

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

Online Map Experiences

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

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Online Display of Consumer Feedback

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

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

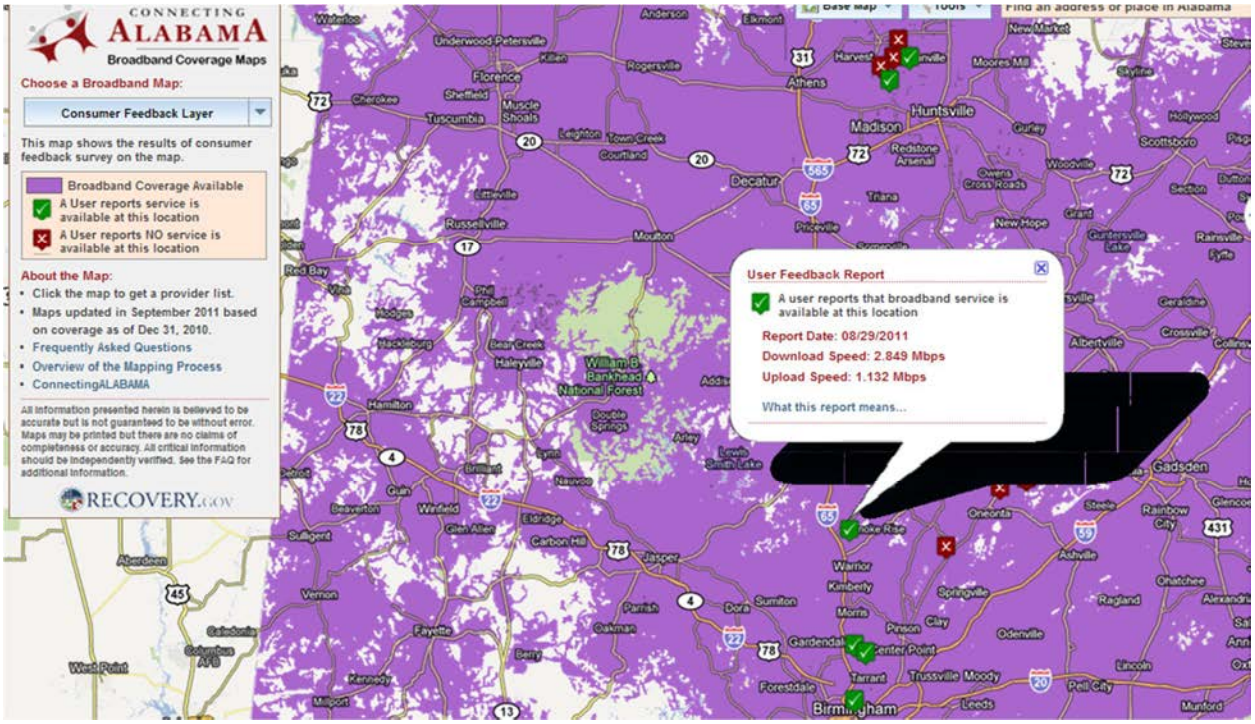
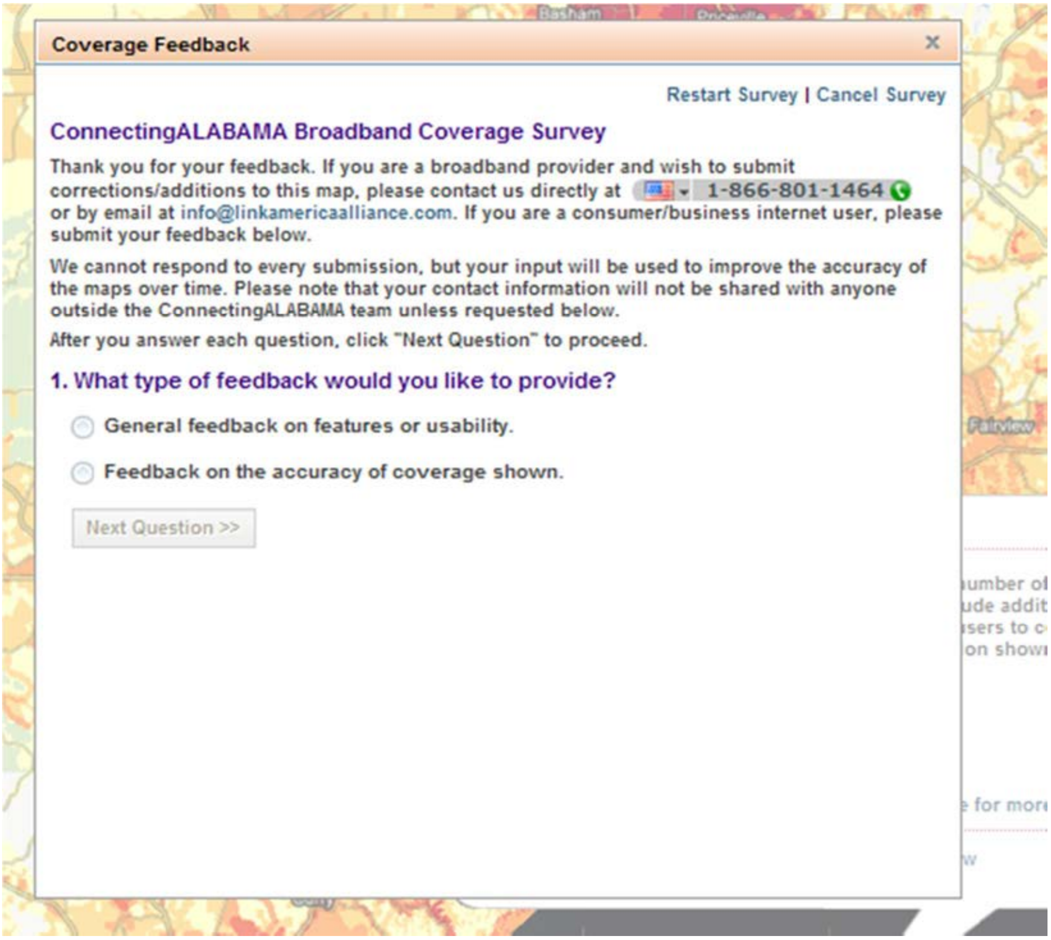


Figure 19--Consumer Feedback Layer

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



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

Perception of Unfair Treatment Across Technologies

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

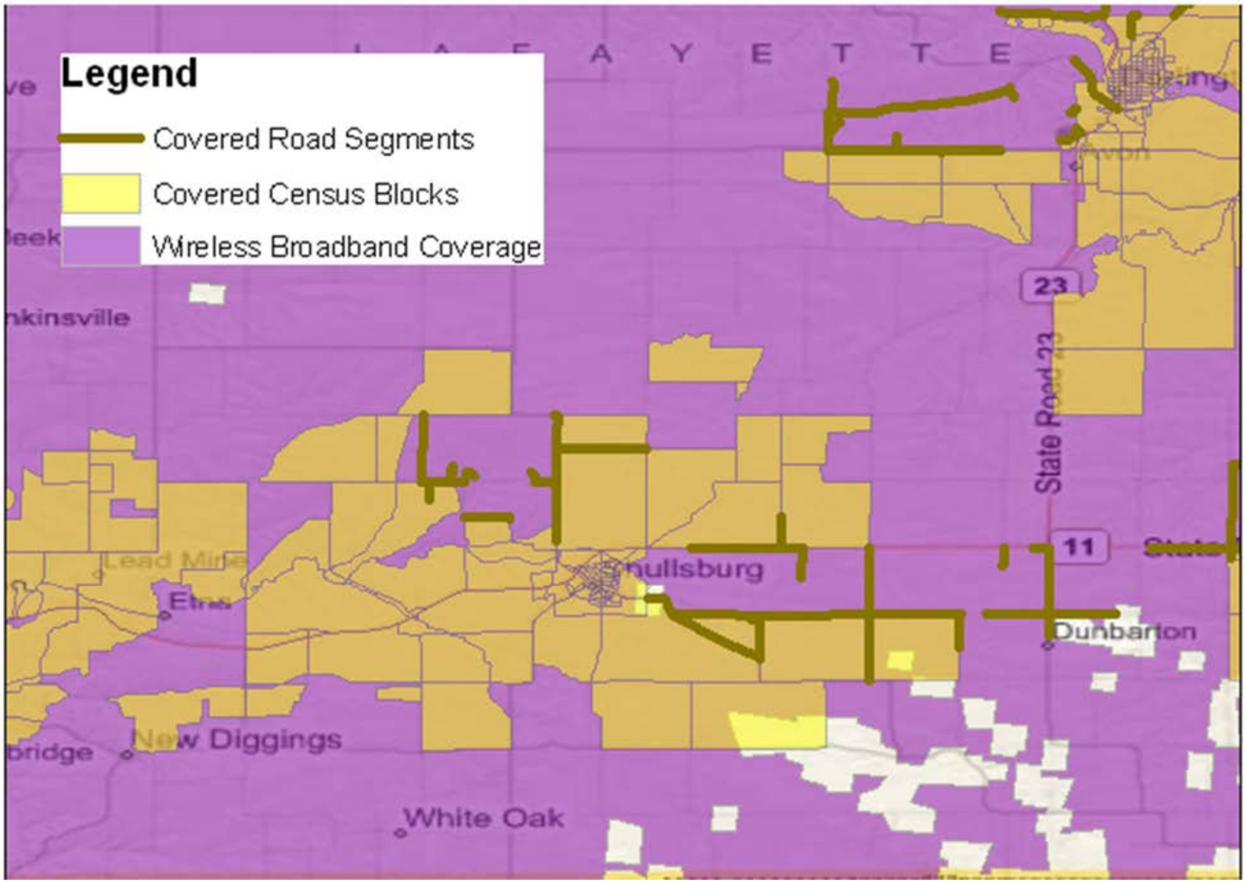


Figure 20--Multi Network Coverage portrayal

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

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory.

Perceptions of Carrier of Last Resort (COLR) Obligations

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

Intentions of Coverage Mapping

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

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

Appendix One

Community Anchor Institutions

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

In the current submission ConnectingALABAMA worked to achieve four goals.
Obtain CAI data sets from the Alabama Emergency Management Agency (EMA).
Obtain Alabama K-12 school data set from the Alabama Board of Education.
Compare these data sets with previous submissions and make necessary changes and additions to previous submissions.
Update the Federal record identifiers (NCES codes, etc) for schools, colleges and libraries.

ConnectingALABAMA was able to obtain GIS feature classes for the following CAI's from Alabama EMA:

Alabama Colleges and Universities
Alabama Fire Stations
Alabama Law Enforcement Agencies
Alabama EMS Providers
Alabama 911
Alabama Government Buildings
Alabama Correctional Institutions
Alabama Hospitals
Alabama Nursing Homes
Alabama Places of Worship
Alabama Public Health Departments
Alabama Red Cross.
Alabama Emergency Operations Centers

Based upon these sources, this submission adds 2,375 additional CAI locations.

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

ConnectingALABAMA's primary focus for this submission was to compare the October 1, 2011, submission with data sets obtained from EMA for Colleges and Universities, Fire Stations, Law Enforcement Agencies, K-12 Schools and libraries.

Data records were compared for each CAI type. Where a location could be improved from a prior submission, the record was suitably updated.

Internally, seven additional attribute fields were added to the CAI feature class to include NCES codes for schools, IPEDS codes for colleges and universities, a DELETE field for duplicate records, a CAV ID field for indexing and FSCS codes for libraries.

Based upon the new locations, FULLFIPSID was populated using the GEOID10 ID from 2010 Census data.

ConnectingALABAMA will utilize the following actions to locate connectivity data:

Alabama Broadband Advisory Board will be asked to participate in the identification of data. The board includes:

Alabama Commission on Higher Education
Alabama Department of Agriculture and Industries
Alabama Department of Children's Affairs
Alabama Department of Conservation and Natural Resources
Alabama Department of Economic and Community Affairs
Alabama Department of Education
Alabama Department of Homeland Security
Alabama Department of Postsecondary Education
Alabama Department of Public Health
Alabama Development Office
Alabama House of Representatives
Alabama House of Representatives
Alabama Rural Development Office
Alabama Senate
Alabama Supercomputer Authority
State of Alabama, Information Services Division

ConnectingALABAMA Regional Coordinators will work within the regional Broadband Action Teams to identify connectivity or appropriate contacts
ConnectingALABAMA Regional Coordinators will work with Alabama Fire College 7 regional leaders to identify Fire Station data.
ConnectingALABAMA will work in cooperation with Alabama SuperComputer Authority and local schools to identify true connectivity. We have identified that while all schools are connected through our Alabama SuperComputer Authority, these schools are also purchasing additional connectivity.
ConnectingALABAMA will work with Alabama Public Library Service to identify connectivity data. In addition the NTIA PCC Grant award to Auburn University to improve Public Computing Centers will deploy 1,180 new computer workstations and replace nearly 915 more at 102 rural libraries and 37 public schools across Alabama. Which we anticipate including improved connectivity.
ConnecitngALABAMA will work with Homeland Security and the Alabama Public Safety Agency to identify the police data.

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

Appendix Two

Data Collection Challenges

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

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

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

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

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

Census Block and Road Standards are not clear

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

Providers Not Wishing for Block Level Aggregation of Their Data

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

Broadband providers not Meeting the NOFA "provider" Definition

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

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[28]. Further, the need for clarification around a facilities-based provider, versus the reseller, has injected even more ambiguity. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are

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[28] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location, versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

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

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

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

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

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

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

In our online maps should we error on overstating coverage to prevent consumer self-disqualification?
In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?
As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results.

Community Anchor Institution Surveys

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

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

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

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

Finally, as we survey groups we find a wider sampling of broadband technologies used. Fixed wireless and mobile wireless definitely exist in the CAI universe. NTIA may want to reconsider the automatic warning that comes from the check submission script from a non-wireline technology.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to December 31, 2011. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

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

Confidentiality

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

Unclear on Definitions

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

Perception of Data Use

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

Location Uncertainty In Source Data

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

Covered Segment Process

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

Record Level Metadata

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

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

1. There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
2. In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
3. We believe some providers are trimming their coverage to honor license area boundaries.
4. Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
5. In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
6. As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
7. We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed over 10 Mbps.
8. We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.
9. We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the lower of the speed tiers.
10. Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.
11. In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.
12. In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to different than what would be returned in geocoding.
13. We made a modification to the NTIA supplied verification script. For the CAI layer we allow the TRANSTECH to be-9999, as per the default value in the fGDB.
14. We made a modification to the NTIA supplied verification script. In the script. The ' theST' variable is not correct for Wyoming.
15. We are aware of several warnings from the output of the validation script. The majority of the warnings are related to speed. In the cases where xDSL speeds are faster than 10 Mbps, we note in our data processing notes discussions with provider. This warning impacts address points, census blocks and road segments. In the case of cable broadband (Techtrans 40, 41) we have warnings associated with speed tier 8. In these cases we have verified the speed availability. Nonetheless, speed category 8 creates a warning for both DOCSIS 3 and non-DOCSIS 3 systems. We have one fail related to address points with multiple speed. Per the webinar on 3/26/12, the address fail is allowable.

Appendix Three

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

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

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

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

Appendix Four

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

Provider Categorization

Provider Type and Status Definitions

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

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant. Satellite providers are currently included in this category due to uncertainty over satellite reporting requirements.
4	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

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

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.
	S	Satellite	Satellite providers .
	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
N/A	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer providesbroadband services.
X			No status codes associated with this Provider Type

Provider Disposition

Provider State	Provider ID	Provider Name	DBA	Provider Type	Provider Status
AL	100036	'TALK AMERICA INC.	CAVALIER TELEPHONE	P	NR
AL	100044	A&E DESIGN/IP-NETWORKS	A&E DESIGN/IP-NETWORKS	X	NP
AL	78	ADVANCED BROADBAND	CYBER BROADBAND	P	P
AL	73	ADVANCED BROADBAND (CAPSHAW)	ADVANCED BROADBAND PKA - BAMAWISP	P	V
AL	68	ADVANCED COMPUTER SOLUTIONS	ADVANCED BROADBAND	P	P
AL	70	AEROWIRE, INC.	AEROWIRE, INC.	P	D
AL	100057	AIRESPRING, INC.	AIRESPRING, INC.	R	R
AL	113	AL SUPERCOMPUTER	AL SUPERCOMPUTER	O	NC
AL	753	AL-GA WIRELESS BROADBAND, LLC	AL-GA WIRELESS BROADBAND, LLC	P	P
AL	33	ALABAMA BROADBAND, LLC	ALABAMA BROADBAND PKA - SOUTHERN CABLE, LLC	P	P
AL	71	ALANU INTERNET SOLUTIONS	ALANU INTERNET SOLUTIONS	N/A	NP
AL	100001	ALAWEB INTERNET SERVICES	ALAWEB INTERNET SERVICES	R	R
AL	200	ALLIANCE COMMUNICATION NETWORK (FNA GALAXY CABLE)	ALLIANCE CABLE	N/A	NP
AL	100051	AMERICAN IP	AMERICAN IP	O	NC
AL	1	ARDMORE TELEPHONE COMPANY	ARDMORE TELEPHONE COMPANY INC	P	P
AL	708	AT&T CORP., INC.	AT&T CORP.	P	V
AL	2	AT&T INC.	AT&T MOBILITY SERVICES, INC.	P	V
AL	709	AT&T INC. / CINGULAR WIRELESS	NEW CINGULAR WIRELESS SERVICES, INC.	P	P
AL	100002	BALDWIN COUNTY INTERNATIONAL/DSSI SERVICES, LLC	BALDWIN COUNTY INTERNATIONAL/DSSI SERVICES,	R	R
AL	61	BELLSOUTH TELECOMMUNICATIONS, INC.	AT&T ALABAMA	P	P
AL	100003	BIRCH COMMUNICATIONS INC	BIRCH COMMUNICATIONS, INC.	R	R
AL	100004	BIRCH COMMUNICATIONS INC	BIRCH TELECOM OF THE SOUTH, INC.	R	R
AL	100005	BLAKELY CABLE TV INC.	BLAKELY CABLE TV INC.	N/A	NP
AL	736	BLOUNT WIRELESS	BLOUNT WIRELESS	P	P
AL	75	BOAGROUP, LLC	BOONLINK	P	P
AL	74	BOONDOCKS WIRELESS	BOONDOCKS WIRELESS	P	NR
AL	35	BRIGHTHOUSE NETWORKS, LLC	BRIGHT HOUSE	P	P
AL	100043	BROADCORE, INC.	BROADCORE, INC.	N/A	NP
AL	100041	BROADSTAR, LLC	BROADSTAR, LLC	O	NC
AL	100007	BROADVIEW NETWORKS HOLDINGS, INC.	BROADVIEW NETWORKS HOLDINGS, INC.	P	D
AL	100008	BULLSEYE TELECOM, INC.	BULLSEYE TELECOM, INC.	R	R
AL	692	BUTLER TELEPHONE COMPANY, INC.	TDS TELECOM	P	P
AL	76	C N G COMPUTERS	C NG COMPUTERS	P	P
AL	36	CABLE ONE	CABLE ONE	P	P
AL	100009	CABLE OPTIONS, INC.	CABLE OPTIONS	N/A	NP
AL	726	CASTLEBERRY COMMUNICATIONS	CASTLEBERRY TELEPHONE COMPANY INC	P	D
AL	5	CENTURYTEL, INC.	CENTURYLINK	P	P
AL	100054	CENTURYTEL, INC.	CENTURYTEL ACQUISITION LLC	P	V
AL	40	CHARTER COMMUNICATIONS	CHARTER COMMUNICATIONS	P	P

AL	43	CHARTER COMMUNICATIONS	CHARTER COMMUNICATIONS	P	V
AL	7	CITIZENS COMMUNICATIONS COMPANY	FRONTIER COMMUNICATIONS OF ALABAMA	P	P
AL	711	CLEARVIEW CABLE	CLEARVIEW CABLE	N/A	NP
AL	756	CLEARVIEW TOWER COMPANY, LLC.	CLEARVIEW TOWER COMPANY, LLC.	N/A	NP
AL	100010	COBRIDGE COMMUNICATION	COBRIDGE COMMUNICATION	X	NR
AL	60	COBRIDGE PNA WINDJAMMER COMMUNICATIONS LLC	WINDJAMMER COMMUNICATIONS LLC	X	NR
AL	100011	COGENT COMMUNICATIONS GROUP	COGENT COMMUNICATIONS GROUP	N/A	NP
AL	100012	COLLINSVILLE TV CABLE	COLLINSVILLE TV CABLE	N/A	NP
AL	41	COMCAST CABLE COMMUNICATIONS, INC.	COMCAST	P	P
AL	42	COOSA CABLE CO., INC.	CABLE VISION SERVICES	P	P
AL	100055	COOSA CABLE CO., INC.	COOSA CABLE CO., INC.	P	V
AL	77	CTSWIRELESS.NET	CTSWIRELESS.NET	P	NR
AL	69	CYBERBROADBAND	CYBERBROADBAND	P	P
AL	44	DEMOPOLIS CATV	DEMOPOLIS CATV	P	P
AL	639	DIECA COMMUNICATIONS INC	COVAD COMMUNICATIONS COMPANY	O	P
AL	79	DIXIE LAND INTERNET SERVICES	DIXIE LAND INTERNET SERVICES	P	NR
AL	100053	DSL BY AIR	DSL BY AIR	P	NR
AL	643	DSLNET COMMUNICATIONS, LLC	DSL.NET,INC.	O	P
AL	45	EDGE'S CABLE CO., LLC	EDGE'S CABLE CO., LLC	N/A	NP
AL	100013	ENVISION MEDIA INC.	ENVISION MEDIA INC.	N/A	NP
AL	757	FARMERS TELECOMMUNICATIONS CORPORATION	FTC CORPORATION	P	P
AL	6	FARMERS TELEPHONE COOPERATIVE, INC.	FARMERS TELEPHONE COOPERATIVE	P	P
AL	100014	FLORIDA CONSOLIDATED	FLORIDA MULTI-MEDIA SERVICES, INC	R	R
AL	734	FRONTIER COMMUNICATIONS OF LAMAR COUNTY, LLC	FRONTIER COMMUNICATIONS OF LAMAR COUNTY, LLC	P	P
AL	733	FRONTIER COMMUNICATIONS OF THE SOUTH, LLC	FRONTIER COMMUNICATIONS OF THE SOUTH, LLC	P	P
AL	717	GALAXY CABLE INC.	GALAXY CABLE INC.	N/A	NP
AL	100015	GLOBAL CROSSING NORTH AMERICA, INC.	GLOBAL CROSSING TELECOMMUNICATIONS, INC.	R	R
AL	100016	GORDON CABLE TV	GORDON CABLE TV	N/A	NP
AL	80	GOSUTO	GOSUTO	P	E
AL	8	GTC, INC.	FAIRPOINT COMMUNICATIONS	P	P
AL	9	GULF TELE	GULF TEL	P	V
AL	100017	GUNBY COMMUNICATIONS	GUNBY COMMUNICATIONS	N/A	NP
AL	10	HARBOR COMMUNICATIONS	HARBOR COMMUNICATIONS, LLC	P	NR
AL	718	HARRON COMMUNICATIONS LP	METROCAST COMMUNICATIONS OF MISSISSIPPI, LLC	P	P
AL	725	HAYNEVILLE FIBER TRANSPORT	CAMELLIA COMMUNICATIONS	P	P
AL	11	HAYNEVILLE HOLDING COMPANY, INC.	HAYNEVILLE TELEPHONE COMPANY, INC.	P	P
AL	100018	HICKORY TECH CORPORATION	ENVENTIS TELECOM INC.	N/A	NP
AL	12	HIWAAY INTERNET SERVICES	HIWAAY INTERNET SERVICES	N/A	NP

AL	82	HORIZONWISP.NET	HORIZONWISP.NET	P	NR
AL	100050	HUGHES COMMUNICATIONS, INC. / HNS	HNS LICENSE SUB, LLC	O	S
AL	100058	INTERGLOBE COMMUNICATIONS	INTERGLOBE COMM	P	NR
AL	112	INTERNATIONAL BROADBAND ELECTRIC COMMUNICATIONS, INC.	CYBRTYME	N/A	NP
AL	85	INTERNET TECHNOLOGY CONSULTANTS	INTERNET TECHNOLOGY CONSULTANTS	X	NP
AL	31	ITC^DELTACOM, INC.	BUSINESS TELECOM	O	NC
AL	86	JMF SOLUTIONS, INC	JMF SOLUTIONS, INC	P	NR
AL	100064	KNETWORX, LLC	SMITH LAKE BROADBAND	P	NR
AL	46	KNOLOGY OF ALABAMA (AUBURN)	KNOLOGY, INC.	P	V
AL	699	KNOLOGY OF HUNTSVILLE	KNOLOGY	P	P
AL	700	KNOLOGY OF MONTGOMERY	KNOLOGY	P	P
AL	701	KNOLOGY OF THE VALLEY (PREV INTERSTATE TELEPHONE COMPANY)	KNOLOGY	P	P
AL	703	KNOLOGY OF THE WIREGRASS	KNOLOGY	P	P
AL	15	KNOLOGY TOTAL COMMUNICATIONS, INC (PREVIOUSLY GRACEBA)	KNOLOGY, INC.	P	P
AL	760	LEAP WIRELESS INTERNATIONAL, INC.	CRICKET COMMUNICATIONS	P	P
AL	47	LEE CO ALABAMA (SAME CO. AS AL_CO) - R. M. GREENE INC.	CABLE TV OF EAST ALABAMA	P	V
AL	658	LEVEL 3 COMMUNICATIONS, LLC - AL	BROADWING COMMUNICATIONS	P	P
AL	100048	LEVEL 3 COMMUNICATIONS, LLC - AL	WILTEL COMMUNICATIONS	P	V
AL	100056	LEVEL 3 COMMUNICATIONS, LLC - AL	LEVEL 3 COMMUNICATIONS	P	V
AL	100046	LIGHTEDGE SOLUTIONS, INC.	LIGHTEDGE SOLUTIONS, INC.	N/A	NP
AL	100019	MAYFIELD COMMUNICATIONS LLC	RANBURNE CABLE	N/A	NP
AL	100020	MEDIA3	MEDIA3	P	NR
AL	48	MEDIACOM SOUTHEAST, LLC	MEDIACOM	P	P
AL	644	MEGAPATH, INC.	MEGAPATH	O	P
AL	100021	METROPOLITAN TELECOMMUNICATIONS HOLDING COMPANY	METROPOLITAN TELECOMMUNICATIONS HOLDING COMPANY	R	R
AL	16	MILLRY CORPORATION	MILLRY TELEPHONE COMPANY	P	P
AL	100022	MOBILE INTERNET SERVICES	MOBILE INTERNET SERVICES	P	NR
AL	17	MON-CRE TELEPHONE COOPERATIVE, INC.	MON-CRE TELEPHONE COOPERATIVE	P	P
AL	18	MOUNDVILLE COMMUNICATIONS, INC.	MOUNDVILLE TELEPHONE COMPANY	P	P
AL	772	MULTI-PATH NETWORKS INC	MULTI-PATH NETWORKS INC	P	P
AL	89	NETWORK SOLUTIONS	NETWORK SOLUTIONS	P	NR
AL	673	NEW EDGE NETWORK, INC	NEW EDGE NETWORK, INC.	O	NC
AL	20	NEW HOPE TELEPHONE COOPERATIVE	NEW HOPE TELEPHONE COOPERATIVE	P	P
AL	50	NORTHLAND COMMUNICATIONS CORP.	NORTHLAND CABLE PROPERTIES EIGHT LIMITED PARTNERSHIP	P	P
AL	90	NOVO COMMUNICATIONS	NOVO COMMUNICATIONS	N/A	NP
AL	689	NUVOX, INC.	NUVOX, INC.	O	NC
AL	693	OAKMAN TELEPHONE COMPANY.,	TDS TELECOM	P	P

		INC.			
AL	91	OMNI BROADBAND	OMNI BROADBAND	N/A	NP
AL	100023	OPEN RANGE	OPEN RANGE	X	
AL	51	OPP CABLEVISION	OPP CABLEVISION	P	P
AL	4	OTELCO INC.- AL	BRINDLEE MOUNTAIN TELEPHONE COMPANY	P	V
AL	21	OTELCO INC.- AL	OTELCO TELEPHONE	P	P
AL	52	OTELCO INC.- AL	HOPPER TELEPHONE COMPANY	P	P
AL	706	OTELCO INC.- AL	BLOUNTSVILLE TELEPHONE COMPANY	P	P
AL	707	OTELCO INC.- AL	BLOUNTSVILLE TELEPHONE COMPANY	X	
AL	100024	PCAIRLINK WIRELESS	PCAIRLINK WIRELESS	P	NR
AL	694	PEOPLES TELEPHONE COMPANY, INC.	TDS TELECOM	P	P
AL	724	PINE BELT CELLULAR, INC.	PINE BELT WIRELESS	P	P
AL	22	PINE BELT COMMUNICATIONS CO. INC.	PINE BELT TELEPHONE CO INC	P	P
AL	88	PROFESSIONAL2-WAYRADIO.COM/NETSPEEDNOW.COM	NETSPEEDNOW.COM	P	NR
AL	100025	QWEST COMMUNICATIONS COMPANY, LLC	CENTURYLINK	N/A	NP
AL	38	R. M. GREENE INC.	CABLE TV OF EAST ALABAMA (CTVEA)	P	P
AL	100026	R. M. GREENE, INC.	R.M.GREENE,INC.	P	V
AL	100027	RABBIT INTERNET SERVICES LLC	RABBIT INTERNET SERVICES LLC	N/A	NP
AL	23	RAGLAND TELEPHONE COMPANY	RAGLAND TELEPHONE COMPANY	P	E
AL	37	RAGLAND TELEPHONE COMPANY	CABLE STAR	P	NR
AL	100028	RAMCO BROADBAND SERVICES	RAMCO BROADBAND SERVICES	N/A	NP
AL	100029	RAPID COMMUNICATIONS LLC	RAPID CABLE	X	NP
AL	100060	RESIDENTIAL DATA SOLUTIONS	RDASOL	P	NR
AL	53	RIVIERA UTILITIES CABLE	RIVIERA UTILITIES CABLE	X	NP
AL	27	ROPIR INDUSTRIES, INC (TELCO DIVISION)	UNION SPRINGS TELEPHONE CO.,INC.	P	P
AL	698	ROPIR INDUSTRIES, INC. (CABLE DIVISION)	COM-LINK, INC.	P	P
AL	100030	S AND V WIRELESS	S AND V WIRELESS	P	NR
AL	54	SCOTTSBORO ELECTRIC POWER BOARD	SCOTTSBORO ELECTRIC POWER BOARD	P	E
AL	92	SHELBY TELECOM	SHELBY TELECOM	P	NR
AL	100049	SILVER STAR	SILVER STAR	N/A	NP
AL	55	SKY CABLEVISION	SKY CABLEVISION	N/A	NP
AL	100032	SMARTRESORT CO. LLC	BEYOND COMMUNICATIONS	P	NR
AL	100033	SOUTH AL COMMUNICATIONS	CONEXUS COMMUNICATIONS	P	NR
AL	684	SOUTHERN LIGHT, LLC	SOUTHERN LIGHT	P	P
AL	93	SOUTHNET	SOUTHNET; A TOMBIGBEE ELECTRIC COMPANY	P	P
AL	714	SPRINT NEXTEL CORPORATION	SPRINT NEXTEL CORPORATION	P	P
AL	100034	STARBAND COMMUNICATIONS INC.	STARBAND COMMUNICATIONS INC.	O	S
AL	94	STARLITE CONSULTING INC.	STARLITE CONSULTING INC	P	P
AL	100035	STRATOS GLOBAL CORPORATION	STRATOS OFFSHORE	O	S

			SERVICES COMPANY		
AL	63	T-MOBILE USA, INC.	T-MOBILE	P	P
AL	100061	TELAPEX, INC	CELLULAR SOUTH	P	NR
AL	19	TELEPHONE ELECTRONICS CORPORATION	NATIONAL TELEPHONE OF ALABAMA, INC.	P	V
AL	24	TELEPHONE ELECTRONICS CORPORATION	TEC/ROANOKE DIVISION	P	P
AL	640	TELEPHONE ELECTRONICS CORPORATION	TEC/CHEROKEE DIVISION	P	P
AL	100062	TELOVATIONS, INC.	TELOVATIONS, INC.	N/A	NP
AL	84	THE CONTACT NETWORK, INC.	INLINE	N/A	NP
AL	100047	THE CONTACT NETWORK, INC.	PAETEC BUSINESS SERVICES	N/A	NP
AL	677	THE UTILITIES BOARD OF THE CITY OF SYLACAUGA	THE UTILITIES BOARD OF THE CITY OF SYLACAUGA	P	P
AL	56	TIME WARNER CABLE LLC	TIME WARNER CABLE LLC	P	P
AL	96	TRAVELER INFORMATION SERVICES	TRAVELER INFORMATION SERVICES	P	NR
AL	97	TRIDIGITAL BROADBAND	INLINE	X	NP
AL	98	TRILLION DIGITAL COMMUNICATIONS	TRILLION DIGITAL COMMUNICATIONS	X	NP
AL	57	TROY CABLEVISION, INC.	TROY CABLE	P	P
AL	58	TV CABLE CO. OF ANDALUSIA, INC.	TV CABLE COMPANY OF ANDALUSIA INC	P	P
AL	761	TW TELECOM, INC.	TW TELECOM HOLDINGS, INC.	P	P
AL	99	US WIRELESS ONLINE	US WIRELESS ONLINE	N/A	NP
AL	100038	UTOPIAN WIRELESS CORPORATION	UTOPIAN WIRELESS CORPORATION	P	NR
AL	702	VALLEY TELEPHONE	KNOLOGY	P	P
AL	101	VERIQIK	VERIQIK	P	NR
AL	62	VERIZON COMMUNICATIONS	CELLCO PARTNERSHIP	P	P
AL	100039	VERIZON COMMUNICATIONS INC. / VERIZON BUSINESS	VERIZON BUSINESS	O	NC
AL	102	VISIONSIX INTERNET	VISIONSIX INTERNET	X	NP
AL	59	WEST ALABAMA TV CABLE CO., INC	WEST ALABAMA TV CABLE CO., INC	P	P
AL	665	WILDBLUE COMMUNICATIONS, INC.	WILDBLUE COMMUNICATIONS, INC.	P	P
AL	29	WINDSTREAM CORPORATION	WINDSTREAM	P	P
AL	103	WP MEDIA	WP MEDIA	P	NR
AL	100040	ZAYO GROUP, LLC	ZAYO BANDWIDTH, LLC	O	NC
AL	100063	ZITO MEDIA	ZITO MEDIA	N/A	NP

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Technical Whitepaper
Arkansas Broadband Data Submitted for April 1, 2012 to NTIA

Submitted By Connect Arkansas

Connect Arkansas

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

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

Identification of Broadband Providers

As of March 1st, 2012, Connect Arkansas has identified by Holding Company name Seventy-Nine (79) Broadband Providers in the state of Arkansas. These providers are identified as having infrastructure in the state and are not identified as being resellers. Of these providers, Seventy-One (71) submitted to Connect Arkansas at least partial data to map coverage. Of the remaining eight (8) Broadband Providers, five (5) have agreed to provide data in the future. Velocity Broadband, Inc. is a fixed wireless provider, along with Excede Satellite broadband were discovered following the Fall 2012 Data Submission. Open Range Communications, Urban Wireless LLC, Pilot Knob LLC, and Horizon Broadband, all of which were fixed wireless providers ceased to operate or to offer Broadband services. Pilot Knob LLC sold infrastructure assets to Wavelinx Wireless, which has agreed to provide data at some point in the future.

Data Collection and Processing

For the Spring 2012 data set all providers were contacted first via mail, then email, and finally with telephone calls to the point of contact for each company. Twenty (20) companies updated coverage information as far as speed or coverage area. The other Thirty Two (32) participating Broadband providers chose to display data as unchanged from the Fall 2012 NTIA Data Submission. Eighteen (18) participating Broadband providers either were unable to update coverage information by deadline, or were unresponsive for this round of data collection.

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

ArcGIS Shape files
Tab delimited files of Address Ranges
Tab delimited files of Addresses
Physical maps of coverage
Tower information for propagation

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

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

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

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

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

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

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

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

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

Verification Processes

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

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

General Notes

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

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

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

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

The Check Submission Tool also flagged Warnings for several DSL providers that offer speed tier 7 for DSL. These providers AT&T, PGTelco, Ritter Communications, TDS Telecom, & Yelcot Telephone all confirmed offering 10 Mbps or higher speed offerings via DSL. In some of these cases, for example AT&T Uverse (high speed variant of ADSL implementing Fiber to the Node (FTTN)) speeds much higher than 10 Mbps are available. Also flagged for Warning was the T-Mobile's offering of speed tier 7, via HSPA+ 42 networks in limited areas. This technology is advertised to support speeds between 10Mbps to 27Mbps in some markets.

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

Several Failed Flags were returned (One under Address Points, three under road segments) which were confirmed to be exceptions due to coding issues in the script by Michael Byrne (FCC) via email 3/27/2012.

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

CenturyLink
CenturyLink provide a system to check availability and speeds at address level. CenturyLink's system allows users to select city, street, and address in sequence via drop down lists. After making these selections the user is brought to page that display Max Available Download speeds for that address. Upload speeds are not mentioned. The download speed is then recorded in the spreadsheet that has been provided for this purpose.
This process captured roughly half the cells. The remaining cells were then checked to see if there were duplicates in the spreadsheet and then filled in by researching the city associated with the ZIP code and checking it against the list of cities CenturyLink provides and filled accordingly. This process still leaves some ZIP codes with the appearance of being unserved. The speeds for these remaining areas were then based on speeds submitted on the MSA/RSA level.

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

Windstream

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

Cox

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

Allegiance

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

American Samoa
Broadband Mapping Project:
Product Release White Paper

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Product Specification:	Spring 2012 NTIA Data Model
Product/Process:	NTIA—April 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Providers Included (DBA Name)
  - ASTCA
  - Bluesky Communications
    - Moana TV

- New Providers Since Last Data Submission
  - None

- Non-Responsive/Non-Cooperative Providers
  - None

COVERAGE AREA CHANGES

- Provider Expansion
  - Bluesky has new HSPA (TT-80) coverage
    - Moana TV expanded TT-41 coverage

- Coverage Footprint Reductions/Map Refinement -
  - None

DATA CORRECTIONS

- There were no data corrections required for this data submission
  - The NTIA 3rd Party data review and summary were compared to the product prior data submission and no changes were required. The one record highlighted in red within the summary file was the TT-10 with speeds in tier 3, which were validated as correct with the provider.

COMMUNITY ANCHOR INSTITUION (CAI) DETIALS

OVERALL STATISTICS

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

CAI CHANGES

- The CAI's within the following categories were reviewed again against the below-mentioned databases to identify if any CAIID's need to be updated or added.
  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**
  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**
  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

AS_2012_3_29.txt

- Error Report

  All items flagged within the submission receipt where confirmed with either the provider or with NTIA that the values are valid. We called the provider that was identified in the warnings due to their Technology/Speed match, and validated again that they were accurate.

  - The exceptions also NTIA noted during the 03/27/12 webinar are as follows:
    - Middle Mile Elevation Fails
    - Middle Mile Latitude/Longitude Fails
    - Middle Mile Ownership Fails
    - Address SpeetTier Fails
    - CAI Transtech Fails

Hyperlinks to Grantee Workspace in which the same issues were identified by other Grantees:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

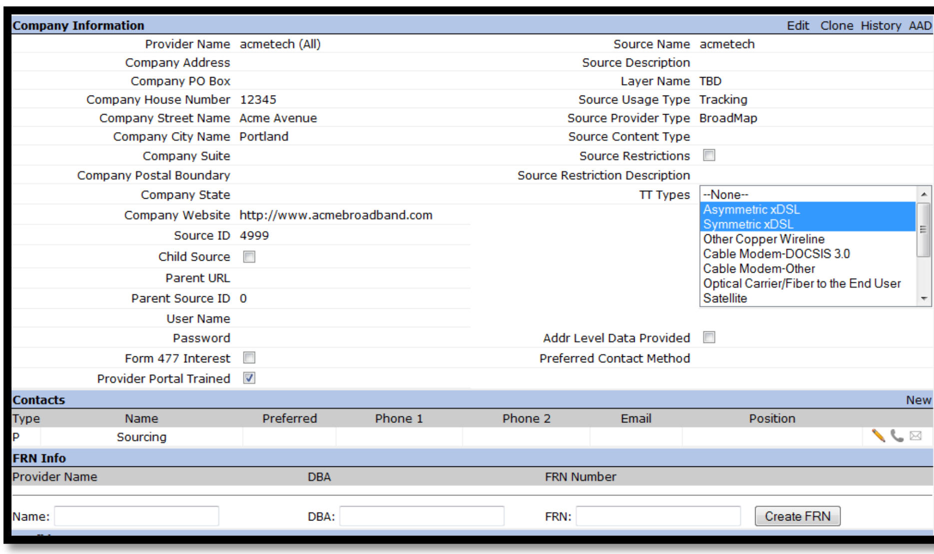
HIGH-LEVEL SUMMARY

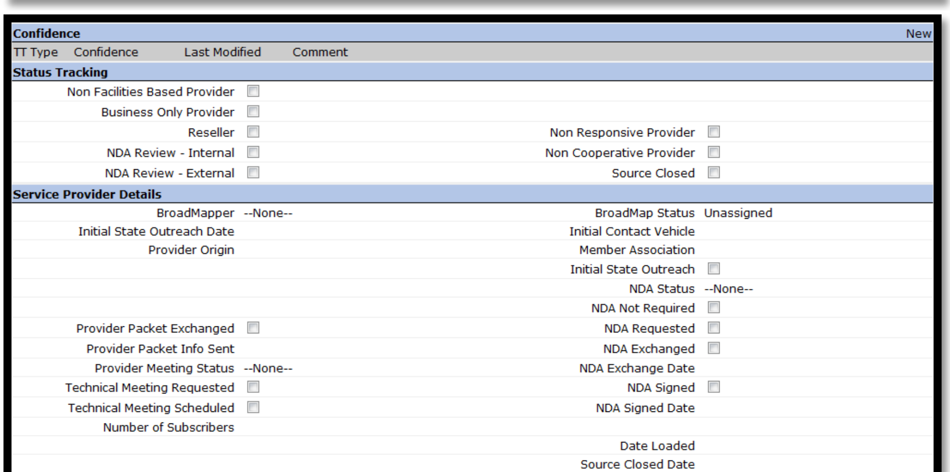
DATA GATHERING

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

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

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





BDIA Delivery 0412			Edit
Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	
Additional Data			
Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission.

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

COMMUNITY ANCHOR INSTITUTION (CAI)

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

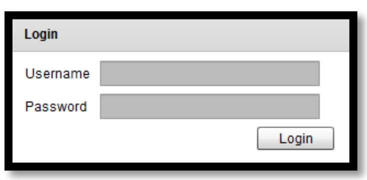
DATA INTEGRATION PROCESS

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

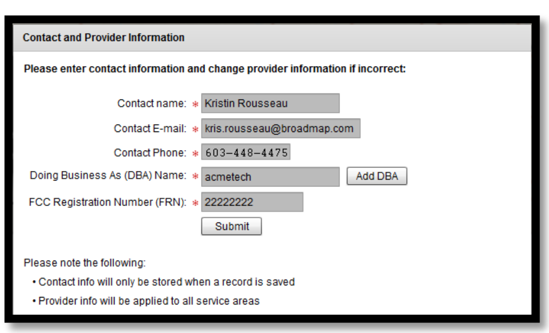
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type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

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

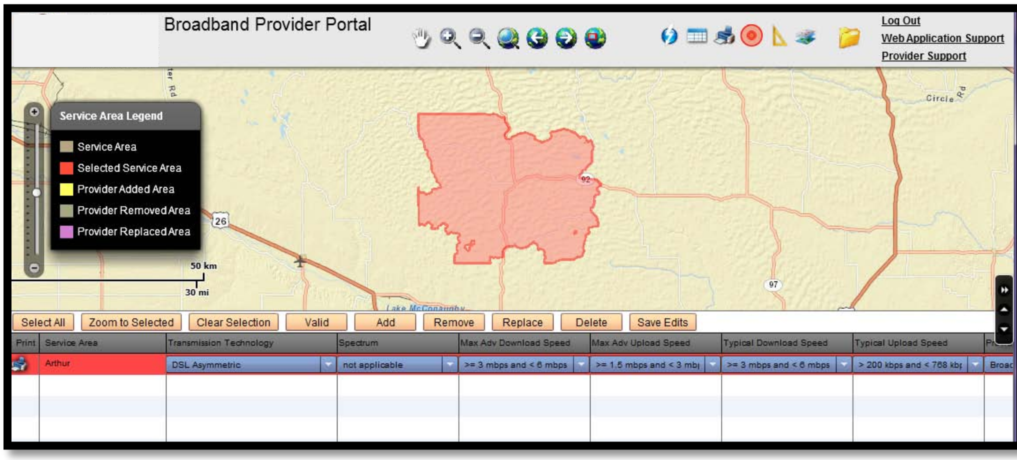
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



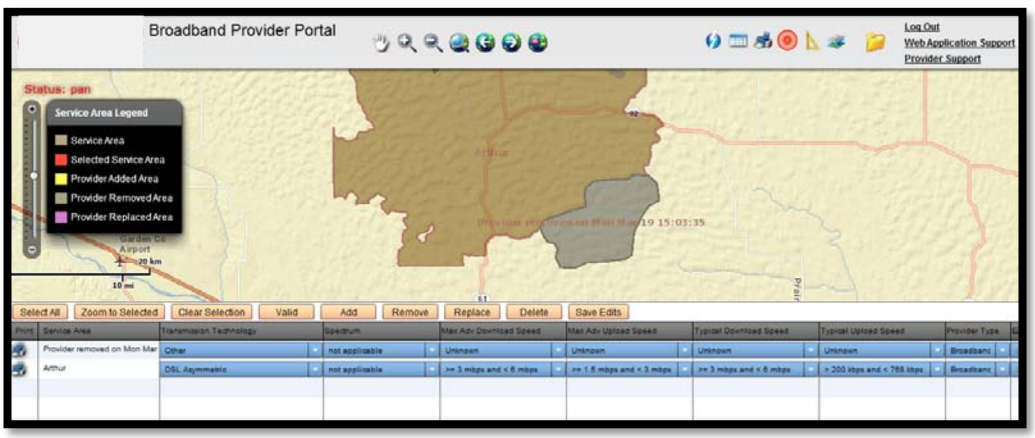
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



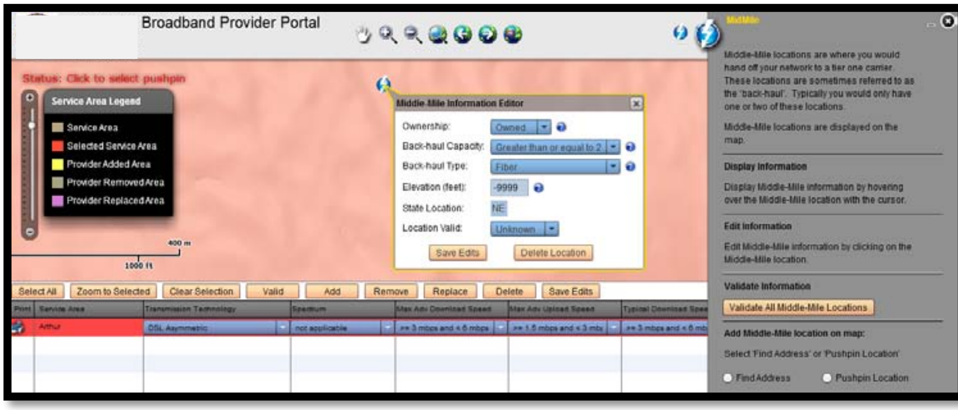
- Capability to review and request changes to the coverage footprint

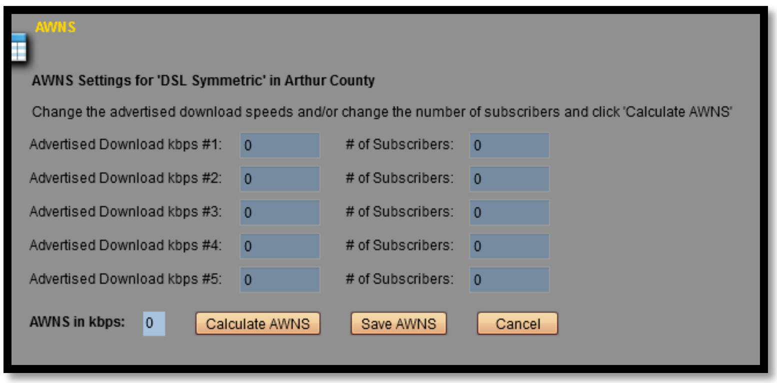


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

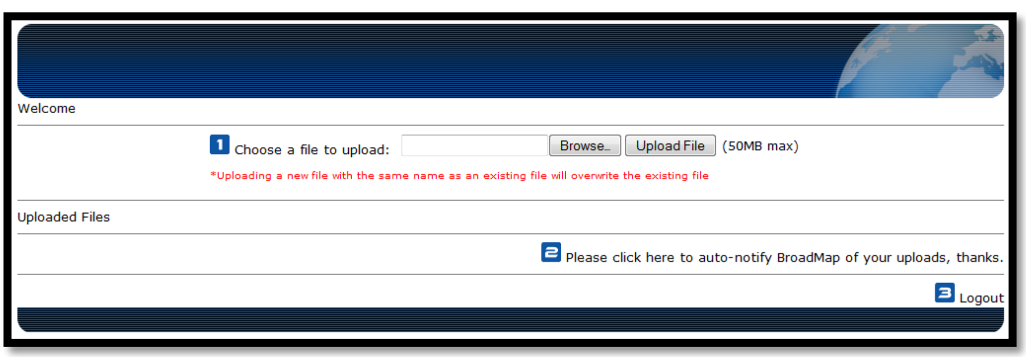


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





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



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

DATA VALIDATION AND VERIFICATION

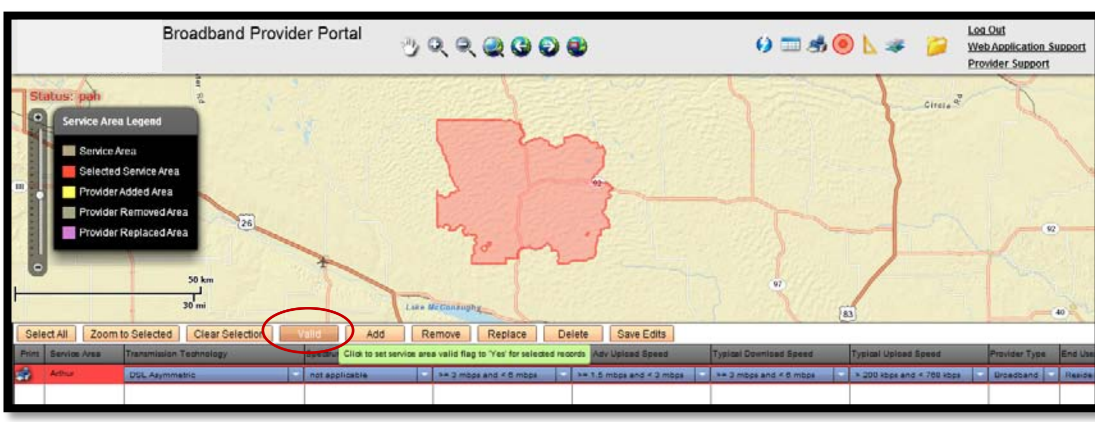
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage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

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

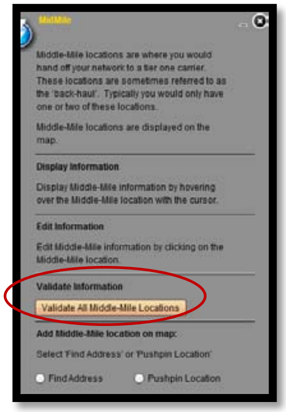
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process**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

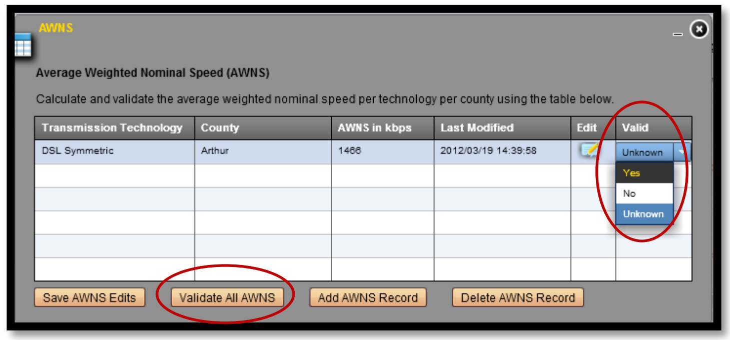
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

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



- Middle Mile & AWNS Validation





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

THIRD-PARTY DATA VERIFICATION

Due to a change in mapping partners, the focus for this data submission was placed on implementing an improved process methodology and integrating provider's coverage areas into a new internal model. Included in these efforts was educating the providers on the new process, encouraging continued participation and supporting their validation prior to the data submission.

For this submission, the NTIA 3rd Party Data summary was reviewed to ensure any corrections required were represented in the final product and the supporting documentation.

This submission was also compared to the previous data submission, fall 2011, as a quality check to identify and resolve any potential erroneous discrepancies between the two products. Since they originated from two different processes, we wanted to ensure there were no unexpected changes or regression.

PUBLIC VERIFICATION

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

The public website can be viewed at the following hyperlink:

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

CONFIDENCE VALUES

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

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

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

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

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

List of errors within the script, which will be listed as exceptions, can be found on PB Works – Grantee Workspace at the following link:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

DETAILED PROCESS REVIEW

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

BMap_ProcessDetails
_2012_04_01.docx

California Public Utilities Commission
NTIA State Broadband Initiative
April 2nd, 2012

Data Processing Methods

Provider Participation

In Round 5, the California Public Utilities Commission identified 225 potential broadband providers, 150 of whom did not submit data, and 75 who did. These providers comprise over 99.9% of the total broadband connections in California, according to data contained in the latest FCC Form 477.

Data Collection

The California Public Utilities Commission (CPUC) sent out a Data Request to broadband providers to initiate the Round 5 data collection. Potential providers were strongly encouraged to submit broadband service availability data. Providers who previously submitted data were also sent maps displaying their Round 4 coverage and validation results to guide their 5th round submissions. Data submission instructions were posted online to assist providers along with template files, sample shape files and record formats on the CPUC Broadband Mapping Website at:

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

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

Community Anchor Institutions (CAI)

CAI data initially came from the eligible entries of California Teleconnect Fund (CTF) program. The CTF program provides a 50% discount on telecommunications bills for qualifying schools, libraries, government-owned and operated hospitals and health clinics, and other community based organizations. The CAI addresses were geocoded to point locations and loaded into a file geodatabase. Technology of transmission and speed data were included and identified either through information received from the institutions themselves (as in the case of libraries), or from those service providers who responded to our request for such information. To provide CAI ID information (as in the case of schools), we used the California Department of Education search engine website (http://www.cde.ca.gov/re/sd/).

CPUC Initial Data Verification

Each data set submitted by broadband providers was reviewed against the GIS data model posted on the SBDD Network website, and checked if mandatory fields were filled in, and if each field contained the appropriate range of values. Where possible, we made certain that appropriate field headers were used and that each field contained the correct data type. When data was found to be missing or incorrect, the provider was contacted and the issue was documented in a separate provider spreadsheet. Some providers submitted high quality data sets, while others gave incomplete, unexpected, or incorrect data. New information, correspondence with the providers, and fixes made by the CPUC were also documented in each provider spreadsheet.

Chico GIC Geoprocessing

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

AT&T submitted 5th Round speed information at the county level as they have done in previous rounds. As in the 4th Round, their 5th round data was adjusted in two ways by the Chico GIC using the most recently available Form 477 data and AT&T wire center locations from a purchased database. First, in census tracts where AT&T's U-Verse service is enabled, AT&T's raw Form 477 data was used to extract the highest speed tier reported to have customers in the census tract containing each block/road segment AT&T serves. The 477 speed tier was used as the max advertised downstream speed in the block/road segment instead of the tier actually submitted. Second, to determine what speed tiers should actually be used in non-U-Verse enabled tracts, AT&T wire center locations from a purchased database were used to employ a degradation model based on loop length to estimate the highest speed ADSL service that could be achieved based on distance from the wire center.

Wireless providers who were unable to submit a shape file or geographic representation of their service area provided tabular system, tower, and antenna information. Wireless parameters were used to model the service area, and from that we created a shape file. The wireless propagation model is based on the Longley-Rice, Irregular Terrain propagation model. Individual unit specifications are used to measure performance based on frequency, transmit power, receiver sensitivity, antenna gain, and height. Signal coverage patterns are produced for each individual unit taking into account terrain and vegetation features that may hinder signal dispersion.

CPUC Final Data Verification

The resulting datasets were delivered from Chico to the CPUC in the SBDD transfer model geodatabase for final review and verification. Data sets were checked again and reviewed for unexpected changes resulting from the geocoding /geomatching process. Geoprocessed data was visually reviewed using

ArcGIS to verify service area footprints, and the SBDD check submission Python script was run on each dataset to identify unexpected values.

Deliverable Data

The final dataset is delivered to the NTIA/FCC in file geodatabase format with the following feature classes:

- BB_ConnectionPoint_LastMile – not required per Clarification to the NOFA.
- BB_ConnectionPoint_MiddleMile – Point between the local “last mile” network and the middle mile network which goes on to connect to the internet backbone. This is a confidential dataset.
- BB_Service_Address – not included per the CPUC NDA.
- BB_Service_CAInstitutions – Community Anchor Institutions: points geocoded from address lists
- BB_Service_CensusBlock – Broadband availability polygons for areas less than 2 square miles
- BB_Service_Overview – Service overview by County including Subscriber Weighted Nominal Speed
- BB_Service_RoadSegment – Broadband availability line segments for areas 2 square miles and greater
- BB_Service_Wireless – Wireless service area polygons.

Planned Validation Methods

The following validation methods will be conducted on Round 5 data. Detailed maps showing submitted service area footprints and areas that could not be validated will be distributed to each provider for feedback.

FCC Form 477

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

ID Insight, BroadBand Scout

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

TeleAtlas Wire Center and Wire Center Region

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

FCC Consumer Broadband Test (Non-Mobile App)

The FCC Online Consumer Broadband Test collects information regarding the location of the client, the engine used to provide the speed test, download speed, upload speed, latency, jitter, packet loss, minimum round trip time, maximum round trip time, and average round trip time at a specified point location. A shape file was created to represent each location at which speed tests were performed based on geocoded address records. All point locations were then geomatched to the census block level where less the two square miles in area and to street segment level where census blocks are greater than two square miles in area. These layers were used to cross reference ISP data submissions to the CPUC where sub-broadband speeds were reported and/or where there were no tests performed.

FCC Consumer Broadband Test (Mobile App)

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

FCC Broadband Dead Zone Reporting Form

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

California State Map Broadband Service Survey Feedback

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

Chico GIC Data Validation Processes

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

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

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

Wireline Census Block and Street Segment Validation

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

Wireless Validation

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

Colorado Broadband Data & Development Program

April 1, 2012 Data Delivery Report

For details about the Colorado Broadband Data and Development Program (CBDDP), please see our web site at www.colorado.gov/oit/broadband or visit the National Broadband Map at www.broadbandmap.gov. The Colorado interactive broadband map is available at http://maps.co.gov/ColoradoBroadband.

Purpose of this Report

This report provides details about the data set delivered to the NTIA on April 1, 2012 to support the National Broadband Map and to meet the requirements of the State Broadband Data and Development Program grant to the Governor's Office of Information Technology (OIT). The report describes the various processes used to verify this data set and the results of those processes. It also describes, in general terms, how the CBDDP collects and validates information about broadband availability in the State of Colorado.

Status of Data Collection

The Colorado Broadband Data and Development Program data collection effort began with a third party contractor through a data collection contract signed on March 22, 2010. After the October 2011 data submission, the CBDDP data processing was brought in-house to the Governor's Office of Information Technology. OIT contacted 161 potential service providers to contribute data toward the CBDDP April 2012 delivery. Of the identified potential providers, 45 provided data updates, 7 new service providers were added to the dataset, and 17 providers declared "no data change".

The following table categorizes all possible broadband service providers in Colorado known to the CBDDP, and indicates the status of their participation in the program. The table also shows progress made over the first four data deliveries to the National Telephone and Information Administration (NTIA). See the Data Delivery Report at the end of this document for more details on the data.

Service Providers	May 21, 2010	October 1, 2010	April 1, 2011	October 1, 2011	April 1, 2012
Potential Identified Providers	102	158	161	161	161
Data Sets Delivered to NTIA	39	59	65	71	69
Duplicates	0	14	14	14	14
Not a BB Provider	15	24	29	31	34
Working Universe of SP's	87	120	118	116	113
Multiple Contact Efforts, Have Chosen Not to Participate So Far, May Not Be a Provider	5	17	50	46	44
Broadband Provider Status Not Yet Known	43	44	0	0	0

The following table describes how many service providers updated their data between the prior and current data delivery. One dataset was removed from the previous delivery: Qwest was acquired by CenturyTel, Inc.

Service Provider Updates	April 1, 2012
New in Data Set	7
Updated Data	45
Responded "No Data Change"	17
Data Sets Delivered to NTIA	69

The following table shows the number of community anchor institutions that have been identified in the state, and how many CAIs for which some broadband information has been collected and included in this data set. In addition, the “Includes Speed Tests” column shows how much of the data in the “Collected” column are actual speed tests.

The CBDDP is very pleased with the progress that has been made in promoting speed tests among reporting CAIs. As shown below, 46% (or 1,663 of 3,613) of the data collected for CAI’s is from speed tests. The CBDDP has not significantly expanded the number of CAIs submitting speed test information between April 2011 and this delivery. However, with the hiring of new GIS staff within OIT, we expect to make a more concerted effort to collect additional CAI information or update the data collected last year.

Community Anchor Institutions	April 1, 2012		
	Identified	Collected	Includes Speed Test
Cat. 1 - School K -12	2109	1987	974
Cat. 2 - Library	252	241	14
Cat. 3 - Medical/Healthcare	709	346	143
Cat. 4 - Public Safety	1779	673	305
Cat. 5 - University/College	55	44	42
Cat. 6 - Other Government	601	315	179
Cat. 7 - Other non-Government	10	7	6
TOTALS	**5515**	**3613**	**1663**

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

Validation and Verification Processes for the April 2012 Data Set

Techniques:

1. Automated Validation
2. Analysis of Changes
3. Visual Review
4. Third Party Data Validation
5. Feedback Loop
6. CAI Speed Test Analysis
7. Drive Testing
8. FCC Speed Test Validation
9. NTIA Assessment
10. Crowd Sourcing
11. Survey

1. Automated Validation

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

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

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

2. Analysis of Changes

There are three major types of data changes between the October 2011 delivery and the April 2012 delivery. First is the addition of new providers or deletion of old providers. The second type of change is that we received new data from an old provider and therefore updated the coverage. The third type of change is from the improved process implemented by the OIT team. OIT analyzed and reprocessed all of the data provided for the last delivery by the third party contractor, Critigen, to determine the accuracy of the data. OIT's applying processing techniques more diligently than the contractor resulted in improved data for many of the providers. In some cases, OIT actually refined the processing techniques based on idiosyncrasies of individual provider's data. The following table shows the percent change of number of features from October 2011 to April 2012.

	Census Blocks		Road Segments		Wireless Service		Middle Mile	
	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed
New providers	4	100%	3	100%	7	100%	2	100%
Deleted providers*	1	-100%	1	-100%	0	n/a	0	n/a
Received new data	17	33%	16	25%	17	35%	18	169%
Reprocessed existing data	8	5%	8	1%	13	31%	13	35%

*The deleted provider (Qwest) was acquired by CenturyTel, Inc. and the combined data was submitted by CenturyTel

3. Visual Review

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

4. Third Party Data Validation

For this data delivery, OIT has compared 100% of the service provider coverage areas to third party data sets. These data sets include American Roamer, ComSearch, Pitney Bowes, MediaPrints, and SpectrumView. 20 providers overlapped multiple third party data sets, so in these cases all of the relevant third party data sets were used to validate a single service provider/technology type combination. The CBDDP records comments about coverage areas, geometry and attribution provided for the technology type and assigns a categorical assessment of the match between the CBDDP data and the third party data. This assessment is necessarily subjective because the third party data sets are sometimes very crude in their spatial resolution so it is difficult to make precise comparisons.

5. Feedback Loop

As a routine part of the work flow, the CBDDP gave all service providers the opportunity to review the final geospatial representation of their data in the form of mapbooks. In addition, the OIT team created and communicated validation assessments based on the tests described below in order to verify speed accuracy for each provider's broadband coverage area. When updates to data were solicited, providers were questioned as to the accuracy of the geospatial display of their coverage areas.

6. CAI Speed Test Analysis

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

The speed test information that the CBDDP collects from CAIs requests the name of the service provider, but of the 1,662 speed tests collected from CAIs only 1048 of those tests specifically identified the service provider. In the past, the CBDDP used only the tests that included provider information, but for this delivery, we used all of the speed tests. We think this gives a more comprehensive perspective of the comparison between the speeds at each institution and the potential advertised service in their area. Service providers report data by speed test tier, and the following table compares how the speed tier for the CAI speed test compares to the maximum advertized speed tier provided by the service provider. A similar test also compared the CAI tests to the minimum advertised speed for all of the providers that reported service in that area, and the table with these results is below as well.

CAI Speed Test Compared to Maximum Download speed by Census Block.																
	Speed Test Slower							***Same Tier***	***Speed Test Faster***							***Total Tests***
Number of Speed Tiers Slower or Faster	***-7***	***-6***	***-5***	***-4***	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	
School K - 12	*2*	*6*	*7*	*54*	*324*	*324*	*164*	*693*	*238*	*42*	*53*	*119*	*38*	*13*	*31*	*2108*
Library	*1*	*1*	*11*	*20*	*40*	*42*	*31*	*51*	*18*	*6*	*23*	*6*	*0*	*2*	*0*	*252*
Healthcare	*0*	*0*	*15*	*11*	*39*	*89*	*81*	*389*	*53*	*11*	*9*	*6*	*4*	*0*	*0*	*707*
Public Safety	*0*	*7*	*4*	*22*	*187*	*189*	*43*	*1254*	*29*	*2*	*11*	*25*	*3*	*1*	*2*	*1779*
University, college	*0*	*0*	*1*	*0*	*6*	*3*	*4*	*21*	*8*	*6*	*4*	*1*	*0*	*0*	*0*	*54*
Other Government	*0*	*4*	*1*	*13*	*8*	*75*	*23*	*312*	*46*	*13*	*5*	*19*	*0*	*2*	*3*	*524*
Other Non-Government	*0*	*0*	*0*	*1*	*1*	*3*	*0*	*3*	*0*	*1*	*0*	*0*	*1*	*0*	*0*	*8*
Totals	***3***	***18***	***39***	***106***	***605***	***725***	***346***	***2723***	***392***	***80***	***105***	***176***	***45***	***18***	***36***	***5417***
Totals	***1842***							***2723***	***852***							***5417***

CAI Speed Test Compared to Minimum Download speed by Census Block.																
	Speed Test Slower							Same Tier	Speed Test Faster							Total Tests
Number of Speed Tiers Slower or Faster	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
School K - 12	0	0	4	9	59	192	323	367	295	372	204	143	27	60	44	2099
Library	0	0	1	23	18	39	37	47	13	22	20	6	15	10	1	252
Healthcare	0	0	0	6	20	27	102	417	39	40	20	19	13	4	1	708
Public Safety	0	0	0	7	35	178	140	1300	35	18	32	27	4	1	2	1779
University, college	0	0	0	0	1	1	6	13	6	6	7	5	5	3	1	54
Other Government	0	0	0	3	22	87	51	330	45	15	11	27	4	3	3	601
Other Non-Government	0	0	0	0	1	2	2	3	0	1	0	0	1	0	0	10
Totals	**0**	**0**	**5**	**48**	**156**	**526**	**661**	**2477**	**433**	**474**	**294**	**227**	**69**	**81**	**52**	**5503**
Totals	**1396**							**2477**	**1630**							**5503**

7. Drive Testing Mobile Coverage Areas

The CBDDP tested the mobile wireless coverage areas reported by the service providers. The CBDDP has completed drive testing for over 5,000 miles of roads. This testing followed a test scheme that started with primary test points along major highways followed by secondary points from one half to one mile away from the primary point to confirm the result of the primary point. Up to four additional secondary points farther from the primary points were then tested or until at least two tests fail with test speeds of less than 768 Kbps. The primary points were generally 10 to 15 miles apart, and the derived points were clustered around the primary points within 2 to 3 miles. The tests all used commercially available wireless air cards, identical laptops, and the same FCC speed test site. The tests checked only the major national mobile providers and were all performed between March and May of 2011.

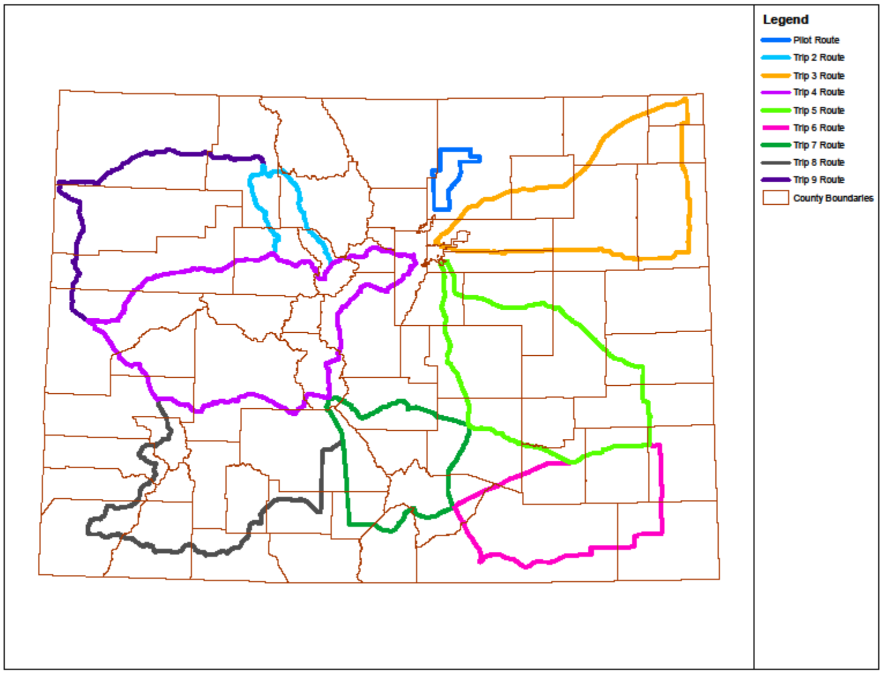


Figure 1: The following graphic is a general depiction of the routes used for the drive testing.

The following table presents the results of these drive tests. The number of test results shown for each provider reflects only the test points that fell within the coverage area provided by that service provider to the CBDDP. In addition, some providers had overlapping areas of mobile coverage with differing speed tier information. All of these overlapping areas were included in the comparison for each point that fell in those areas. For example, if at a specific point a provider had four different overlapping regions each with its own speed tier, the test point there was compared to each one, and the results added to the total for the appropriate tier difference and an increased the total number of tests by four for that provider.

MOBILE WIRELESS COVERAGE TESTING									
All Points Tested Including Primary and Derived									
Combined Result for Three Providers Tested									
	Tiers Slower				***Same Tier***	***Tiers Faster***			***Total Tests***
Number of Speed Tiers Slower or Faster	***< 768 Kbps***	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***	
	542	*657*	*743*	*238*	*92*	*47*	*23*	*13*	*2355*
Totals	*2180*				*92*	*83*			*2355*
ATT									
	Tiers Slower				***Same Tier***	***Tiers Faster***			***Total***
Number of Speed Tiers Slower or Faster	***< 768 Kbps***	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***	
	366	*423*	*173*	*57*	*53*	*16*	*9*	*3*	*1100*
Totals	*1019*				*53*	*28*			*1100*
Sprint									
	Tiers Slower				***Same Tier***	***Tiers Faster***			***Total***
Number of Speed Tiers Slower or Faster	***< 768 Kbps***	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***	
	84	*164*	*389*	*98*	*39*	*31*	*14*	*10*	*829*
Totals	*735*				*39*	*55*			*829*
Verizon									
	Tiers Slower				***Same Tier***	***Tiers Faster***			***Total***
Number of Speed Tiers Slower or Faster	***< 768 Kbps***	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***	
	92	*70*	*181*	*83*	*0*	*0*	*0*	*0*	*426*
Totals	*426*				*0*	*0*			*426*

8. FCC Validation

The FCC speed test information contains two separate data sets, both of which cover a date range from March 2010 to February 2012. The Consumer Broadband Test (CBT) Data includes speed tests from homes, businesses, community centers, and other landline locations. The Mobile Data includes speed test collected using the Mobile App on either an iPhone or Android mobile device.

The following tables compare how the speed tier for the FCC speed tests compare to the maximum and minimum advertised speed tiers reported by service providers for each location.

FCC CBT Data Speed Tests Compared to Maximum Download Speed

	Speed Test Slower								Same Tier	Speed Test Faster									Total Tests
Number of Speed Tiers Slower or Faster	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
Maximum	4	40	9	59	63	173	200	1586	4635	2554	2678	2165	1889	128	169	39	4	1	16396
Totals	2134								4635	9627									16396

FCC CBT Data Speed Tests Compared to Minimum Download Speed

	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	Total Tests
Minimum	4	44	25	150	823	2059	3991	2201	2393	2201	1697	593	182	30	3	0	0	0	16396
Totals	9297								2393	4706									16396

FCC Mobile Speed Tests compared to Mobile Services Providers

	Speed Test Slower					Same Tier	Speed Test Faster							Total Tests
Number of Speed Tiers Slower or Faster	**-5**	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
Composite														
	10235	19511	32934	71786	90496	83357	83202	63743	41125	32819	128	5	4	529345
Totals	224962					83357	221026							529345
AT&T Mobility LLC														
	0	0	11594	18158	18056	18742	18696	10834	12248	50	2	0	0	108380
Totals	47808					18742	41830							108380
Leap Wireless International, Inc.														
	0	0	0	10552	16496	16578	17734	17844	10206	11894	40	2	0	101346
Totals	27048					16578	57720							101346
Nucla-Naturita Telephone Company														
	0	0	1	0	0	0	1	0	0	0	0	0	0	2
Totals	1					0	1							2
Open Range Communications, Inc.														
	0	0	180	295	328	241	167	146	176	0	0	0	0	1533
Totals	803					241	489							1533
Sprint Nextel Corporation														
	0	3365	4843	7497	10104	10061	6388	6497	2152	2472	11	0	1	53391
Totals	25809					10061	17521							53391
T-Mobile USA, Inc.														
	5439	8518	8725	9179	9280	5437	6163	95	46	1	0	0	0	52883
Totals	41141					5437	6305							52883

Verizon Wireless													
	4775	7615	7574	26094	36226	32295	34053	28327	16297	18402	75	3	3	211739
Totals	82284					32295	97160							211739
Viaero Wireless													
	21	13	17	11	6	3	0	0	0	0	0	0	0	71
Totals	68					3	0							71

9. NTIA Assessment Data

NTIA Assessment data shows whether October 2011 data submission values match the comparison data source values. The following is a description of how the data was processed by the NTIA:

The broadband elements compared were Provider Name, Technology of Transmission (Trans Tech), Max. Advertised Down Speed, Max. Advertised Up Speed, Typical Down Speed, and Typical Up Speed.

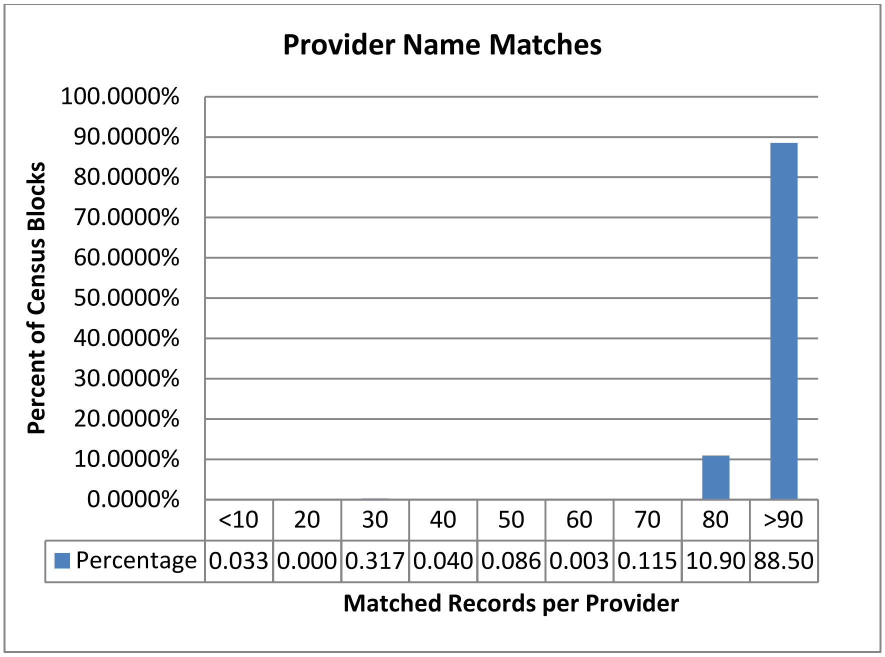
For each comparison element, the complete record set consists of three types of results:

1. *Matched Records: the compared elements matched*
2. *No-Match Records: the compared elements did not match*
3. *Not Compared: the broadband elements were not or could not be compared*
    a. *If Provider Name does not match, no other comparisons are performed*
    b. *If Technology of Transmission does not match, no speed comparisons are performed*

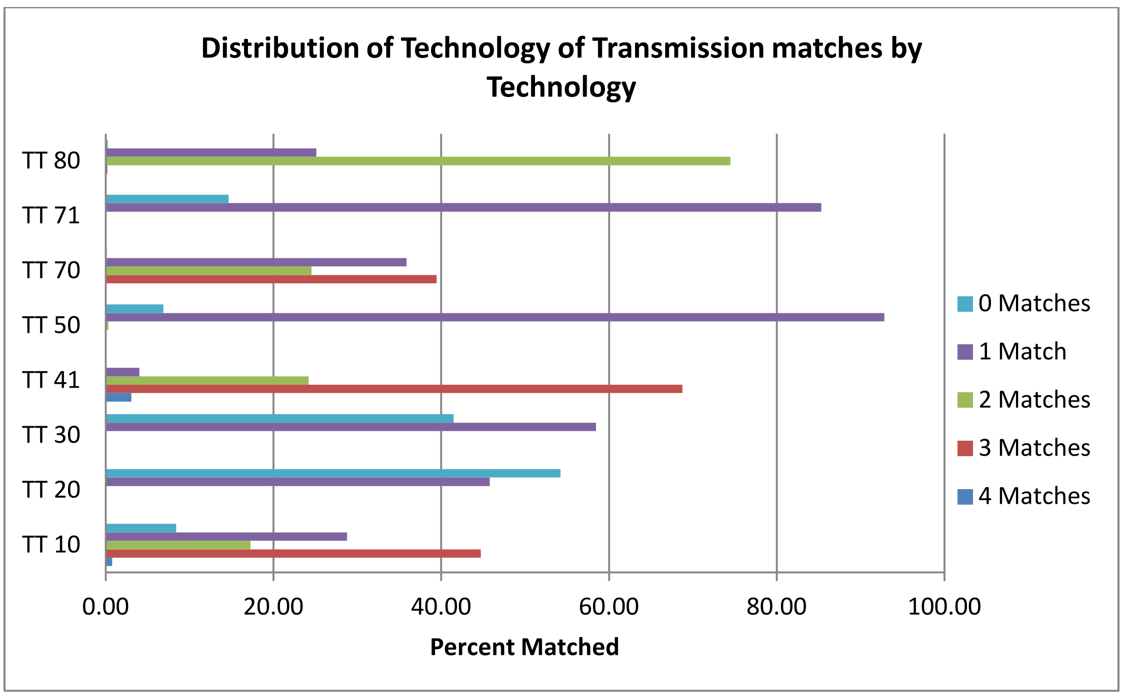
The data was used to validate provider data and the results were communicated to the provider in order to verify data accuracy. The following summary shows the overall results of statewide NTIA Validation data comparison:

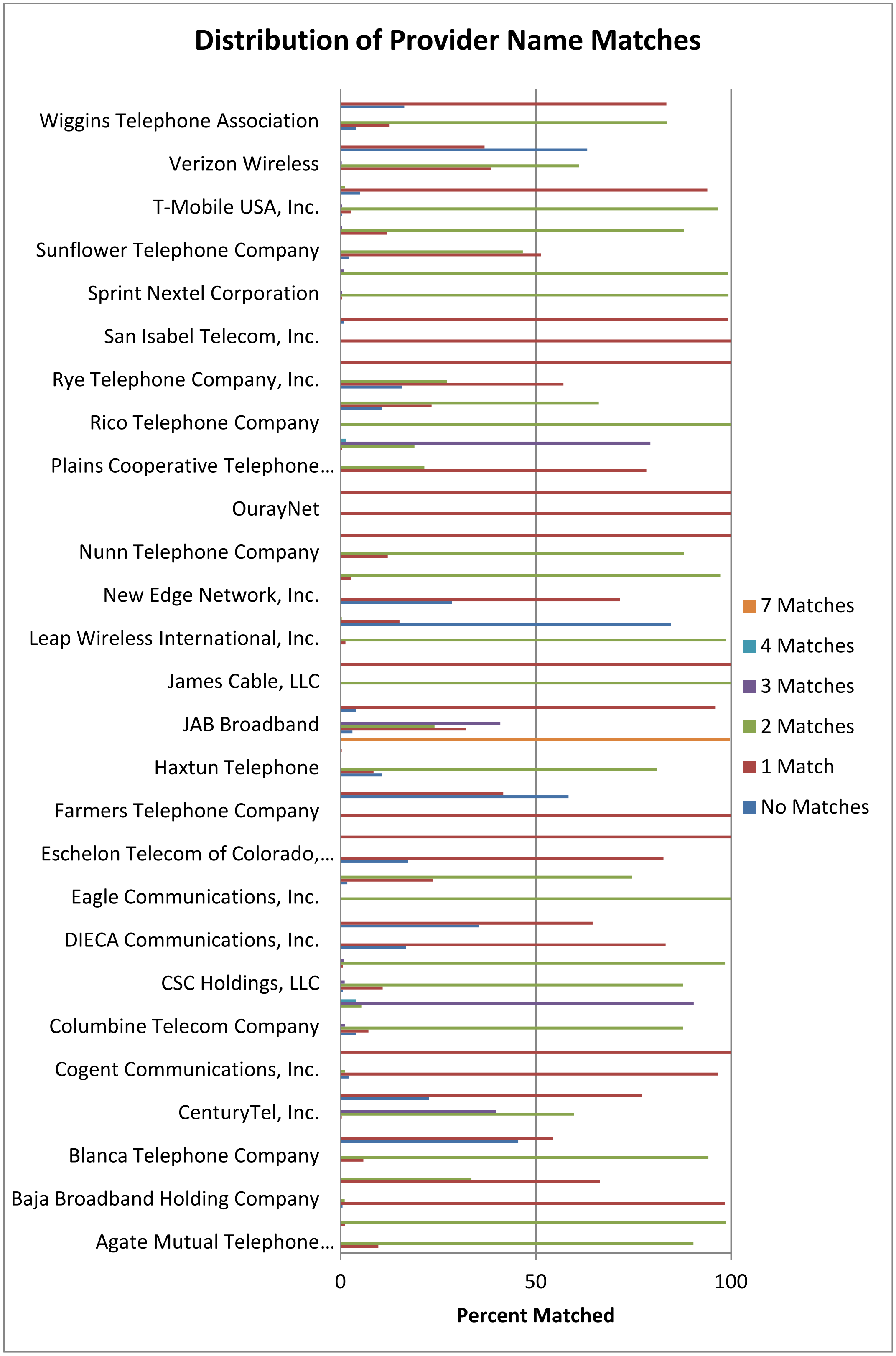
Matched Records by Feature Type:

	Provider Name		**Technology of Transmission**		**Maximum Advertised Download Speed**		**Maximum Advertised Upload Speed**		**Typical Download Speed**		**Typical Upload Speed**	
Feature	No.	% Match	No.	% Match	No.	% Match	No.	% Match	No.	% Match	No.	% Match
Address Point	310	66.5%	310	100.0%	240	77.4%	240	77.4%	0	0.0%	0	0.0%
Census Block	356,254	90.7%	288,986	81.1%	100,184	34.7%	111,273	38.5%	11,690	4.0%	11,690	4.0%
Road Segment	98,021	90.3%	91,378	93.2%	33,162	36.3%	23,738	26.0%	9,387	10.3%	4,194	4.6%
Service Area	1,546,579	99.3%	1,541,528	99.7%	466,964	30.3%	468,066	30.4%	1,654	0.1%	1,230	0.1%



	<10	20	30	40	50	60	70	80	>90
Percentage	0.033	0.000	0.317	0.040	0.086	0.003	0.115	10.90	88.50





Distribution of Provider Name Matches
Wiggins Telephone Association
Verizon Wireless
T-Mobile USA, Inc.
Sunflower Telephone Company
Sprint Nextel Corporation
San Isabel Telecom, Inc.
Rye Telephone Company, Inc.
Rico Telephone Company
Plains Cooperative Telephone...
OurayNet
Nunn Telephone Company
New Edge Network, Inc.
Leap Wireless International, Inc.
James Cable, LLC
JAB Broadband
Haxtun Telephone
Farmers Telephone Company
Eschelon Telecom of Colorado,...
Eagle Communications, Inc.
DIECA Communications, Inc.
CSC Holdings, LLC
Columbine Telecom Company
Cogent Communications, Inc.
CenturyTel, Inc.
Blanca Telephone Company
Baja Broadband Holding Company
Agate Mutual Telephone...
0
50
100
Percent Matched
7 Matches
4 Matches
3 Matches
2 Matches
1 Match
No Matches

10. Crowd Sourcing

Colorado broadband speed tests are initiated using an online mapping application in which the general population can conduct speed tests from their home or office. All speeds shown in the application are Maximum Advertised Speeds. The purpose is to collect reports of service from citizens and Community Anchor Institutes. The speed test is provided by an Ookla application and results are given for Download and Upload speeds in mbps. In addition to test results being collected, the User's location, Provider name, technology type, and monthly cost are also requested following the test results. The hyperlink to the Colorado Broadband Mapping Application is provided below: http://165.127.200.27/coloradobroadband/. The CBDDP is still gathering a significant quantity of speed tests to compare to the provider data. After the April delivery, the result of these comparisons will be used in feedback with the providers to help improve the data OIT receives from them.

11. Surveys

The CBDDP has prepared a survey for residences and businesses querying them about their broadband availability and their use of broadband as well as their , actual speeds received, and transmission technology. Six Hundred Surveys were collected from rural, underserved, and un-served communities across the state. Similar to the data verification shown above, these results will provide sense of the actual speeds in use or available to residents and businesses across the state. While the address information in these surveys requires some cleansing, the CBDDP will also compare the responses to broadband provider data after this delivery and then represent these results to the broadband service providers as a feedback and potential data improvement process for future data deliveries.

Summary of Process

The CBBDP follows a data collection process outlined on the National Broadband Map in the "Technical Overview" of the "About" section at www.broadbandmap.gov. If you would like a more detailed, procedural description of the process, please contact the CBDDP via email at COBroadband@state.co.us.

The data gathering process begins by contacting the potential broadband providers. Although participation is voluntary, many providers choose to support this effort. The success of this program rests, in part, on that support, and we appreciate their efforts to participate in this program. Broadband providers submit data in a variety of formats, and in almost twenty cases the CBDDP also conducts technical assistance to support the efforts of smaller providers to participate. For census blocks less than two square miles, the entire census block is presumed to have coverage if any service provider reports broadband anywhere in the census block. For census blocks greater than two square miles, the CBDDP reports service along road segments. Before submitting data to the NTIA, the CBDDP integrates the data from each provider into a single dataset using a data model specified by the NTIA. The NTIA and FCC then integrate the CBDDP's dataset along with those from all other states into the single National Broadband Map dataset.

The CBDDP utilized a third party contractor, Critigen, during the first two years of the program. Starting with the April 1, 2012 delivery, the CBDDP has hired staff and brought this process in-house and will continue with in-house staff through the remainder of the program to October 31, 2014. As mentioned earlier, this has resulted in improved data in many cases and inclusion of data from additional providers not included in any previous deliveries. The CBDDP has implemented the following data collection and ingestion processes which may vary from other state programs.

1. The CBDDP implemented the following process to spatially transform broadband service to census or road geography where the service provider has given the CBDDP address specific information. A 150 foot buffer is drawn around each point. Any census block less than 2 square miles touched by the buffered area is selected. For census blocks greater than two square miles, any road segment touched by the buffer is selected.

2. Based on clarifications from the NTIA, the CBDDP did not provide any features in the BB_Service_Overview feature class since more granular speed information was provided in the BB_Service_CensusBlock, BB_Service_RoadSegment and BB_Service_Address feature classes.

3. The CBDDP is not currently collecting pricing information.

4. Reference layers include the U.S Census Bureau 2010 census blocks and 2010 TIGER data for roads.

5. Typical speeds continue to be an issue. Only half of the providers include typical speed information in their data.

6. Central office locations and wireless towers are included in the BB_ConnectionPoint_MiddleMile.

7. The CBDDP implemented various validation techniques as described in the “Validation and Verification” section of this document.

8. The CBDDP transformed digital subscriber line access multiplexer (DSLAM) locations into a network polyline feature class based on the strength of the device. This strength was used as the basis for a network analysis on the road network to select the census blocks and road segment for that provider service area.

Data Summary and Feature Class Statistical Tables

File Summary	
File Type	**Number of Records**
Total Records in all Files	**517614**
Census Block < 2 sq. miles	**394157**
Street Segments	**116199**
Wireless Shape File	**57**
Service Address	**509**
BB Service Overview	**0**
Community Anchor Institutions	**5515**
Middle Mile	**1177**
Metadata Provided for Geospatial Data	**Yes**

Provider Information	
File Type	**Number of Records**
Number of ISPs Provided	**70**

Census Blocks < 2 sq. miles

Data Type	Code	Data Element	Count	%
Records Details		Total Records	392973	
		Census Blocks < 2 sq. miles with Broadband	134578	
		Census Blocks < 2 sq. miles in State (with & without broadband)	192101	
		Census Blocks > 2 sq. miles in the State (with & without broadband)	8961	
		Total Census Blocks in the State (with & without broadband)	201062	
Services Provider Details		Number of Distinct Providers	36	
		Number of Distinct "Doing Business As"	34	
		Number of Distinct FRN	35	
Technology	10	Asymmetric xDSL	192540	49.0%
	20	Symmetric xDSL	58679	14.9%
	30	Other Copper Wireless	77033	19.6%
	40	Cable Modem-DOCSIS 3.0	0	0.0%
	41	Cable Modem-Other	61690	15.7%
	50	Optical Carrier/Fiber	3031	0.8%
	60	Satellite	0	0.0%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%
	80	Terrestrial Mobile Wireless	0	0.0%
	90	Electrical Power Line	0	0.0%
	0	Other	0	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	3930	1.0%
	4	> 1.5 mbps, < 3 mbps.	47436	12.1%
	5	> 3 mbps, < 6 mbps.	87395	22.2%
	6	> 6 mbps, < 10 mbps.	127856	32.5%
	7	> 10 mbps, < 25 mbps.	51112	13.0%
	8	> 25 mbps, < 50 mbps.	74228	18.9%
	9	> 50 mbps, < 100 mbps.	40	0.0%
	10	> 100 mbps, < 1 gbps.	941	0.2%
	11	> 1 gbps.	35	0.0%
Provider Type	1	Provider	392005	99.8%
	2	Reseller	968	0.2%

Data Type	Code	Data Element	Count	%
Typical Download Speed	3	>= 768 kbps. < 1.5 mbps.	12784	3.3%
	4	>= 1.5 mbps. < 3 mbps.	46716	11.9%
	5	>= 3 mbps. < 6 mbps.	100977	25.7%
	6	>= 6 mbps. < 10 mbps.	55553	14.1%
	7	>= 10 mbps. < 25 mbps.	32373	8.2%
	8	>= 25 mbps. < 50 mbps.	74168	18.9%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
		ZZ "null"	70402	17.9%
Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	19754	5.0%
	3	>= 768 kbps. < 1.5 mbps.	155787	39.6%
	4	> 1.5 mbps, < 3 mbps.	66471	16.9%
	5	> 3 mbps, < 6 mbps.	85076	21.6%
	6	> 6 mbps, < 10 mbps.	39270	10.0%
	7	> 10 mbps, < 25 mbps.	25485	6.5%
	8	> 25 mbps, < 50 mbps.	114	0.0%
	9	> 50 mbps, < 100 mbps.	40	0.0%
	10	> 100 mbps, < 1 gbps.	941	0.2%
	11	> 1 gbps.	35	0.0%
Typical Upload Speed	2	>200 kps, < 768 kps.	38546	9.8%
	3	> 768 kps, < 1.5 mbps.	71240	18.1%
	4	> 1.5 mbps, < 3 mbps.	74031	18.8%
	5	> 3 mbps, < 6 mbps.	75175	19.1%
	6	> 6 mbps, < 10 mbps.	38206	9.7%
	7	> 10 mbps, < 25 mbps.	25319	6.4%
	8	> 25 mbps, < 50 mbps.	54	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
		ZZ "null"	70402	17.9%
End User Name	1	Residential	390893	99.5%
	2	Governmental	2080	0.5%

Street Segment

Data Type	Code	Data Element	Count	%
Record Details		Total Records	108607	
Services Provider Details		Number of Distinct Providers	35	
		Number of Distinct "Doing Business As"	33	
		Number of Distinct FRN	34	
Technology	10	Asymmetric xDSL	68760	63.3%
	20	Symmetric xDSL	15188	14.0%
	30	Other Copper Wireless	4592	4.2%
	40	Cable Modem-DOCSIS 3.0	0	0.0%
	41	Cable Modem-Other	16317	15.0%
	50	Optical Carrier/Fiber	3750	3.5%
	60	Satellite	0	0.0%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%
	80	Terrestrial Mobile Wireless	0	0.0%
	90	Electrical Power Line	0	0.0%
	0	Other	0	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	6553	6.0%
	4	> 1.5 mbps, < 3 mbps.	27471	25.3%
	5	> 3 mbps, < 6 mbps.	8480	7.8%
	6	> 6 mbps, < 10 mbps.	20847	19.2%
	7	> 10 mbps, < 25 mbps.	39384	36.3%
	8	> 25 mbps, < 50 mbps.	5870	5.4%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	2	0.0%
	11	> 1 gbps.	0	0.0%
Provider Type	1	Provider	108584	100.0%
	2	Reseller	23	0.0%
End User Name	1	Residential	108551	99.9%
	2	Governmental	56	0.1%

Data Type	Code	Data Element	Count	%
Typical Download Speed	3	> 768 kps, < 1.5 mbps.	7730	7.1%
	4	> 1.5 mbps, < 3 mbps.	26360	24.3%
	5	> 3 mbps, < 6 mbps.	5653	5.2%
	6	> 6 mbps, < 10 mbps.	17685	16.3%
	7	> 10 mbps, < 25 mbps.	13820	12.7%
	8	> 25 mbps, < 50 mbps.	5870	5.4%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
		ZZ "null"	31486	29.0%
Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	21838	20.1%
	3	> 768 kps, < 1.5 mbps.	45409	41.8%
	4	> 1.5 mbps, < 3 mbps.	19812	18.2%
	5	> 3 mbps, < 6 mbps.	6024	5.5%
	6	> 6 mbps, < 10 mbps.	15326	14.1%
	7	> 10 mbps, < 25 mbps.	196	0.2%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	2	0.0%
	11	> 1 gbps.	0	0.0%
Typical Upload Speed	2	>200 kps, < 768 kps.	22185	20.4%
	3	> 768 kps, < 1.5 mbps.	16702	15.4%
	4	> 1.5 mbps, < 3 mbps.	19612	18.1%
	5	> 3 mbps, < 6 mbps.	3235	3.0%
	6	> 6 mbps, < 10 mbps.	15188	14.0%
	7	> 10 mbps, < 25 mbps.	196	0.2%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
		ZZ "null"	31486	29.0%

Wireless

Data Type	Code	Data Element	Count	%
Record Details		Total Records	40	
Services Provider Details		Number of Distinct Providers	31	
		Number of Distinct "Doing Business As"	30	
		Number of Distinct FRN	28	
Technology	10	Asymmetric xDSL	0	0.0%
	20	Symmetric xDSL	0	0.0%
	30	Other Copper Wireless	0	0.0%
	40	Cable Modem-DOCSIS 3.0	0	0.0%
	41	Cable Modem-Other	0	0.0%
	50	Optical Carrier/Fiber	0	0.0%
	60	Satellite	0	0.0%
	70	Terrestrial Fixed Wireless-Unlicensed	13	32.5%
	71	Terrestrial Fixed Wireless-Licensed	13	32.5%
	80	Terrestrial Mobile Wireless	14	35.0%
	90	Electrical Power Line	0	0.0%
	0	Other	0	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	8	20.0%
	4	> 1.5 mbps, < 3 mbps.	9	22.5%
	5	> 3 mbps, < 6 mbps.	16	40.0%
	6	> 6 mbps, < 10 mbps.	7	17.5%
	7	> 10 mbps, < 25 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
Spectrum	1	800 MHz Spectrum Used	2	5.0%
	2	700 MHz Spectrum Used	5	12.5%
	3	1900 MHz Spectrum Used	4	10.0%
	4	1700 MHz Spectrum Used	5	12.5%
	5	2500 MHz Spectrum Used	4	10.0%
	6	Unlicensed Spectrum Used	18	45.0%
	7	Specialist Mobile Radio Service	2	5.0%
	8	Wireless Communication Service	0	0.0%
	9	Satellite	0	0.0%

Data Type	Code	Data Element	Count	%
Typical Download Speed	2	>200 kps, < 768 kps.	0	0.0%
	3	> 768 kps, < 1.5 mbps.	8	20.0%
	4	> 1.5 mbps, < 3 mbps.	6	15.0%
	5	> 3 mbps, < 6 mbps.	7	17.5%
	6	> 6 mbps, < 10 mbps.	3	7.5%
	7	> 10 mbps, < 25 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
		ZZ "null"	16	40.0%
Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	6	15.0%
	3	> 768 kps, < 1.5 mbps.	17	42.5%
	4	> 1.5 mbps, < 3 mbps.	9	22.5%
	5	> 3 mbps, < 6 mbps.	6	15.0%
	6	> 6 mbps, < 10 mbps.	2	5.0%
	7	> 10 mbps, < 25 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
Typical Upload Speed	2	>200 kps, < 768 kps.	3	7.5%
	3	> 768 kps, < 1.5 mbps.	16	40.0%
	4	> 1.5 mbps, < 3 mbps.	2	5.0%
	5	> 3 mbps, < 6 mbps.	2	5.0%
	6	> 6 mbps, < 10 mbps.	1	2.5%
	7	> 10 mbps, < 25 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
		ZZ "null"	16	40.0%

Community Anchor Institutes

Data Type	Code	Data Element	Count	%
Record Details		Total Records	5515	
Anchor Category	1	School-K through 12	2109	38.2%
	2	Library	252	4.6%
	3	Medical/healthcare	709	12.9%
	4	Public safety	1779	32.3%
	5	University, college, other post-secondary	55	1.0%
	6	Other community support-/gov't	601	10.9%
	7	Other community support-non-/gov't	10	0.2%
Technology	10	Asymmetric xDSL	340	6.2%
	20	Symmetric xDSL	6	0.1%
	30	Other Copper Wireless	1591	28.8%
	40	Cable Modem-DOCSIS 3.0	0	0.0%
	41	Cable Modem-Other	133	2.4%
	50	Optical Carrier/Fiber	1248	22.6%
	60	Satellite	14	0.3%
	70	Terrestrial Fixed Wireless-Unlicensed	27	0.5%
	71	Terrestrial Fixed Wireless-Licensed	77	1.4%
	80	Terrestrial Mobile Wireless	0	0.0%
	90	Electrical Power Line	0	0.0%
	0	Other	0	0.0%
		ZZ "null"	2109	38.2%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	209	3.8%
	4	> 1.5 mbps, < 3 mbps.	1292	23.4%
	5	> 3 mbps, < 6 mbps.	421	7.6%
	6	> 6 mbps, < 10 mbps.	280	5.1%
	7	> 10 mbps, < 25 mbps.	913	16.6%
	8	> 25 mbps, < 50 mbps.	157	2.8%
	9	> 50 mbps, < 100 mbps.	10	0.2%
	10	> 100 mbps, < 1 gbps.	54	1.0%
	11	> 1 gbps.	70	1.3%
		ZZ "null"	2109	38.2%

Data Type	Code	Data Element	Count	%
Max. Advertised Upload Speed	1	< 200 kps.	0	0.0%
	2	>200 kps, < 768 kps.	125	2.3%
	3	> 768 kps, < 1.5 mbps.	195	3.5%
	4	> 1.5 mbps, < 3 mbps.	1297	23.5%
	5	> 3 mbps, < 6 mbps.	516	9.4%
	6	> 6 mbps, < 10 mbps.	391	7.1%
	7	> 10 mbps, < 25 mbps.	660	12.0%
	8	> 25 mbps, < 50 mbps.	90	1.6%
	9	> 50 mbps, < 100 mbps.	8	0.1%
	10	> 100 mbps, < 1 gbps.	54	1.0%
	11	> 1 gbps.	70	1.3%
		ZZ "null"	2109	38.2%
Y/N Broadband Service	Y	Yes-Subscribers to Service	3406	61.8%
	N	No-Does Not Subscribers to Service	2109	38.2%
Lat/Long Accuracy	1	Lat/Long that Falls within the State	5515	
	2	Total Lat/Long	5515	100%
Anchor Names		Total Count Anchors Names	5515	
		Distinct Count of Anchor Names	5368	

Data Type	Code	Data Element	Count	BB Info
Community Anchor Institution Category Count with Broadband Information	1	School-K through 12	2109	1950
	2	Library	252	209
	3	Medical/healthcare	709	327
	4	Public safety	1779	566
	5	University, college, other post-secondary	55	43
	6	Other community support-/gov't	601	305
	7	Other community support-non-/gov't	10	6
		Totals	5515	3406

Data Type	Code	Data Element	Count	
Public WI IF	1	Y	0	
	2	N	5515	

Middle Mile

Data Type	Code	Data Element	Count	%
Record Details		Total Records	926	
Services Provider Details		Number of Distinct Providers	37	
		Number of Distinct "Doing Business As"	33	
		Number of Distinct FRN	36	
Ownership	0	Owned	112	12.1%
	1	Leased	814	87.9%
Facility Capacity	1	Multiple T1's and less than 40 mbps.	409	44.2%
	2	Greater than 40 mbps. and less than 150 mbps.	87	9.4%
	3	Greater than 150 mbps. and less than 600 mbps.	43	4.6%
	4	Greater than 600 mbps. and less than 2.4 gbps.	15	1.6%
	5	Greater than 2.4 gbps. and less than 10 gbps.	2	0.2%
	6	Greater than 10 gbps	370	40.0%

Data Type	Code	Data Element	Count	%
Facility Type	1	Fiber	480	51.8%
	2	Copper	5	0.5%
	3	Hybrid Fiber Coax (HFC)	1	0.1%
	4	Wireless	440	47.5%
		N/A "null"	0	0.0%
Lat / Long		# of Lat/Long in State	926	100%
		Total Lat/Long	926	
Elevation		Number of Data Points	425	
		Lowest Elevation	5	
		Highest Elevation	225	

#	FRN	Company Name	Doing Business As	Census	Roads	Wireless	Mid Mile
Services Providers							
Broadband Services Providers Submitted							
#	**FRN**	**Company Name**	**Doing Business As**	**Census**	**Roads**	**Wireless**	**Mid Mile**
1	0004311627	Agate Mutual Telephone Cooperative Association	Prairie Networks, LLC	28	214		10
2	0003777927	Antilles Wireless, LLC	USA Communications	232		1	
3	0004496774	AT&T Inc.	AT&T Corp, Inc.			2	1
4	0014860522	Baja Broadband Holding Company	Baja Broadband Operating Company, LLC	995	138		
5	0003728292	Beulahland Communications, Inc.,	Beulahland Communications, Inc.,			2	1
6	0003754652	Bijou Telephone Co-op Association, Inc.	Bijou Telephone Cooperative Association, Inc.	424	902	1	3
7	0003766201	Blanca Telephone Company	Blanca Telephone Company	2922	3252		
8	0017108747	Brainstorm Internet	Brainstorm Internet			1	14
9	0014778781	BySky, Inc.	BySky, Inc.			1	
10	0019746445	CAP Cable	USA Communications	628	5	1	
11	0018626853	CenturyTel, Inc.	CenturyTel, Inc.	92302	47370		2
12	0001621127	City of Glenwood Springs	City of Glenwood Springs, Community Broadband Network	835	52	1	
13	9999	Colorado Mobile Inet, LLC	Colorado Mobile Inet, LLC			1	
14	0002147098	Columbine Telecom Company	FairPoint Communications	251	667	1	10
15	0004441663	Comcast Cable Communications, LLC	Comcast	48819	9520		
16	0007001977	CSC Holdings, LLC	Bresnan Communications	13361	5746		
17	0001617281	Delta County Tele-comm, Inc.	TDS Telecom	825	820		1
18	0003753753	DIECA Communications, Inc.	Covad Communications Company	133643	4572		3
19	0001629781	Dubois Telephone Exchange, Inc.,	DTE	53	130	1	4
20	0013339973	Eagle Communications, Inc.	Eagle Cable TV And Internet	237	29		1
21	0004317731	Eastern Slope Rural Telephone Association, Inc.	Eastern Slope Rural Telephone Association, Inc.	1998	6511		12
22	0003767852	Eschelon Telecom of Colorado, Inc.	Integra Telecom	81750	20735		
23	0004338489	Farmers Telephone Company	Farmers Telephone Company	180	921		12
24	0005059092	Farmers Telecommunications	Farmers Telecommunications	682	111	2	1
25	0015575285	Front Range Internet, Inc.	Front Range Internet, Inc.	795	2		1
26	0016084683	Grand County Internet Services, Inc.	Grand County Internet Services, Inc.			1	30
27	0000824224	Grand Valley Telecommunications, Inc.	Grand Valley Telecommunications, Inc.	1171	10	1	7
28	0001616200	Haxtun Telephone	Haxtun	1023	1327		
29	0019794643	HighSpeed4U	HighSpeed4U			1	24
30	0002157550	IHateToWait.com, LLC	IHateToWait			1	2
31	0015866460	Internet Colorado	Internet Colorado	364	54	1	10
32	0018706002	Inventive Wireless of Nebraska, LLC	Vistabeam			1	
33	9999	Irish & Reynolds, Inc.	Nednet			3	
34	0014175673	JAB Broadband	Skybeam, Inc.			1	416
35	0003766623	Jade Communications, LLC	Jade Communications, LLC			1	7

36	0002748044	James Cable LLC	CommuniComm Services	692	3		1
37	0003728284	J.e.d. Enterprises, Inc.	J.e.d. Enterprises, Inc.	209	1780		16
38	0005030200	Live Wire Networks, Inc.	Live Wire Networks, Inc.	293		1	
39	0003723822	Level 3 Communications, LLC	Level 3 Communications, LLC				365
40	0002963528	Leap Wireless International, Inc.	Cricket Communications, Inc.,			2	
41	0018769547	Magnolia Road Internet Coop	MRIC			2	20
42	9999	Nedernet, Inc.	Nedernet, Inc.			1	12
43	0003720471	New Edge Holding Company	New Edge Networks, Inc.	968	23		
44	0004312187	Nucla-Naturita Telephone Company	Nucla-Naturita Telephone Company	229	201	2	
45	0004311809	Nunn Telephone Company	Nunn Communication, LLC	199	679		1
46	0015246895	Open Range Communications Inc.	Open Range Communications Inc.			1	39
47	9999	OurayNet	OurayNet			1	13
48	0014699953	Peetz Communications, LLC	Peetz Cooperative Telephone Company	94	176	1	
49	0004314316	Phillips County Telephone Company	PCTelecom	1888	236	1	4
50	0001615889	Plains Cooperative Telephone Association, Inc.,	Plains Cooperative Telephone Association, Inc.,	1113	3475	1	52
51	0005059092	Rico Telephone Company	Rico Telephone Company	78	93		3
52	0014705602	Roggen Telephone Cooperative Company	Roggen Telephone Enterprises, Inc.			1	1
53	0001615665	Rye Telephone Company, Inc.	ghValley.net	894	2641	2	2
54	0005061775	San Isabel Telecom, Inc.	San Isabel Telecom, Inc.			1	5
55	0004310769	S&T Telephone Coop Association Inc.	S&T Telephone Coop Assoc Inc	22	29		
56	0016136327	SECOM	SECOM			1	25
57	0005070933	South Park Telephone Company, LLC	ghValley.net			2	1
58	0003774593	Sprint Nextel Corporation	Sprint			2	1
59	0001616390	Strasburg Telephone Company	TDS Telecom	112	180		1
60	0003723236	Sunflower Telephone Company	FairPoint Communications	179	359		12
61	0006945950	T-Mobile USA, Inc.	T-Mobile			3	9
62	0013430244	Time Warner Cable	Time Warner Cable	922	485		
63	0004351086	tw telecom inc.	tw telecom inc.	1260	5		2
64	0003290673	Verizon Wireless	Verizon Wireless			4	
65	0015360456	Viaero Wireless	Viaero Wireless			1	
66	0001616192	Wiggins Telephone Association	Wiggins Telephone	648	2693		1
67	0006275945	XO Communications, LLC	XO Communications Services, Inc. (Affiliated Entity)	839	53		
68	0012579652	Zirkel Wireless, LLC	Zirkel Wireless, LLC			1	19
69	0019898303	Cogent Communications, Inc.	Cogent Communications, Inc.	43 Service Address			
	0003723822	Level 3 Communications, LLC	Level 3 Communications, LLC	466 Service Address			

Distinct Speed Tiers Provided

Technology Codes		Allowable Down	Allowable Up
10	Asymmetric xDSL	3 to 8	2 to 7
20	Symmetric xDSL	3 to 8	3 to 8
30	Other Copper Wireless	3 to 8	2 to 8
40	Cable Modem-DOCSIS 3.0	3 to 7	2 to 7
41	Cable Modem-Other	3 to 9	2 to 9
50	Optical Carrier/Fiber to End User	3 to 11	2 to 11
60	Satellite	3 to 6	2 to 6
70	Terrestrial Fixed Wireless-Unlicensed	3 to 6	2 to 6
71	Terrestrial Fixed Wireless-Licensed	3 to 6	2 to 6
80	Terrestrial Mobile Wireless	3 to 6	2 to 6
90	Electric Power Lines	3 to 6	2 to 6
0	All Other	3 to 11	2 to 11

Speed Tier Codes	
1	< 200 kps.
2	>200 kps, < 768 kps.
3	> 768 kps, < 1.5 mbps.
4	> 1.5 mbps, < 3 mbps.
5	> 3 mbps, < 6 mbps.
6	> 6 mbps, < 10 mbps.
7	> 10 mbps, < 25 mbps.
8	> 25 mbps, < 50 mbps.
9	> 50 mbps, < 100 mbps.
10	> 100 mbps, < 1 gbps.
11	> 1 gbps.

Distinct Speed Tiers Provided

Maximum Advertised Speed				Typical Speed			
Technology	Download	Upload	Freq.	Technology	Download	Upload	Freq.
10	3	2	4912	10	3	2	13233
10	3	3	6938	10	3	3	6938
10	4	2	28182	10	4	2	8140
10	4	3	21149	10	4	3	700
10	5	2	14351	10	5	2	18503
10	5	3	8535	10	5	3	3257
10	5	4	552	10	6	3	1502
10	5	5	15	10	7	4	46239
10	6	2	3703	10	ZZ	ZZ	158410
10	6	3	67664	20	3	2	4123
10	6	4	24854	20	3	3	601
10	6	5	4320	20	4	4	16185
10	7	4	46239	20	5	5	638
10	7	5	9152	20	6	6	54633
10	7	6	46	20	7	7	1634
10	7	7	16288	20	8	8	974
10	8	7	20	20	ZZ	ZZ	31
20	3	2	7	30	3	3	3
20	3	3	4423	30	4	2	37
20	4	3	2	30	4	4	2653
20	4	4	8249	30	5	5	76233
20	5	4	6	30	6	6	36
20	5	5	8891	30	7	7	451
20	6	6	54056	30	7	8	1099

Maximum Advertised Speed

Technology	Download	Upload	Freq.
30	3	3	378
30	4	4	3079
30	5	5	76405
30	6	4	37
30	7	8	1099
30	6	6	114
30	7	7	557
30	7	8	1099
30	8	8	105
40	5	5	338
40	6	6	58001
41	5	2	93
41	5	4	695
41	7	2	772
41	6	6	1133
41	7	3	19107
41	7	4	1673
50	3	3	10
50	4	4	11
50	5	5	18
50	6	6	13
50	7	4	2731
50	7	5	6256
50	7	7	883
50	8	8	25
50	9	9	49
50	10	10	1017
50	11	10	35
50	11	11	500
70	3	2	1
70	3	3	2
70	4	3	2
70	5	2	3
70	5	3	4
70	5	4	2
70	5	5	2
70	6	2	2
70	6	4	1
70	6	5	2
70	6	6	3
71	3	2	1

Typical Speed

Technology	Download	Upload	Freq.
30	8	8	54
30	ZZ	ZZ	1208
40	ZZ	ZZ	58339
41	5	2	93
41	5	4	695
41	7	2	772
41	7	4	266
41	ZZ	ZZ	21647
50	5	2	77
50	6	4	1062
50	7	4	2731
50	7	7	793
50	11	11	466
50	ZZ	ZZ	6419
70	4	3	3
70	5	2	3
70	5	3	3
70	5	4	1
70	5	5	1
70	6	6	1
70	ZZ	ZZ	7
71	3	3	5
71	4	3	1
71	5	3	3
71	ZZ	ZZ	5
80	3	2	4
80	4	3	1
80	5	3	1
80	6	5	1
80	ZZ	ZZ	9

Maximum Advertised Speed			
Technology	Download	Upload	Freq.
71	3	3	4
70	4	2	1
71	4	3	1
71	4	4	2
71	5	2	1
71	5	3	3
71	5	4	1
71	5	5	1
71	6	5	1
71	6	6	1
80	3	2	6
80	4	2	1
80	4	3	3
80	5	3	1
80	5	4	1
80	6	2	1
80	6	4	1
80	6	5	2

CT Broadband Mapping

Data Processing Report

Supplement

Submission 5

March 30, 2012

CONNECTICUT PROGRAM OVERVIEW

In response to the Notice of Funds Availability published in the Federal Register on July 8, 2009 (NOFA), the State of Connecticut Department of Public Utility Control (CT DPUC) submitted a grant application for consideration under the National Telecommunications and Information Administration's (NTIA) State Broadband Initiative Grant Program (SBI), for broadband mapping. The CT DPUC, pursuant to Executive Order 32-A, was designated as the single Connecticut state entity eligible to apply for funds under this program.

In July of 2011, the CT DPUC was merged with the CT Department of Environmental Protection to form a new agency called the Department of Energy and Environmental Protection (CT DEEP). CT DEEP will now be the lead agency coordinating with NTIA on this program.

The State has long been committed to broadband delivery and enhanced use as a fundamental goal. The State has developed a planning strategy to marshal the State's resources and stakeholders and establish Connecticut as a leader in broadband usage, in addition to being a leader in "e-Government" and other broadband-dependent endeavors.

The State entered its SBI initiative not possessing any data related to broadband service, availability, or infrastructure that could readily support the requirements of the Broadband Data and Development grant program. Due to technical considerations, DEEP has partnered with Applied Geographics Inc., and subcontractor Sanborn, to support the data collection and mapping efforts.

So far CT has been very successful in acquiring the requested information from the broadband service providers, and is utilizing this information on our own http://CT.gov/Broadband website as well as providing the needed information up to NTIA to support the national map.

SPRING 2012 SUBMISSION OVERVIEW

According to both our research and lists provided to use by NTIA, there was the potential for CT to have up to 132 broadband providers:

We contacted every provider on this master list.

47 Companies stated they do not provide any type of broadband service in CT. Many of these are either national carriers without a CT presence, or they file 477 reports because they provide VOIP or Video Teleconference services (but not broadband).

360 Networks
8x8, Inc.
Accessline Communications Corporation
Acecape Innovative Networks
American Fiber Network, Inc.
American Fiber Systems, Inc.

Apptix, Inc
Aptela, Inc
Bellsouth Long Distance, Inc.
Broadcore, Inc.
CIMCO Communications, Inc.
Custom Network Solutions
Echostar
Global Crossing North America, Inc.
GlobalPhone Corp.
GreatCall, Inc
Hickory Tech Corporation
i2 Telecom International, Inc
IDT Corporation
InPhonex.com, LLC
Intra Global Communications Inc.
IP Communications, LLC
ITC^DELTACOM Communications
Kosmaz Technologies LLC
M5 Networks, Inc
Matrix Telecom, Inc
New Global Telecom, Inc
Ooma, Inc.
Phone.com, LLC
Qwest Interprise America, Inc.
RCN Corporation
RingCentral, Inc.
Sage Telecom, Inc
SBC Long Distance, LLC
SkyTerra LP
Software Cellular Network Ltd.
Stella Communications
Tata Communications (America) Inc.
Telefonica Data Corp SA
Telefonica USA, Inc.
Test Provider
University Corporation For Advanced Internet Devel
VoiceINC.COM Corporation
VoIPnet Technologies
VoIPStreet, Inc.
Vonage Holdings Corp
Zayo Enterprise Networks, LLC

22 Company names turned out to be a DBA or legal holding names for another firm that is listed in another category. So these duplicates were dropped from our list.

A-R Cable Investments, Inc.
AT&T Corp.
AT&T Services, Inc.
Broadwing Communications, LLC
Cablevision Lightpath CT
Cablevision Systems Corporation
Cellco Partnership
COMCAST CABLE COMMUNICATIONS, INC
Connecticut DataNet, LLC. dba Lightower Fiber Netw
DataNet Communications Group, Inc.
Deutsche Telekom AG
DSLnet Communications, LLC
DSLnet Communications, LLC (Megapath)
Enventis Telecom Inc.
Harron Communications LP
Hudson Valley DataNet, LLC.
Hughes Communications, Inc.
New Cingular Wireless Services, Inc.
Verizon Business Global LLC dba Verizon Business
Verizon Communications Inc.
WilTel Communications Group, LLC
Yipes Holdings, Inc

29 Companies reported that they are strictly resellers (which we are not including in our submission).

ACN Communication Services, Inc
Airespring, Inc.
Bandwidth.com, Inc
BCN Telecom, Inc.
BullsEye Telecom, Inc.
Caused Based Commerce Incorporated
Cypress Communications, LLC
Direct TV
Dish Network
Earthlink
Ernest Communications, Inc.
Fionda VOIP, LLC
Granite Telecommunications LLC
Lightyear Network Solutions LLC
Metropolitan Telecommunications Holding
Company
New Edge Holding Company
PAETEC Communications, Inc.
Prescient Worldwide
Proximiti Communications

Smart Choice Communications, LLC
Stage 2 Networks, LLC
Telesphere Networks Ltd
Trans National Communications International
Transbeam Inc.
TW Telecom Data Services
VCOM Solutions, Inc
Wholesale Carrier Services
Wholesale Carrier Services, Inc
Windstream

8 Companies may be broadband providers, but either they indicated they are not willing to provide data, or were completely unresponsive to multiple attempts of contacting them. Luckily none of these providers have any significant market share in Connecticut.

Advanced Corporate Networking, Inc.
DSCI Communications, Inc.
Great Auk Wireless (GAW Communication)
Interglobe Communications, Inc.
Meriplex Communications, Ltd.
One Communications Corporation
Saturn Telecommunication Services Inc.
SkyWay USA

26 Broadband providers actually submitted data:

AT&T Inc.
Broadview Networks, Inc.
Charter Communications
Clearwire
Cogent Communications, Inc.
Comcast
Connecticut Educational Network /CEN
Covad Communications Group, Inc.
Cox Comunications
CSC Holdings, Inc.
Fibertech Networks, LLC
Groton Utilities
HNS License Sub, LLC
Level 3 Communications, LLC
Light Tower Fiber Long Island, LLC
METROCAST COMMUNICATIONS OF CT
Reliance Globalcom Services, Inc.
Sidera Networks
Sprint Nextel Corporation
StarBand Communications, Inc.
T-Mobile USA, Inc.

Verizon New York Inc.
Verizon Wireless
Wave2Wave Communications Inc.
Wild Blue Communications, Inc.
XO Holdings, Inc.

For the spring 2012 submission (S5), roughly 65% of the state providers submitted either entirely new or significantly revised data sets. This is slightly down from the last submission where approximately 75% of the providers submitted either entirely new of significantly revised data sets. Some of this may be attributed to the change in census geometry in S4, where more updates were required, even if their physical infrastructure remained the same.

In general, the submission 5 processes followed the same basic approach that was used in earlier submissions. This document summarizes the following:

- Submission 5 Processing Assumptions
- Reference Data Creation
- Processing of new provider data
- Additional automated quality control checks
- Improved validation techniques
- NTIA quality control scripts
- NTIA Submission Data Model Schema Changes

SUBMISSION 5 PROCESSING ASSUMPTIONS

Based on NTIA feedback and information provided in NTIA webinar sessions, the submission 5 data processing workflow is based on the following assumptions to meet NTIA submission requirements.

1. All census blocks and road segments are mapped based on 2010 census data set. Any data submitted in 2000 or 2009 format was converted to 2010 for submission.
2. For this submission we requested actual speed data from the providers in addition to max advertised and typical speeds. 75% of the providers provided this data to us. This data was then populated into an internal data model, was used to support validation efforts, and will be used to enhance the functionality of the state broadband web site.
3. Due to our NDA restrictions, last mile points are still not being submitted to NTIA.
4. Due to NDA restrictions and our inability to accurately flag service by “category of end user”, address points were not submitted to NTIA for any commercial provider.
5. Some providers did not submit middle mile elevation. Wherever possible, we went back to providers to obtain their middle mile elevation information, but it is not available for every record. Due to changes in the NTIA check script, when a provider provided us with and elevation that was negative (below grade level), this value was changed to zero so the check script would not report a failure even though we feel this is inaccurate.

6. Terrestrial Mobile Wireless and Terrestrial Fixed Wireless (licensed and unlicensed) were again treated as wireless coverage and were delivered as a shape. In cases where a provider served the same technology and spectrum with different speeds, overlapping areas were removed and the higher speed was assigned.

7. If a cable based wireline provider can provide both DOCIS 2.0 and DOCIS 3.0 service to the same area, the block or road was listed only once with a technology code of 40.

8. Providers were only willing to indicate on a general level if they severed business, residential or both, so we did not get any providers that broke down the type of service by block. Only if the provider stated they only serve business to business customers did we fill in the "category of end user" with a code of 2, otherwise this field was left blank.

9. The submission 5 Provider data model is currently based on the NTIA December 2011 data package.

SUBMISSION 5: REFERENCE DATA

This section describes the reference data used in submission 5.

BLOCK REFERENCE SETUP

For s5, Census 2010 data was utilized. The data was set up as follows:

- Block size (AREA) is calculated combining the 2010 land area (ALAND) and water area (AWATER)
- AREA is converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

ROAD REFERENCE SETUP

2010 Tiger Line IDs (TLID) were used for data processing in s5. The data was set up as follows:

- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
  - The 2010 road segment <u>is completely within</u> a block that is NOT less than 2 square miles
- Only minimum and maximum address ranges and a single zip code for each road segment is maintained.

SUBMISSION 5: PROCESSING OF NEW DATA

For submission 5, AppGeo started data collection on January 6th 2012 by sending out data update requests and technical data specifications to all providers. This incorporated all the NTIA changes released as of December 31st, 2011. These were sent to a large list of companies which were compiled from past collection efforts, and the revised FCC 477 list. The technical document highlighted the changes from Submission 4 to Submission 5. All new data was requested using Census 2010 geography whenever possible.

We then actively followed up with the providers. As we had discovered in the past, many of the providers listed on the FCC 477 list are either resellers, or not involved in the actual delivery of broadband. (Many are VOIP or teleconference service providers that utilize existing broadband connections.)

In our solicitation for data updates, we told known past providers that if we didn't hear from them by a certain date, we would default to using their data from Submission 4. We contacted them after the due date a few times but for two providers, we eventually had to just reuse Submission 4 data.

All data received went through the following processing steps:

1. **Triage**: All new data was quickly reviewed to understand what was received, and in what format. We also made sure we had all the required components for NTIA's data model, such as their FRN and advertised speed information. We also screened for any known issues that we might have seen before (such as Excel 2003 spreadsheets that cut off at 32k rows.)
2. **Ingest**: At this time the data is actually brought into our systems. Each provider is set up with a unique file geodatabase to store their information. Record counts of what was received is logged so that we can validate we did not drop anything in processing.
3. **Data Processing**: This is where the data goes through a number of ETL routines to convert the raw proprietary information into a format similar to the NTIA format. The exact routine utilized depends on how the data is received:

a. When a wireline provider submits a service boundary, we select all the blocks and roads inside that shape.
b. If a wireline provider submits a customer address list, the points are geocoded, and then the appropriate block or road segment is selected.
c. If a wireline provider submits block and road information using Census data, we just make sure everything is formatted to the appropriate specifications
d. If the wireline provider submits any type of road or line data that does not direct correlate to the TIGER data set, we convert the lines to TIGER by selecting the road centroid and spatially selecting the closed segment in our data set. If the road is in a block less than 2sqmi, than the block is selected. Some manual cleanup is also applied to make sure we do not accidentally drop any road segments that should have been processed.
e. Wireless provider data is formatted to ensure that there are no any overlapping polygons with the technology type. In addition the data is cropped to the state boundary.
f. After each round of processing, we make sure that we only keep unique records. A unique record is defined as having a one of a kind combination of FRN, Block/Road ID, and technology type. If there are multiple records with different speeds, but all else is equal, than we select the maximum of the advertised speeds.

4. **QC Review**: All data is then sent to a different analyst to perform a through quality control review on the processed data set. Record counts are compared to what was submitted. The QC staff also make sure the ETL scripts and routines populated all of the right fields.
5. **QA Review:** Data is then sent to another team for Quality Assurance Review. In this step the data is not only double checked against what was originally submitted, but it also brought up inside standardized MXD templates that allow us to make sure our results make sense. This often involves comparing the new data set with prior submissions, as well as looking for any possible technology or speed anomalies. At this stage we also start in on our validation process. This includes looking at the provider data in comparison to things such as speed test results, franchise boundaries, siting information, and feedback from the planning surveys.
6. **Provider Review:** Processed data is all posted to a customized web application we refer to as our Provider Portal. All providers were notified once their data was available in the site, and they were always given at least ten business days to review the data and respond. In this site, providers can log on and visually see their processed data in a map format. It also allows them to overlay their raw data to help them validate that we did indeed process things correctly. The provider portal also has a suite of markup tools that will allow the providers to edit their data, including adding or removing service areas, and making changes to the data attributes.
7. **Comment Processing:** All comments and feedback received from the provider portal, is then reviewed and applied to the processed data set. This updated data set goes back through our QA and QC processes, and if time allows, back out to the Provider Portal, for the provider to review and sign off on.
8. **Data Append:** After all of the individual data sets are processed and approved, we run an append process which merges all of the individual provider data sets into one geodatabase. This is also the point where our team will do any final transformations to get our working data model into the latest NTIA publishing format.
9. **Final QA/QC:** A series of quality checks are run on the final appended data sets to ensure it is ready for submission to NTIA. We also run the latest version of the NTIA receipt tool at this time. If any issues are flagged as failing they are reviewed and corrected. All warnings are also reviewed and either corrected or documented in the attached document which explains that we have validated this data and it should be accepted. Any last issues are corrected, and the data is sent to the state for their review.
10. **Submission to NTIA**

As with the fourth data submission, we followed the following protocols:

1. We did not collect data from resellers
2. We collected data from satellite providers, only if they were able to provide to us all of the required information we need to pass onto NTIA: including spectrum, FRN, and advertised speeds.

COMMUNITY ANCHOR INSTITUTIONS DATA

The community anchor institutions data was primarily populated through State resources, in particular the CEN database which services many schools, colleges, and libraries. The CEN database was significantly improved for this submission by working closely with the state's BTOP team.

We also were able to get a connection survey results for all the libraries through the state library association. Location information for all other CAI points, notably, police, fire, and town halls, were obtained through the Department of Public Safety. All of this information was then populated into an online data gathering and validation web based application. Each town was contacted and asked to update their respective site information. While the web based responses have not been as high as we would like, we do feel that we are fortunate to have a good base set of data from the state.

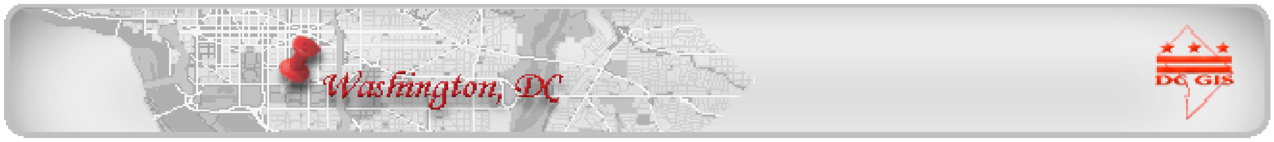
CONNECTICUT SPECIFIC INFORMATION

Due to Connecticut's geography and population, 99.75% of the census blocks in the state are less than two square miles. The need for us to break apart coverage based on blocks versus roads leads to a lot of unnecessary confusion as well as creates some distorted pictures when you try to visualize this information on a map. For this reason, all of the maps available on the CT.gov/broadband website are published after we convert all of the data to just use blocks.

In the documentation form NTIA there has been a lot of discussion about making sure that a provider uses the same DBA and FRN consistently across all feature classes. We mentioned this to the providers, but there was some push back. Most providers complied with this request, but a few providers pointed out that while they may share a common name, they actually operate as separate organizations. Also, due to regulatory implications of the different FRN's a few providers did insist that their records not be combined.

The State of Connecticut built and maintains the Connecticut Educational Network, which is used to provide one high speed network connection to each town in the state (typically fiber, but some outliers are still on DSL.) CEN network will typically install one fiber uplink in each town, and then it is the town's responsibility to provide connection between facilities. So for example CEN may supply the board of education's office with a 10mb connection, but then the board of education will run lines to each of the schools in the district. Because of this, many towns are reluctant to report speed information as there may technically be 10mb available to the school, but reporting that speed at each school would grossly overestimate how much connectivity they have in total, when in fact there may be 15 schools sharing that same uplink. In addition, CEN's primary mandate is to provide site to site connectivity between towns, and so they do not feel they meet the true definition of an internet provider, and as such, do not have a FRN. CEN is also limited by regulations to only support educational facilities, so they requested that their data only be shown as address points, as they cannot provide service to anyone else in that census block.

District of Columbia Spring 2012
State Broadband Availability Data Collection and Verification
Technical White Paper



District of Columbia Spring 2012

State Broadband Availability Data Collection and Verification Technical White Paper

Award #:	**11-50-M09011**
Award Period:	**10/1/2009 - 9/30/2014**
Project Type:	**State Broadband Initiative**
Organization Name:	**District of Columbia Office of Chief Technology Officer**
Project Title:	**ARRA SBDD - District of Columbia OCTO**
Contact:	**Matthew Crossett, Interim Geospatial Technology Manager**
Email:	**matthew.crossett@dc.gov**
Submission Date:	**April 1, 2012**

Introduction

The State Broadband Initiative (SBI) Program is a grant awarded by The National Telecommunications and Information Administration (NTIA), a division of the U.S. Department of Commerce. This Program is designed to fund projects that gather comprehensive and accurate state-level broadband mapping data, develop state-level broadband maps, aid in the development and maintenance of a national broadband map, and fund statewide initiatives for broadband planning.

The following white paper describes the data integration and verification processes employed by the District of Columbia in preparation of the broadband availability data submission to NTIA. This data collection is to be conducted on a semi-annual basis over a five-year period. The Spring 2012 data submission reflects conditions as of December 31, 2011.

The paper is divided into eight sections:

Section 1 - Data Submission: describes April 1, 2012 deliverables to NTIA.

Section 2 - Provider Participation: summarizes provider cooperation.

Section 3 - Data Collection: describes outreach and collection efforts.

Section 4 - DC Geospatial Data: describes the role of DC GIS data in broadband data processing.

Section 5 - Data Integration and Processing: describes data manipulation steps.

Section 6 - Data Validation: describes efforts to validate the data received.

Section 7 – Documentation and Submittal: Includes the NTIA final checklist steps.
Section 8 – Appendix: Documentation, forms, and maps

SECTION 1 - DATA SUBMISSION

The District of Columbia's Spring 2012 submission consists of the following files:

- **DC_SBDD_20120401.zip** – Consolidates all other files for the purpose of data transfer.
- **DC_SBDD_2012_04_01.gdb** – An ESRI file based geodatabase that conforms to the data model distributed by NTIA. It contains primary data and metadata. The District provides NTIA with five data sets:
    - **Community Anchor Institutions** – The location of community serving institutions and information about their broadband connections – if known.
    - **Middle Mile Connections** – The locations and attributes of infrastructure that interconnects broadband networks.
    - **Wireless Broadband Availability** – The service territories and attributes of wireless broadband providers including terrestrial fixed wireless and satellite.
    - **Wireline Broadband Availability –** The territories and attributes of wireline broadband providers with 2010 Census Block geography.
    - **Metadata –** Information about the data sets described above.
- **DC_DataPackage_2012_04_01.xls** –A report on broadband providers contacted and the status of their submissions.
- **DC_2012_04_01.txt** – An analysis of DC_SBDD_2012_04_01.gdb known as the "data submission receipt." This file is created by an automated script supplied by NTIA.
- **DC_Methodology_2012_04_01**.**pdf** – An electronic version of the following document.
- **DC_Readme_2012_04_01.txt** – A reduced file with the same information found in the header and section 1 of this white paper.

SECTION 2 - PROVIDER PARTICIPATION

- The PSC contacted 116 prospective broadband providers.
- Of those, 32 are believed to be providing broadband service in the District and are listed in DC_DataPackage_2012_04_01.xls.
- Of those, 22 meet the NOFA definition of available (either wireline and or wireless).
- 10 providers do not provide service in District within 10 days or are non-responsive.
- 10 provided middle mile data.

SECTION 3 - DATA COLLECTION

Collection of Broadband Availability Data

The District of Columbia Office of the Chief Technology Officer ("OCTO") was awarded a grant from NTIA to map the availability of broadband services in the District of Columbia ("District"). OCTO has delegated to the District of Columbia Public Service Commission ("PSC") the responsibility for all interaction, including data collection, with the broadband service provider community.

Process Steps

- **Identifying and Contacting Broadband Providers -** The work of identifying providers is conducted by the PSC. The PSC reviewed its own records and those of the FCC. The initial identification of providers took place prior to the spring 2010 data call and has been refined for each NTIA submission. Firms identified as providers were:
  - All firms in PSC records as providing any kind of telecommunications service in the District.
  - All firms identified by the FCC having filed a form 477 for broadband service in the District.
  - **Contacting providers -** The PSC requested the assistance and cooperation of all commercial broadband service providers that provide service to any residential, business, institutional, or government entity located within the District, to provide the PSC with broadband service location data. Whenever possible, providers are initially contacted by email. The package of material sent by the PSC to providers includes:
    - **A letter from the Chairman of the District of Columbia Public Service Commission.** Sample letters can be found in **Appendix 1**. Providers receive one of two letters based upon their previous submission:
      - Providers that submitted data from the previous round and met the NOFA broadband service and availability definitions.
      - Providers from the previous round that did not meet the NOFA definitions or are new BSPs.
    - **Non-Disclosure Agreement** (NDA) The PSC offers every provider opportunity to enter into a NDA between OCTO and the Provider. The standard OCTO NDA is shown in **Appendix 2**. The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of the public website on broadband services available within the District that is maintained by OCTO. Key provisions of the District's standard NDA include:

        - OCTO will provide the data to NTIA for the National Broadband Map.
        - The service territories of individual providers will not be made public by OCTO, but OCTO has created a public web site that allows users, including potential broadband service subscribers, to enter any valid address in the District of Columbia and be referred to all the broadband service providers offering service at that location.
        - Form 477 subscriber count data from all companies will be aggregated by OCTO at the Census Tract level. OCTO will use this information to estimate the residential broadband adoption rate by Census Tract. Estimated broadband service adoption rates will be made public, but the market share of individual broadband service providers will not be revealed.
    - **Technical Document –** The document provides detailed information on the requested data, data formatting, and data submission. The document is sent to providers that meet the NTIA definition of broadband availability (see **Appendix3**).
    - **Provider Submission Form -** The form is a Microsoft Excel based questionnaire which is accompanied by a glossary. **Appendix 4** contains a copy of the form and glossary. The form collects information on:
        - The Provider (Includes: business name, DBA name, FRN#, URL, etc.)
        - Transmission Technology
        - Business type (facility based or reseller)
        - Service Territory
        - Maximum advertised and typical upload and download speeds
        - Wireless spectrum
        - Middle mile connection points
- **Interaction with providers –** While we hope that all providers complete our forms, not all do. In practice OCTO will accept a variety of submission types and our policy is to work with providers interactively via email and phone whenever we or they have questions.

SECTION 4 - THE ROLE OF DC GEOSPATIAL DATA

DC GIS maintains several datasets that are integral to processing provider submissions. Each dataset and how it is employed is described below:

DC GIS Data Set (Click link to view and double click and zoom)	**Description**	**How the data is used in broadband processing**
Imagery	6" resolution 2010 ortho corrected imagery	GIS analysts superimpose provider service territory on imagery to ensure that submission fit the ground in a credible way. For example, do we have wireline service over water or parks?
DC Base Map	1" to 100' planimetric map.	Used similarly to imagery.
Master Address Repository	A precisely located point for every address in the District	Used to process address lists submitted by broadband providers. Also used to locate and map Community Anchor Institutions.
Education Libraries Health Public Safety Recreation	A variety of GIS layers that include Community Anchor Institutions locations	Used to identify and survey as many Community Anchor Institutions as possible.
Real Property	Ownership data with use codes	Used to ensure that broadband providers who provide to business are not shown as providing service in residential areas.
InfoUSA ISP Connectivity Database	Connectivity provider and connection type records by IP	Used to verify provider service area.

SECTION 5 - DATA INTEGRATION

- **Broadband Provider Data Submission Check-in**
  - Provider data submissions are received in several ways
    - Providers send email file attachments to the PSC.
    - Providers submit data by courier.
    - Providers upload the data to a secure OCTO FTP site.
    - Provider notifies the PSC that data has not changed since last submission
    - Submit updates through the Provider Portal.
  - PSC will then contact OCTO that new data has been received.
  - Scanned for viruses.
  - Entered into a submission tracking database.
  - Give an initial review to ensure that each major component is present.

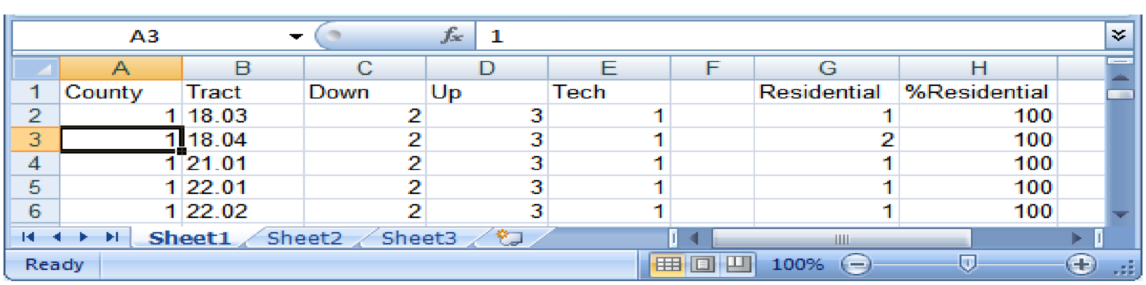
- **OCTO Data Ingestion –** The District of Columbia has implemented data submission and data processing tracking software. After the submission has been checked in by the PSC and received by OCTO, the provider submission status is entered into a data tracker database to reflect the current status of receipt and contents of the submitted data package.

- **Wireline Data Processing -** The following information was collected.
  - Provider Name
  - Doing Business As Name
  - FRN (Federal Registration Number)
  - Census Tract and Block number
  - Technology of Transmission
  - Maximum Download speed
  - Maximum Upload
  - Typical Download Speed
  - Typical Upload Speed

- **Wireline Data Processing - Geography**
  - **Service territory description -** In order for a provider to be eligible and have their data processed, the Company's service territory must offer broadband service to new customers within 10 days of a service order without extraordinary effort. Note: A Company can have multiple service territories within the District of Columbia, and those territories need not be contiguous. NTIA requires that the service territory be mapped

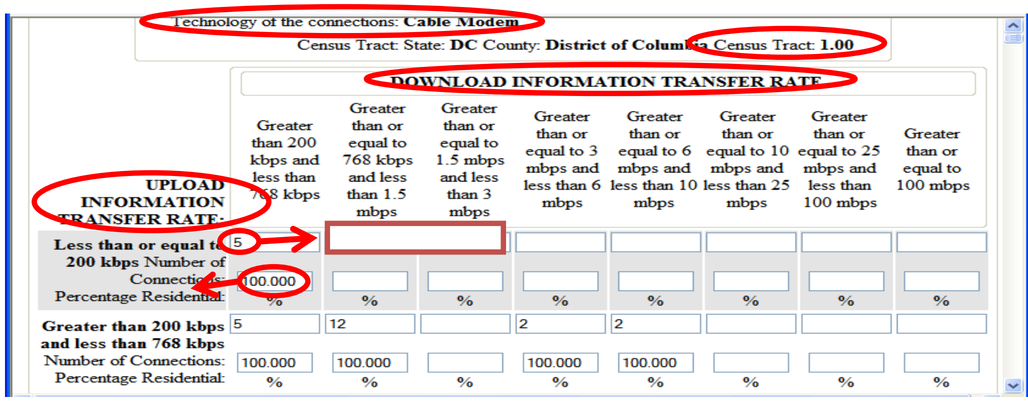
to the Census Block. Companies have several options for describing their service territory:

- **District-wide broadband service provider.** The Company must offer broadband service to all customers of the entire District of Columbia. If the Company meets the definition, the description of the Company's service territory is complete. The following definitions apply:
  - **"Broadband service"** is the provision to end users of two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (Kbps) downstream and greater than 200 Kpbs upstream.
  - **"Offer"** means that the Company can provide broadband service to end users (a residential, business, institutional or government entity) within 10 business days of a service order without an extraordinary commitment of additional resources. It also interprets "offer" to be a commercial service. We are not mapping free services such as Wifi hotspots at this time. District of Columbia's free Wifi hotspots are included in the Community Anchor Data.
  - The **"entire District of Columbia"** means that a wireline company offers service to residential, business, institutional, or government end users in every Census Block in the District. This definition expressly excludes parkland, cemeteries, institutional campuses, bodies of water. The definition also excludes real estate complexes where the landlord, condominium association, or similar entity controls the provision of wireline service. Even if the firm doesn't offer service in all categories, it can still be a District-wide provider. Providers that service non-residential customers only are restricted to reporting service to commercial, high density residential, and industrial areas as defined by property use codes. Any firm claiming to be a citywide provider receives greater scrutiny.
- **Non District-wide broadband service provider.** Any of the following may describe the Company's service territory:
  - **List of Census Blocks –** The Company may provide a list of Census Blocks in which they offer service. The list should be provided in a Microsoft Excel File or Text File with each Census Block listed on a separate row.



	A	B	C	D	E	F	G	H
1	County	Tract	Down	Up	Tech		Residential	%Residential
2	1	18.03	2	3	1		1	100
3	1	18.04	2	3	1		2	100
4	1	21.01	2	3	1		1	100
5	1	22.01	2	3	1		1	100
6	1	22.02	2	3	1		1	100

- **Address File** - If service is only offered to certain addresses, a list of those addresses may be submitted. Address lists (whether for buffering or not) should be submitted in a Microsoft Excel table or text file with each address on a separate row. Address lists are geocoded to the structure using the District's Master Address Repository. OCTO encourages providers to submit all addresses where service can be provided within 10 days not just the address of current subscribers.
- **Written Description –** The Company may describe one or more polygons. For example, a service territory in part of downtown could be described as "East of 23rd Street NW, South of K Street NW, West of 17th Street NW, North of Constitution Ave NW. " Alternatively, the territories can be described by using buffers, for example, "Within 500 feet of 441 4th Street NW Washington DC 20001."
- **Detailed Map(s)** – Submitted maps should delineate the service area boundaries and label all DC streets within those boundaries. The map may be a PDF file. Geographic Information System (GIS) or Computer Aided Design files may be submitted in lieu of a map.
- **Form 477** – The Form 477 already includes a list of Census Tracts where the firm has existing customers. Census Blocks nest within Census Tracts. Optionally, the Company may indicate that it wishes to use the Census Tracts already listed within its Form 477, minus a list of Census Blocks within those Tracts in which it does not offer service.



- **Wireless Data Processing –** Wireless providers provide a polygon shapefile of their coverage area(s). If they are an existing provider they communicate if the coverage information has changed or resubmit a new shapefile of their coverage area. The majority of wireless provider's service areas are District-wide. The following information was collected.
    - Provider Name
    - Doing Business As Name
    - FRN (Federal Registration Number)
    - Technology of Transmission
    - Spectrum
    - Maximum Download speed
    - Maximum Upload Speed
    - Typical Download Speed
    - Typical Upload Speed

- **Middle Mile Data Processing -** Broadband service providers are also asked to list "middle-mile and backbone interconnection points" in the District of Columbia. Interconnection points are facilities that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. Collectively, (a) and (b) are middle-mile and backbone interconnection points. The following information was collected.
    - Provider Name
    - Dosing Business As Name
    - FRN (Federal Registration Number)
    - Ownership Status
    - Serving Facility Capacity
    - Serving Facility Type
    - Location
    - Elevation

- **Community Anchor Institutions -** As part of the reporting requirements for the grant, OCTO is required to collect a list of Community Anchor Institutions (CAI) and report broadband service available at these institutions. The dataset consists of schools, libraries, medical and healthcare providers, public safety entities, institutions of higher education, and other community support entities. Data is compiled from various district agencies and by contacting institutions directly. Non-government community anchors are contacted to complete an online survey. The survey requested the internet service type and service speed at the institution's location(s). **Appendix 5** contains a copy of the Community Anchor Institution online survey form.

- **Data Review and Consultation with Providers**
    - If a component of the submission is missing, an OCTO GIS analyst will contact PSC for assistance to receive the missing data from the provider.
    - PSC and OCTO will schedule several meetings before final submittal: to review what providers have submitted data and who has not, discuss action points that need to be addressed, and review the process for areas of improvement.
    - Contact providers as needed to verify the submitted data. Most providers respond openly and are willing to make changes to their submissions when questions are raised.
    - Contact providers to review the processed data through the provider portal mapping application.
    - The NTIA receipt script is run against each provider submitted dataset separately. Repairs and reruns are iterated until the dataset successfully passes.

SECTION 6 - DATA VALIDATION

- **Data Sources and Uses for Validation**
  - **Provider Communication and Feedback** –The District of Columbia's unique geography allows for focused communication with providers to resolve possible anomalies or errors in data submissions.
  - **DCGIS spatial datasets**
    - The Master Address Repository, a robust dataset of valid address within the District, is utilized to verify submitted address data.
    - Land use data aggregated to the census block level is utilized to create potential service areas for District-wide non-residential only providers. The land use code data was utilized in earlier submissions to eliminate obvious census blocks where providers could not provide service (i.e. water bodies, parks, etc.). Provider submissions have become more defined in recent submissions.
  - **Form 477** –Utilized to identify/validate providers, transmission of technology, service area, potential speed tiers, FRNs, end users, and adoption rates.
  - **Wireless Drive Tests** – Utilized to identify/validate providers, service area, and to a lesser extent typical speed tiers. New wireless drive tests are planned for 2012.
  - **FCC Broadband Data Tests** – Utilized to validate service areas and providers.
  - **InfoUSA Broadband Data (Commercial Database)** – Utilized to validate service areas of providers.
  - **Community Anchor Institution (CAI) Surveys** – Those subscribing to commercial providers are used as an additional resource to validate provider service areas.
  - **Provider Websites** – Verify advertised speeds.
  - **Future Data Sources (Fall 2012)**
    - Connect.dc.gov speed test data – Will be used to validate service areas and providers.
    - Updated wireless drive tests - Will be used to validate service areas and providers.
    - Public online survey – Will be used to validate service areas and providers.

- **Wireless Validation -** The District completed drive testing of major wireless providers. Drive tests were completed in a single vehicle employing multiple laptops and GPS. This was accomplished by installing computer and GPS hardware and software in a vehicle and testing and mapping upstream and downstream transmission speeds. At this time, the District has not shown the drive test data to providers nor discussed our collection techniques with them. This data was collected with public funds and is not covered by NDAs, but DC has not made a decision to release it publically at this time. All providers who claim to be providing citywide wireless service are providing it, and to that end the District will declare all providers who submitted service territories to be "valid". That said, speed of service does drop below the definition of broadband, and does vary across providers, place, and time. The District did not conduct new drive testing for spring 2012 but plan to. The fall 2010 drive testing results can be found in **Appendix 6.**

- **Wireline Validation**
    - The District, through PSC, has made extensive use of FCC Form 477 data. The Form 477 is used to, verify that we have contacted the correct providers, compare the technology of transmission and speed of transmission between what was reported to the FCC and what was submitted by the provider, compare the geography reported to the FCC by census tracts with the areas submitted to the District by census blocks. When discrepancies are found, the providers are asked for more information.
    - The District purchased a database of broadband subscribers from a commercial mailing list company InfoUSA. This dataset and the FCC broadband test data, and CAI survey data are used to crosscheck data coming from providers. When discrepancies are found, the providers are contacted to determine the validity of the data.

- **Middle Mile Validation –** To date the district has not attempted to validate middle mile data other than checking locations against GIS base data to be sure they are plausible.

- **Final Review -** All data undergoes a standup review conducted jointly by OCTO and PSC staff. Do service territories seem plausible? Do speeds seem realistic? How do speeds compare to other providers using similar technologies? What is the total DSL, Cable, Fiber coverage and does it seem plausible?

- **Amalgamation and documentation** - Unless a provider's submission is conclusively invalidated (which hasn't happened) and the issue cannot be resolved with the contributing provider, it is included in the amalgamation phase. Until this stage, OCTO handles each submission separately. During this stage, all successful submissions are appended to the latest version of the NTIA/NSGIC geodatabase model, and requested transmittal forms are prepared.
    - The data is appended to the NTIA geodatabase model.
    - The amalgamated data is given a final quality review by the GIS Analysts involved in the broadband grant program.
    - FGDC Compliant metadata is prepared and included in the geodatabase.
    - The NTIA provided script is run for the last time on the data set as a whole.

SECTION 7 - DOCUMENTATION AND SUBMITTAL

Once past the quality review, the data package documents are updated the data sets are submitted to NTIA/FCC via secure FTP. The checklist provided by NTIA is below:

- Have you obtained a new clean Transfer Data Model?
- Have you followed the instructions for loading data into the Transfer Data Model?
- Have you run the receipt process (SBDD_CheckSubmission) and resolved all data integrity issues?
- Have you included your receipt text file as part of the package?
- Have you populated the metadata fields?
- ~~Have you exported the metadata as .xml files?~~
- Have you obtained a new data_package.xls and filled it out appropriately?
- Have you included methodological description?
- Have you followed the required naming conventions of all the files?
- If you are resubmitting any data for the current collection, have you (a) deleted your previous submission (b) informed the Program Office or the FCC of your resubmission and (c) resubmitted your entire data package (e.g., the Program Office is not accepting an partial submissions)?

Appendix 1

Letters from Public Service Commission to Prospective Broadband Providers

PSC letter to Providers that submitted data from the previous round and meet the NOFA requirements

Dear (Insert Name of BSP contact):

The District of Columbia ("District") Public Service Commission ("Commission") and the Office of the Chief Technology Officer ("OCTO") would like to thank you for your continued participation in the District's Broadband Service Mapping Program. To meet the objectives under the National Telecommunications and Information Administration ("NTIA") State Broadband Data and Development Grant Program, the Commission requests the assistance and cooperation of all broadband service providers that enable a residential, business, institutional, or government entity located within the District to use broadband Internet services. At this time, the Commission is now requesting broadband service availability data **current as of December 31, 2011** for processing and review before submittal to NTIA for the spring 2012 National Broadband Map and database update.

Please note that the NTIA has requested that data be submitted using the Census 2010 geography if applicable. **The Commission requests broadband service providers submit their data updates by Wednesday, March 14th 2012, to allow an adequate time period for OCTO to process and review the data submission.** Information on data submission options can be found in the attached document.

I request that you also provide us with a copy of your company's Broadband Service Report for the District of Columbia (Form 477) filed with the Federal Communications Commission ("FCC") on or before March 1, 2012. This will help OCTO identify any improvements or changes in the adoption rates for broadband services within the District.

If your company submitted, in association with a previous broadband data submission, a Non-Disclosure Agreement ("NDA") with OCTO, even though the two-year term of the NDA has expired, it will continue to be honored by OCTO. If your company would like to sign an amendment to the previous NDA that extends it for the additional three-years of this program or if your company would like to sign a NDA for the first time with OCTO please email your request to Virgil Young: vyoung@psc.dc.gov. The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of OCTO's website on broadband services available in the District.

Thank you in advance for completing this data request. We have attempted to make the process minimally burdensome, but understand that questions may arise. Should you have any questions regarding this data request, please contact my Policy Advisor, Cary B. Hinton, at chinton@psc.dc.gov or 202-626-9186.

More information regarding requested data, data formats, and submission options are outlined in the attached document. As a reminder, we have provided access to the District's Broadband Provider Portal to view and edit processed datasets. As a courtesy, account credentials issued during the last round of data collection are provided below. The portal can be accessed at the following URL.

http://host.appgeo.com/DistrictofColumbiaProviderPortal/

Your secure login account is provided as follows:

Username:
Password:
Thank you for your assistance,

Betty Ann Kane

Chairman
District of Columbia Public Service Commission

ATTACHMENT (1): DC_SBDD_TechnicalDocumentSpring2012.pdf

PSC letter to Providers that did not meet NOFA requirements from the previous round

Dear (Insert Name of Group #2 BSP contact):

The District of Columbia ("District") Public Service Commission ("Commission") and the Office of the Chief Technology Officer ("OCTO") would like to thank you for your continued participation in the District's State Broadband Initiative.

At this time, the Commission is now requesting broadband service availability data **current as of December 31, 2011** from providers that meet the definitions described below. This data is used by the National Telecommunications and Information Administration ("NTIA") to update the National Broadband Map and to assist broadband planning efforts in the District and at the national level. **The Commission requests broadband service providers submit their data updates by Wednesday, March 14th 2012, to allow an adequate time period for OCTO to process and review data submissions.**

Overview

To meet the objectives under the NTIA's State Broadband Initiative, the Commission requests the assistance and cooperation of all broadband service providers by submitting the availability, technology of transmission, and downstream/upstream services if the company or organization:

1. Offers broadband services to end users in the District, or service could be established, without an extraordinary commitment of resources; or
2. Owns facilities in the District that make possible the delivery of broadband services by other companies that meet the description above.

Definitions

For the purposes of this Program, NTIA has adopted the following definitions for the State Broadband Initiative:

"Broadband service" is the provision of data transmission technology that provides two-way data communication with the Internet with advertised speeds of at least 768 kilobits per second ("kbps") downstream and greater than 200 kbps upstream to end users.

An entity is a **"facilities-based"** provider of broadband service connections to end user locations if any of the following conditions are met:

1. It owns the portion of the physical facility that terminates at the end user location;
2. It obtains unbundled network elements ("UNEs"), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or
3. It provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

Service is **"available"** at an address if the service provider currently provides service to a location, or if broadband service could be established, without an extraordinary commitment of resources, in a 7 to 10 business day period.

"End User" is a residential or business party, institution or state or local government entity, including a Community Anchor Institution, that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access services. Internet Service Providers ("ISPs") are not "end users" for this purpose.

Data Request

If your company or organization meets the NTIA terms above and **has not** participated in a previous data submission, please contact Virgil Young Jr., Senior Telecommunications Analyst, at vyoung@psc.dc.gov for additional information and resources. The Commission encourages all broadband service providers to participate in the data collection effort in order to provide the Commission a better understanding of broadband services offered in the District and at the national level.

If your company or organization does not meet the NTIA terms above, I respectfully request that the attached service data questionnaire be completed. While not a requirement under the NTIA grant program, it will provide the Commission a better understanding of broadband services offered in the District, see attached "DC Broadband Mapping Questionnaire – Spring 2012". The information will not be part of the NTIA data submission. Please submit the questionnaire as an attachment to an e-mail response to Virgil Young: vyoung@psc.dc.gov. **The Commission requests broadband service providers submit the questionnaire by Wednesday March 14th 2012.**

Additionally, please provide information on the following items to Virgil Young.

1. If your company or organization has merged, sold, or bought another broadband service provider in the District or if your company has ceased operations in the District. This can have an impact on the data submitted to the NTIA.

2. If your company or organization does not currently provide broadband Internet access services to a residential, business, institutional, or government entity located within the District

Form 477

I also request that you provide us with a copy of the Broadband Service Report for the District of Columbia (Form 477) filed with the Federal Communications Commission ("FCC") on or before March 1, 2012. This will help OCTO identify any improvements or changes in the adoption rates for broadband service within the District. A "Raw data upload file for Part VI" text file, as described in the 'Completing and Filing FCC Form 477' document, is preferred but the District will accept a pdf copy.

The Form 477 can be submitted using one of several methods.

- Submit a new dataset to Virgil Young at the PSC via e-mail vyoung@psc.dc.gov.
- Submit a new dataset by requesting a temporary login to a secure FTP site.
- Submit a new dataset via postal service.

Matthew Crossett
GIS Program Manager
1100 15th St NW, 9th Floor
Washington, DC 20005

Non-Disclosure Agreement

If your company would like to sign a Non-Disclosure Agreement ("NDA") with OCTO please email your request to Virgil Young: vyoung@psc.dc.gov. The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of OCTO's website on broadband service availability in the District.

If your company or organization submitted a NDA with OCTO in association with a previous broadband data submission, it will continue to be honored by OCTO even though the two-year term of the NDA has expired. If your company would like to sign an amendment to the previous NDA that extends it for the additional three-years of this program please email your request to Virgil Young: vyoung@psc.dc.gov.

Thank You for Your Participation

Thank you in advance for completing this data request. We have attempted to make the process minimally burdensome, but understand that questions may arise. Should you have any questions regarding this data request, please contact my Policy Advisor, Cary B. Hinton, at chinton@psc.dc.gov or 202-626-9186.

Thank you for your assistance,

Betty Ann Kane

Chairman

District of Columbia Public Service Commission

Attachments:

1. DC Broadband Mapping Questionnaire – Spring 2012
2. Broadband Data Definitions – Spring 2012

Appendix 2
Standard Non-Disclosure Agreement

NON-DISCLOSURE AGREEMENT

(District of Columbia Broadband Service Mapping)

This **Non-Disclosure Agreement** ("**Agreement**") is between the Office of the Chief Technology Officer of the District of Columbia ("OCTO") and __________________ ("Company"), a corporation having a business address at ____________________ ____.

RECITALS

A. Company wishes to disclose and OCTO wishes to receive certain information from Company represented by Company to be confidential and commercial / proprietary information (hereinafter collectively, "Information") pertaining to _________________. This exchange includes all communication of Information between the parties in any form whatsoever, including oral, written and machine readable form, pertaining to the above.

B. OCTO wishes to receive and Company wishes to disclose the Information for the sole purpose of participating in national broadband service mapping activities. OCTO will disclose the information only in the following ways:

To The public:

- The service territories of individual providers will not be made public, but OCTO will create a public web site that allows users, including potential broadband service subscribers, to enter any valid address in the District of Columbia and be referred to all the broadband service providers offering service to that location.

- Form 477 subscriber count data from all companies will be aggregated by OCTO at the Census Tract level. OCTO will use this information to estimate the residential broadband adoption rate by Census Tract. Estimated broadband service adoption rates will be made public, but the market share of individual broadband service providers will not be revealed.

To the U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA):

- The broadband service data required by the NTIA in the Notice of Funds Availability; clarification published in the Federal Register; August 7, 2009 (74 FR 40569).

To the Metropolitan Police Department and the District of Columbia Homeland Security and Emergency Management Agency:

- Middle-mile connection points will be added to the District's critical infrastructure data base. This critical infrastructure database is used only for public safety purposes. These data will not be shared outside law enforcement and homeland security communities.

AGREEMENTS

Therefore, OCTO and Company agree as follows:

1. That the disclosure of Information by Company is in confidence and thus OCTO agrees to:

a. (1) Not disclose the Information to any other person, and (2) use at least the same degree of care to maintain the Information confidential as OCTO uses in maintaining as confidential its own confidential information, but always at least a reasonable degree of care;

b. Use the Information only for the above purpose;

c. Restrict disclosure of the Information solely to those employees or contract staff of OCTO having a need to know such Information in order to accomplish the purposes stated above; The District Government operates an in-house broadband service provider known as DC Net, accordingly, the Information expressly will <u>not</u> be shared by OCTO with DC Net as an organization or its employees.

d. Advise each such individual, before he or she receives access to the Information, of the obligations of OCTO under this Agreement, and require each such individual to maintain those obligations.

2. This Agreement imposes no obligation on OCTO with respect to any portion of the Information received from Company which: (a) was known to OCTO prior to disclosure by Company, (b) is lawfully obtained by OCTO from a third party under no obligation of confidentiality, (c) is or becomes generally known or publicly available other than by unauthorized disclosure, (d) is independently developed by OCTO or (e) is disclosed by Company to a third party without a duty of confidentiality on the third party.

3. This Agreement imposes no obligation on OCTO with respect to any portion of the Information unless such portion is: (a) disclosed in a written document or machine readable media marked as "COMMERCIAL / PROPRIETARY INFORMATION" at the time of disclosure, or (b) disclosed in any other manner and summarized in a memorandum mailed to OCTO within thirty (30) days of the disclosure. Information disclosed by Company in a written document or machine readable media and marked "COMMERCIAL / PROPRIETARY INFORMATION" includes, but is not limited to, the items, if any, set forth in the request for broadband service data from the District of Columbia Public Service Commission ("Commission"); attached hereto. The Commission's request for broadband service data is incorporated herein by reference. OCTO

hereby acknowledges receipt of the items listed in the Commission's request for broadband service data, if any.

4. The Information shall remain the sole property of Company.

5. In the event of a breach or threatened breach or intended breach of this Agreement by either party, the other party shall be entitled to preliminary and final injunctions, enjoining and restraining such breach or threatened breach or intended breach.

6. OCTO agrees it will not export, directly or indirectly, any technical data acquired from Company or any product utilizing any such data to any country for which the U.S. Government or any agency thereof at the time of export requires an export license or other governmental approval, without first obtaining such license or approval.

7. The validity, construction, and performance of this Agreement are governed by the laws of the District of Columbia, and suit may be brought in the District to enforce the terms of this Agreement.

8. The rights and obligations of the parties under this Agreement may not be sold, assigned or otherwise transferred.

This Agreement is binding upon OCTO and Company and upon the directors, officers, employees and agents of each. This Agreement is effective as of the later date of execution and will continue indefinitely.

Office of the Chief Technology Officer of the District of Columbia

By

Name:________________________________

Title:_________________________________

Date:_________________________________

(Company)

By:

Name:________________________________

Title:_________________________________

Date:____________________________________

Appendix 3
Technical Document

DISTRICT OF COLUMBIA

SBDD DATA SUBMISSION TECHNIAL DOCUMENT

SPRING 2012

<u>REQUESTED DATA</u>

Under the directive of the NTIA State Broadband Data and Development grant program, the District requests Internet Service providers in the District submit the following data in an approved data format. OCTO will provide guidance and assistance as needed.

- The provider's available broadband service area, technology of transmission, download and upload speeds
- Middle mile infrastructure
- FRN (FCC Registration Number)
- FCC Form 477 (March 1, 2012 filing)
- End User Type. If possible, the NTIA is requesting the type of end user for each record. Please refer to the NTIA code tables at the end of the document.

Please send an email to Mr. Young if your company has merged, sold, or bought another broadband service provider in the District or if your company has ceased operations in the District, as this can have an impact on the data submitted to the NTIA.

NTIA Definition of Terms

"Broadband service" is the provision of data transmission technology that provides two-way data communication with the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end users.

Service is "available" at an address if the provider currently provides service to a location, or if broadband service could be established, without an extraordinary commitment of resources, in a 7 to 10 business day period.

Internet Service Providers (ISPs) are not "end users" for this purpose. An entity is a "facilities-based" provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

BROADBAND AVAILABILTY AND MIDDLE MILE DATASET SUBMISSION OPTIONS

The broadband service availability and middle mile dataset can be submitted using one of several methods.

- If the dataset has not changed since last submission, the provider can verify so through the provider portal mapping application. OCTO will use this dataset for the Spring 2012 submission.
- The provider can submit a new dataset to Virgil Young at the PSC via e-mail vyoung@psc.dc.gov .
- The provider can submit a new dataset by requesting a temporary login to a secure FTP site.
- The provider can submit a new dataset via postal service.

Matthew Crossett
GIS Program Manager
1100 15th St. NW
Washington, DC 20005

- The provider can edit the previous submission through the provider portal mapping application to current as of December 31st 2011.

FCC FORM 477 SUBMISSION OPTIONS

The request for Form 477 filings will assist the District track broadband adoption rates and provide an additional resource to verify data submissions. A "Raw data upload file for Part VI" text file, as described in the 'Completing and Filing FCC Form 477', is preferred but the District will accept a pdf copy. The Form 477 can be submitted using one of several methods.

- The provider can submit a new dataset to Virgil Young at the PSC via e-mail vyoung@psc.dc.gov .
- The provider can submit a new dataset by requesting a temporary login to a secure FTP site.
- The provider can submit a new dataset via postal service.

Matthew Crossett
GIS Program Manager
1100 15th St. NW
Washington, DC 20005

WIRELINE PROVIDER DATA FORMATS

Wireline data are requested in one of the following data submission formats and the tables must include all required information by reporting method (Address point or census block).

- Flat text files (.csv or .txt)
- Spreadsheets (Excel)
- Database tables (Access or SQL).

The data will be processed to NTIA data standards and reviewed. Providers will have the ability to review and verify the processed datasets before the data is submitted to the NTIA grant office.

Address point table definition

Broadband availability can be reported by address. The table should include address records for all locations that are currently serviced and addresses that could be serviced within ten days. Required data in the table include the FRN, address, the Technology of Transmission, and the Maximum Up/Down speeds. If more than one transmission type services an address, it must be reported as a separate record. The data will be aggregated to the census block geography. Refer to the code tables at the end of the document to populate the table.

FRN	Address	ZIP Code	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed*	Typical Upstream Speed*	End User Category*
12345678	12 3rd St NW	12345	50	8	5	6	4	1
12345678	56 6th St NW	12345	41	5	2	4	1	1

*Requested but not required.

Census block table definition

Broadband availability can be reported by census block (2010 geography). The table should include census block records for all locations that are currently serviced as well as those that could be serviced within ten days. Required data in the table include the FRN, full FIPS Census Block ID, the Technology of Transmission, and Maximum Up/Down speeds. If more than one transmission type services a census block, it must be reported as a separate record. Refer to the code tables at the end of the document to populate the table.

FRN	Census Block 15-digit FIPS	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed*	Typical Upstream Speed*	End User Category*
12345678	123456789012345	50	8	5	6	4	1
12345678	123456789012346	41	5	2	4	1	2

*Requested but not required.

WIRELESS PROVIDER DATA FORMATS

The wireless data should be submitted as a geographic dataset with polygons depicting the extent of the service area and attributed with the requested broadband service information. Typical data formats include shapefiles or kml files. Required data in the table include the FRN, the Technology of Transmission, Spectrum, and Maximum Up/Down speeds. Please refer to the NTIA code tables at the end of the document to populate records.

FRN	Technology of Transmission	Spectrum	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed*	Typical Upstream Speed*
12345678	80	1	4	3	4	2

*Requested but not required.

MIDDLE MILE DATA FORMAT

Middle mile data are requested in one of the following data submission formats with requested infrastructure information.

- Flat text files (.csv or .txt)
- Spreadsheets (Excel)
- Database tables (Access or SQL).

Required data in the table include FRN, Ownership Status, Serving Facility Capacity, Serving Facility Type, Lat/Long, and Elevation (if known). Addresses can be substituted for lat/long coordinates. OCTO will geocode the addresses and populate the records with the correct coordinates. Please refer to the NTIA code tables at the end of the document to populate records.

FRN	Owned or Leased	Serving Facility Capacity	Serving Facility Type	Latitude (Optional if address provided)	Longitude (Optional if address provided)	Elevation (in feet from grade)
12345678	1	4	1	38.02	-77.23	0

NTIA CODE TABLES

Provider Technology of Transmission Codes

Code	Description
10	Asymmetric xDSL
20	Symmetric xDSL
30	Other Copper Wireline - All copper-wire based technologies other than xDSL (Ethernet over copper and T-1 are examples)
40	Cable Modem - DOCSIS 3.0
41	Cable Modem - Other
50	Optical Fiber or Fiber to the End User
60	Satellite
70	Terrestrial Fixed Wireless - Unlicensed
71	Terrestrial Fixed Wireless - Licensed
80	Terrestrial Mobile Wireless
90	Electric Power Line
0	All Other

Speed Tier Codes

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

End User Category Codes

Code	Description
1	Residential user
2	Governmental user
5	Other

Wireless Spectrum Codes

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

Middle Mile Serving Facility Type Codes

Serving Facility Type Code	Description
1	Fiber
2	Copper
3	Hybrid Fiber Coax (HFC)
4	Wireless

Middle Mile Serving Facility Capacity Codes

Serving Facility Capacity Code	Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 mbps and less than 600 mbps
4	Greater than or equal to 600 mbps and less than 2.4 gbps
5	Greater than or equal to 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

Middle Mile Ownership Codes

Code	Description
0	Owned
1	Leased

Appendix 4
Provider Questionnaire and Glossary

District of Columbia - Mapping Questionnaire Spring 2012

This questionnaire is directed to providers that have not qualified for participation in the National Broadband map. Each sheet collects a different type of information. Tabs at the bottom of the workbook allow users to switch among the three sheets.

Date Submitted:<mm/dd/yyyy>	
Company Name:	
Doing Business As:	
FRN #:	
Contact Name:	
Contact Email:	
Contact Address1:	
Contact Address2:	
Contact City, State Zip code:	

1.1 Provide a URL of the Company's website to which the District should refer potential broadband service subscribers.

1.2 Is your Company a facility based provider or a reseller? Please select the cell next to the technology that you provide and choose from the dropdown menu which business type applies.

Technology	Business Type	Technology	Business Type
10 Asymmetric xDSL		60 Satellite	
20 Symmetric xDSL		70 Terrestrial Fixed Wireless - Unlicensed	
30 Other Copper Wireline *(All copper-wire based technologies other than xDSL. Ethernet over copper and T-1 are examples)*		71 Terrestrial Fixed Wireless - Licensed	
40 Cable-DOCSIS 3.0		80 Terrestrial Mobile Wireless	
41 Cable-Other		90 Electric Power Line	
50 Optical Carrier/Fiber to the End User *(Fiber to the home or business end user. Does not include "fiber to the curb")*		0 Other *(Any Specific technology not listed above)*	

1.3 If your company is a resller, who is the facility based provider(s)?

1.4 Complete the following dropdown table for each Technology of Transmission that your company provides.
(One row for each Technology of Transmission - click on the cell to view a list of selections per column).

	Technology Transmission		Districtwide*	Maximum Advertised Speed		Typical Speed	
	Code	Description	Yes/No	Download Speed	Upload Speed	Download Speed	Upload Speed
(Ex.1)	*10 Asymmetric xDSL*		*Yes*	*768 kbps to 1.49 mbps*	*201 to 767 kbps*	*1.5 to 2.9 mbps*	*768 kbps to 1.49 mbps*
1							
2							
3							
4							
5							

***Districtwide Definition**: The Company must be able to "offer broadband service" to the "entire District of Columbia", (residential, business, institutional or government entity **within 10 business days** of a service order without an extraordinary commitment of additional resources.) with advertised speeds of **at least 768 kilobits per second (Kbps) downstream and greater than 200 Kpbs upstream**.*

1.5 For each Technology of Transmission that was selected in 1.2 how long does it take to provide service to a customer after service has been ordered? (Click on the cell next to each Technology you provide and select the length of time from a drop-down list).

Technology	Length of time to provide service	Technology	Length of time to provide service
10 Asymmetric xDSL		60 Satellite	
20 Symmetric xDSL		70 Terrestrial Fixed Wireless - Unlicensed	
30 Other Copper Wireline		71 Terrestrial Fixed Wireless - Licensed	
40 Cable Modem - DOCSIS 3.0		80 Terrestrial Mobile Wireless	
41 Cable Modem - Other		90 Electric Power Line	
50 Optical Carrier (Fiber to end user)		0 All Other	

1.6 For each Technology of Transmission that was selected in questions 1.2, please provide your service area in any of the following data formats (each data format should include technology of transmission, maximum advertised download and upload speed, typical download and upload speed):
- GIS or CAD file(s)
- Text file or Excel Spreadsheet listing service addresses
- Text file or Excel Spreadsheet with a list of Census Blocks with Tract numbers

See graphics below of sample data formats

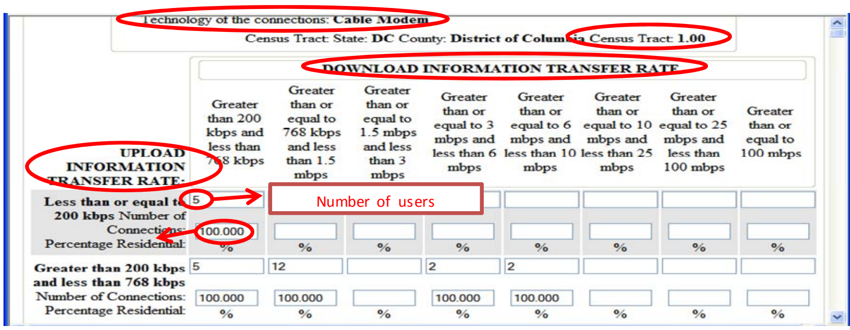
1.7 Does your company primarily make your service available to residential or non-residential (i.e. business) customers?

1.8 Can you provide this service within 10 business days of a service order without extraordinary commitment of additional resources?

1.9 If you provide broadband service and can offer it to customers (residential, business, institutional, or government entity) in the District of Columbia within 10 business days of a service order without extraordinary commitment of additional resources, the District of Columbia Public Service Commission encourages your participation in the State Broadband Mapping Program. We will be happy to discuss the benefits of participation with you.

1.10 Please provide a copy of your most recent filing of Form 477 to the FCC. Provide attachment filenames below. See data request letter for delivery options.

Ex. of Form 477 by Census Tract - Includes Technology of Transmission; Census Tract; Transfer Rate; Number of Users; and Percentage Residential.



__Proceed to Sheet 2.__

Provider Name

Wireless Spectrum Questions (Wireline only companies may skip this sheet.)

2.1 What spectrum(s) do you use to provide service? See table in Broadband Data Definitions guide for spectrum codes and descriptions.

<u>**Proceed to Sheet 3.**</u>

Broadband service providers shall provide a list of "middle-mile and backbone interconnection points" in the District of Columbia. Interconnection points are facilities that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are middle-mile and backbone interconnection points. Middle-mile and backbone interconnection points typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured. Examples might include: points of interconnection enabling communications between an incumbent local exchange carrier's central office and the Internet, between a cable aggregation point (headend) and the Internet, or between a wireless base station and the provider's core network elements that connect to other networks, including the Internet.

3.1 Do you have any Middle Mile Facilities located in the District of Columbia?

"Yes" or "No"

3.2 If no, do you have Middle Mile Facilities in other states that serve customers within the District of Columbia?

3.3 Please list all Middle Mile Facilities that serve customers within the District of Columbia in the table below

Owned or Leased	*Serving Facility Capacity Code	**Serving Facility Type Code	Facility Address In DC (Street#, Street Name, Street Type, Quadrant)	*** Latitude (Optional if address provided)	*** Longitude (Optional if address provided)	Elevation (in feet from grade. Negative numbers are below grade)
Owned/Leased	*(1-6) See below*	*(1-4) See below*	*123 Main Street NW*	*38° 53' 43.6" N*	*77° 0' 56.35" W*	*15*
			…add rows as needed			

* Serving Facility Capacity Code	Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 mbps and less than 600 mbps
4	Greater than or equal to 600 mbps and less than 2.4 gbps
5	Greater than or equal to 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

** Serving Facility Type Code	Description
1	Fiber
2	Copper
3	Hybrid Fiber Coax (HFC)
4	Wireless

*** Coordinates must be expressed using the WGS 1984 geographic coordinate system.

Appendix 5
Community Anchor Institution
Data Request Letter and Survey Form

Survey: Broadband Service of Community Anchor Institutions in DC - Spring 2012

Dear Contact:

The District of Columbia State Broadband Initiative (SBI) is in its fifth round of collecting information on broadband service availability and adoption in the District. The collection effort is being led by the District's Office of the Chief Technology Officer (OCTO) and is funded by a grant from the National Telecommunications and Information Administration.

A critical component of this grant involves identifying the level of broadband service at Community Anchor Institutions (CAI) in the District. The NTIA defines Community Anchor Institutions as schools, libraries, health care providers, public safety entities, institutions of higher education, and other community supported organizations and entities.

We request that your institution participate in this process by completing an online survey. The data you provide will help develop a more accurate, comprehensive dataset of broadband availability in the District and will further assist broadband planning efforts at a national level.

For this data collection request, OCTO has developed a simple, one page web-based broadband survey form that can be accessed at this link: DC - Community Anchor Institutions Survey (web form). We request that your institution complete the survey by Wednesday March 14th, 2012.

Your time and effort is appreciated and we thank you in advance for completing this data request.
Should you have any questions, please contact me via email *Insert* or phone *Insert*.

Sincerely,

INSERT

Direct URL to survey:

https://docs.google.com/a/dc.gov/spreadsheet/viewform?formkey=dHY5VWpHQlAzX2dlMjlRcXJxc01yMXc6MA#gid=2

District of Columbia - Community Anchor Institutions - Round 5

Please fill-out the following questions below. If you have any questions please contact David Jackson: email davidy.jackson@dc.gov or 202.724.5135. Thank you for your time.

* Required

Contact Name *

Title *

Contact Phone Number: *

Contact Email: *

Name of Institution *

Address *
Street Address

Institution Type *
Select

Institution Website *

Institution Website *

Do you currently have broadband service at this institution? *

- Yes
- No

Name of Broadband Provider

- Allied Telecom Group, LLC
- Atlantech Online, Inc.
- Broadview Networks, Inc.
- Comcast
- Covad Communications Company
- RCN
- Verizon Communications Inc.
- Windstar
- XO Communications Services, Inc.
- Other:

Please select the technology of transmission used at this institution *

Select

Do you provide Public WiFi? *

- Yes
- No

What is the maximum advertised download speed?

Data transfer speed

Select

What is the maximum advertised upload speed?

Data transfer speed

Select

Appendix 6
Wireless Validation

Mobile Broadband Mapping

Commercial Cellular Networks

District of Columbia

Bob Pavlak

Chris San-Gaspar

September 29, 2010

Mobile Broadband Mapping of Commercial Cellular Networks: District of Columbia

Executive Summary

The outdoor downlink and uplink throughput speeds of the commercial cellular networks serving the District of Columbia were measured in September 2010, and compared with measurements made in September 2009. In addition to the three networks tested in 2009 (Verizon Wireless, Sprint, AT&T), our 2010 measurements also include Cricket and T-Mobile.

All five of the service providers deliver broadband service (minimum 768 kbps downlink and 200 kbps uplink) in some areas of the District. However, there is a wide variation in coverage performance. Throughput speeds may be above the “broadband” thresholds in some areas and below the “broadband” thresholds in other areas. This variation in performance is shown by the color codes on the attached citywide maps.

There is also a significant variation in performance between the cellular service providers. The downlink speeds of the AT&T and T-Mobile networks are substantially above the broadband threshold of 768 kbps, with many areas above 1.5 Mbps. The speeds on AT&T’s network are substantially higher in 2010 compared to 2009, which we believe is attributed to the 3G upgrade of the AT&T network to HSPA (High Speed Packet Access), a more recent version of 3G. Both AT&T and T-Mobile operate network infrastructure based on the 3GPP (3rd Generation Partnership Project) set of standards.

The uplink speeds on the AT&T network is by far the highest of any of the commercial service providers. We believe this is due to the more advanced version of the 3GPP standard used by AT&T. Uplink speeds on AT&T’s network exceed 768 kbps and 1.5 Mbps in all but a few areas of the drive route.

The downlink speeds on Verizon’s network, between 2009 and 2010, appear about the same. The uplink performance has improved, with many areas in 2010 above 768 kbps. Many areas in 2009 were above 200 kbps uplink (but less than 768 kbps). Similarly, Sprint’s downlink performance appears about the same between 2009 and 2010, and their uplink performance in 2010 is slightly improved from 2009, but not as high as any of the other service providers.

Sprint, via Clearwire, now offers 4G WiMax broadband service in the District. This network was not included in our broadband drive tests because the mobility performance of WiMax is poor. Sessions are frequently dropped during handoffs and the tool used for drive test measurements is unable to accommodate a high dropped session rate.

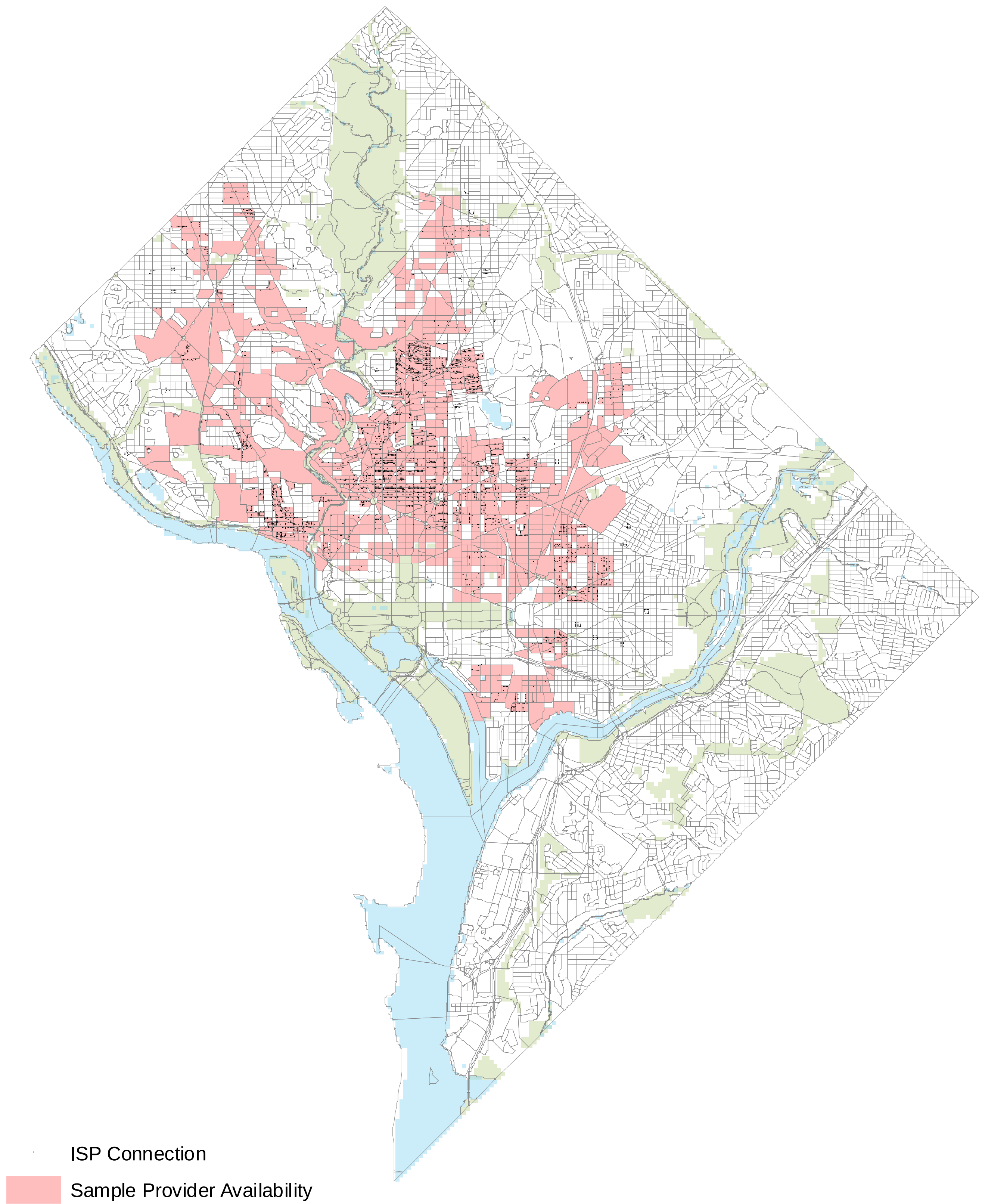
The authors wish to thank Felix Igbedior for his assistance in performing the drive tests with Chris San-Gaspar.

Appendix 7

Wireline Service Area Validation

Sample Map

Sample Provider Reported Availability vs. InfoUSA ISP Connections



Appendix 8
Contacted Providers

PROVIDER LIST

1-800-Reconex, Inc. d/b/a USTel
360Networks (USA), Inc.
A.R.C. Networks d/b/a InfoHighway
AboveNet Communications, Inc. d/b/a AboveNet Media Networks
Access One, Inc.
Access Point, Inc.
Accutel of Texas d/b/a 1-800-4-A-Phone
ACN Communication Services, Inc.
Airband Communications Inc.
Airespring, Inc.
Allconnect
Allied Telecom Group, LLC
AOC Connect, LLC f/k/a MFN Global Services, LLC
AT&T Corp, Inc.
AT&T Mobility LLC
ATC Outdoor DAS, LLC
Atlantech Online, Inc.
ATX Licensing, Inc. d/b/a ATX Telecommunications Services
Bandwidth.Com CLEC, LLC
BCN Telecom, Inc.
Bethel Communications
Bluemont Networks, LLC.
Broadcore, Inc.
Broadnet Solutions LLC d/b/a Broadnet Wireless
Broadview Networks, Inc.
Broadvox CLEC
BT Communications Sales, LLC f/k/a Concert Communications Sales, LLC
Budget PrePay, Inc. d/b/a Budget Phone
Business Telecom, Inc. d/b/a BTI
Cable & Wireless Americas Operations, Inc.
Capsule Communications (Merged with Covista in Feb. 2002)
Cat Communications International, Inc. d/b/a CCI
Cbeyond Communications, LLC

CityNet Telecom, Inc.
Clear (WiMAX markets), Clearwire (Expedience Markets)
Cogent Communications, Inc.
Comcast
ComExpress Communications, Inc.
CommPartners Connect, LLC
Comtech 21, LLC
Covista, Inc.
Cox District of Columbia Telcom, LLC
Crexendo Business Solutions
Cricket Communications, Inc.
Cypress Communications Operating Company
DC Access, LLC
DC-CLEC LLC c/o Crown Castle Solutions
DSCI Corporation
Dynalink Communications, Inc.
Enkido, Inc.
Entelegent Solutions
Eureka Telecom, Inc. d/b/a InfoHighway Communications
Everest Broadband Networks of DC
Extenet Systems Inc.
Fiber Technologies Networks, L.L.C.
FiberLight, LLC
First Communications, LLC
France Telecom Corporate Solutions L.L.C.
Gateway Communications Services, Inc.
Global Crossing Telemanagement, Inc.
Global Telecom & Technology Americas, Inc.
Global Telecom Brokers
Google
Granite Telecommunications, LLC
Great American Networks, LLC.
Hughes Network Systems
Hypercube Telecom d/b/a/ KMC Data LLC
IDT America, Corp.

Infotelecom, LLC
Intellifiber Networks, Inc. (A Paetec Company)
Intrado Communications, Inc.
IPC Network Services, Inc.
Iridium Satellite LLC
Kentucky Data Link, Inc.
LCI International Telecom Corporation d/b/a/ Qwest (acquired by CenturyLink)
Level 3 Communications, LLC
Light Tower Fiber LLC
LightSquared Inc. f/k/a SkyTerra Communications Inc.
Magellan Hill Technologies, LLC
Mass Communications
Matrix Telecom, Inc. d/b/a Matrix Business Technologies (Trinsic)
McGraw Communications, Inc.
McLeod USA Telecommunications Services, Inc. (A Paetec Company)
MegaPath
Metropolitan Telecommunications of DC d/b/a MetTEL
Mitel NetSolutions, Inc. f/k/a Inter-Tel Netsolutions, Inc.
Network Communications International Corp.
Neutral Tandem-Washington, DC, LLC
NextG Networks Atlantic, Inc.
Nextlink Wireless, LLC
Norlight Telecommunications, Inc.
NOS Communications
One Voice Communications, Inc.
OpenBand of DC, LLC
Pac-West Telecomm, Inc.
Peerless Network of the District of Columbia, LLC
Pelzer Communications Corporation
Primus Telecommunications, Inc.
Quantum Shift Communications, Inc. d/b/a VCOM Solutions
Quintelco, Inc.
RCN and RCN Business Solutions
Reliance Globalcom Services, Inc. f/k/a Yipes Enterprise Services, Inc.
RNK, Inc.

Roadstar Internet, Inc.
Sidera Networks
Sidera Networks, LLC
Spectrotel, Inc.
Sprint
Stratos Global Corp.
Telovations, Inc.
T-Mobile
Trans National Communications International, Inc.
Trident Internet Systems, Inc. d/b/a Trident Wireless Internet
tw telecom inc.
Vector Data Systems LLC
Verizon Communications Inc.
Verizon Wireless
ViaSat Inc.
Wave2Wave Communications, Inc.
Wholesale Carrier Services, Inc.
WildBlue Communications, Inc.
Windstream
Windstream Communications
XO Communications Services, LLC
YMax Communications Corp.
Zayo Bandwidth, LLC

Submitted to:

Delaware Department of Technology and Information

Contract No. DTI-08-0013

Delaware Broadband Data and Development

Spring 2012 Data Submission White Paper

Submitted by:

GeoDecisions
A Division of Gannett Fleming

March, 2012

Table of Contents

1 Introduction

As part of the American Recovery and Reinvestment Act (ARRA), the National Telecommunications and Information Administration (NTIA) released its State Broadband Data and Development Grant Program[1] Notice of Funds Availability (NOFA). The NTIA then awarded the State of Delaware funding to create a database of broadband deployment (Project) in the State of Delaware (State). GeoDecisions and its team partner CBG Communications, Inc. (CBG) have been retained by the State of Delaware (collectively referred to as the "State Parties") to perform a variety of tasks as part of the Broadband Data Development process, with the goal being creation of maps of the State showing where broadband is available, Providers' names, and speeds or bandwidth provided to citizens, businesses, and anchor institutions throughout the State.

The NOFA requires mapping of facilities-based Providers' availability of broadband speed internet access in the State. The NTIA, in the NOFA, defined broadband as "Broadband service is 'available' to an end user at an address if a broadband service provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (Kbps) downstream and at least 200 Kbps upstream to the end user at an address."

The following specific project tasks were to be performed and completed by GeoDecisions and CBG with oversight by State staff:

- Drafting, negotiation, establishment, and status reporting of all Non-Disclosure Agreements (NDAs) with broadband service Providers to support the Delaware broadband expansion initiative.
- Mapping of broadband Providers and service attributes, including technologies utilized and advertised speeds available to end users.
- Support of field verification of broadband mapping (using an approximately 35% sampling rate).
- Development of web-based mapping applications.
- Project, task, and contract management.
- Review of Provider marketing materials.
- Assistance in developing criteria for web-based surveys and speed tests.
- Quality Control and review of all deliverables.
- Assistance in the development of a data maintenance document.
- Identification and assessment of broadband infrastructure (using an approximately 35% sampling rate).
- Participation in weekly status and project meetings with internal staff, NTIA, the University of Delaware, the State of Delaware, Providers, and all other stakeholders.
- Submission of weekly status reports.

[1] http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf

The Project began with meetings with the State, GeoDecisions, and CBG to map out the processes that needed to occur in order to produce an accurate map that included all known broadband Providers that were willing to participate in the project. It should be noted that broadband Providers (Providers) were not required to participate in the Project but were encouraged to provide data specific to their networks so the State would have maps that were as accurate as possible. Providers that applied for federal grant funds for network expansion or upgrades, however, would be eliminated from consideration for these grants if they did not cooperate with the State on this project.

1.1 List Compilation

The first task was to compile a list of all known broadband Providers throughout the State and contact information for each of these Providers. Information from FCC databases, Internet research, and the State Parties' overall understanding of the broadband industry was utilized to compile the list.

1.2 NDA Negotiation

Contact was then made to each of the Providers to determine whether they had facilities in the State that provided broadband to end users. If so, the Providers were encouraged to participate in the project by providing the pertinent data needed to create the State's maps. Many Providers believe that some of the information required from them for participation is confidential and cannot be released to the general public. To overcome this obstacle, the State Parties created a Non-Disclosure Agreement (NDA) template whereby information deemed confidential by the Providers would not be released publically by the State Parties. The NDA also ensured that all information requested from the Providers is available for release to the NTIA as required by the NOFA. Based on the variation among Providers on what information is deemed confidential and varying interpretations of the template NDA, negotiations were held with many of the Providers to modify the NDA to meet the Providers' needs while still allowing the State Parties to utilize and share the information as required in the NOFA. Once the Providers and the State Parties signed an agreed-upon NDA, the data gathering process proceeded.

1.3 Data Gathering

As each Provider signed an NDA with the State Parties, they were referred to GeoDecisions' mapping department where they were asked to provide specific data in formats that would be compatible with the State's mapping process. Although many of the Providers had previously provided system data to the Federal Communications Commission (FCC), those submissions showed availability at the Census Tract level. The requirements of this Project were for mapping of network availability at the Census Bock level, which is more granular than previously submitted data. Furthermore, in Census Blocks that are larger than 2 square miles, data was gathered at the street segment level (eg. From # 1 First Street to #111 First Street). As Providers supplied this data, GeoDecisions created maps of the State showing where each of the Providers' footprint(s) was located, as well as other required attributes such as advertised speeds available in these areas and the technologies utilized to provide service to end users.

1.4 Provider Data Submittal

NTIA 5th data submission included 19 Broadband providers data, 10 of the providers have submitted new data updates; the following is a brief description the data provided:

1- AT&T Mobility LLC.

DBA Name: AT&T

FRN	0004979233
Date of submission	3/14/2012
Type of Data Submission	• Coverage Shape file • Excel Sheet
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	AT&T provided a shape file that showed coverage over the three counties of the state of Delaware. The excel sheet contained speed data, Technology of transmission & Mobile Spectrum.

2- Comcast Cable Communications, LLC.

DBA Name: Comcast

FRN	0004441663
Date of submission	1/27/2012
Type of Data Submission	• Excel Sheet of block coverage • Excel Sheet of street coverage • Excel Sheet with speed information
Census Blocks	12451 Technology 40
Road Segments	723 Technology 40
Middle Mile infrastructure	No
Technology of Transmission	Cable Modem - DOCSIS 3.0
Data description	Three excel sheets, the excel sheets were expressing the Comcast block coverage.

3- DIECA Communications, Inc.

DBA Name: Covad Communications Company

FRN	0003753753
Date of submission	2/13/2012
Type of Data Submission	• Text file tab delimited with block coverage • Text File with Subscriber-Weighted Nominal Speed • Text file with a note "No Middle Miles in DE"
Census Blocks	3907 Technology 10 3225 Technology 20 6544 Technology 30
Road Segments	No
Middle Mile infrastructure	No
Technology of Transmission	Asymmetric xDSL Symmetric xDSL Other Copper Wireline
Data description	Two text files tab delimited, and a read me file.

4- Leap Wireless International, Inc.

DBA Name: Cricket Communications, Inc.

FRN	0002963528
Date of submission	3/2/2012
Type of Data Submission	• Shape file with Coverage, Technology, Spectrum, and speed
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	Coverage shape file.

5- T-Mobile USA, Inc.

DBA Name: T-Mobile.

FRN	0006945950
Date of submission	2/2/2012
Type of Data Submission	• Three shape files with Coverage Area with different speed • Text file with technology and Spectrum and speed • Excel sheet with Subscriber Weighted Nominal Speed. • No Middle Mile Notice.
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	Two shape files that provide Broadband coverage with two different speed ranges for upload and download, the Technology and spectrum were provided by a different text file, Nominal speed came from an excel sheet.

6- Cellco Partnership and its Affiliated Entities.

DBA Name: Verizon Wireless.

FRN	0003290673
Date of submission	1/25/2012
Type of Data Submission	• Shape file for 4G Coverage (LTE) • Shape file for 3G Coverage (EVDO) • Email with Spectrums and speed.
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	The Two shape files provided Coverage area for different speed range (4G – 3G), an email provide the speed and spectrum.

7- Verizon Communications, Inc.

DBA Name: Verizon Delaware, LLC.

FRN	0003271798
Date of submission	1/23/2012
Type of Data Submission	• Text file tab delimited with block coverage • Text file tab delimited with street segment coverage • Text file with Weighted Nominal Speed by technology and county. • Notice with no middle mile
Census Blocks	11608 Technology 10 6430 Technology 50
Road Segments	3328 Technology 10 1242 Technology 50
Middle Mile infrastructure	No
Technology of Transmission	Asymmetric xDSL Optical Carrier/Fiber to End User
Data description	Two Text files with Census blocks and Street segment coverage, weighted nominal speed came in a separate text file.

8- Sprint Nextel Corporation.

DBA Name: Sprint.

FRN	0003774593
Date of submission	1/9/2012
Type of Data Submission	• One Shape file with two Coverage areas with different spectrums and speeds.
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	One Shape file specifying the spectrum and speed of two coverage areas.

9- Hughes Communications, Inc.

DBA Name: Hughes Network Systems.

FRN	0018483073
Date of submission	2/17/2012
Type of Data Submission	• Excel sheet with Census blocks coverage
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Satellite
Data description	Text

10- WildBlue Communications, Inc.

DBA Name: WildBlue Communications, Inc.

FRN	000 7843766
Date of submission	2/8/2012
Type of Data Submission	• One Shape file with two Covering the whole state of Delaware
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	One Shape file specifying the spectrum and speed.

1.5 Data Processing

The method for processing the data varies depending on the data received from each provider; the following is a brief summary of the steps taken to process the data for each provider.

1-AT&T Mobility LLC.	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file • Load Repaired Shape file into Transfer data model using append. • Use excel sheet values to calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

2- Comcast Cable Communications, LLC.	
Processing Census Block Coverage Area	• Census block coverage excel sheet exported into dbf after adjusting column name (less than 11 characters) • Template of 2010 Census block < 2SQM joined Technology 40 dbf file (create Census block coverage of Cable Modem-DOCSIS 3.0 • Census Block Coverage is loaded to Transfer Data model using append. • Result is stored in "BB_Service_CensusBlock"
Processing Service Overview	• Template County feature class is loaded into ArcMap • Subscriber Weighted Nominal speed is calculated in each country • County layer is loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview"

3- DIECA Communications, Inc.	
Processing Census Block Coverage Area	• Load provided text file into excel • Export text file into dbf after altering columns names • Separate dbf file into 3 technologies dbf files (Asymmetric xDSL - Symmetric xDSL -Other Copper Wireline) • Perform Join 3 times with Template census 2010 census block (one join per technology) • Merge the 3 feature classes into one coverage feature class. • Load the output feature class into the transfer data model. • Result is stored in "BB_Service_CensusBlock"
Processing Service Overview	• Template County feature class is loaded into ArcMap • Three Overview county layers are produced, one layer per technology. • County layers are merged. • County layers are loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview"

4- Leap Wireless International, Inc. (Cricket)	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file • Load Repaired Shape file into Transfer data model using append. • Calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

5- T-Mobile USA, Inc.	
Processing Mobile Coverage Area	• Apply Repair Geometry on two coverage Shape files • Load the two Repaired Shape files into Transfer data model using append. • Calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

6- Cellco Partnership and its Affiliated Entities. (Verizon Wireless)	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage on both Shape files (4G-3G) • Load Repaired Shape files into Transfer data model using append. • Calculate technology, spectrum and speed, for each type of coverage. • Result is stored in "BB_Service_Wireless"

7- Verizon Communications, Inc.	
Processing Census Block Coverage Area	• Load provided text files into excel • Census block coverage excel sheet exported into dbf after adjusting column name (less than 11 characters) • Select statement on the dbf file to separate Technology coverage 10 blocks & Technology Coverage 50 blocks. • Template of 2010 Census block < 2SQM joined twice, one time with Technology 10 dbf file (create Census block coverage of Asymmetric xDSL), second time with Technology Coverage 50 (create Census block coverage of Optical Carrier/Fiber to End User). • Merge is applied on both Census blocks to create Census Block Coverage • Census Block Coverage is loaded to Transfer Data model using append. • Result is stored in "BB_Service_CensusBlock"

Processing Service Overview	• Template County feature class is loaded into ArcMap • Two Overview county layers are produced, one layer per technology. • County layers are merged. • County layers are loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview"

8- Sprint Nextel Corporation.	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file • Load Repaired Shape file into Transfer data model using append. • Use excel sheet values to calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

9- Hughes Communications, Inc.	
Processing Satellite Coverage Area	• Load text file into excel • Alter column names and export as a dbf file • Join excel sheet with template census block 2010 shape file using Block_ID to get Satellite block coverage area. • Merge all blocks into one polygon to create Satellite Coverage shape file. • Load shape file into Transfer data model using append • Calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

10- WildBlue Communications, Inc.	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file • Load Repaired Shape file into Transfer data model using append. • Calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

1.6 Map Creation/Interactive Web Application

An interactive web application was developed to enable the general public to view a map of Delaware's broadband availability in each of its three counties. Users will be able to see which forms of broadband exist in each area of the State and can also search for Providers by address. This web application is necessary in order to access and employ the data collected. In essence, the data collected is in a static state; this web application will move the data into dynamic, usable form.

With the creation of the web application, the State will move forward in meeting the requirements of this project's grant as outlined in the NOFA. The web application was created in a manner that honors the guidelines established in each NDA executed with each respective Provider. A publically accessible, interactive website is the best means by which the citizens/taxpayers can be informed of broadband availability and options. The applications serve as a hub of broadband coverage information. The resultant functionality is expected to improve service for several user groups. From a citizen standpoint, the application will serve as a gateway to access or improve access to broadband services. Citizens can use the application to gain knowledge of providers, technologies, and access level at their residence or place of business. Planners can use the site to aid in infrastructure construction plans to improve broadband access and capabilities to their assigned region of the State. The State Legislature will use the application to notify politicians of district relevant broadband capabilities and as a catalyst in policy making and a various array of legislative actions.

1.7 Backlab Verification

As the first version of maps covering each of the State's Providers was completed, the State Parties performed backlab verification of the data gathered and input onto the maps. This backlab verification included researching the Providers' websites to verify that the advertised speeds on the websites were consistent with those documented by the Providers as part of their submission to the State. In addition, the team made phone calls to some of the Providers to further verify service availability and speeds where necessary to gain the highest level of confidence in the data gathered.

1.8 Provider Review

After the backlab process was completed for each of the Providers, the data was sent back to the Providers for their review and acknowledgement of the data as being accurate. This phase of the project also allowed the Providers to update their data if changes had occurred since the intiatial gathering of data by the State Parties. Each of the Providers' data was pulled out from the aggregate data base prior to sending it to the Provider for their review. This ensured that the State Parties maintained the agreed-to confidentiality of each of the Providers' data.

1.9 Field Verification

The final step for the State Parties to verify the accuracy of the data was to perform a field verification process. Prior to beginning the original field verification activities in the summer of 2010, The State parties developed a field verification guide for use by each member of the field verification team. The guide included systematic instructions and a checklist related to verification of each broadband system, technology, and service type. The guide and checklist were drafted, reviewed by all State Parties, and finalized prior to the beginning of field verification activities.

To ensure uniformity of the team's approach to field verification, discussions were held with the Project Manager, and the Lead GIS Analyst and the field verification team immediately prior to the beginning of field verification activities in the fall of 2010.

The goal of field verification was revised from the original methodologies to only include verification of updated information from the providers in the State. For example, areas previously verified, which had no reported changes in technology or speed, were not re-verified as part of this round of verification.

New areas of broadband system coverage or where technologies and/or speeds changed from the previous submissions were verified by sampling whether services were available at various points shown on the Providers' system coverage maps that were randomly chosen from all of the census blocks that are within the Providers' systems. Points were chosen to represent areas throughout the Providers' new or upgraded service territory, including system boundary edges.

The State Parties team sample looked to provide a sampling of all broadband Providers who have made changes in coverage, technology or speed in the State, including large and small Providers across the State, being sure to include each of the three counties.

Team members spent a total of 5 days performing Field Verification functions including interviews and infrastructure identification at nearly 45 locations. In addition, the team performed approximately 65 speed tests of Cellular based wireless broadband provider networks.

1.10 Speed Tests

As part of the field verification process, State residents and businesses were given a business card-sized handout that briefly explained the project and pointed them to the state-specific speed test website. The State utilized a project-specific speed test web site[2] run by Ookla in order to gain Information on users' addresses, satisfaction, and the upstream and downstream speeds associated with their broadband connection. Ookla is a company that provides a private web-based reporting portal where customer-specific

[2] http://www.delawarespeedtest.com/

testing can be performed and documented over time. The results of the speed tests performed on the Ookla site are stored and available to the State Parties at any time.

Ookla tracks the end users' Provider name, technology of connection, downstream and upstream speeds, and other parameters such as IP address.

In addition, testing similar to that done by residents and businesses was performed by State Party representatives on four of the five major cellular-based broadband providers' networks. Cricket Wireless' network has not been upgraded since previous speed tests performed by the State Parties and therefore was not tested during this round of field verification. This again verified availability and speeds on each of the remaining four major cellular-based broadband Providers in the State. All speed test locations, to date, are shown on Attachment 3.

Note: The Following Sections discuss data description and field verification for the fall 2011 data submittal. The spring submittal field verification will occur in April 2012.

1.11 Presentation to the NTIA

The data submitted in the State Broadband Data and Development (SBDD) project is governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, on page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, on page 40569 of the Federal Register. According to the NOFA, an NDA may be executed with broadband Providers prior to data collection. The NTIA has proposed a National States Geographic Information Council (NSGIC) data model as a means to store the collected broadband data. The NSGIC model includes five main feature classes as follows:

1.11.1 Broadband Service by Census Block (Less than 2 square miles in area)

This feature provides the atomic unit for mapping provider services that, when tied to census demographic and socio-economic data, can provide guidance for the build-out and adoption of broadband. The Census Block feature class is generated by different methods, depending on the data submitted by the Broadband service Provider. The main methods for generating census block data are as follows:

- Broadband providers submit a list of served Census Blocks. In this case, the blocks are joined to the State's Census Block data to obtain its spatial location. Finally, the data are loaded into the Geodatabase model, and attributes are either transferred or filled in manually.

- Broadband Providers submit a list of end users. In this case, an overlay is needed between the submitted geocoded end user points and the State of Delaware Census Block feature class to obtain the list of Census Blocks.

- Broadband providers submit shape files or drawings with their boundary(s) of coverage. The boundary(s) is intersected by the Census Block feature class to obtain Census Block coverage.

1.11.2 Broadband Service by Census Block (greater than 2 square miles in area)

In order to provide a more granular representation of availability in Census Blocks larger than 2 square miles in area, these Census Blocks are described at a street segment level of detail.

GeoDecisions
A Division of Gannett Fleming

There are two methods utilized to garner the data needed to generate street segment coverage maps. Depending on the data submitted by the providers, these methods can be summarized as follows:

- The broadband Provider submits a list of end user addresses. The nearest road segment is then selected, based on the attributes of the end user point.

- The broadband provider submits a shapefile or drawing showing their coverage area. In this case, street segments are selected based on the intersection of its coverage area and street segment feature class.

1.11.3 Broadband Service - Wireless

The maps of wireless technologies provide a representation of the expected, modeled, or field-verified service areas associated with wireless carriers, their service levels, and their utilized spectrums. The data in this feature class are generated based on a drawing (shapefile) submitted by a wireless technology service Provider (Terrestrial Mobile Wireless - Terrestrial Fixed wireless [licensed or unlicensed] - Satellite), as well as through field verification of wireless data.

1.11.4 Broadband Service - Overview

This feature provides a coarse view of speeds at a county level so that any regional or systematic patterns of service and speed can be assessed and mitigated.

The State of Delaware has three counties. The maximum downstream and upstream speed has been stipulated for each provider, along with the technology that they are using to provide these speeds. Most providers were reluctant to provide pricing data, but some have provided data for weighted nominal speed.

1.11.5 Broadband Connection Points – Middle Mile

The purpose of broadband Connection Points, known as Middle Mile locations or points, is to give the locations and elevations of Interconnection points for service Providers working in the State of Delaware. Gathering infrastructure components (Middle Miles) helps leverage opportunities for network deployment after assessing gaps in broadband availability in the State.

The locations of Middle Mile points were provided by Providers either by their geographic coordinates (Latitude & Longitude) or by their street address(s), which are geo-coded to their spatial locations. Intersection between the Middle Mile points and Census block layer is needed to obtain Full Block ID (FULLFIPSID).

The above mentioned processes provided the State with the raw data to develop maps of the State showing where broadband is available, the maximum advertised levels of service, or speed offered to end users, and areas of the State that are unserved or underserved. This information will be updated every 6 months to show changes made by Providers that will impact the broadband landscape throughout the State. This report details some of the most pertinent information derived from the project and can be utilized to help the State during its Broadband Planning Project currently underway.

2 Areas of Delaware Unserved/Underserved by Broadband Providers

One of the main objectives of the NTIA, the State of Delaware, GeoDecisions, and CBG was to determine where broadband is not currently available in the State of Delaware. Having areas where broadband is not available to potential end users helps create a phenomenon known as a Digital Divide. The Digital Divide is defined as the inability of residents to access broadband and Internet services based on economic, educational, or geographic reasons.

The NTIA defines an unserved area as: "An area composed of one or more contiguous census blocks where at least 90 percent of households in the service area lack access to facilities-based terrestrial broadband service, either fixed or mobile, at the minimum broadband transmission speed (set forth in the definition of broadband above). A household has access to broadband service if the household can readily subscribe to that service upon request."

Furthermore, the NTIA defines an Unserved Area as "A service area is defined as consisting of one or more contiguous census blocks, where half the households lack access to minimum broadband service, or an area where no land or mobile service offers broadband with at least 3 Mbps, or areas where less than 40% of households subscribe to any service."

To obtain information about where broadband is not available in the State, the State Parties performed the above tasks to determine where broadband is available in the State and where it is not available to potential end users. After determining where broadband is not available, the State is in the process of utilizing this information to determine what may be done to expand existing networks to provide service to these unserved areas or how new Providers may be enticed into building networks to serve these parts of the State. This is being undertaken by the State and the University of Delaware as part of their planning activities in the next phase of this project.

Although some services delivered by satellite-based Providers meet the requirement for broadband of 768 Kbps downstream and 200 Kbps upstream, for the purposes of this report, we have not included them when detailing broadband availability. While any location within the State is capable of receiving satellite based service as long as there is a clear unobstructed view of the southern sky, the reasoning for not considering satellite-based Internet here is that often times realized speeds on satellite-based networks fall significantly below 768 Kbps in the forward direction and 200 Kbps in the upstream direction. That being said, satellite Internet is an option for citizens and businesses in the State when other high speed connections are not available.

The State of Delaware has the 6th highest population density of the 50 states in the US. This helps the State's overall broadband availability in that broadband Providers are apt to serve high density areas because the cost to build a network is lower on a per-address passed basis. In other words, the amount of infrastructure needed to connect a given address to the Internet lessens as density increases. Conversely, the cost of building a network to more rural areas increases on a per-address (potential customer) basis to the point of not providing the broadband Provider the minimum potential return on their investment that they have established. Large companies have minimum potential customers per mile that must exist or they will not build infrastructure to an unserved area. For instance, a Provider may require a minimum of 20 homes or businesses be passed per mile of new infrastructure before they will build it. Some providers will require a minimum number of homes passed per mile, of new infrastructure, to be in excess of 30 homes. In rural areas, there may be as few as 1 or 2 homes per mile. Therefore, the area will not be built out.

Although the State of Delaware has a relatively small number of areas, and therefore citizens, that do not have broadband available to them, this should still be a concern for the State and its planning group. As in other locales, the State will likely find during its planning project that broadband is a driving force in many aspects of life today, including economic development, health care, all areas of business and institutional users, education, and entertainment to name a few. Consequently, the State will also likely find that encouraging expansion of broadband into the unserved areas of the State will have a positive impact on all of these aspects. Areas of the State that do not have access to broadband are shown on the map included as Attachment 1.

In addition to determining which areas of the State do not have access to broadband, demographics and socio-economic characteristics can be analyzed in areas of the State that do not have broadband availability. For instance, the State Parties have over-laid age, minority status, and income data onto the maps to determine which groups may be most impacted by the lack of broadband service in their areas. This information may prove valuable as the State's planning project moves forward. In addition, maps including other demographic and socio-economic characteristics can be created by the State Parties to show other groups that are impacted by the lack of broadband availability in areas of the State. The maps showing each of these parameters are included as Attachments 6, 7, and 8.

3 Areas of Delaware Served by a Single Broadband Provider

Similar to areas of the State that are unserved or underserved by any broadband Provider, the NTIA and the State desired to know what areas of the State are only served by a single Provider.

Areas that have a single broadband Provider imply that service is available in these areas but that there is no competition. Therefore, associated benefits that competition may bring, including lower pricing, higher speeds, and better customer service, are also not available in these areas. This project did not ask for or document any of these parameters, and therefore, other than speed and pricing information included in the Broadband Service Tiers – Residential, Business Governmental and Academia section of this report, they are not included in this report.

Similar to the unserved/underserved areas of the State, the State's high density makes it a good business decision for broadband Providers to build out the networks throughout most of the State since even with competition, these Providers can make a good return on their investment. As Attachment 2 shows, in addition to the areas of the State with no broadband availability, there are only a few small areas in the State that are not served by at least two Providers. Some of the areas served by fewer than two Providers include:

- An area east of Highway 301 and south of DE-896 in New Castles County
- Augustine State Wildlife Management Area and Silver Run Wildlife Area in New Castle County
- The area east of Highway 9 from Appoquinimink Wildlife Area southeast to Highway 6 East of Smyrna
- The area northeast of Smyrna to Highway 9
- The Bombay Hook National Wildlife Refuge area
- Dover Air Force Base
- The area south of Highway 6 between State Roads 42 and 15
- The Milford Wildlife Area
- The Prime Hook National Wildlife Refuge
- The area north of Highway 54 and south of Road 402 between Highway 30 and Highway 113 in Sussex County

As a percentage, the areas of the State with fewer than two broadband Providers equates to less than 0.5% of the Census Blocks in the State. Furthermore, the estimated total number of households in the State that are not served by a broadband Provider is 3,223 or 0.79% of all households. This is based on the total number of homes in Census Blocks where broadband does not exist as an option to residents. However, as these areas are utilized by residents of the State and as housing and other developments reach these areas, they will not be broadband ready. The lack of broadband availability may hamper expansion into these areas as the need arises in the future.

4 Areas of Delaware Served by Multiple Broadband Providers

The large majority of the State of Delaware has multiple broadband Providers, serving addresses within the area, with over 50% of the State having six or more Providers of broadband service. When including all areas of the State with two or more broadband Providers, over 99% of the State's Census Blocks are offered broadband service by multiple Providers. A map of the State of Delaware with color codes showing the number of Providers is included as Attachment 2 to the report.

Having multiple Providers helps promote competition among the Providers in given areas and should translate into the highest level of speed the Providers can offer at affordable costs. Having multiple Providers in an area also promotes higher customer service standards from Providers as they attempt to keep their existing customer base and increase their numbers of customers.

5 Types of Technology Used to Provide Broadband in Delaware

The NTIA classified broadband technologies into 11 categories plus a 12th category labeled "All Other". These categories represent both hardline cable networks (cable, phone lines, or fiber optic infrastructure connected to the residence or business) and wireless networks (signals are transmitted to and from an address or location). The NTIA further defined each of the technologies into more specific categories. The technologies utilized in Delaware are listed and defined below:

- **Asymmetrical xDSL**
  DSL is a telephone system-based data communications service that utilizes modulation schemes that allow high-speed transmission of data on copper or phone lines. Asymetrical xDSL is a design characteristic where return speed is lower than forward speed. This allows for more of the network's bandwidth capability or throughput to be utilized by the forward portion of the network allowing for faster downloads than uploads. This technology is utilized widely by telephone companies in the State to provide broadband service to end users.

- **Other Copper Wireline**
  Non-DSL telephone system-based data communications service such as T-1 (1.54 Mbps). Other Copper Line technologies tend to be utilized more for business and anchor end users, as bandwidths are often gauranteed verses "up to" speeds.

- **Cable Modem – DOCSIS 3.0**
  A cable modem is a device that converts information from one device (computer) to a usable form for another device (cable TV network). Specifically, information from a computer is converted to a useable format for transport on the cable TV network and converted back to a format useable by a computer at the receive site modem. DOCSIS 3 provides for multiple channels on the cable TV system to be combined and the combination used to enable higher data communications speeds or bandwidths.

DOCSIS 3.0 is widely utilized by cable television network-based Providers throughout the State. Cable TV systems currently utilizing previous versions of DOCSIS will likely migrate to DOCSIS 3.0 in the near term to utilize its higher bandwidth capabilities.

- **Cable Modem – Other**
  Similar to DOCSIS 3.0, except these are all prior versions and revisions of DOCSIS including 1.0, 1.1 and 2.0. These versions offer lower bandwidth or speed than DOCSIS 3.0. Only one Provider reported using Cable Modem – Other in the State. This Provider is primarily DOCSIS 3.0 and will likely migrate the remaining areas of the State from earlier versions of DOCSIS to DOCSIS 3.0 in the near future.

- **Optical Carrier/Fiber to the End User**
  A communications network utilizing fiber optics up to or into a household, business, or other facility – also called Fiber to the Home (FTTH) or Fiber to the Premise (FTTP). Fiber optic cables allow for transmission of modulated light along an optical fiber for significant distances. Fiber optic cables are utilized throughout communications systems due to their ability to transmit signals over longer distances with higher bandwidths, while having significant reductions in noise and distortion effects compared to other wireline and wireless networks. This technology is replacing other traditional telephone technologies throughout more densely populated areas of the State. The local phone company in these areas will likely phase out the traditional phone system over the long term.

- **Satellite**
  Wireless service provided between satellites and the end user. A dish-shaped antenna, similar to those used for satellite TV, is utilized at the end user's location to receive the downstream signal and to transmit the signal upstream. Satellite is available anywhere in the State where a clear view to the southern sky exists. Trees, buildings, and other obstructions are the only obstacles that may keep end users from accessing satellite internet.

- **Terrestrial Fixed Wireless – Unlicensed**
  Broadband service typically provided in a point-to-point configuration from a central tower location, or through a series of towers (hops) as part of a mesh network, to an end user location. The frequencies utilized are not licensed by the FCC and therefore are susceptable to interference or competition for bandwidth from other non-licensed networks. The only system to report utilization of Fixed Wireless – Unlicensed is located in and around the Rohoboth Beach area of the State. This is a WiFi-based system that requires a subscription and is password protected.

- **Terrestrial Fixed Wireless – Licensed**
  Broadband service typically provided in a point-to-point configuration from a central tower location, or through a series of towers (hops) as part of a mesh network, to an end user location. The frequencies utilized are licensed by the FCC and therefore are more immune to interference and competition for bandwidth from other networks.

- **Terrestrial Mobile Wireless**
  Broadband service typically provided in a point-to-multipoint configuration from multiple tower locations, as part of a mesh network, to end user locations. The mesh configuration allows for mobile access to the broadband network. These networks are most commonly known as cellular data networks. The frequencies utilized are licensed by the FCC and therefore are more immune to interference and competition for bandwidth from other networks. Terrestrial mobile based, or cellular, broadband is available throughout the State with the exception of a few areas. These are shown on the accompanying maps as unserved areas of the State.

6 Advertised Upstream and Downstream Transmission Speeds

Broadband Providers often advertise both downstream and upstream speeds as "up to" speeds. In other words, a Provider will advertise speeds "up to" 4 Mbps in the downstream direction and "up to" 1 Mbps in the upstream direction. Consumers may believe that those are the speeds they will most often realize when utilizing the Provider's network for internet access. However, in reality, the actual speeds offered on the network may be significantly less than the advertised "up to" speeds.

Many broadband networks deployed today utilize a shared bandwidth design whereby the network is developed based on customers sharing the total available bandwidth on the network. This is an effective way for a Provider to offer fast speeds to large areas while minimizing the amount of infrastructure needed and thereby reducing the cost of deployment. In many cases, this design provides speeds sufficient for most subscribers' needs that are well within the definition of broadband. However, the actual speeds will most often be lower than the advertised speeds because of the shared bandwidth design, and in some cases they will fall below the threshold stipulated for broadband.

An example of this is – if a network has a total available bandwidth equating to a download speed of 10 Mbps and one person is accessing the network, they will realize speeds at or near 10 Mbps. However, if 10 people are accessing the same network at the same time, they will divide the available network bandwidth among them. Although the actual results will vary, based on the level of utilization of bandwidth by each of the users, for purposes of this example, the result would be approximately 1 Mbps available to each of the 10 people accessing the network. In this example, we assume all 10 users are accessing significant amounts of bandwidth that may be required to download music, video, and large files or that may be required to watch live video. In reality, all 10 users will likely be utilizing differing levels of bandwidth at any given time. This phenomenon makes it difficult to evaluate advertised speeds within a given system, between systems, and throughout the State and beyond.

The Providers that supplied speed information, as verified during the backlab verification process, reported the following ranges of speed by technology:

- **Asymmetrical xDSL**

  Speeds between 768 Kbps to 25 Mbps in the downstream direction with speeds between 200 Kbps to 1.5 Mbps in the upstream direction[3].

- **Symmetric xDSL**

  Speeds between 768 Kbps to 6 Mbps in the downstream direction with speeds between 768 Kbps to 6 Mbps in the upstream direction.

- **Other Copper Wireline**
  Speeds between 768 Kbps to 25 Mbps in the downstream direction with speeds between 200 Kbps to 25 Mbps in the upstream direction.

- **Cable Modem – DOCSIS 3.0**
  Speeds between 50 Mbps to greater than 100 Mbps in the downstream direction with speeds between 10 Mbps to 25 Mbps in the upstream direction.

- **Optical Carrier/Fiber to the End User**
  Speeds between 50 Mbps to greater than 1 Gbps in the downstream direction with speeds between 10 Mbps to greater than 1 Gbps in the upstream direction.

  SatelliteSpeeds between 768 Kbps to 3 Mbps in the downstream direction with speeds between 200 Kbps to 768 Kbps in the upstream direction[4].

RBwifi dropped

- **Terrestrial Mobile Wireless**
  Speeds between 768 Kbps to 25 Mbps in the downstream direction with speeds between 200 Kbps to 6 Mbps in the upstream direction.

7 Samples of Actual Upstream and Downstream Transmission Speeds

Several methods were used to obtain a sampling of the actual broadband transmission speeds achieved by residents, businesses, and institutions. For example, State residents and businesses were given a business card-sized handout that briefly explained the Project and pointed them to the State-specific speed test and survey website. This round of verification focused on areas of the State where providers have reported new technologies and speeds compared to previous data submissions. The State utilized a Project-specific Ookla speed test

[3] These speeds have decreased from previous submissions based on providers' updated data.
[4] These speeds have decreased from previous submissions based on providers' updated data.

website[5] and survey in order to gain information on users' addresses, satisfaction, and the upstream and downstream speeds associated with their broadband connection. In addition, the State Parties' team members performed approximately 65 speed tests, on wireless networks. The locations of these speed tests are included on Attachment 3.

Another verification method, in addition to utilizing the above-mentioned methodologies for verifying system coverage and characteristics, was for team members to enter into discussions with residents in the area. Residents were asked if they knew if a particular Provider's service was available, if they were or had recently been a customer, and if they know what speeds they could achieve. Residents often times did not know what their service level and speeds were but did know who the broadband service Provider was. Questions such as how much they were paying for the service led to a better understanding of their service level. Approximately 150 speed test cards were handed to residents and at business locations such as business strip malls. These cards encouraged the residents to visit the State speed test and survey website, as listed on the card, to assist the State in gathering actual speed data. Thus far, nearly 3,300 speed tests have been performed by both State Party team members on site and residents and business personnel at their locations throughout the State at locations with broadband speeds of at least 768 Kbps in the forward and 200 Kbps in the return direction. In addition to the 3,300 speed tests mentioned, several hundred speed tests have been performed showing less than broadband speeds being achieved.

It should be noted that there are many variables that can affect speed test results. Of these, the most significant are the technology reportedly utilized and the performance characteristics of the computer or device being utilized by the end user performing the test, the number of computers or devices at a location accessing the internet at the same time, the level of throughput being utilized by each, and the day and time of day when the tests are performed. For these reasons, speed tests are best analyzed in the aggregate to give a good understanding of typical speeds being realized. In other words, all cellular tests should be averaged to get an accurate understanding of actual speeds that can be expected from that given technology. Furthermore, speeds for a given Provider can be averaged to again get a better understanding of the actual speeds available from that Provider.

Of the nearly 3,300 speed tests performed, providing broadband speed results, to date, the overall average speeds of all technologies and Providers) were approximately 6.8 Mbps downstream and 3.0 Mbps upstream. Further broken down by technology, the average speeds are:

The Ookla tests are showing the categories incorrectly. For instance, Comcast is many times referred to as a DSL connection which we know it is not. There are no Cable modem connections shown. Do we pull this service specific part out?? We need to take a good look at what Ookla is providing and how we may scrub it going forward and then plot it on a map for comparison to our provider maps.

[5] http://www.delawarespeedtest.com/

Technology	Downstream	Upstream
All Technologies Combined	6.8 Mbps	3.0 Mbps
Mobile Wireless	1.5 Mbps	550 Kbps
Cable Modem – Residential	10.7 Mbps	3.2 Mbps
Cable Modem – Business class	11.6 Mbps	3.3 Mbps
DSL	10.3 Mbps	4.4 Mbps
Fiber To The Premises/Business	23.9 Mbps	14.0 Mbps

As described above, these are aggregate numbers that represent an average of these tests taken by end users. Actual speeds at a given location will vary from these speeds. Overall, the speed tests indicate speeds comparable to those advertised by the providers. For example, mobile wireless providers offer speeds between 768 Kbps to 3.0Mbps (some offer a lower maximum speed) in the downstream direction. The speed tests show an average speed of 1.5 Mbps in the downstream direction. Cable modem DOCSIS 3.0 is advertised to offer speeds between 10 Mbps and 100 Mbps. The average tested speed was 10.7 Mbps. This is on the low end of what is advertised and may reflect end users with a lower than maximum speed plan. In other words, although speeds up to 50 Mbps may be offered to residential end users, many may be signed up for a service with a maximum throughput of 20 Mbps or less, which brings the aggregate average speed for cable modem DOCSIS 3.0 down. Fiber to the premise is similar to cable modem DOCSIS 3.0 in that the tested speeds are lower than the advertised maximum speeds of between 50 Mbps and 1 Gbps. These higher end speeds are more costly and therefore not likely to be the highest selling tier of service. Therefore, the speed tests done on the lower tiered service will bring the overall aggregated average speed down from the advertised "up to" speeds. DSL service is the only technology that had tested aggregated average speeds near the top of the advertised maximum speed range. In fact, the advertised maximum speeds for DSL are between 768 Kbps and 10 Mbps, and the tested speeds for DSL came in at 10.3 Mbps.

8 Broadband Service Tiers – Residential, Business and Anchor Institutions

One of the goals of the project was to find the maximum downstream and upstream speeds offered by the various Providers in the State. The goal was not necessarily to determine the various levels of service or speed being offered up to the maximum by the Providers. However, speed tiers or levels are an important component of determining what services are available to end users, as many will not require or be able to afford the fastest available speeds but do want or need a higher speed connection than is available via a dial-up connection.

Broadband service is provided in many different speed tiers through the various technologies. Most Providers offer more than one level of service or speed whereby end users who need or desire faster connectivity can opt for the highest level of service, and end users who only need lower levels of service can elect to purchase a slower connection at a reduced cost. Speed tiers differ considerably between Providers and are dependent on the technology utilized to provide the service. For instance, Providers using cable modem DOCSIS3 technology offer maximum speeds of between 10 Mbps to 100 Mbps in the downstream direction, while mobile wireless Providers in the State offer maximum downstream speeds between 768 Kbps and 3 Mbps.

Making exact comparisons between broadband service Providers is difficult for a variety of reasons, the most significant of which is that most Providers offer "up-to" speeds. As an example, an end user on one Provider's network with "up-to" speed of 1.5 Mbps may realize close to that maximum speed at most times. However, a customer on another Provider's network with "up-to" speed of 1.5 Mbps may only realize half of that speed at most times. This makes it difficult to accurately determine which Provider has the speeds that will consistently provide the level of service needed by the end user. Other issues that can make shopping for a broadband Provider difficult are introductory pricing, bundled pricing (where broadband service must be purchased with another service such as phone or TV), and long-term contracts. Introductory pricing may provide a benefit in the short term, while offering less competitive pricing in the long term. Long-term contracts can lock an end user into a plan they may not need over the course of the contract term or lock them into a plan that does not fulfill their needs in the future. Additionally, some Providers such as mobile broadband and satellite services have established throughput limits, such as 5 gigabits of throughput per month. After a customer hits that level of throughput, they may be charged additional fees or their service level is cut back significantly for the remainder of the month (such as is done by some satellite based Providers).

Providers are also continually changing their service offerings and pricing. As end users needs for speed continue to increase, Providers continue to offer higher levels of speed with new additional features as discussed elsewhere in this report. Another aspect that must be considered by potential end users is installation, equipment, and activation fees. These can vary from $0.00 to over $100.00. Many Providers that require installation or equipment fees run promotions where these fees are waived or reduced for a limited time.

Other add-ons or extras, which may or may not offer value to the end user, that some Providers offer as a part of their service are security tools such as anti-spam and anti-virus software, home networking, specific web content free such as Disney, ESPN3, and others.

Some examples of available plans and non-introductory, non-bundled pricing as researched on Providers' websites include the following:

Cable Modem Providers (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1.0 Mbps	512 Kbps	$32.95
1.5 Mbps	384 Kbps	$40.95
3 Mbps	Unadvertised	$29.95
15 Mbps	3 Mbps	$59.95
20 Mbps	4 Mbps	$69.95
50 Mbps	10 Mbps	$114.95

Fiber To The Premise (FTTP all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
15 Mbps	5 Mbps	$54.99
25 Mbps	25 Mbps	$69.99
50 Mbps	20 Mbps	$144.99

Satellite (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1.2 Mbps	200 Kbps	$69.99
1.5 Mbps	256 Kbps	$109.98
1.6 Mbps	250 Kbps	$79.99
2.0 Mbps	300 Kbps	$119.99

Mobile Wireless (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1.4 Mbps	200 Kbps	$40/50/60*
1.4 Mbps	800 Kbps	$20/35/50/80*
*Based on monthly throughput, $20 = 1 Gbit allowance, $80 = 10 Gbit allowance		

DSL (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1 Mbps	384 Kbps	$19.99
3 Mbps	768 Kbps	$29.99
7.1 Mbps	768 Kbps	$39.99
8 Mbps	Not advertised	$39.95

Fixed wireless (Not licensed all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1.5 Mbps (residential)	Not advertised	$39.99
1.5 Mbps (business)	Not advertised	$49.99

As the tables above show, shopping for the plan that meets the specific, consistent needs of an end user can be confusing. Many other options and additional features are offered by Providers that are not shown in the examples above, including virus protection, spam filters and pop-up blockers, and subscription only websites. In addition, end users must decide if long-term commitments are a concern for them prior to signing up for many types of broadband service offerings.

Some Providers such as the cable modem, DSL, and wireless Providers also offer business class service. These services may be identical to residential service with additional add-on services, such as Outlook for e-mail, and may include a higher level of, or faster, service response when problems arise.

In addition, some Providers offer faster speeds as business class service at a higher monthly cost. These Providers also will offer business class and residential class services to Anchor Institutions. Some Providers will offer higher speeds on a per site basis, such as fiber optic connections, with speeds as high as 1 Gbps symmetrical such as those supplied to the cities of Dover and Wilmington and the University of Delaware.

As shown below in the Broadband Availability at Anchor Locations section, Anchor locations' requirements vary significantly based on their size, the number of internet users, and the applications being run at the location. Costs will vary on these services based on speed and necessary infrastructure expansions needed to connect the Anchor Institution.

9 Locations of Towers Utilized to Provide Broadband

During the previous Field Verification portion of the project, the State Parties noted the locations of towers that are utilized by cellular Providers and for other radio communications.

These locations have been plotted onto a map for potential future reference. These locations can serve as transmit and receive sites for wireless broadband Providers. As a potential wireless Provider evaluates whether to deploy a network to offer broadband to residents and businesses, one of the most significant costs can be construction of a tower that is high enough to provide service to the surrounding areas. These existing towers may have space available that can be leveraged for placement of broadband related antennas at a significantly lower cost than building new towers and therefore may allow a Provider to deploy a network where one may not otherwise exist. The available space must be at a height on the antenna that will meet the needs of a new occupant on the tower. Furthermore, like any business, the Provider must recoup their investment over a set period of time. Using a lower cost option such as existing towers may allow a Provider to offer service at a lower monthly cost to the end user.

The goal during the Field Verification phase of the project was to document all towers passed while performing the more pertinent task of verification of broadband availability where the Providers indicated service was available. This process did not identify all towers in the State but does provide a useful database that can be built upon over time. The Towers that were located are shown on the map included as Attachment 4.

10 Wireless Spectrums Utilized to Provide Broadband

Several wireless frequency spectrums are being utilized by the various wireless Providers to offer broadband service. These include both fixed and mobile wireless Providers. As part of the data request sent to all of the Providers, they were asked to include which frequencies they are utilizing to offer broadband service in a wireless format. The spectrums utilized, as reported by the Providers, are as follows:

Cellular Providers are using several spectrum ranges including:

- 700 MHz band
- 698 – 758 MHZ
- 775 – 788 MHz
- 805 – 806 MHz
- 824 – 849 MHz
- 862 – 869 MHz
- 1.850 – 1.915 GHz
- 1.930 – 1.995 GHz
- 1.710 – 1.755 GHz
- 2.100 – 2.155 GHz

  2.496 – 2.690 GHz

Satellite Providers are using licensed frequencies as provided by the FCC in the L-band, Big LEO, Little LEO, and 2 GHz spectrums.

11 Broadband Availability at Anchor Locations

To be updated by the University and DTI

12 Conclusion

The State of Delaware, with direction and grant funds from the NTIA, began the process of determining the level of broadband availability in the State of Delaware in early 2010. As components of the project, Providers were asked to provide data detailing where they provide broadband service, the advertised maximum downstream and upstream speeds, and the technology deployed to offer the service. The data gathered from the Providers was verified using multiple methods, including checking the data against websites; field verification and speed tests by State Party team members and the general public. The data was then sent to the Providers for one final check for accuracy. The State has now completed its 4th submission or version of the project with updates being included in the data base each time.

Because, in part, the State has a relatively high population density, broadband providers offer service throughout much of the State. Additionally, in more than 50% of the State more than six different Providers offer broadband in the same areas. Over 99% of the State has broadband service availability from at least two Providers.

There are several technology types being utilized in the State to provide broadband to residents, businesses, and Anchors. These vary from telephone-based technologies such as asymmetrical and symmetrical DSL and other copper wireline to cable-modem based technologies, optical carrier or Fiber-To-The end user, satellite, and mobile wireless. Each of the technologies brings broadband to end users in different ways and fills various needs such as speed, price, reliability and mobility.

Determining and documenting speed offerings can be a complicated task. Most broadband providers offer "up to" speeds. The actual speeds of these networks at a given time may vary drastically from the "up to" speed that is advertised. In addition, Providers often include other services such as virus protection, anti-spyware, and others or require a customer to bundle their broadband service with other services such as phone or TV to get the best price. Consumers need to weigh all aspects of the Providers' service prior to signing up for service and potentially signing a long-term contract.

As a part of the Project, the State Parties documented existing cellular and other communications towers throughout the State. These locations may provide a potential cost reduction for future broadband providers to enter the broadband marketplace.

This may allow the State to encourage build out of existing wireless networks or deployment of new networks where broadband service is lacking today.

The Institute for Public Administration at the University of Delaware (IPA) has had contact with 455 of the 645 known Anchor Institutions in the State. Of these, only 15 do not have broadband service today. The State should continue to make efforts to contact the Anchors that have not responded thus far. The State should then work with the Anchors during its Planning Project to determine if the broadband services available to the Anchors are meeting their needs today, as well as being able to meet their anticipated short- and long-term needs in the future.

The State can utilize availability documentation gathered during this Project to continue to help direct the Planning Project that is currently underway. During the Planning Project, the State and the University of Delaware's Institute for Public Administration will determine broadband-related needs of the general public, businesses, and Anchor Institutions throughout the State in today's environment as well as into the future.

13 Glossary of Terms

Access Point (AP) – Transmitter and receiver utilized to create a wireless connection between devices. End users connect wirelessly to the network via an Access Point.

Asymmetrical Speeds – A network system design characteristic where return speed is lower than forward speed. This allows for more of the network's capability or throughput to be utilized by the forward portion of the network allowing for faster downloads than uploads.

Broadband – (as defined in the NTIA's NOFA) – Data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (Kbps) downstream and at least 200 Kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users within the project area.

BPL (Broadband-Over Powerline) – A network utilizing electrical conductors (a power Provider's lines) as its transport medium.

Cable Modem – A device that converts information from one device (computer) to a usable form for another device (cable TV network), i.e., Information from a computer is converted to a useable format for transport on the cable TV network and converted back to a format useable by a computer at the receive site modem.

Community Anchor Institutions – Schools, libraries, medical and healthcare Providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and entities.

Digital Divide – The inability of residents to access broadband and Internet services based on economic or geographic reasons.

Digital Subscriber Line (DSL) – A telephone system-based data communications service that utilizes modulation schemes that allow high-speed transmission of data on copper or phone lines.

Downstream, also known as "download" or "forward direction" – Connectivity path from a network service Provider, or ISP, to the customer's location.

Fiber Optic Cable – Cable made from glass that provides the medium for transmission of light along a designated path. Single mode fiber is utilized to transport light over long distances.

Fiber To The Premises (FTTP) – A communications network utilizing fiber optics up to or into a household, business or other facility, also called FTTH or Fiber To The Home.

Fixed Wireless – Broadband service typically provided in a point-to-point configuration from a central tower location, or through a series of towers (hops) as part of a mesh network, to a customer premise location.

Gigabits per Second (Gbps) – One billion bits of information transmitted between devices in one second, i.e., 1 Gbps = 1,000,000,000 bits of information transported over a network per second.

Internet Protocol (IP) – Internetworking protocol used to transmit data across and between switched networks. Also specifies the formatting and addressing scheme of information packets.

ISP – Internet Service Provider – Private company or other organization offering connectivity to the Internet.

Kilobits Per Second (Kbps) – One thousand bits of information transmitted between devices in one second, i.e., 256 Kbps = 256,000 bits of information transported over a network per second.

Megabits per Second (Mbps) – One million bits of information transmitted between devices in one second, i.e., 1.5 Mbps = 1,500,000 bits of information transported over a network per second.

Middle Mile/Backbone/Backhaul – Transmission media utilized to connect APs or network nodes within a system to each other and to the main network and to the Internet. Backhauls can consist of fiber optic cables, WiMAX, and other wireless technologies.

Symmetrical Speeds – A system design characteristic allowing equal speeds in the forward and return paths of the network.

Upstream – Also known as "upload" or "return direction" – Connectivity from the customer back to the network service Provider or ISP.

Voice over IP (VoIP) – Transmission of voice communications as IP packets, allowing for transportation of voice over the Internet, LANs and WANs.

Wi-Fi (Wireless Fidelity) – Wireless local area networks based on the IEEE's (Institute of Electrical and Electronics Engineers, Inc.) 802.11 standards. 802.11 refers to a group of standards in place today as well as standards that are currently being developed.

WiMAX (**Worldwide Interoperability for Microwave Access)** – Wireless wide area networks based on the IEEE's 802.16 standards. Capable of transmission speeds up to 70 Mbps over 70 miles with actual speed and coverage far less based on applications and terrain.

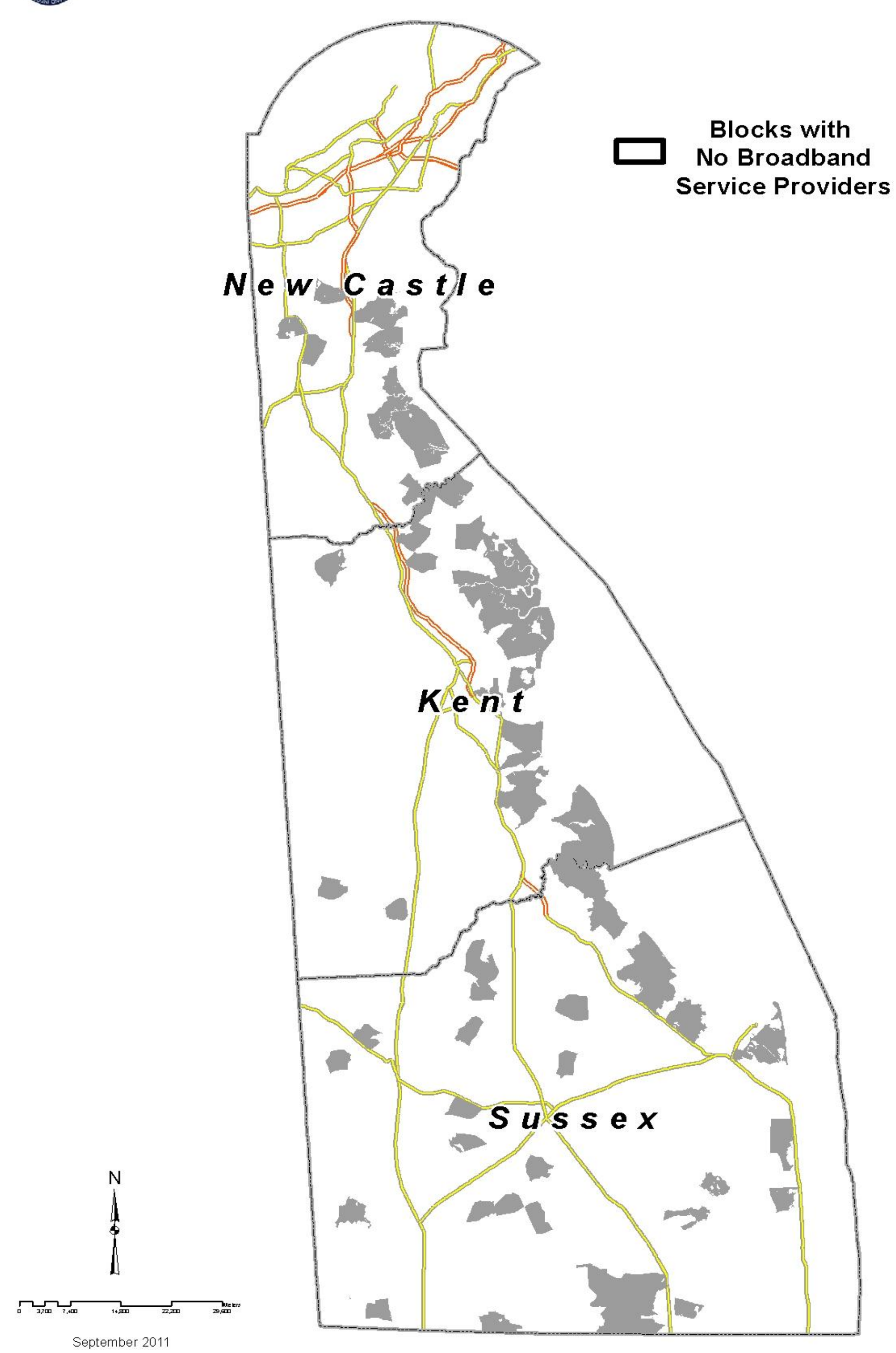
Version Information

Version Num.	Edit Date	Edited By	Comments
0.1	12/07/10	Nielsen, Robinson	Draft Document
1.0	12/10/10	Jensen, Conway	Draft Document Revisions
1.1	04/26/11	Jensen	Spring 2011 Updates
1.2	06/13/11	Tuttle	Updated 2011 Anchor Stats
2.0	09/22/11	Cloud	Updated 2011 CAI Stats for Fall submission from UD-IPA
2.1	01/25/12	GeoDecisions	Fall 2011 Updates
3.0	03/20/12	GeoDecisions	Spring 2012 Updates
3.1	03/29/12	Cloud	Minor edits, Updated CAI Stats for spring submission from UD-IPA

Attachments

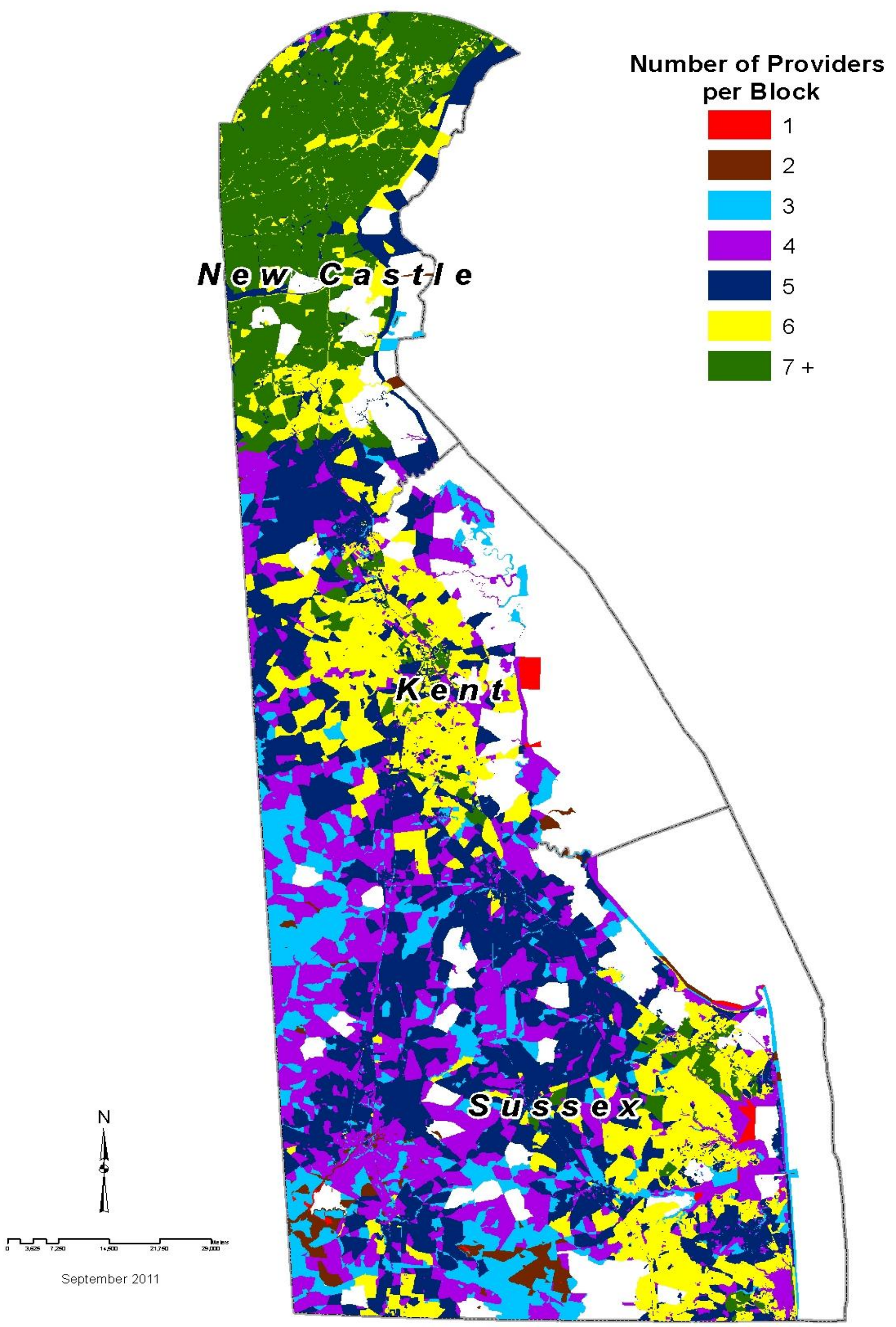
Attachment 1

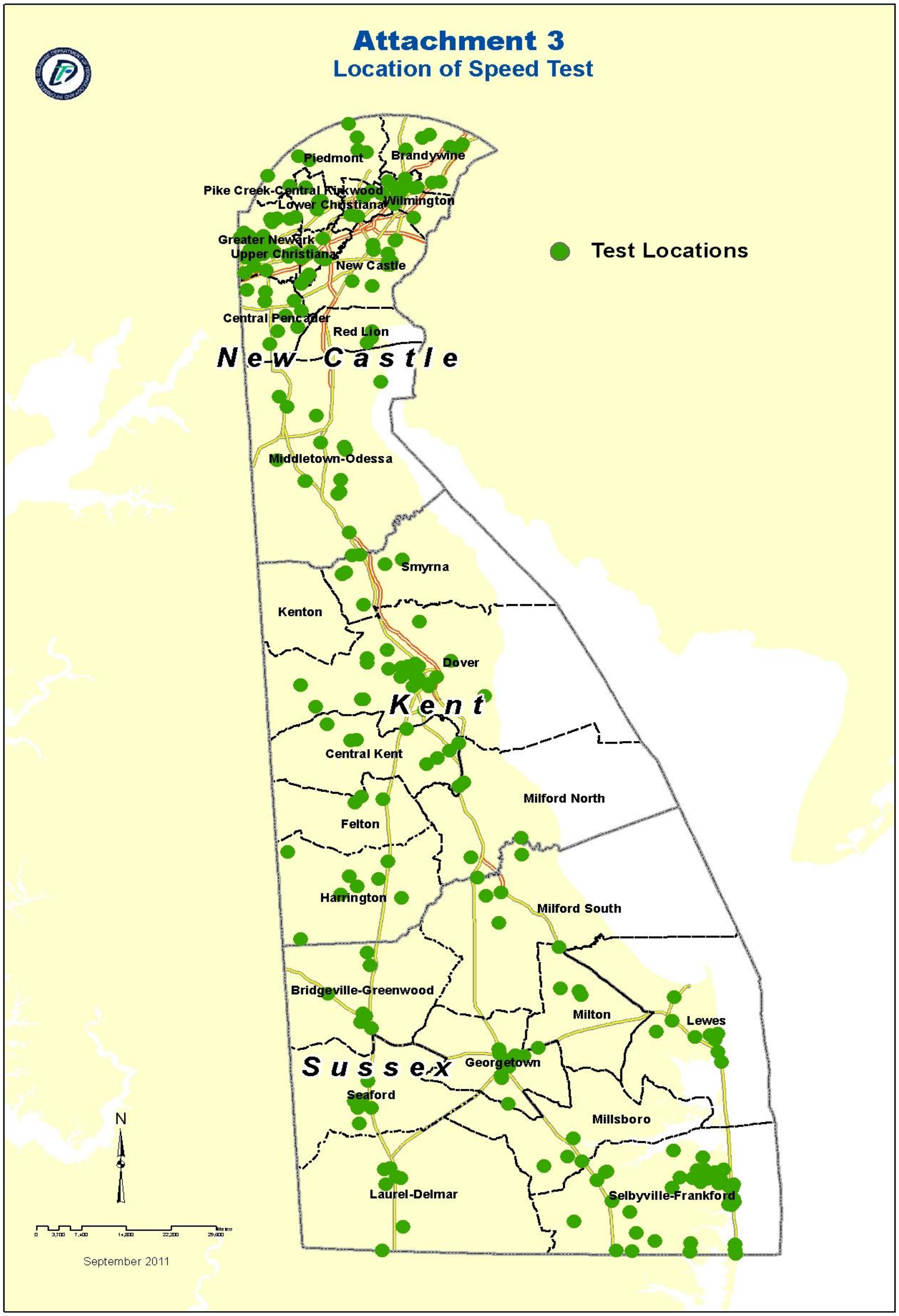
Areas with No Access to Broadband

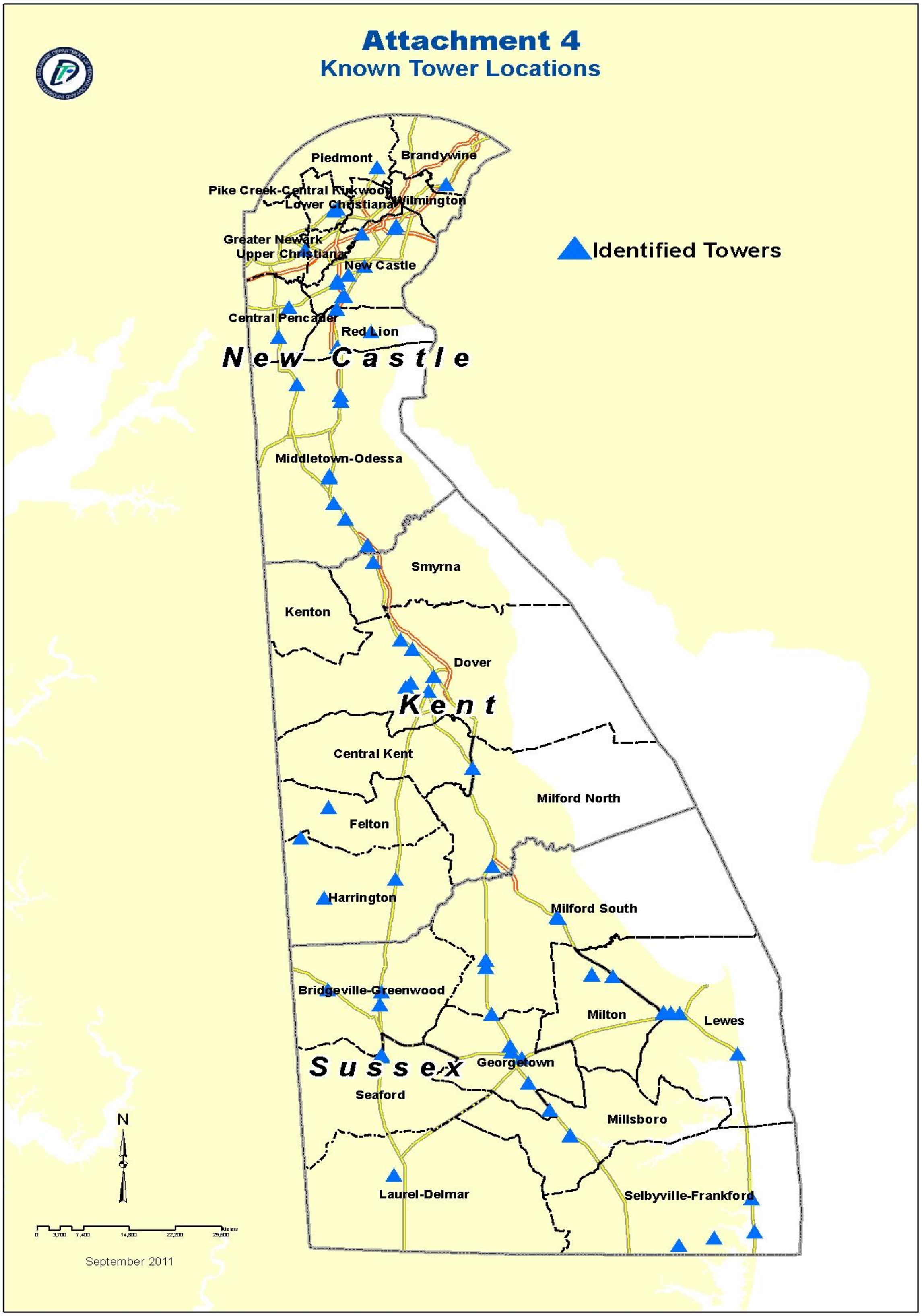


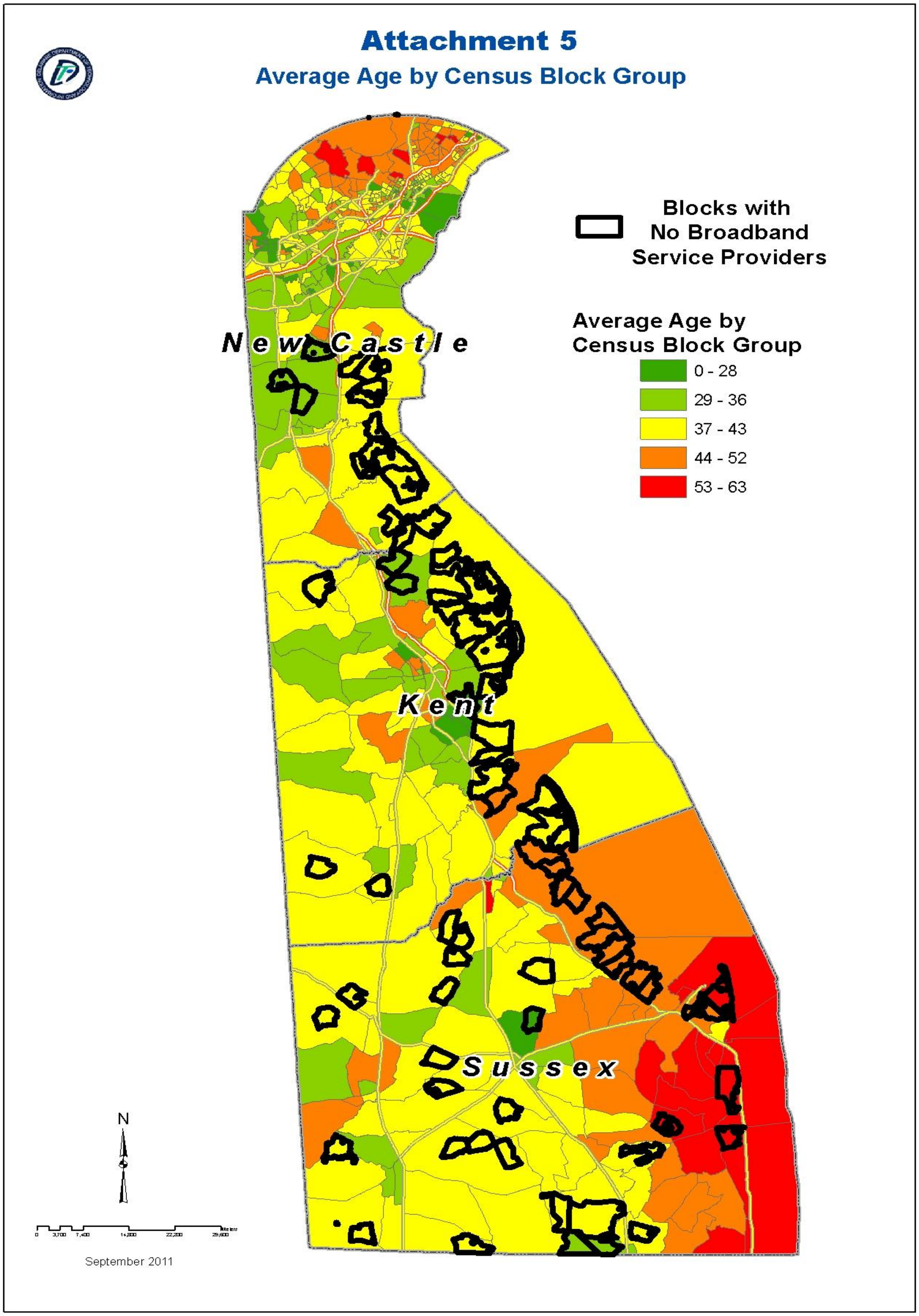
Attachment 2

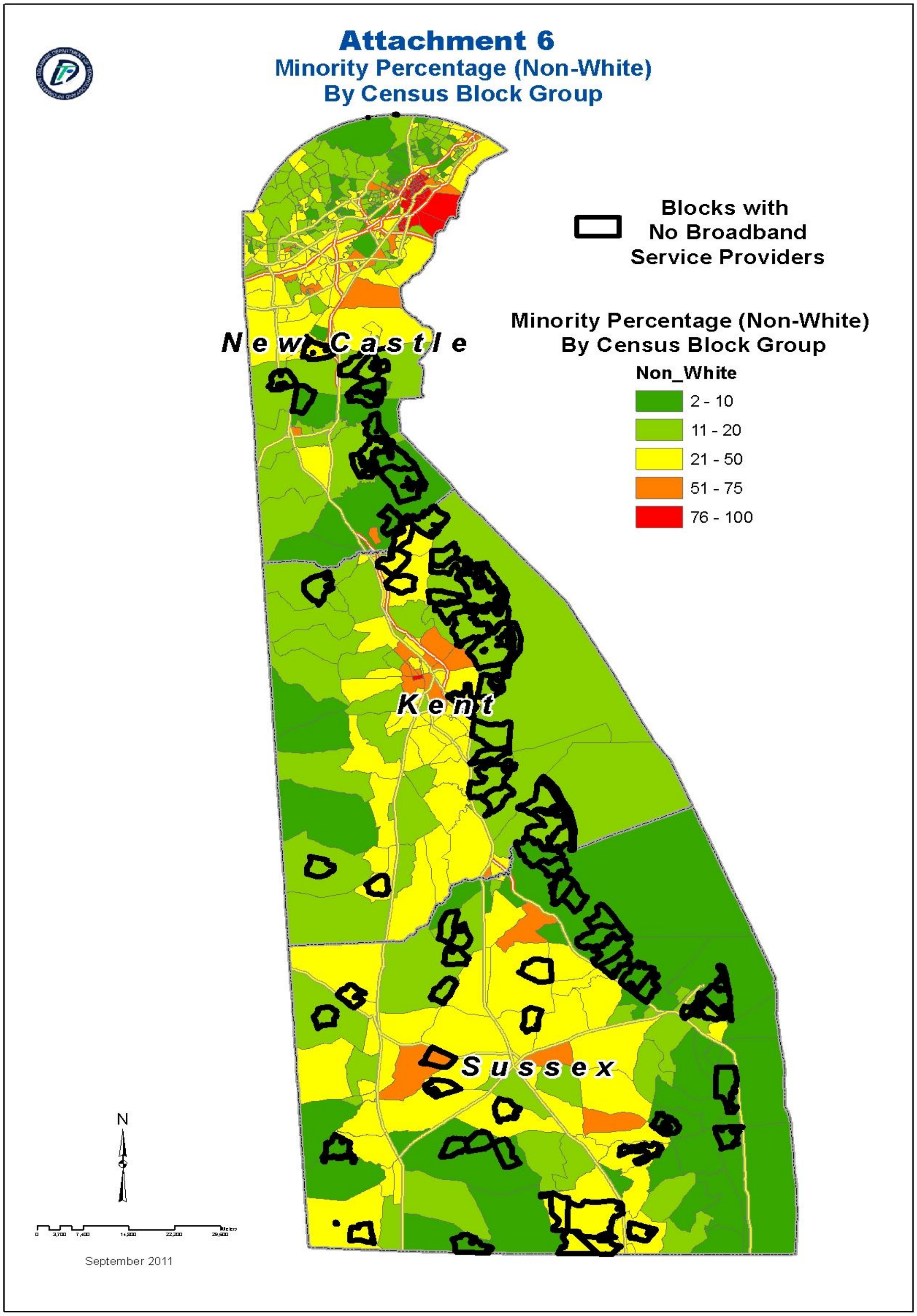
Number of Broadband Providers per Block

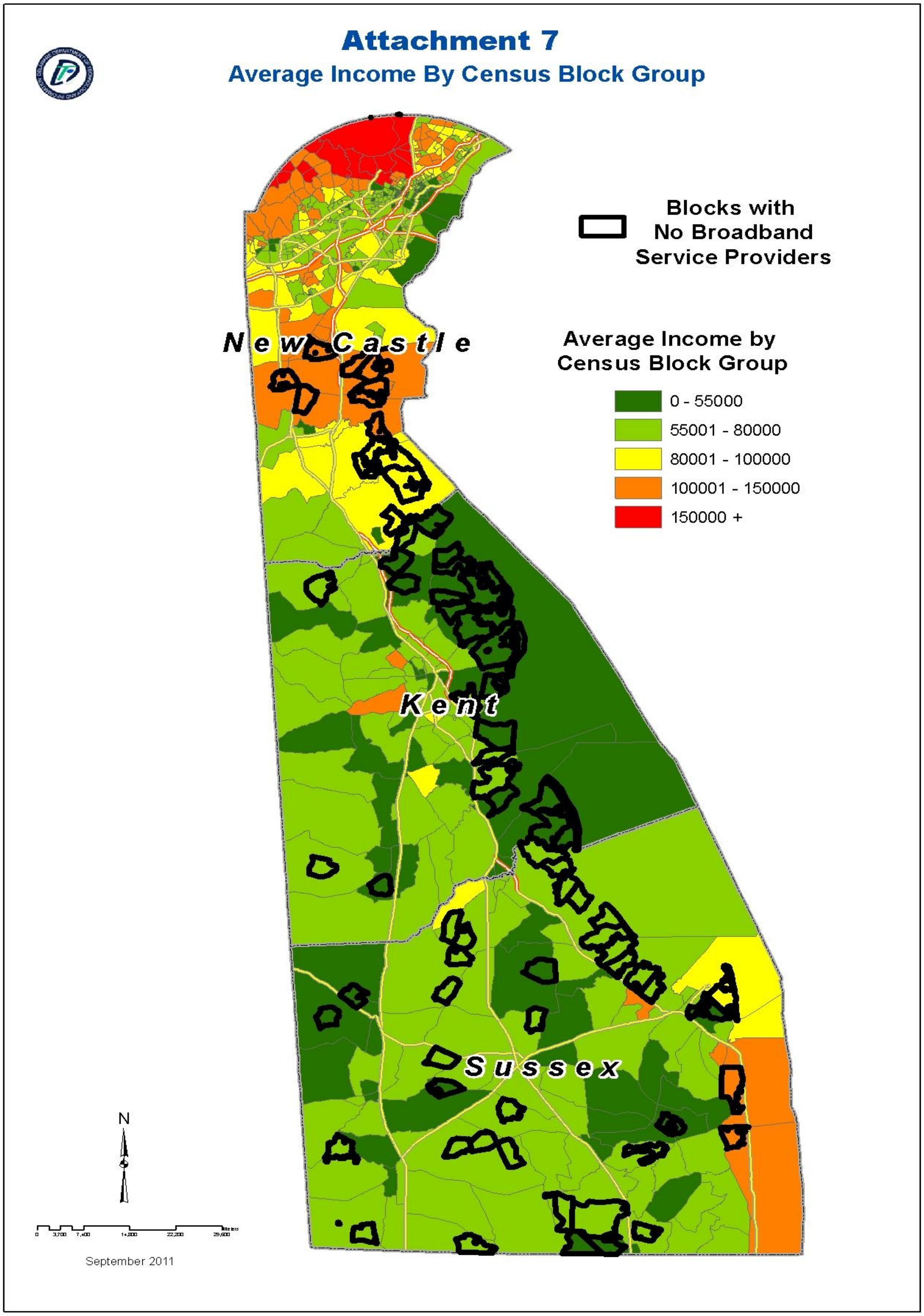



Attachment 3
Location of Speed Test
Test Locations
Piedmont
Brandywine
Pike Creek-Central Kirkwood
Lower Christiana
Wilmington
Greater Newark
Upper Christiana
New Castle
Central Pencader
Red Lion
New Castle
Middletown-Odessa
Smyrna
Kenton
Dover
Kent
Central Kent
Milford North
Felton
Harrington
Milford South
Bridgeville-Greenwood
Milton
Lewes
Sussex
Georgetown
Seaford
Millsboro
Laurel-Delmar
Selbyville-Frankford
N
September 2011


Attachment 4
Known Tower Locations
Identified Towers
Piedmont
Brandywine
Pike Creek-Central Kirkwood
Lower Christiana
Wilmington
Greater Newark
Upper Christiana
New Castle
Central Pencader
Red Lion
New Castle
Middletown-Odessa
Smyrna
Kenton
Dover
Kent
Central Kent
Milford North
Felton
Harrington
Milford South
Bridgeville-Greenwood
Milton
Lewes
Sussex
Georgetown
Seaford
Millsboro
Laurel-Delmar
Selbyville-Frankford
N
September 2011


Attachment 5
Average Age by Census Block Group
Blocks with No Broadband Service Providers
Average Age by Census Block Group
0 - 28
29 - 36
37 - 43
44 - 52
53 - 63
New Castle
Kent
Sussex
N
September 2011


Attachment 6
Minority Percentage (Non-White)
By Census Block Group
Blocks with
No Broadband
Service Providers
Minority Percentage (Non-White)
By Census Block Group
Non_White
2 - 10
11 - 20
21 - 50
51 - 75
76 - 100
New Castle
Kent
Sussex
N
September 2011


Attachment 7
Average Income By Census Block Group
Blocks with No Broadband Service Providers
Average Income by Census Block Group
0 - 55000
55001 - 80000
80001 - 100000
100001 - 150000
150000 +
New Castle
Kent
Sussex
N
September 2011

OFFICIAL APRIL 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE PROGRAM FOR THE STATE OF FLORIDA

April 1, 2012

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BROADBAND FLORIDA 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:

The state of Florida is pleased to present this submission for Florida's State Broadband Initiative (SBI) Grant Program.

These artifacts should be found to be compliant with the October 1, 2011, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability.

Within the timeframe of this reporting cycle the Florida Department of Management Services (the Department or DMS) transitioned services from our former contractor to an interim contractor and took on the responsibility for the data outreach and collection portion of the project while issuing an Invitation to Negotiate (ITN) and following the process to secure a new contract for GIS services. In doing so, the Department successfully negotiated non-disclosure agreements prior to receiving data from most providers. The Department also launched a concentrated effort and obtained broadband connection information for community anchor institutions (CAIs) with a specific focus on schools. Through the coordination of our interim contractor, the Tampa Bay Regional Planning Council, and GeoPlan, which is affiliated with the University of Florida, we were able to add broadband connection data to several thousand schools in Florida.

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.

<u>Broadband Service Availability — Provider Outreach and Verification</u>

The Department made every effort to contact the providers and sent each non-responsive company an individual coverage map requesting that the provider either confirm or correct the information. A complete roster by provider depicting participation status is included in the narrative. This data update submission under the SBI program includes datasets for approximately 50 percent of the Florida provider community, or 40 of 80 total providers. Of the 30 actively participating providers, 20 supplied an update to their network or coverage area(s), although only 17 of those updates arrived in time or with usable data to include in this submission. A total of 10 providers reported there was no change in their coverage area; however, not all of those providers could be captured in the dataset because they did not resubmit middle mile data. A breakdown of middle mile data follows. There are 17 providers who previously supplied data but were non-responsive in the April 2012 update effort; therefore their previous dataset is being put forward as part of this compilation. Of all of the providers that are not represented in the attached datasets, only 1 refused to participate in the voluntary program and 38 were non-responsive to multiple contact attempts.

Because Broadband Florida did not have access to previously submitted middle mile data, there is a gap in that portion of our submission. There are 2 providers that reported no change, but did not resubmit middle mile data. There are a total of 12 non-responsive providers that responded in earlier submissions with middle mile data. The previous data for all 14 providers could not be included in the dataset because our former contractor refused to provide it to the state.

Broadband Florida believes that all commercially reasonable efforts were made to account for 100 percent of the known Florida broadband provider community, pursuant to this semi-annual data update submission.

Broadband Florida established a new state mapping tool, which can be found at http://bb-prod.geoplan.ufl.edu/flexviewer/, includes additional datasets not required by NTIA, a street level view widget, the ability to identify broadband coverage and providers by address, and layer selection capability. The mapping tool is still in the development phase and will soon include a modified data organizational structure and an Ookla speed test that was purchased for use in conjunction with the map to verify provider coverage information. The performance of the new tool is substantially better than our previous version and will be featured on the Broadband Florida website. The Department contracted with a marketing firm to develop and produce a high quality product to showcase the Broadband Florida initiatives. The new site will include pages for each of the Broadband Florida funded projects, various surveys to collect data, a way for consumers to contact members of the Broadband Florida team, opportunities for consumers to submit feedback and useful historical and reference information.

Community Anchor Institutions

DMS made the decision to aggressively collect data on the location and broadband connectivity of CAIs, in accordance with the data requirements of the SBI NOFA Technical Appendix.

The Department extracted library information from the assessments produced by the Library Assessment Project, completely reviewed and updated CAIs using MyFloridaNet, the statewide technology network, and made use of publicly available school connectivity data available through utilization of and application for e-rate funding. The Department also made the decision to replace some existing CAI data with data that is collected by GeoPlan and subject to rigorous quality control protocols and verification methodology. In addition to providing accuracy, the data collected by GeoPlan is updated on a specific schedule and will be easy to connect to our database to ensure continued relevance and accuracy.

The Department also reached out and established relationships with the Department of Health, the Department of Education, the Agency for Healthcare Administration and other associations throughout the state which we plan to use to develop a strategy to obtain additional CAI broadband connectivity. DMS recognizes the role that statewide associations play in promoting the importance of broadband connectivity at anchor institutions and participation in this data collection process. The Department will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

We appreciate the chance to participate in the SBI project and believe that the projects have and will create opportunities for citizens of Florida throughout all regions and demographic categories in the state. We plan to continue to bring best practices to our efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

If you have any questions about this Data Narrative, please do not hesitate to contact me, at (850) 410-0709.

Respectfully submitted,

Bill Price
Director of Broadband Programs
Department of Management Services
State of Florida

The Transition In Activities From Connected Nation to the Broadband Florida Team

During the data submission cycle ending on October 1, 2011, Broadband Florida took major steps in improving Broadband Florida's ability to collect and publish broadband data, to ensure broadband access throughout the State, and to maximize the impact of broadband availability. This data narrative focuses on the data collection and publication activities of the Broadband Florida Team.

In these efforts, Broadband Florida assumed full responsibility for the data-collection activities from broadband providers in the State. Assuming this role is vital to achieve the State's goals with regard to improving broadband access and adoption. In 2010 and 2011, Broadband Florida had worked together with a subcontractor, Connected Nation, in performing this function for the data collection cycles that ended on March 31, 2010, October 8, 2010, April 1, 2011, and on October 1, 2011. As part of the transition from Connected Nation to Broadband Florida, as of the end of the contract date with Connected Nation, December 31, 2011, Broadband Florida established its own Non-Disclosure Agreements (NDAs) with broadband providers for confidential information. Broadband Florida also collected updated information from providers throughout the State. The protection of the NDA used by Broadband Florida did not differ from the NDA used by Connected Nation as, per state law, a contractor acting as an arm of the state is subject to compliance with all state public record laws. However, Connected Nation was not willing to provide Broadband Florida with the confidential information that Connected Nation collected on behalf of the state of Florida. Therefore, Broadband Florida had to obtain NDAs in its own name with providers.
This process decreased the time period in which Broadband Florida had to process and verify the data. In some instances data was not received until the last week of March. Our contractor, the Tampa Bay Regional Planning Council, did everything possible to include all submitted data regardless of submission date. Their effort and flexibility enabled us to provide as much updated data as possible to the NTIA.

Our previous subcontractor, Connected Nation, did provide Broadband Florida with the non-confidential broadband provider information at the Census block level as of June 30, 2011. As a result of obtaining this data, the Broadband Florida team, consisting of DMS, the Tampa Bay Regional Planning Council, and GeoPlan, undertook an effort to rebuild and re-launch the Broadband Florida mapping tool. The site displays additional datasets and meets performance standards that were not achievable using the BroadbandStat tool. The site is live, but remains in the development stage.

Provider Outreach By Broadband Florida

Beginning on January 13, 2012, all providers were sent requests to reestablish a Non-Disclosure Agreement between Broadband Florida and the provider. Since Broadband Florida would now be collecting the data without the assistance of Connected Nation, it was necessary to start this process from the beginning. Of the providers included in the data package, Broadband Florida managed to execute an NDA with all of the organizations that require an NDA prior to data submission (16). Broadband Florida will continue to pursue NDAs with providers that were non-responsive and/or had no update and therefore did not require an NDA. As part of the same request, every provider was asked whether or not they had new data, as of December 31, 2010, that they would be including in our April 1, 2011, submission. Similar requests were sent to those providers that did not respond to the initial outreach multiple times via email and placing personal calls to the organizations.

Data Acquisition: Florida Community Anchor Institutions Methodology

Broadband Florida (DMS and its contractors) put forth considerable efforts within this reporting period to, not only identify additional broadband connectivity information, but also to ensure quality of the existing dataset. The CAI data was audited by our contractor and modified to increase accuracy.

Additionally, the Department obtained all new data, which consisted of over 4,800 locations, for entities that utilize the state network known as MyFloridaNet. The data was divided into subcategories to increase usability and value of the data to consumers and other state agencies.

The CAI featureclass was enhanced to provide more broadband information percentage overall. The data was reviewed over a period of time and due to data quality and ambiguity the Department decided to repopulate the CAI data from scratch with the intent of tracking the source and quality of the derived data. Broadband Florida also decided to ensure that all CAI data collected could be mapped back to the original sources through the use of unique identifiers that exist in public datasets to ensure that the data could be updated on a regular basis. Where the CAI universe was around 18,000 previously and the known sites with broadband service was 5,020, this submission round has increased the percentage of known broadband serviced sites to 7,385 out of a universe of 12,755. The confidence level of site placement is greater as well for sites that still have unknown broadband status. Geocoding was run through multiple address locators for higher match scores. As stated above, particular attention was paid to transferring record IDs where possible from source data.

While we attempted to collect broadband connectivity data from schools and libraries in the past, our response rate was not very high. With this in mind, we took an alternative approach to collecting school and library information for this reporting period. Schools and library information for the institutions that utilize e-rate funding is publicly available through the Universal Service Administration Company (USAC) website. USAC's data retrieval tool in combination with its form displays yielded information on several thousand schools. This is just a subset of what is available from USAC, but because of the format in which the data is released, much of the data collection consisted of manual lookup exercises. We did send a request to USAC asking for access to the data in a format whereby we could automate the process, but the request was denied. We encourage the NTIA to pursue coordination with USAC as every state would benefit from the inclusion of such data. DMS will continue to process and look up connectivity information to include in future submissions.

The Department's mission is to continue to seek out CAI data resources and to promote the importance of the project to CAIs within the state. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. The Department of Management Services will continue working to identify new outreach methods that will be beneficial to the project.

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

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12	6.804	6.804	6.804	10	719	0
Libraries	1.083	1.083	1.083	494	509	66
Healthcare	421	421	421	421	420	0
Public Safety	1.321	1.321	1.321	1321	1.318	0
Higher Ed	660	660	660	87	87	0
Other Government	2.179	2.179	2.179	2.179	2.170	0
Other Non-	287	287	287	287	287	0
Total	12.755	12.755	12.755	4.799	5.510	66

SBI Data Submission Methodology

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 2, 2012. Broadband Florida 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, as well as the pre-submission webinar the week of the submission to NTIA, was also followed to ensure the completeness and validity of the submission.

Unlike the Data Package spreadsheet request last submission that included any and all possible service providers, NTIA has requested a provider worksheet page to reflect only the providers included in the geodatabase submission. A table that summarizes the status of all providers can be found at the end of the narrative. Providers deemed non-viable that have been excluded from continued outreach may have been eliminated for reasons such as (i) the company offers Internet service but at speeds below the current definition of broadband; (ii) the company was listed in advertisements as a broadband provider, but is actually a network solution or consulting firm, etc.; (iii) the company may build or install network infrastructure, but does not actually provide the broadband service to consumers; and (iv) the company has gone out of business.

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

Inventory of Deliverables, Broadband Florida: April 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband service availability of facilities-based providers. Encompassed in Census Blocks of no greater than two square miles in area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband service availability of facilities-based providers by road segment in Census Blocks larger in area than two square miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband service availability of wireless services not provided to a specific address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband service infrastructure Middle-Mile locations
Appendix A: 4	BB_Service_CAInstitutions	Community anchor institution locations

The provider data collected by Broadband Florida has 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, address point, 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.

Broadband Florida, through its contractors, has continued reach out to satellite providers on their availability, technology, and speed information, but focused sub-state coverage is not yet available. Included within the wireless feature class are the satellite companies providing service to Florida as a polygon of the state boundary.

Accuracy and Verification: Provider Validation Methodology

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and resolution. The NTIA has assigned various levels of classification for the bandwidth speed and transmission technology. These classifications are not a perfect fit for all providers, but the data they submit in a variety of formats has to be molded into a common framework, and this framework is the geodatabase with stacked layers. Having these stacked layers in a mappable geodatabase does not necessarily mean they are correct. A number of checks and balances must be performed to ensure a reasonable snapshot of the last six months of broadband availability in the state of Florida. These methods include (but are not limited to): *spatial coverage provider verification, topological validation and table consistency checks, public feedback, propagation modeling, enhanced covert purchase validation, speedtest metrics, and field signal validation.*

Spatial Verification

Once these featureclasses or layers in the geodatabase are checked for spatial errors and anomalies, check plots are provided to the provider for initial verification. If further detail and focus is required, Broadband Florida devotes attention to the provider and verification correction begins. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by Broadband Florida, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; Broadband Florida 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. After approval by the provider, the spatial depiction of the data is considered a success.

These same layers that are deemed suitable for public viewing by the NOFA are incorporated into the web map service application on the Broadband Florida map site. Public display of the layers on the Florida map site and BroadbandMap.gov site allow the general public a chance to provide feedback if in fact service is not available where it might say it is on the maps.

Topological Validation

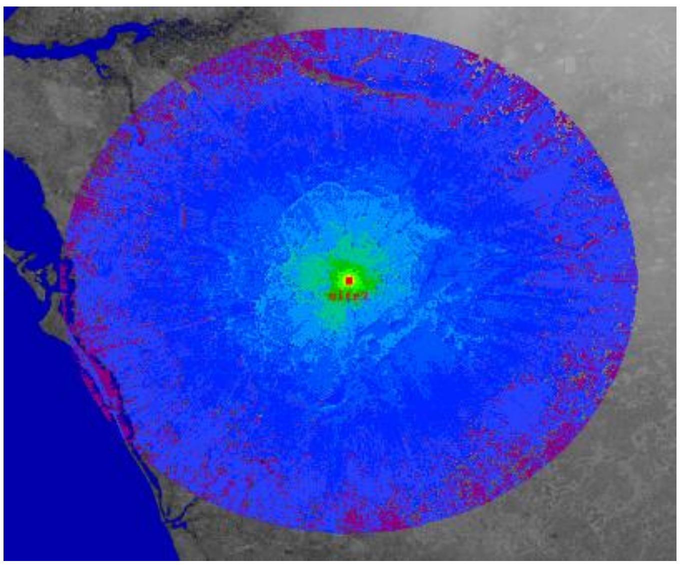
GIS data, when imported and created from a variety of sources can look pretty or it can look ugly. We try to prevent the data from looking ugly early in the process by running the resulting data from providers through a number of filters for lack of another term. The first filter is 'eyeballing' the data for inconsistencies and strange outliers. Much of the work involved with this SBI project involves geocoding. Geocoding results can literally be all over the map. The eyeballing of the geocoding results can pick up misses of machine coding return scores that would otherwise be considered valid. If left to using the address ranges on their own, street segment creation from address ranges can produce a messy unrealistic patchwork of availability. Another filter is transferring the data to topologically correct features. This 'conflation' process can filter out strange anomalies produced from using TIGER line files as the base for road segments. Many providers dump the TIGER line data of more than just the roads, such as water bodies and political lines. Conflation solves the strange outlier availability by transferring the data over to road segments that are spatially accurate. The result is road segments that spatially depict where broadband infrastructure would most likely be deployed. In some cases, however, even though data is transferred over to correct roads, source data reveals only a certain segment of addresses. No matter how bad it may look, over-correcting is changing the data, so only when there is logical evidence that a road segment should be extended considerably, or cut down, will we correct the data in this manner.

The data inside the table itself may have been exported or imported with errors. Many times, data had been imported only to be unusable or considerable work has to get it corrected after it is inside a featureclass or shapefile. It is always best to correct the data before import or loading. This type of validation can catch improper field character imports like lat/lon values that get truncated or rounded. The same can happen of Census Block FIPS code transfers that are not properly formatted as text. ArcGIS has tendency to round those into scientific notation.

Wireless Propagation

Providers may submit wireless data in GIS format or in the form of tower locations and various output characteristics. In a perfect world, all providers would have all the data at their fingertips to produce their own propagation models. In rural Florida, service providers can be small operations. Most of the time they are understaffed, and running on a tight budget. These same providers welcome an entity to come in and do propagation analysis for them.

Broadband Florida undertook the role of propagation modeling for these small rural broadband providers. The goal is to get surface coverage of their wireless output at their designated spectrum. We chose SPLAT! to model fixed wireless in Florida. Splat can do an impressive job of coverage modeling armed with just a few key parameters. Namely, the parameters consist of the tower location in latitude and longitude, tower height, the spectrum frequency, ERP wattage, polarization of antenna, and a few other optional parameters. SPLAT! uses the Longley-Rice Irregular Terrain model as well as ITWOM v3.0 model. The following displays the typical SPLAT! results:



After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. Propagation output is delivered to the provider for verification and quality check. Further inquiries are made to determine optimum decibel range results typical end-user receives. After all verification methods have passed, the resulting field strength coverage is merged with other towers (if there are any) and loaded into SBI model with populated field attributes.

Covert Purchase Scenario Validation

Many times during the data validation process, it becomes necessary to derive real-world results for areas that may be flagged for issues or extent of coverage is questionable. One approach to validate the data is to check availability for broadband packages and services online. This used be an easier process where entering an address would get you results showing whether the broadband (DSL, cable, fiber) was available at that time. Increasingly, the service providers are building in controls that prevent random address availability to generate a yes or no for purchasing service. Currently, a few providers incorporate customer database data into the searches, so if you land on an address that has service, the application will throw up a page that asks you to call the office for availability. Sometimes it is possible, with Google Maps and guessing an address, to have the web application supply you with availability and package bundling options. Other times, no matter what address you put in, the application generates the 'please call' result. That will lead to making the phone call and the sales staff can either be helpful with divulging what service is available at that address, or they will be confused as to why you want to know if you are in another part of the state. We found it best to proceed as if you are helping out your mother who is looking to get high-speed internet. This is tricky, as the web application will display the please call page if there is a customer already at the address. By using property appraiser data, it is possible to find vacant parcels near your desired area of inquiry. This can offset the current customer issue. Providers are very helpful with this approach and are happy to help.

Field Test Verification

This verification technique has not been used very much by Broadband Florida; however, there have been some validation tests with staff that have 4G compatible devices and obtain services from providers that provide this service. In order to obtain an estimation of coverage speed, they were asked, when going to seminars and conferences away from the region, to note when 4G service cut out compared to the maps produced by the data providers submitted to us. We have found that in general, the propagation maps from the major service providers in regards to 4G speeds is within a mile or so of the depicted boundary on the map. Any error or discrepancy can be attributed to the field personnel not checking on the proper coordinates. Future tests may not be necessary due to the close results gained so far, but if undertaken, they will include GPS assistance for recording.

Speed Test Verification

Broadband Florida has continued its subscription with Ookla for website portal speedtest application to gather speedtest statistics from around the state. Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Florida 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.

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive - Submitted Updated Data	Responsive - No Change in Data	Non-Responsive - Included Oct. 2011 Data in Submission	Non-Responsive - No Data Included in Submission
1	21Globe, Inc.	2	9999						
2	3oaks.com	4	9999						
3	561net	1	9999	✓					✓
4	650Net	4	9999						
5	A 007 Access	2	9999						
6	AAA Internet Service	4	9999						
7	Aaccess Network Communications	4	9999						
8	Access123.net	4	9999						
10	ACERX.NET	2	9999						
11	ACES of Jacksonville, Inc.	4	9999						
12	Adelphia	4	9999						
13	Advanced Cable Communications	1	0001795798	✓	✓		✓		
14	Advantage Group of Florida Communications, LLC	2	0018515692						
15	AirCom Broadband, Inc.	2	9999						
17	AirComm Associates	4	9999						
18	Airespring, Inc.	2	0006875322						
19	Airewaves Broadband, LLC	4	9999						
20	Airface	4	9999						
21	Airimba Wireless	4	9999						
22	AirLink Corporation	4	9999						
24	Airmail247.com	4	9999						
26	Airpath Wireless, Inc.	4	9999						
27	airPowered	1	0016106239	✓	✓			✓	
29	AirWire Net	2	9999						
30	Akeva	4	9999						
31	AKODI	4	9999						

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32	America Outdoors Camper Resort and Marina	4	9999						
33	American Telephone Company LLC	2	0015414642						
34	Antioch Wireless Broadband	4	9999						
35	Anywhere Internet, Inc.	4	9999						
36	AreYouOnline.Net	1	9999	✓	✓	✓			
37	Arrowheadnet.com	4	9999						
38	AstroTel, Inc.	2	0008779878						
40	AT&T Florida[+]	1	0001857952	✓	✓	✓			
41	AT&T Mobility LLC	1	0004979233	✓	✓	✓			
42	Atlantic Broadband, LLC	2	0009596826	✓	✓			✓	
43	AugLink Communications, Inc.	4	9999						
45	bargainisp.net	4	9999						
47	Birch Communications, Inc.[^]	1	0004319299	✓					✓
48	Bluemont Networks, LLC	4	0016802266						
49	Break Free Wireless Corporation	1	9999	✓					✓
50	Brevard Wireless	1	0016346991	✓					✓
52	Bright House Networks	1	0007508237	✓	✓		✓		
53	Broadband National	2	9999						
54	Broadcore, Inc.	4	0018122523						
55	Broadstar, LLC	4	0016981573						
56	Broadview Networks Holdings, Inc.	2	0010296853						
57	BullsEye Telecom, Inc.	2	0004350930						
58	Business Telecom, Inc.	4	0003744935						
60	Cablevision of Marion County LLC	1	0011406675	✓					✓
61	CAC MediaNet, Inc.	4	9999						
62	Camino-Net Internet Services	4	9999						

Broadband Florida

Broadband Provider Status Log

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63	Caviair Corporation	4	9999						
64	Cbeyond Communications, LLC	2	0003759602						
65	CCIS.net	4	9999						
66	Celito Communications	4	9999						
67	Cellular South, Inc.	1	0013247325	✓	✓		✓	✓	
68	CenturyLink	1	0018626853	✓	✓	✓			
69	CIMA Telecom	2	0008570111						
70	Circle Net	4	9999						
72	Citi WiFi Networks	4	9999						
73	Citicom Comm Serv	4	9999						
75	Citrus Hills Cable TV, Inc.	4	9999						
78	City of Leesburg*	1	0010556496	✓					✓
79	Citynet, LLC	4	0014281588						
81	Clear	1	0017775628	✓	✓	✓			
83	ClearSurf Broadband	1	9999	✓					✓
84	Cleartouch.Com	4	9999						
85	Cogent Communications, Inc.	1	0019066034	✓					✓
87	Comcast	1	0004441663	✓	✓	✓			
88	CommFunction, LLC+	1	9999	✓		✓			✓
90	Computer Cable Connection	4	9999						
91	Covad Communications Company	1	0003753753	✓	✓	✓			
93	Cox Communications	1	0001524461	✓	✓	✓			
95	Creative Network Innovations	4	9999						
96	CyberStreet Inc.	1	9999	✓					✓
98	CyberXpress, Inc.	4	9999						
100	Data Wave, Inc.	4	9999						
101	DayStar Communications	4	9999						

Broadband Florida

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102	DeltaCom	1	0005183025	✓	✓	✓			✓
103	Deltaforce	4	9999						
104	deluxehost.com	4	9999						
105	Desoto Life	1	9999	✓					✓
106	DGUI	4	9999						
107	DHR Technologies, Inc.	4	9999						
108	Dial National	4	9999						
109	Dialer.net	4	9999						
110	Digital Canopy	4	9999						
111	Digital Downtown	4	9999						
112	DISH Network Corporation	1	0010500338	✓	✓			✓	
113	Dixie-Net, Incorporated	4	9999						
114	DSL @ Interlync	2	9999						
115	DTNet	4	9999						
116	DTS-NET.COM	2	9999						
117	Dynalink Communications	2	9999						
118	eHarbor	4	9999						
119	Enventis Telecom Inc.	4	0008394322						
120	ethX.biz	4	9999						
121	ETI - Connecting Your World	2	9999						
122	eTully, Inc.	4	9999						
123	EWOL	4	9999						
124	Expedient	4	9999						
125	FairPoint Communications, Inc.[+]	1	0001824606	✓	✓	✓			
126	Fast Dependable Access	4	9999						
127	FiberLight LLC	1	0014117139	✓					✓
128	FiberTower Corporation	4	0004237178						

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129	FLAccess, Inc.	4	9999						
130	Florida Broadband	4	9999						
131	Florida Cable, Inc.	2	0007170558						
132	Florida Georgia Online	4	9999						
133	Florida Keys Wireless	4	9999						
134	Florida LambdaRail, LLC*	1	9999	✓					✓
135	Florida Multi-Media Services, Inc.	2	0018567123						
136	Florida Phone Systems, Inc.	4	0018624494						
137	Florida Rural Broadband Alliance	4	9999						
138	Florida Wireless	4	9999						
139	FlyFi	4	9999						
140	FPL FiberNet, LLC	1	0008338683	✓					✓
141	FPUAnet Communications	1	0001813369	✓					✓
142	Frontier Communications of the South, LLC	1	0003766987	✓	✓		✓		
143	Fullsail Group	4	9999						
144	Fuzion Wireless	4	9999						
145	GBS Online	1	9999	✓					✓
146	General Computer Services Inc.	4	0018596882						
147	Global Crossing Telecommunications, Inc.	1	0002850519	✓					✓
148	Global Data Systems	4	9999						
149	Global WiFi Plus	4	9999						
150	GLS3C Systems	4	9999						
151	GRUCom*	1	0018584425	✓					✓
152	Gulf Coast Internet Company	4	9999						
153	Hi Development	4	9999						

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154	Home Town Plus	1	0009470766	✓	✓		✓		
155	Hotwire Communications, Ltd.	4	0009846494						
156	Hubwest Protected Networks LLC	4	9999						
157	Hughes Network Systems, LLC	1	0017434911	✓	✓		✓	✓	
158	Imbris, Inc.	4	9999						
159	IMGISP.NET	4	9999						
160	Immedia Sea	4	9999						
161	Incredible Networks	4	9999						
162	Inercom Communications Inc.	4	9999						
163	Interactive Services Network, Inc.	2	0004328456						
164	Interactiveinfo.com Inc.	4	9999						
165	Interatworld	4	9999						
166	IntNet	2	9999						
167	IPacket Networks, LLC	4	0016724494						
168	iRadical	4	9999						
169	ISPartner.net	4	9999						
170	ITS Telecom	1	0003731734	✓	✓		✓		
171	James Cable LLC	1	0016914137	✓					✓
172	JaxWIZ	4	9999						
173	Jenco Speed Web	4	9999						
174	Joytel Communications	4	9999						
175	JTEL Communications	4	9999						
176	K.Tek	4	9999						
177	KCL	2	9999						
178	Kentucky Data Link, Inc.	4	0007345754						
179	Kissimmee Utilities Authority	4	9999						
180	KissimmeeWeb	1	9999	✓					✓

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181	Knology of Florida, Inc.*	1	0003766268	✓	✓			✓	
182	Knology of Panama, Inc.*	1	0001808666	✓	✓			✓	
183	LARIAT.NET	4	9999						
184	LCN	4	9999						
185	LCSisp.com	4	9999						
186	Leap Wireless International, Inc.	4	9999						
187	Level 3 Communications, LLC*	1	0003723822	✓					✓
188	LightEdge Solutions, Inc.	4	0015546443						
189	Lightning Wireless	4	9999						
190	Lightyear Network Solutions, LLC	2	9999						
191	LinkAmerica.Net	4	9999						
192	Litestream Holdings, LLC	1	999	✓					✓
193	Litestream Technologies	4	1149800086						
194	Long Hammock Wireless	1	9999	✓	✓			✓	
195	Magnolia Belle Data Systems, Inc.	4	9999						
196	Main Street Broadband LLC	1	0014962880	✓	✓			✓	
197	MainBoard	4	9999						
198	Maine Cable and Wireless	4	9999						
199	Marcin Company	4	9999						
200	Marco Island Cable, Inc.	1	0004243689	✓					✓
201	Marlowe & Associates	2	9999						
202	Mediacom	1	0004036778	✓	✓	✓			
203	Metropolitan Telecommunications Holding Company	2	0009806019						
204	MFI.net	2	9999						
205	Millenicom Inc.	2	9999						
206	Mobile Area Networks, Inc.	4	9999						

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207	Myakka Technologies, Inc.	4	0016084857	✓	✓	✓			
208	Nanomega.Com	4	9999						
209	National Access Point	4	9999						
210	Nationwide Computer Systems, Inc.	2	9999						
211	Nature Coast Networks	1	9999	✓					✓
212	NEbuTel	4	0016467649						
213	NEFCOM	1	0004928750	✓	✓			✓	
214	Neighbor Networks, LLC	4	0006221287						
215	Neopolitan Networks	4	9999						
216	Net Bypass Wireless	4	9999						
217	NetAccess, Inc.	4	9999						
218	NetComm Internet Technologies	4	9999						
219	NetCon.com	4	9999						
220	Netlogic, Inc.	4	0006825954						
221	NetQuincy	1	0004572533	✓	✓			✓	
222	NetSpeed Online	4	9999						
223	New Edge Network, Inc.	2	0003720471						
224	Next Level Wireless	4	9999						
225	Nextlink Wireless, Inc.*	1	0014286934	✓					✓
226	North Florida Broadband Authority	4	9999						
227	Northwest ISP	4	9999						
228	NuVox, Inc.	4	0004319414						
229	NXCONN Wireless	4	9999						
230	Oak Run Associates Ltd.	2	0003745767						
231	Ofinet	4	9999						
232	Oltronics Wireless	4	9999						
233	Omnispring LLC	1	9999	✓					✓

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive - Submitted Updated Data	Responsive - No Change in Data	Non-Responsive - Included Oct. 2011 Data in Submission	Non-Responsive - No Data Included in Submission
234	Open Range, Inc.	4	0015246895						
235	Orlando Web Solutions	4	9999						
236	Overarch Broadband	4	9999						
237	Pacific Internet Exchange	4	9999						
238	Paknet Limited	4	9999						
239	Palm Coast-Flagler Internet, LLC	1	9999	✓					✓
240	PDMNet	1	0017149014	✓	✓			✓	
241	Planet Online	4	9999						
242	PNA Networks	4	9999						
243	Power One*	2	0016106239	✓					✓
244	PremoWeb	4	9999						
245	PrimeVision	4	9999						
246	Pure Connection	4	9999						
247	Qmega Technologies	4	9999						
248	Qwest Communications Company, LLC	4	0003605953						
249	Rapid Systems Corporation[+]	1	0014499438	✓		✓			
250	Regional Internet Media	4	9999						
251	Reliance Globalcom Services, Inc.	1	0008072803	✓					✓
252	Reliance Globalcom Services, Inc.	2	0008072803						
253	Renaissance Networks	4	9999						
254	RJS Networks	4	9999						
255	Sago Networks, Inc.*	1	0018151878	✓			✓		
256	Sands River Wireless	4	9999						
257	Saturn Telecommunication Services Inc.	4	0004343828						
258	SBB Communications, LLC	4	0019088624						
259	SETEL	4	9999						
260	Shentel Converged Services, Inc.	2	0013962170						

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive - Submitted Updated Data	Responsive - No Change in Data	Non-Responsive - Included Oct. 2011 Data in Submission	Non-Responsive - No Data Included in Submission
261	Simply Dialup A Metrogeek Company	4	9999						
262	Skyhive	4	9999						
263	Skyline Broadband	4	9999						
264	SKYNAP	4	9999						
265	SkyNet360	1	9999	✓					✓
266	Sling Broadband	1	9999	✓					✓
267	Smart City	1	0004381505	✓	✓			✓	
268	Smartresort Co, LLC	2	0017103979						
269	SmartWires	4	9999						
270	Southeastern Services, Inc.	4	0010211167						
271	Southern Light*	1	0006694111	✓			✓		✓
272	Spacenet, Inc.	4	0004314704						
273	Speakeasy DSL	4	9999						
274	Sprint	1	0003774593	✓	✓	✓			
275	Sprint Broadband Direct	4	9999						
276	Stratos Offshore Services Company	4	0002147353						
277	Summit Broadband*	1	0008410102	✓	✓			✓	
278	Sun Digital Computers & Services	4	9999						
279	Sun-Tel USA	2	0018079152						
280	Surferz.Net	4	9999						
281	Suwannee Valley Internet	4	9999						
282	SVIC Internet & Computers	1	9999	✓					✓
283	Systemlink Broadband	4	9999						
284	T1 Shopper	4	9999						
285	TDS Telecom	1	0001824689	✓	✓	✓			
286	Teccom USA	4	9999						
287	Telcomprice.Com	4	9999						

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive - Submitted Updated Data	Responsive - No Change in Data	Non-Responsive - Included Oct. 2011 Data in Submission	Non-Responsive - No Data Included in Submission
288	Telefonica USA, Inc.	2	0018547828						
289	Telovations, Inc.	4	0015331390						
290	TerraNova Net Internet Services	1	0016098147	✓					✓
291	Terranovus.net	4	9999						
292	The City of Daytona Beach	4	0018522409						
293	The Hometown Network, Inc.	1	0019072339	✓	✓			✓	
294	The Ultimate Connection, LLC	2	0004557724						
295	Tier 3 Communications; Ft. Myers Telephone; Naples Telephone*	1	0008882979	✓					✓
296	T-Mobile	1	0006945950	✓	✓	✓			
297	Total Access Networks, Inc.	4	9999						
298	Towerstream, Inc.	4	0007097355						
299	Transbeam Inc.	4	0008904690						
300	Trillion Digital Communications	4	9999						
301	Triple Crown Communications	4	9999						
302	TSISP.NET	4	9999						
303	TW Telecom of Florida LLC	1	0004351466	✓	✓	✓			
304	Ultrawave Technologies	4	9999						
305	Umbrella Wireless	4	9999						
306	University Corporation for Advanced Internet Development	4	9999						
307	UNUM Telecommunications, Inc.	4	9999						
308	US Metropolitan Telecom, LLC	1	0016713497	✓					✓
309	USA Airnet, Inc.	4	9999						
310	Utilities Commission, City of New Smyrna Beach, FL	4	0018603779						
311	Valparaiso Communication System	4	9999						

BROADBAND Florida

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive - Submitted Updated Data	Responsive - No Change in Data	Non-Responsive - Included Oct. 2011 Data in Submission	Non-Responsive - No Data Included in Submission
312	Velocity Online*	1	0016126971	✓			✓		✓
313	Verizon	1	0001824804	✓	✓	✓			
314	Verizon Wireless	1	0003290673	✓	✓	✓			
315	Vortex Broadband	4	9999						
316	Wave2Wave Communications Inc.	2	0015329394						
317	WebNet	4	9999						
318	Wildblue Communications	1	0007843766	✓	✓			✓	
319	WilTel Communications, LLC.	4	0003716511						
320	Wind Serve	4	9999						
321	Windstream Florida, Inc.*	1	0004967360	✓	✓			✓	
322	Wireless Broadband, Inc.	4	9999						
323	Wireless Online Services	4	9999						
324	Wireless Roanoke, Inc.	4	9999						
325	Wireless Web Access, Inc.	4	9999						
326	wisbin	4	9999						
327	WISP Networks	4	9999						
328	WiVo	2	9999						
329	WorldCom Broadband	4	9999						
330	WPMedia	4	9999						
331	www.AmericanAngel.us	4	9999						
332	Xecu.net	4	9999						
333	XO Communications Services, Inc.*	1	0006275945	✓					✓
334	XP Internet	4	9999						
335	Xtremeaccess	4	9999						
336	YEYZOO.NET	4	9999						
337	YLISP (Your Local ISP)	2	9999						
338	YourT1Wifi.com	4	9999						

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive - Submitted Updated Data	Responsive - No Change in Data	Non-Responsive - Included Oct. 2011 Data in Submission	Non-Responsive - No Data Included in Submission
339	ZOOM Internet Services, LLC	4	9999						
Total				80	40	20	10	17	39

* Middle mile data was submitted in the October 2011 submission, but not included in the April 2012 submission. Middle mile data from this provider is not included in the submission database for one of two reasons. 1) The provider reported no change to its data, but did not submit a new dataset to the Department, or 2) The provider was non-responsive.

+ All or part of the data was received after the cut-off date or did not meet submission criteria.

^ Provider was responsive, but elected to refuse to participate in the program.

Georgia Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Rich Calhoun
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Submitted By:	Rich Calhoun
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Product Specification:	Spring 2012 NTIA Data Model
Product/Process:	NTIA—April 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	155
Total Valid Broadband Providers	107
Business-only/New Researching Providers	30
Non-Responsive Providers	3
Non-Cooperative Providers	6
Number of Providers – Represented in Data Submission	79
Number of Providers - Supplied Updates for this Submission	50
Number of Providers - Confirmed No Updates	18

- New Providers Since Last Data Submission
  - Unite Private Networks, LLC
  - Zayo Group LLC

- Existing Providers – No Updates
  - Abovenet Communications Inc
  - Advanced Technology Group
  - ATC
  - Bright House Networks LLC
  - Bulldog Cable Georgia, LLC
  - Cogent Communications Inc.
  - Cox Communications
  - Fort Valley Utility Commission
  - Frontier Communications of Fairmount LLC

- Glenwood Telephone Company
- Hughes Network Systems
- Level 3 Communications LLC
- New Edge Network, Inc., d/b/a New Edge Networks
- Nextlink Wireless Inc.
- Southeastern Services Inc.
- StarBand Communications Inc.
- Windstream
- XO Communications Services Inc. (Affiliated Entity)

- Providers Included (listed by Provider and Holding Company name)

Abovenet Communications Inc	Cricket Communications Inc.	Pineland Telephone Company Inc.
Advanced Technology Group	Darien Telephone Company Inc.	Plant Telephone Company
AL-GA Wireless Broadband LLC	DeltaCom Inc.	Plantation Cablevision, Inc.
AllTel	Depot Street Communications, Inc. dba Carnesville Cable TV	Planters Rural Telephone Cooperative
AT&T Georgia	ElbertonNET	Progressive Rural Telephone
ATC	ETC Communications LLC	Quitman Wireless
Brantley Telephone Inc.	FairPoint Communications	Ringgold Telephone Company
Bright House Networks LLC	Flint Cable Television	SGRITA
Bulldog Cable Georgia, LLC	Fort Valley Utility Commission	Shentel Converged Services, Inc.
Bulloch County Rural Telephone Cooperative Inc.	Frontier Communications of Fairmount LLC	Skycasters
CenturyLink	Frontier Communications of Georgia LLC	Southeastern Services Inc.
Charter Communications Inc.	Glenwood Telephone Company	Sprint
Chickamauga Telephone Corporation	Hargray	StarBand Communications Inc.
Citizens	Hart Telephone Company	TDS Telecom
City of Cairo	Hughes Network Systems	T-Mobile
CITY OF CAMILLA	iWispr.net	tw telecom of georgia l.p.
City of Dublin	Kings Bay Communications	Unite Private Networks, LLC
City of Moultrie	KitePilot Wireless Internet	University Corporation for Advanced Internet Development
CITY OF THOMASVILLE	Knology of Georgia Inc	Verizon Wireless
Clearwire	Level 3 Communications LLC	Waverly Hall Telephone LLC
Cogent Communications Inc.	MainStreet Broadband	WildBlue Communications Inc.
Columbia Country Information Technology Department	Mediacom	Wilkes Telephone and Electric Co.
Comcast	Megapath	Windstream
Communicom	New Edge Network, Inc., d/b/a New Edge Networks	XO Communications Services Inc. (Affiliated Entity)
ComSouth	Nextlink Wireless Inc.	Zayo Group LLC
Covad Communications Company	Open Range Communications	
Cox Communications	Pembroke Telephone Company Inc	

- Non-Responsive Providers
  - Airimba and Windchannel Communications
  - Georgia Business Net
  - VectorLink

- Non-Cooperative Providers
  - Birch Communications, Inc.
  - Birch Telecom of the South, Inc
  - Brightlan.net
  - Kennedy CableVision Inc.
  - NuLink Digital
  - Smartresort Co, LLC dba Beyond Communications

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement - Resulting from Validation (Provider Portal)
  - BellSouth Telecommunications, Inc. (TT-10)
  - Broadband South (TT-71)
  - CHARTER COMMUNICATIONS INC. (TT-40)
  - Clearwire Corporation (TT-80)
  - ComSouth Corporation (TT-40 and TT-50)
  - DIECA Communications, Inc. (TT-10 and TT-20)
  - Darien Telephone Company, Inc. (TT-10)
  - Ellijay Telephone Company (TT-10 and TT-40)
  - Fort Valley Utility Commission (TT-50)
  - Mediacom Southeast LLC (TT-41)
  - Shentel Converged Services, Inc (TT-30 and TT-41)
  - tw telecom of georgia l.p. (TT-30 and TT-50)

  - **Coverage Footprint Expansion –**
  - AT&T Mobility LLC (TT-80)
  - AWCC (TT-80)
  - Blue Ridge Telephone Company (TT-10 and TT-50)
  - Camden Telephone & Telegraph Company, Inc. (TT-10 and TT-50)
  - Cellco Partnership (TT-80)
  - CenturyTel, Inc. (TT-10)
  - City of Elberton, Ga. (TT-41)
  - ComSouth Corporation (TT-10)
  - Comcast Cable Communications, LLC. (TT-40)

- DIECA Communications, Inc. (TT-30)
- Darien Telephone Company, Inc. (TT-50)
- Nelson-ball Ground Telephone Company (TT-10 and TT-50)
- Pineland Telephone Company, Inc. (TT-10 and TT-50)
- Public Service Telephone Company (TT-41)
- Quincy Telephone Company (TT-10)
- Ringgold Telephone Company (TT-50)
- Sprint Nextel Corporation (TT-80)
- T-Mobile USA, Inc. (TT-80)
- WildBlue Communications, Inc. (TT-60)

DATA CORRECTIONS

- Per NTIA's guidance on 02/21/12, we updated all Verizon speed data to support the business rules they laid out.

  ~~

  All grantees should then apply the following business rule, as some of the speed ranges fall into two tiers:

  3G Speeds:
  Maximum <u>and</u> Typical download speed: 600 kbps to 1.4 Mbps (Speed Tier 3: 768 kbps – 1.5 Mbps)
  Maximum <u>and</u> Typical upload speed: 500 kbps to 800 kbps (Speed Tier 2: 200 – 768 kbps)

  4G LTE Speeds:
  Max Adv Download Speed: 12 Mbps (Speed Tier 7: 10 Mbps – 25 Mbps)
  Max Adv Upload Speed: 5 Mbps (Speed Tier 5: 3 Mbps – 6 Mbps)

  Typical download speed: 8.5 Mbps (Speed Tier 6: 6 Mbps – 10 Mbps)
  Typical upload speed: 2 Mbps to 5 Mbps (Speed Tier 5: 3 Mbps – 6 Mbps)

- The NTIA 3rd Party data review and summary were also compared to the product prior data submission and no changes were required. The Technology/Speed tier differences highlighted were reviewed with the providers and corrected, where needed. The remaining items were maintained, as we confirmed their service capability with the providers. We also reviewed their website to ensure the data reported against what was advertised were also in alignment.

COMMUNITY ANCHOR INSTITUTION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	Broadband Subscriber (1 or 2)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	2065	2055	2055	2055	2055
Category 2 - Library	451	383	383	382	382
Category 3 - Medical/Healthcare	2633	0	0	0	0
Category 4 - Public Safety	2656	0	0	0	0
Category 5 - Universities/Colleges	202	99	99	99	99
Category 6 - Other: Government	747	0	0	0	0
Category 7 - Other: Non-Government	0	0	0	0	0
Total	**8754**	**2537**	**2537**	**2536**	**2536**

CAI CHANGES

- No significant changes for the CAI layer this round.
- The CAI inventory was review again against the database mentioned below for the following categories: Category 1: K-12 Schools, Category 2: Libraries and Category 5: Colleges
  These databases are as follows:
  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**
  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**
  - For Libraries (CAI type 2) please. Combine (do not add) “FSCSKey” and “FSCs_SEQ” from the “puout08av2000” file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state’s unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

GA_2012_04_01.txt

- Error Report
  - The only items flagged in the submission receipt output are as follows, which has been verified as correct entries within the data submission. Please see the ReadMe text file for more details.

- The exceptions NTIA noted during the 03/27/12 webinar are as follows:
  - Middle Mile Elevation Fails
  - Middle Mile Latitude/Longitude Fails
  - Middle Mile Ownership Fails
  - Address SpeetTier Fails
  - CAI Transtech Fail

Hyperlinks to Grantee Workspace in which the same issues were identified by other Grantees:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

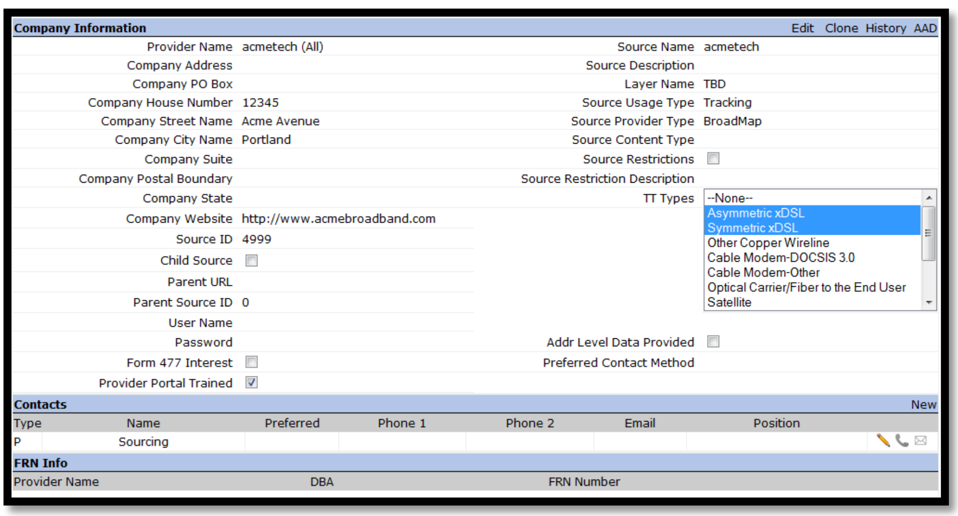
HIGH-LEVEL SUMMARY

DATA GATHERING

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

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

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



Confidence			New
TT Type	Confidence	Last Modified	Comment

Status Tracking

Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐

Service Provider Details

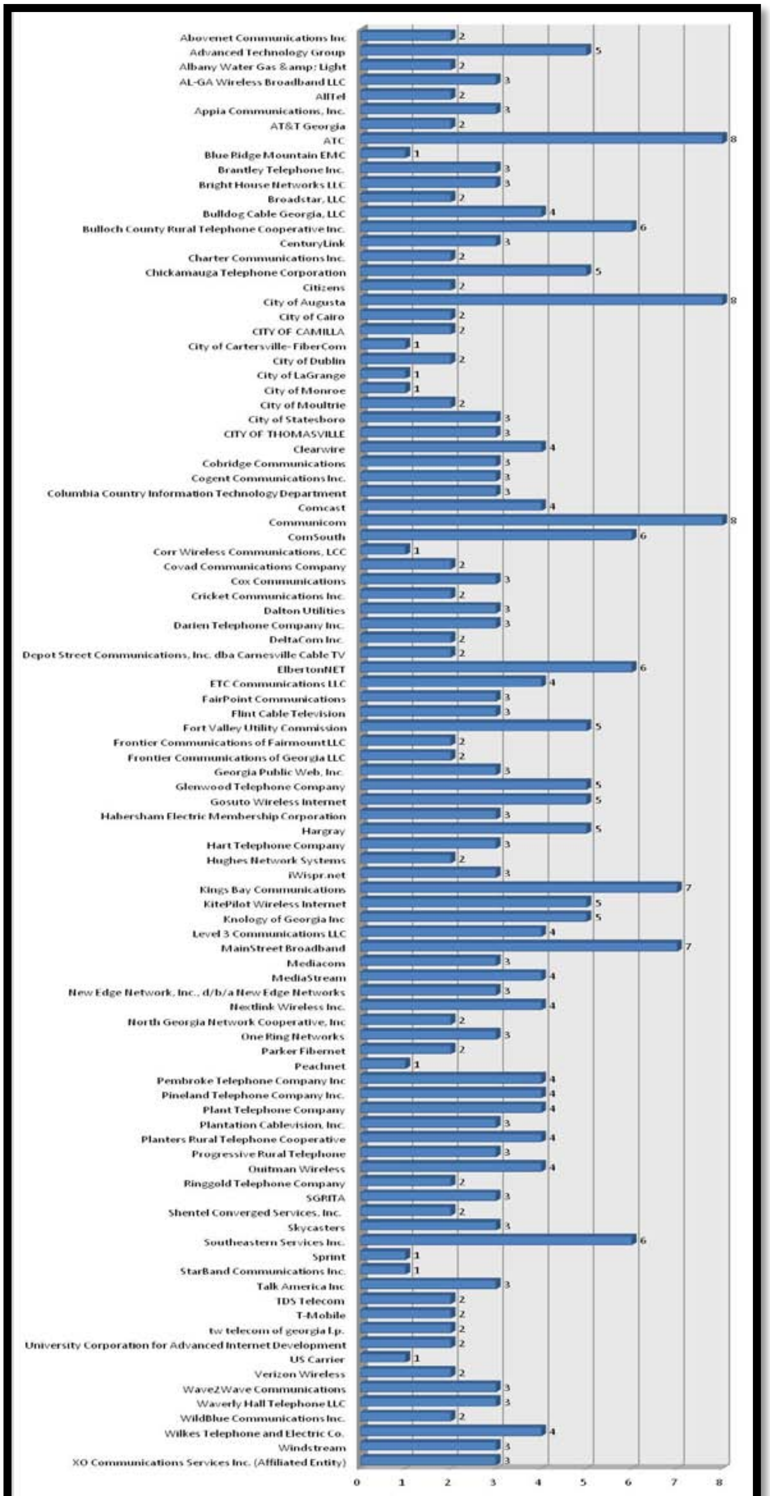
BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	

BDIA Delivery 0412			Edit
Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission. The chart below represents that interaction count with each provider.



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

COMMUNITY ANCHOR INSTITUTION (CAI)

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

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

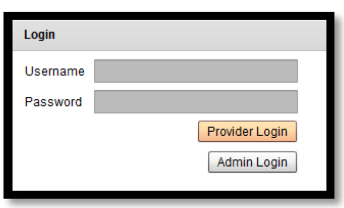
DATA INTEGRATION PROCESS

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

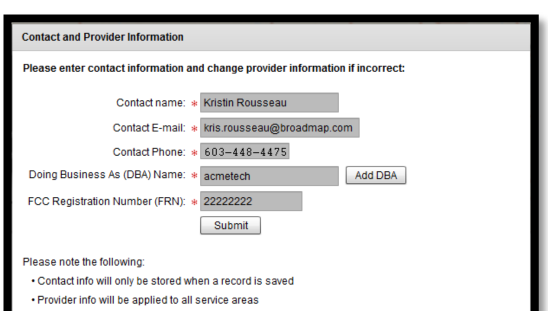
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type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

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

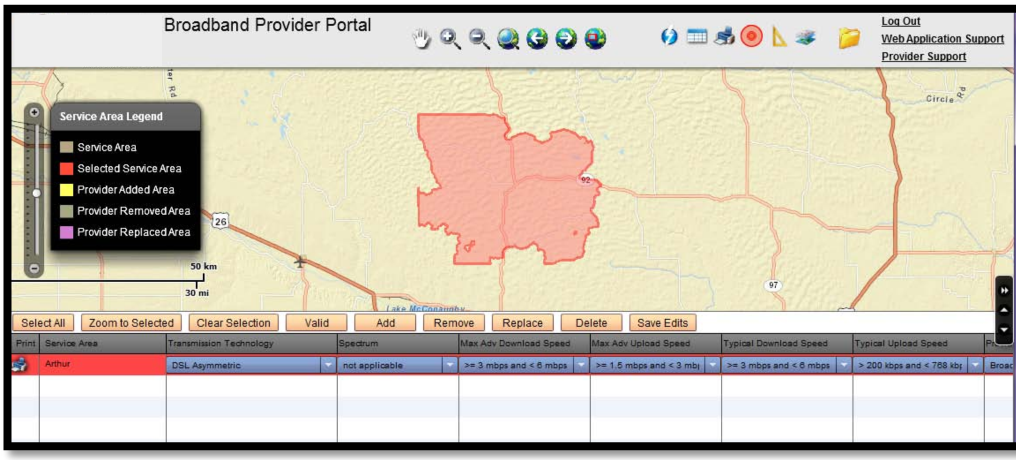
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



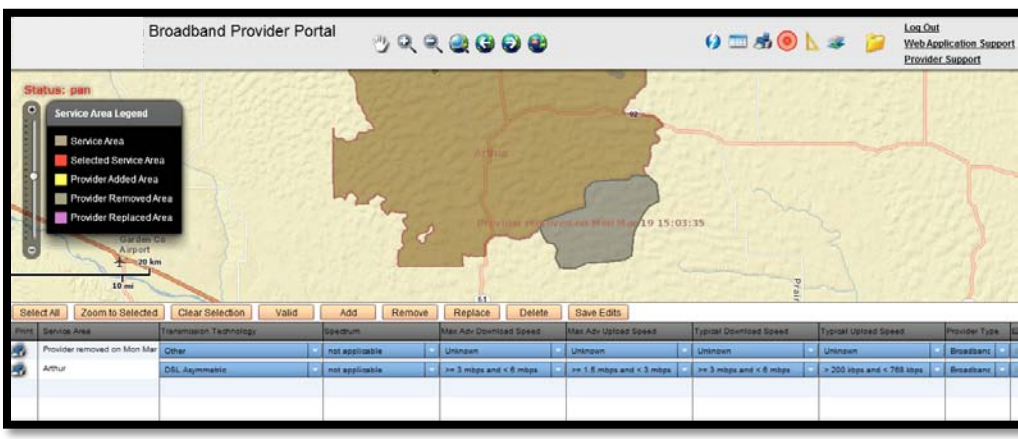
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



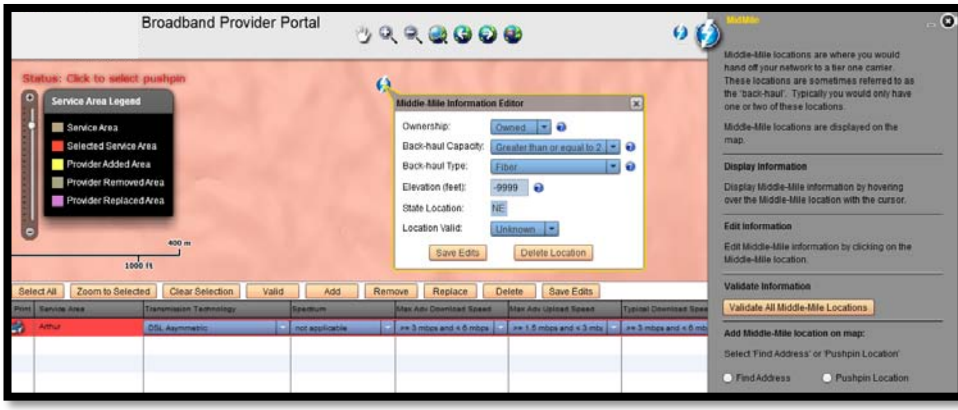
- Capability to review and request changes to the coverage footprint

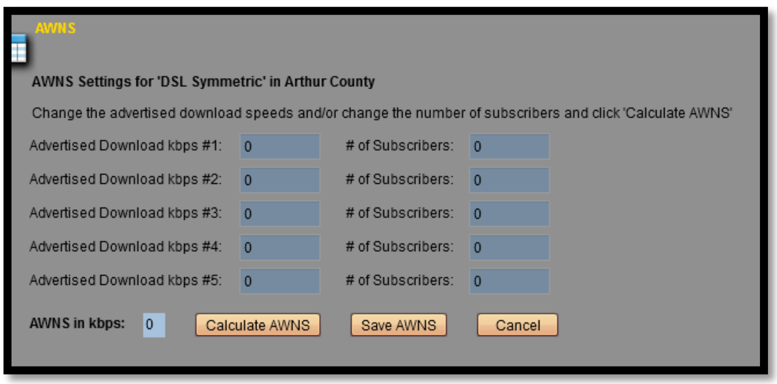


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

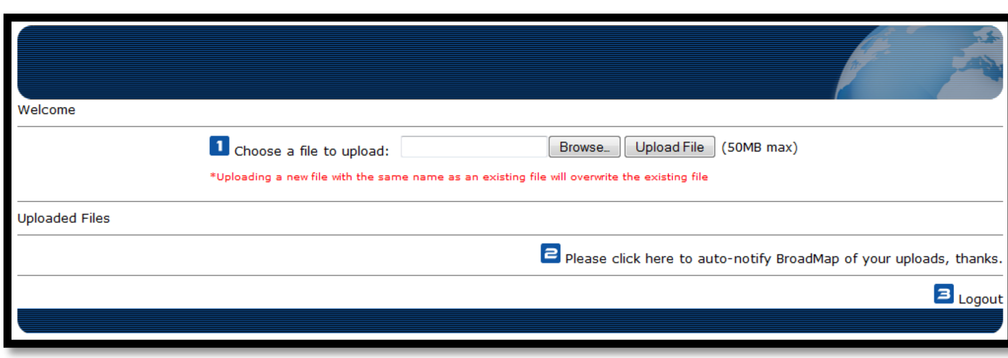


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





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



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

DATA VALIDATION AND VERIFICATION

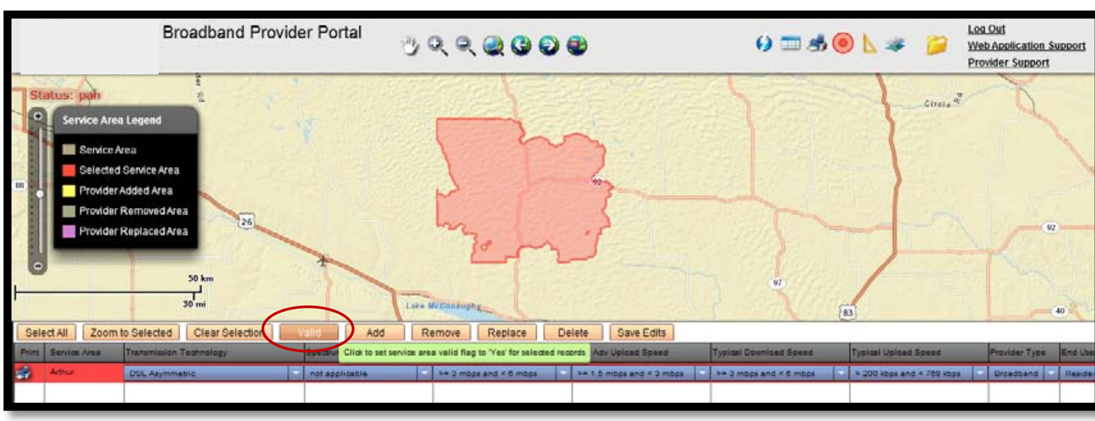
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage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

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

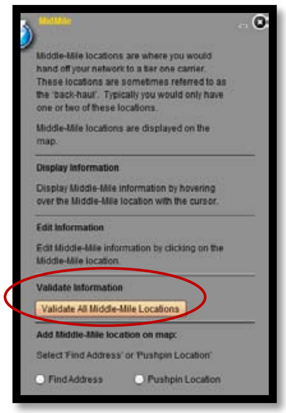
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process**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

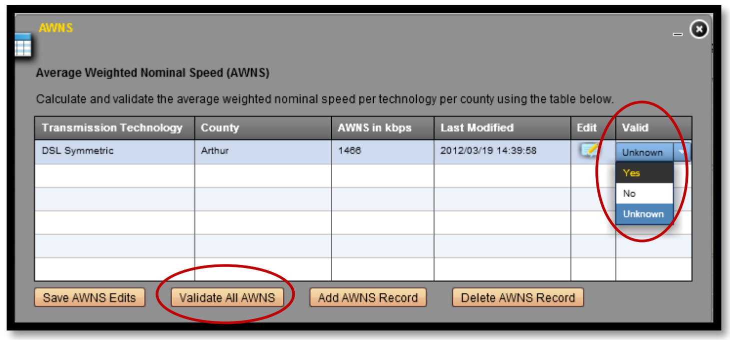
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

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



- Middle Mile & AWNS Validation





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

SME VERIFICATION – PROVIDER PORTAL ADMIN

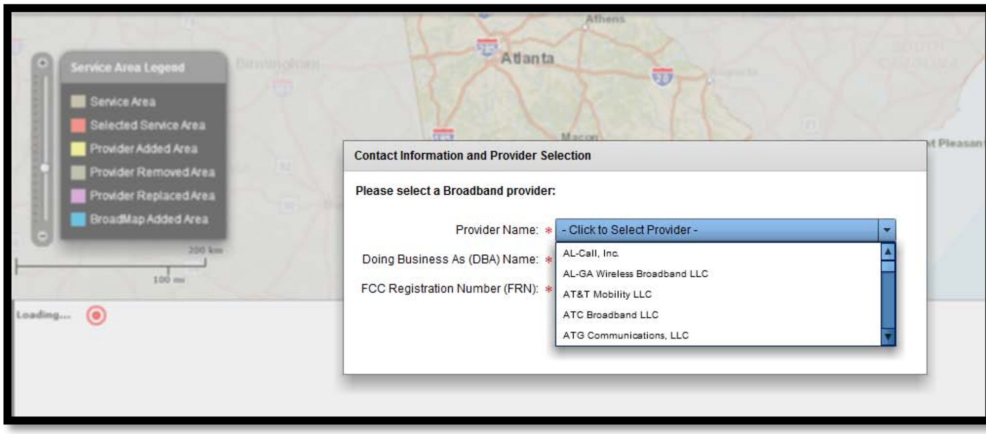
For this dataset submission, Georgia introduced new verification enhancements to the Provider Portal that supports administrative functionality for Subject Matter Experts (SMEs) to review the provider coverage areas and supply feedback/commentary on the accuracy and completeness. These enhancements allowed Georgia to:

- Review the coverage submitted by the carriers online
- Use our subject matter expertise to evaluate the accuracy of the data against local knowledge, online advertising, personal meetings, etc.
- Document a dialogue with its providers for verification purposes. We were able to review many of the provider submissions manually and submit questions to the providers if speeds, coverage areas, technology types, or other items appeared.
- Update provider entries if appropriate.
- Report our verification comments and any responses from the providers to NTIA in the dataset.

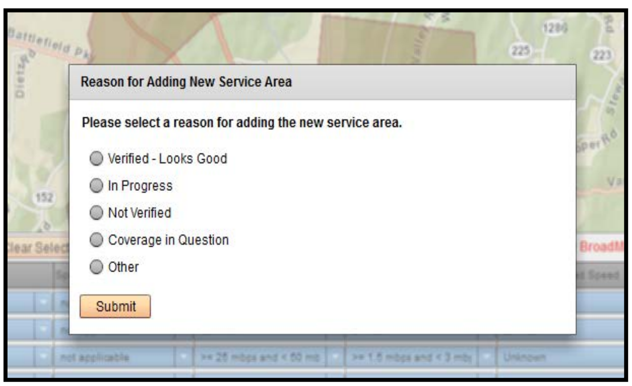
NOTE: Georgia analyzed every carrier who did not meet the NTIA Technology/Speed table matches and documented our justification, submitted question/commentary to the carrier, or corrected the carrier's entry. All commentary extracted from the administrative portal can be found with the data package that accompanied this data submission.

Below are some screen shots illustrating the administrative capability of the Provider Portal.

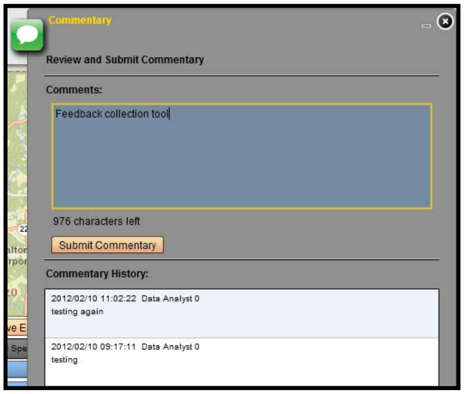
As shown below, the SME can login through the secure web application and choose the provider to be reviewed.



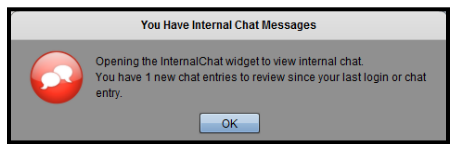
The portal supports two ways of verification at a coverage footprint level. The SME can draw areas of concern or approval on the map and supply a categorized comment that can easily be extracted at anytime.



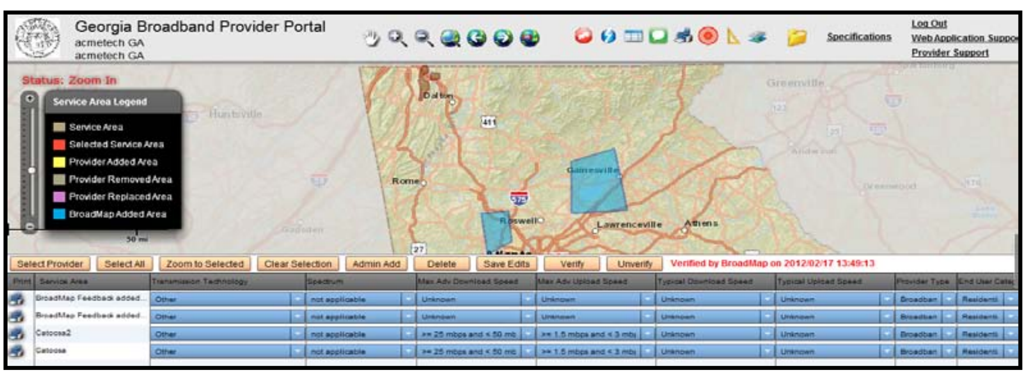
Additionally, the SME can leave commentary that will then be automatically e-mailed to the provider for their review and displayed as a pop-up when the first login to the Provider Portal. This includes historical tracking so you can see all commentary between the SME and provider, as well as the date/time stamp for each comment.



The administrative Provider Portal also allows for commentary between team members, which will only be viewable by the internal admin team members. The team members are notified automatically via e-mail when a comment is submitted, as well as when they login.



Similar to how the providers update and validate their coverage within the Provider Portal, the administrative version walks the SME through the verification assignments to ensure everything is reviewed and documented with a status and date/time stamp.



Through the testing and initial release of the portal, the providers have been very responsive to the commentary and supplying updates where needed. As we progress with this tool, the commentary and verification status will be included in future submission documentation. Some is already included within this submission's data package.

CROWD SOURCING

The collection and use of public feedback on provider coverage areas is planned for deployment soon after the spring data submission. An updated version of the State public interactive map will be released with enhanced feedback capability, which can then be brought to the provider for potential map refinement.

THIRD PARTY DATA VERIFCATION

We are currently in the process of acquiring 3rd party data to extend our verification efforts. The data that will e acquired will allow comparisons against exchange and cable boundaries. We will also continue our reviews against the Form 477 data as provider coverage areas change from submission-to-submission.

CONFIDENCE VALUES

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

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

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

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

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

List of errors within the script, which will be listed as exceptions, can be found on PB Works – Grantee Workspace at the following link:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

DETAILED PROCESS REVIEW

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

BMap_ProcessDetails_2012_04_01.docx

PROVIDERS RESEARCHED

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

5LINX Enterprises, Inc.	Dialtone & More, Inc	OneTone Telecom, Inc.
8x8, Inc.	Digital Agent, LLC	ONS-Telecom, LLC
Access One, Inc.	DoveTel Communications, LLC	OnWav, Inc
Access Point, Inc.	DOW Management Company, Inc.	PaeTec Corporation
Accessline Holdings, Inc.	DSLnet Communications LLC	Peerless Network, LLC
ACN, Inc.	Echostar	Phone.com, LLC
ACN, Inc.	ECR Voice, LLC	Plant Tifnet
Airespring, Inc.	Electric Power Board	PNG Telecommunications, Inc.
Albany State University	Equinox, Inc.	Preferred Long Distance, Inc.
Albany, Water, Gas and Light Commission	Ernest Communications, Inc.	Professional Resources Management of Rabun, LLC
ALEC, Inc.	EveryCall Communications, Inc.	Proximiti Technologies, Inc.
Alma Telecom, Inc.	Evolve IP, LLC	Public Service Telephone Company
Alternative Phone, Inc.	Fidelity Voice Services LLC	Quick Connect Telecommunications, Inc.
America Internet & Communications	Fionda VoIP, LLC	Quincy Telephone
American Telephone Company LLC	First Communications, LLC	Qwest
Appalachian Valley Fiber Network	Global Connection Inc. of America	Razorline LLC
Applied Satellite Technology Systems	Global Crossing North America, Inc.	Reynolds Cable TV Inc.
Apptix, Inc.	GlobalPhone Corp.	Ring Connection, Inc.
Aptela, Inc.	Granite Telecommunications, LLC	Saturn Telecommunication Services Inc.
AT&T Mobility LLC	GreatCall, Inc.	Seimitsu Corporation
Atlantic Tele-Network	Hickory Tech Corporation	Semperon Corporation
Avaya Inc.	iCore Networks, Inc.	Single Source Integrated Services, Inc.
Bandwidth.com, Inc.	IDT Corporation	SinglePipe Communications

BCN Telecom, Inc.
BetterWorld Telecom, LLC
Big River Telephone, LLC
Birch Communications Inc.
Blue Ridge Mountain EMC
Blue Ridge Telephone
Board of Water, Light & Sinking Fund Commissioners
Broadview Networks Holdings, Inc.
Broadvox Go!, LLC
Budget Prepay Inc.
BullsEye Telecom, Inc.
Call Catchers, Inc.
Cause Based Commerce Inc.
Cbeyond Communications, Inc.
CCP Holdings, LLC
Cincinnati Bell Inc.
City of Cartersville
City of Decatur
City of Elberton, Georgia
City of Hapeville
City of LaGrange
City Of Manchester
City of Manchester, Georgia
City of Savannah
City Of Wadley
CommPartners Holding Corporation
Computer Office Solutions, Inc.
Conexiz Corporation
ConnectMe, L.L.C.
Corr Wireless Communitcations, LCC
Covista, Inc.
Cypress Communications, Inc.

InPhonex.com, LLC
Interface Security Systems Holdings, Inc.
Interglobe Communications, Inc.
IP Communications, LLC
IP Networked Services, Inc.
ipSBS Managed Services, LLC
Kosmaz Technologies, LLC
LightEdge Solutions, Inc.
LightSquared LP
LY Holdings, LLC
M5 Networks, Inc.
Matrix Telecom, inc.
Megapath
MetroPCS Georgia, LLC
Metropolitan Telecommunications Holding Company
Midwestern Telecommunications Inc.
Millicorp
Mitel Netsolutions Inc.
Mix Networks, Inc.
MOMENTUM TELECOM INC
N.W.ComTech, Inc
Navigator Telecommunications, LLC
Negia, Inc.
Netlink IP Communications
Netlogic, Inc.
Network Billing Systems LLC
Nexus Communications, Inc.
nexVortex, Inc.
Northland Communications Corp.
Northwest Georgia Regional Commission
NOS Communications, Inc.
Ojo Service LLC

South Carolina Net, Inc.
South Georgia Governmental Services Authority
Southern Communications Services, Inc.
Southern Telecom, Inc.
StarBand Communications Inc.
TCO Network, Inc.
TDS Telecom2
Telapex, Inc.
Tele Circuit Network Corporation
Teledias Communications, Inc.
TelefÃ³nica USA, Inc
Telekenex, Inc.
Telesphere Networks Ltd.
Telovations, Inc.
Tennessee Telephone Service, LLC
The Edge Group Inc
Think 12 Corporation
Thinking Phone Networks, LLC
Tphone.us
Trans National Communications International, Inc.
Transbeam Inc.
Trenton Telephone Co.
Unite Private Networks, LLC
vCom Solutions
Velocity Networks Inc.
VoIPStreet, Inc.
Vonage Holdings Corp.
WildBlue Communications, Inc.
Windjammer Communications LLC

Guam Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Daniel Calarco
Contact Phone Number:	202-393-1175
Contact E-mail:	**dcalarco@one-economy.com**
Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**
Product Specification:	Spring 2012 NTIA Data Model
Product/Process:	NTIA—April 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Providers Included
  - Docomo Pacific
  - GTA
  - IT&E
  - MCV
  - PDS (Pacific Data Systems) Guam

- New Providers Since Last Data Submission
  - None

- Other Provider Comments
  - iConnect
    - Currently not a broadband service provider; however they are researching further on entering the Terrestrial Fixed Wireless market

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
  - Coverage reduction for GTA near Umatac's mayor's office, based on feedback received during public broadband meetings.

- Coverage Footprint Expansion –
  - No expansion for this data submission round

DATA CORRECTIONS

- There were no data corrections required for this data submission
  - There was also no NTIA 3rd Party data review results posted on the Broadband State Data Management Tool that could lead to potential data corrections.

COMMUNITY ANCHOR INSTITUION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	Transmission Technology	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	56	0	0	0
Category 2 - Library	9	5	5	5
Category 3 - Medical/Healthcare	8	6	6	6
Category 4 - Public Safety	28	19	19	19
Category 5 - Universities/Colleges	5	0	0	0
Category 6 - Other: Government	79	0	0	0
Category 7 - Other: Non-Government	69	0	0	0
Total	**254**	**30**	**30**	**30**

CAI CHANGES

- The CAI's within the following categories were reviewed again against the below-mentioned databases to identify if any CAIID's need to be updated or added.

  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**

  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**

  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

GU_2012_3_30.txt

- Error Report

  All items flagged within the submission receipt where confirmed by NTIA as exceptions during the 03/27/12 webinar or are confirmed as allowable values according to the NTIA data model. The exceptions mentioned are as follows:
    - Middle Mile Elevation Fails
    - Middle Mile Latitude/Longitude Fails
    - Middle Mile Ownership Fails
    - Address SpeetTier Fails
    - CAI Transtech Fails

Hyperlinks to Grantee Workspace in which the same issues were identified by other Grantees:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

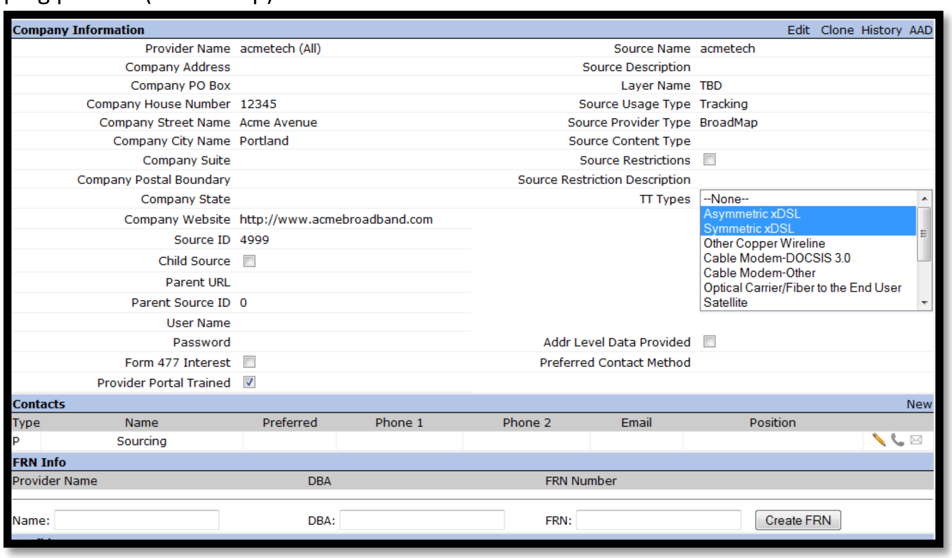
HIGH-LEVEL SUMMARY

DATA GATHERING

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

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

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



Company Information — Edit Clone History AAD

Provider Name acmetech (All) | Source Name acmetech
Company Address | Source Description
Company PO Box | Layer Name TBD
Company House Number 12345 | Source Usage Type Tracking
Company Street Name Acme Avenue | Source Provider Type BroadMap
Company City Name Portland | Source Content Type
Company Suite | Source Restrictions
Company Postal Boundary | Source Restriction Description
Company State | TT Types --None-- / Asymmetric xDSL / Symmetric xDSL / Other Copper Wireline / Cable Modem-DOCSIS 3.0 / Cable Modem-Other / Optical Carrier/Fiber to the End User / Satellite
Company Website http://www.acmebroadband.com
Source ID 4999
Child Source
Parent URL
Parent Source ID 0
User Name
Password | Addr Level Data Provided
Form 477 Interest | Preferred Contact Method
Provider Portal Trained

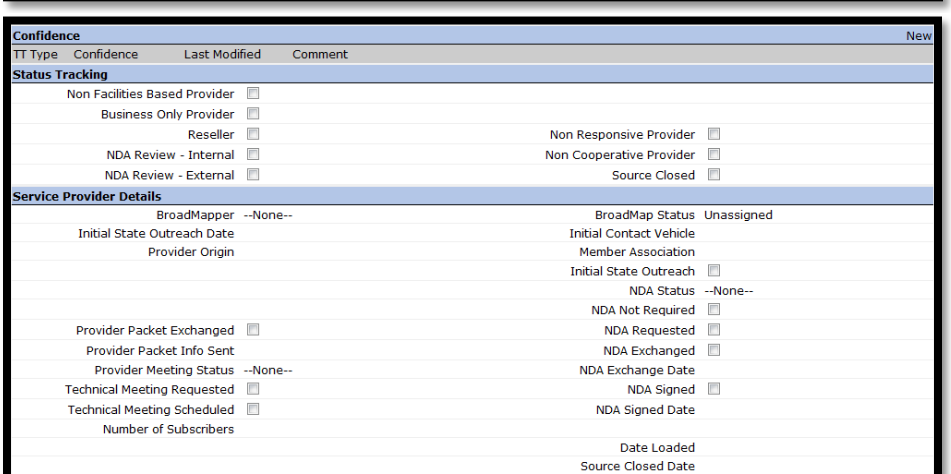
Contacts — New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name | DBA | FRN Number

Name: | DBA: | FRN: | Create FRN



Confidence — New

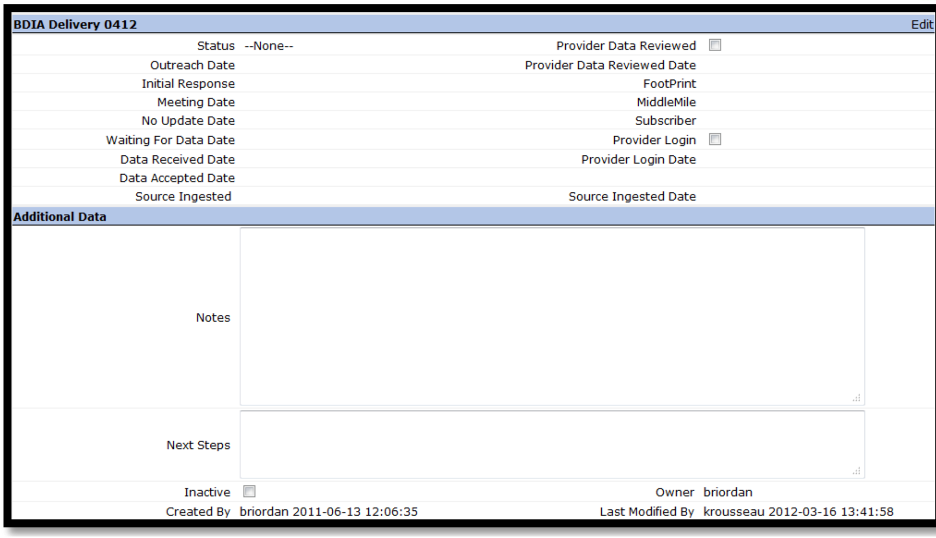
TT Type | Confidence | Last Modified | Comment

Status Tracking

Non Facilities Based Provider
Business Only Provider
Reseller | Non Responsive Provider
NDA Review - Internal | Non Cooperative Provider
NDA Review - External | Source Closed

Service Provider Details

BroadMapper --None-- | BroadMap Status Unassigned
Initial State Outreach Date | Initial Contact Vehicle
Provider Origin | Member Association
Initial State Outreach
NDA Status --None--
NDA Not Required
Provider Packet Exchanged | NDA Requested
Provider Packet Info Sent | NDA Exchanged
Provider Meeting Status --None-- | NDA Exchange Date
Technical Meeting Requested | NDA Signed
Technical Meeting Scheduled | NDA Signed Date
Number of Subscribers
Date Loaded
Source Closed Date



BDIA Delivery 0412 Edit

Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission.

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

COMMUNITY ANCHOR INSTITUTION (CAI)

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

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

DATA INTEGRATION PROCESS

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

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

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

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

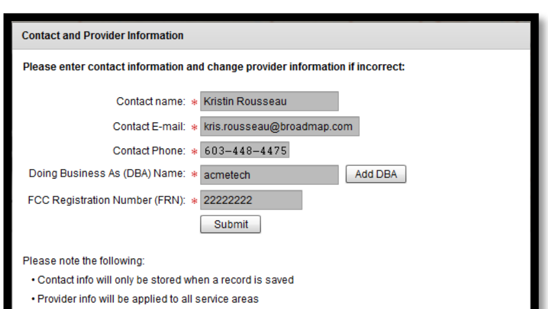
Login

Username

Password

Login

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



Contact and Provider Information

Please enter contact information and change provider information if incorrect:

Contact name: * Kristin Rousseau

Contact E-mail: * kris.rousseau@broadmap.com

Contact Phone: * 603-448-4475

Doing Business As (DBA) Name: * acmetech Add DBA

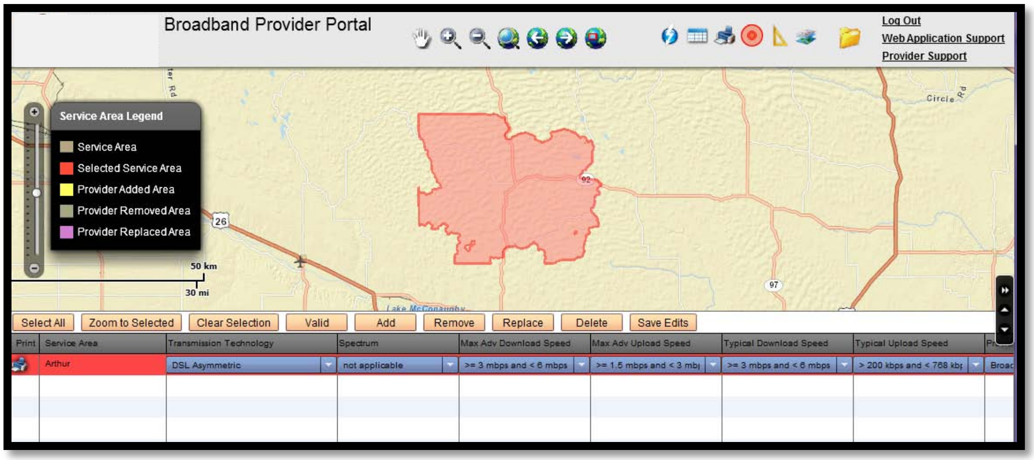
FCC Registration Number (FRN): * 22222222

Submit

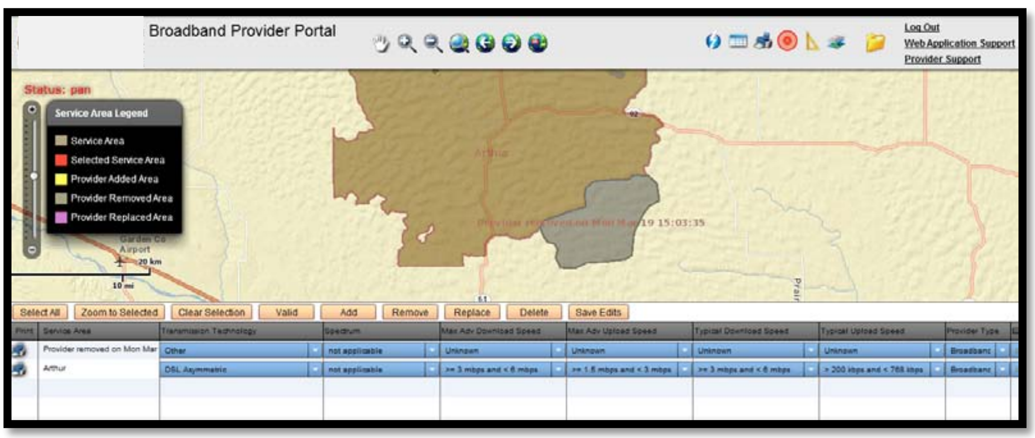
Please note the following:

- Contact info will only be stored when a record is saved
- Provider info will be applied to all service areas

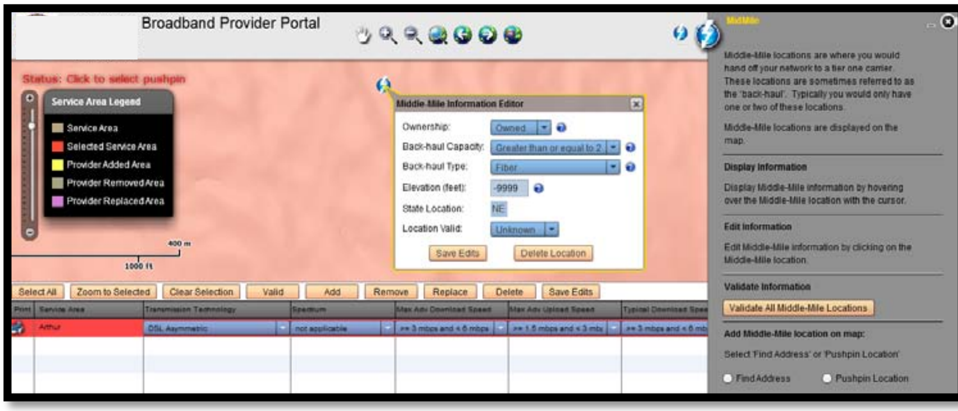
- Capability to review and request changes to the coverage footprint

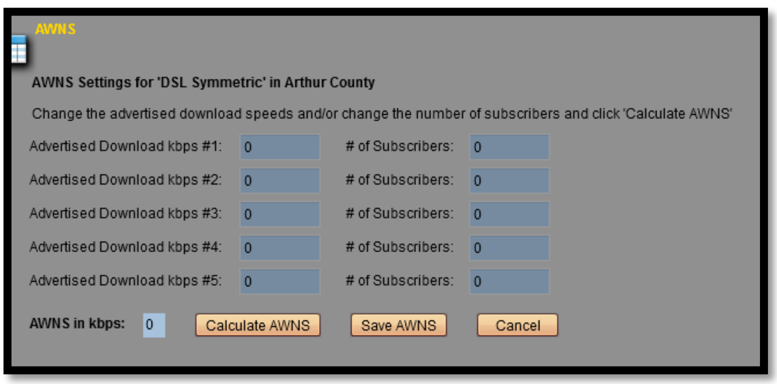


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

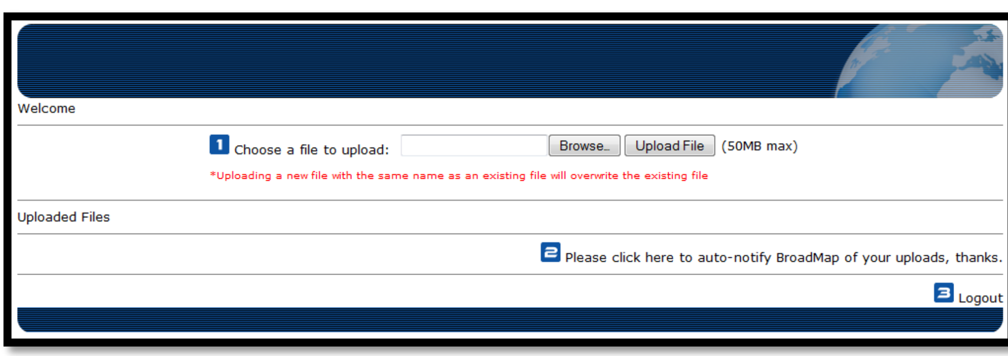


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





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



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

DATA VALIDATION AND VERIFICATION

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

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

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

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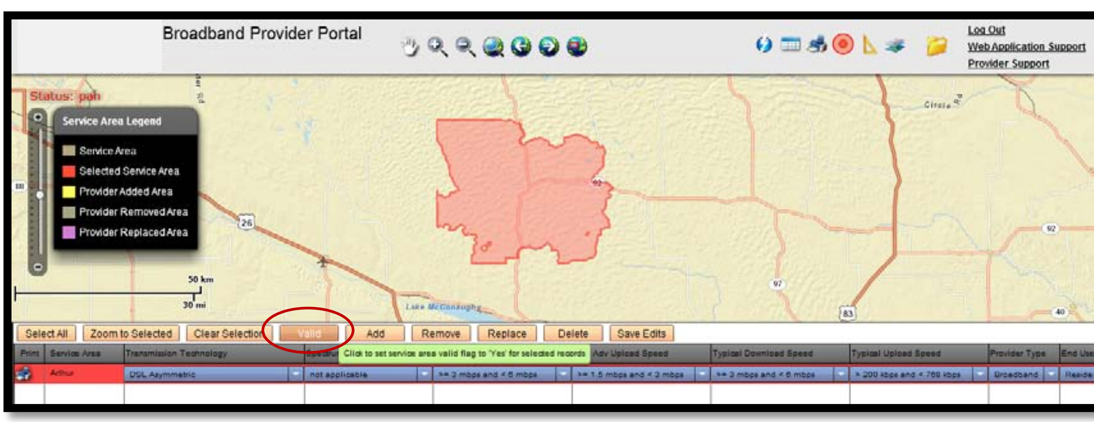
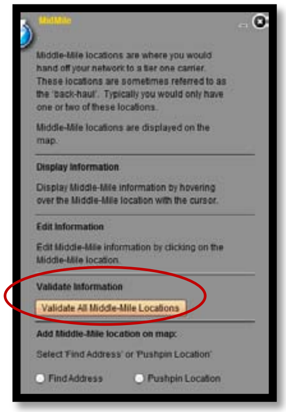
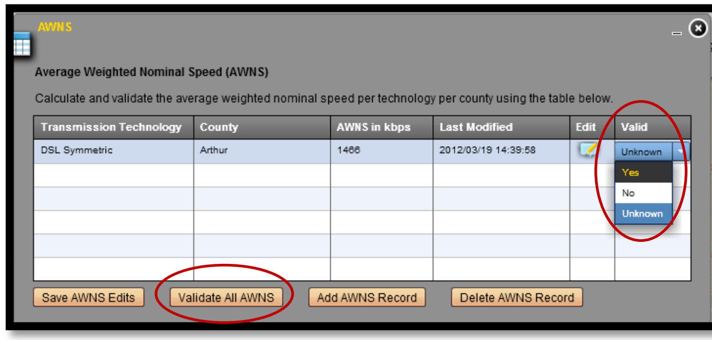


- Middle Mile & AWNS Validation





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

THIRD-PARTY DATA VERIFICATION

Due to a change in mapping partners, the focus for this data submission was placed on implementing an improved process methodology and integrating provider's coverage areas into a new internal model. Included in these efforts was educating the providers on the new process, encouraging continued participation and supporting their validation prior to the data submission.

For this submission, the NTIA 3rd Party Data summary was reviewed to ensure any corrections required were represented in the final product and the supporting documentation.

This submission was also compared to the previous data submission, fall 2011, as a quality check to identify and resolve any potential erroneous discrepancies between the two products. Since they originated from two different processes, we wanted to ensure there were no unexpected changes or regression.

PUBLIC VERIFICATION

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

The public website can be viewed at the following hyperlink:

http://cnmi-bb.broadmap.com/PublicMap/

CONFIDENCE VALUES

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

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

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

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

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

List of errors within the script, which will be listed as exceptions, can be found on PB Works – Grantee Workspace at the following link:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

DETAILED PROCESS REVIEW

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

BMap_ProcessDetails_2012_04_01.docx

Methodology Guidance

The white paper should:

1. Effectively describe the deliverable data;
2. Effectively describe the data collection process;
3. Effectively describe the verification process.

1. Data Description Provide a general description / summary of data submission including file names and a brief description of each dataset.

Contents of the data submission folder:

1. Final Geodatabase (HI_SBDD_2012_04_01.gdb)

Description: This data submission follows FCC/NTIA guidelines including Metadata for the project.
The SBDD File Geodatabase contains the following layers:

BB_Service_Address	4 Records
BB_Service_Road_Segment	6,091 Records
BB_Service_CensusBlock	16,178 Records
BB_Service_CAInstitutions	1,306 Records
BB_Service_Wireless	13 Records
BB_Service_Overview	0 Records
BB_ConnectionPoint_LastMile	119 Records
BB_ConnectionPoint_MiddleMile	1 Records

2. Submission Receipt (HI_2012_3 _28.txt)

Description: This is the submission receipt from the NTIA receipt tool.

3. Data Package (HI_DataPackage_2012_04_01.xlsx)

Description: This is the NTIA "datapackage.xls" spreadsheet that is used to document the data submission.

4. Changes and Corrections (HI_2012_04_01_Changes_and_Corrections.pdf)

Description: This is the NTIA "Changes and Corrections" document that is used to describe the changes and corrections to the data submission.

5. Whitepaper (HI_WhitePaper_2012_04_01.pdf)

Description: This is the methodology guidance document requested by NTIA to document the data submission. Page 1 of 6 (this document)

2. Provider Participation Provide a summary of provider cooperation (datapackage.xls).

The project team has been collecting and processing broadband data from eleven (11) providers (Oceanic Time Warner Cable, Hawaiian Telcom Communications, Inc., Clearwire Corp., TW Telecom Holdings, Inc., Verizon Communications, Inc., Sprint Nextel, AT&T Inc., MOBI PCS, T-Mobile USA, Inc., Sandwich Isles Communications, Inc., and BlueStreak Broadband, Inc.). These eleven (11) providers account for the overwhelming majority of actual broadband subscribers in Hawaii. The project team has identified a 12th provider as Pacific Light Net, Inc. dba/Wavecom Solutions, but the team has not yet received any data from Pacific Light Net, Inc.

Hawaii Department of Commerce and Consumer Affairs ("DCCA") has encountered challenges in fully executing NDAs with providers and subcontracts under the grant. This has affected the signing of certain NDAs with data providers as well as subcontracts dealing with data processing and delivery. Subsequently, throughout this term, DCCA has experienced some delays in obtaining necessary information. However, to-date DCCA has been able to process data representing the overwhelming majority of broadband providers in the State of Hawaii. – DCCA continues to overcome these challenges through cooperation between the parties and improving process expediency. Eleven (11) of the twelve (12) Providers identified have executed confidentiality agreements for data sharing.

Hawaiian Telcom Communications, Inc. and Oceanic Time Warner Cable: Last-mile and middle-mile facility capacity and more specifically backhaul from the facilities are deemed proprietary. Further, providers maintain that they do not have information documented in a form that they would be able to easily provide. No information regarding this has been shared to-date by these providers. DCCA is working to compel these Providers to furnish more detailed information.

Clearwire Corp., Sandwich Isles Communications, Inc., BlueStreak Broadband, Inc. and MOBI PCS did not provide new data updates for the Spring 2012 data delivery. However, BlueStreak Broadband, Inc. and MOBI PCS verified the existing coverage was accurate and there was no need for Spring 2012 data update.

The project team continues to verify these coverage areas and broadband speed claims as well as to collect data from other providers as they are identified.

The most recent iteration of updated and verified mapping data was submitted to NTIA on April 1, 2012 in accordance with the latest FCC/NTIA broadband data model.

3. Data Collection and Integration

a. Primary Data Collection describes the data collection process and list any surveys distributed to retrieve data.

Data was obtained by working with Providers (phone conference calls and email) to get the latest information at the most detailed level possible. The team furnished Providers with a data request including the latest table specifications via email that included the specific information needed for the project. All other terrestrial broadband Providers maintained census block level detail. Wireless providers submitted RF propagation polygons illustrating coverage.

Broadband coverage data for Hawaiian Telcom Communications has been extrapolated as a one-mile buffer from each Central Office location. For every other provider, the DCCA has obtained census block level information and coverage footprints from the wireless providers. Since the data is being provided at the census block level or via a coverage footprint from wireless providers, exact levels of service provided within these boundaries in some cases has been limited to a single tier of service per census block or wireless footprint. TW Telecom has furnished customer addresses which have been geocoded and inserted into the FCC file geodatabase model as appropriate. We have received information from the public via the hibroadbandmap.org website, stating that fiber to the premise existed for Hawaiian Telcom Communications, Inc. at a few addresses which were verified with the provider and added to the database.

No address level detail from any Providers has been submitted for this data submission. For wireless providers, the project team is requesting more detailed RF propagation maps, tower locations, and greater detail on wireless service coverage and technology. Further, the project team will be analyzing and adjusting existing census block data to fit within Tax Map Key (TMK) boundaries in an effort to increase the accuracy of the stated data coverage areas for use on the State's broadband website and for planning purposes.

b. Community Anchor Institutions Summarize Community Anchor Institutions by type, describe your data collection process, and list any surveys distributed to retrieve data.

The baseline Community Anchor Institutions database has been amended, updated and verified. The Community Anchor Institutions database is composed of 1,306 points that include:

Schools – K through 12 (public and private)	367
Libraries	56
Medical/Healthcare	212
Public Safety	95
Universities, Colleges, other Post-Secondary (public and private)	44
Other Community Support – Nongovernmental (Hotels, Resorts, Other)	532

The data was collected from various State databases (i.e. Schools, Libraries, Public Safety), and from InfoUSA data downloads. Data was verified by personal telephone calls and information collected from websites. No surveys were distributed. The project team plans to include restaurant lounges, malls and coffee shops with advertised free Wi-Fi in the next deliverable, as well as, continue with telephone verification to obtain more information from CAI's.

For this data submission we collected additional CAI's. These CAI's were private business providing free Wi-Fi services for their customers.

4. Validation

a. **Overview Provide a general summary of the validation process and methodology used**.
   See below.

b. **Business Logic Rules Define the business logic related to data validation including a clear structure or methodology used.**

Data Excluded by Business Rules (Organized by layer)

Broadband_Service_CensusBlock - Total Excluded: 10,652 Census Blocks

- Excluded by Business Rule
  - The block must contain population
    - 3,433 Census Blocks – Hawaiian Telecom
    - 5,818 Census Blocks – Time Warner Cable
    - 414 Census Blocks – TW Telecom
    - 984 Census Blocks – Sandwich Isles Communications
  - Combination business rule for transmission technology speed combinations
    - 3 Census Blocks – TW Telecom

Broadband_Service_RoadSegment - Total Excluded: 1,024 Segments

- Excluded by Business Rule
  - The block must contain population
    - 734 Segments – Hawaiian Telecom
    - 47 Segments – Sandwich Isles Communications
    - 243 Segments – Time Warner Cable

c. Feedback Loop Describe any outreach to Broadband Providers after you processed their data.

We are working with providers on an ongoing basis to rectify data including the provision of coverage maps.

d. Statistical Models List and describe any statistical models used to compile and analyze the data.

None used to date.

e. 3rd Party Publicly Available Data identify all 3rd party datasets used and describe how they were used to validate the data. (3rd party datasets include American Roamer, Form 477, Form 325, etc.

- Info USA used for address validation of CAI's.
- Used updated Hawaiian Homelands boundaries.

f. Crowd Sourced Data Identify whether or not crowd sourced data was used and how the data was used for validation.

Hawaii broadband website Ookla tools are being collected on a monthly basis. The State's Broadband Speed Test (http://hawaiispeedtest.net) has been advertised and has experienced over 25,000 tests taken in the last 60 days. The data is being analyzed to determine actual speeds versus provider stated speeds. Also, we have received email reports of unserved areas from residents using the http://www.hibroadbandmap.org website.

The project team is implementing the following verification activities:

- Coverage Verification via Website: DCCA launched a dedicated website (hibroadbandmap.org) that contains the latest information on the project as well as a speed and line test application and database for consumers to use. Additionally, consumers are able to report unserved areas on the website. – Completed December 1, 2010

- CAI Verification by Telephone: DCCA will independently verify access to broadband services by Community Anchor Institutions ("CAI") where no data currently exists via personal contact by telephone. – Ongoing

- CAI Verification by External Data Source Comparison: The project team will be collecting data from InfoUSA to verify the completeness of the CAI inventory. – Ongoing

- Provider Verification via Map Products: DCCA will present the data to the individual providers in the form of a map product, ask them to verify the results visually, and, if necessary, ask them to provide more accurate information if available. – Ongoing

- Speed Test Verification via Website: DCCA will announce the speed and line test application and website for consumers via press releases and newspaper articles to encourage subscriber participation. The database will be maintained throughout the course of the project. – Completed January 25, 2012 and Ongoing

- Speed Test Verification via FCC Ookla/MLabs: FCC databases are being collected on a monthly basis and integrated into a coverage verification layer that will also appear on the website. – Ongoing

- Provider Verification via Website: Providers will also be able to access the maps of their data through a secure portal on the website. – Ongoing

The project team's status on implementing the following verification activities:

- Coverage Verification via Website: The dedicated website (hibroadbandmap.org) was launched on December 1, 2010 and includes a customized Ookla speed test application and database for consumers to use, as well as, ESRI's BBStat application. – In Progress.

- CAI Verification by Telephone: DCCA has and will continue to verify Community Anchor Institution data via telephone. – In Progress.

- CAI Verification by External Data Source Comparison: InfoUSA data is being downloaded to augment and verify the completeness of the CAI inventory. – In Progress.

- Provider Verification via Map Products: Maps that illustrate coverage gaps are being prepared for provider review. – In Progress.

- Speed Test Verification via Website: The dedicated website (hibroadbandmap.org) launched on December 1, 2010 includes a customized Ookla speed test application and database for consumers to use, as well as, ESRI's BBStat application.– In Progress.

- Speed Test Verification via FCC Ookla/MLabs: FCC speed test data is also being integrated into an independent map layer. – In Progress.

- Provider Verification via Website: Providers will also be able to access the maps of their data through a secure portal on the website. – In Progress.

Note: These verification activities and direct updates from providers are anticipated to continue through the next data delivery date.

In addition, the project team is participating in a program sponsored by Akaku: Maui Community Television on Broadband. Our website Hibroadbandmap.org will be listed on their site and they will be requiring all students to perform daily speed tests using our Site to test as well as theirs. The team will be talking about broadband, the national and state programs and the importance of speed test accuracy. Phase 1 was complete in Dec 2011, which consisted of broadband mapping team members being interview by Akaku at their studios in Kahului, Hi. Phase 2: TDB

OFFICIAL APRIL 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND DATA AND DEVELOPMENT GRANT PROGRAM FOR THE STATE OF IOWA

CONNECT IOWA®

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:

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

It is with highest regard that the collective stakeholders of Connect Iowa 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 Iowa has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit not just Iowans, 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 Iowa: 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 (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2011 SBI data submission for the Connect Iowa program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 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.

> In addition to the requirements mentioned above, please find this methodology paper to be inclusive of a new section pertaining to industry mergers and acquisitions – specifically this section will detail any and all mergers or acquisitions that have taken place in Iowa, since the October 2011 submission. The intent of this new section is to provide a better understanding of how the broadband provider landscape has changed over time.

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 98.02 percent of the Iowa provider community, or 198 of 202 total providers. There are 196 participating providers and 2 additional non-participating providers whose estimated coverage areas have been submitted. Of the 196 participating providers, 55 supplied an update to their network or coverage area(s), while 133 have reported no change. The remaining 8 represent providers who previously supplied data but were 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 4 providers that are not represented in the attached datasets have refused to participate in the voluntary program or were non-responsive to multiple contact attempts.

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

Connect Iowa has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Iowa conducts field validation efforts. To date, 103 (50.99 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

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

As an indicator of stakeholder penetration, the Connect Iowa website encountered 3,295 unique visits during this reporting period (21,005 total to date for the life of the grant awarded on January 1, 2010). Additionally, this pronounced Web activity netted 16 broadband inquiries over this same reporting period (206 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 Connect Iowa website and the Connect Iowa 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 Iowa mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Iowa to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Iowa 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 Iowa Economic Development Authority, outreach was conducted during this data update reporting period by Connect Iowa to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Iowa website. Connect Iowa worked with members of the Iowa Broadband Advisory Committee to distribute the CAI survey to their contacts to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. Connect Iowa will continue to build upon these relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

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

The Connect Iowa program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Iowa, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead.

Respectfully submitted,

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

DATA ACQUISITION: IOWA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this fifth reporting period of the SBI, Connect Iowa, working in close coordination with the state of Iowa, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. During this reporting period Connect Iowa has continued to focus efforts on conducting outreach and raising awareness of this important project.

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

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

The survey can be accessed at this link: http://www.surveymonkey.com/s/RRZ9KHC.

Connect Iowa conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Iowa continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Iowa works with the Iowa Association of Regional Councils to identify existing relationships that can support CAI outreach.

Connect Iowa has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. Connect Iowa is also taking advantage of pre-existing relationships with organizations and agencies that participate on the Connect Iowa Advisory Committee.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Iowa project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Iowa will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Iowa Association of Regional Councils (IARC) will continue to be briefed on the current CAI data and provided information so they can assist with outreach and promotion within the state. The local data will be very helpful to IARC representatives as they create local teams and need help identifying CAI representation.

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	1851	1851	1851	119	119	121
Libraries	552	552	552	312	398	232
Healthcare	143	143	143	40	40	39
Public Safety	1175	1175	1174	72	64	65
Higher Ed Institutions	77	77	77	30	30	30
Other Government	706	706	706	320	265	299
Other Non-Government	4	4	3	3	4	4
Total	**4508**	**4508**	**4506**	**896**	**920**	**790**

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

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 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 state of Iowa.

Inventory of Deliverables, Connect Iowa: 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.

The provider data collected by CN on behalf of the state of Iowa have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

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

Mergers and Acquisitions

Throughout the course of the SBI program, CN has maintained a repository of electronic records related to its provider outreach activities. Recently, due to the high volume of mergers and acquisitions (M&A) within the provider community, CN elected to create a listing of M&A activities for this mapping cycle as a way of supplementing the Provider Changes and Corrections section of this document. M&A activities for this state are listed below with a brief description and date as obtained through public records or provider disclosure.

- **CenturyLink Merged With Qwest**
  On April 1, 2011, CenturyLink, Inc. (NYSE: CTL) and Qwest Communications completed their merger, creating the nation's third largest telecommunications company. The combined companies will deliver a broader range of communications services to consumers and small businesses throughout its 37-state service area and to business, wholesale, and government customers nationwide via its 190,000 route mile fiber network.

- **Circle Computer Resources Acquired Cramer IT**
  Circle Computer Resources of Cedar Rapids acquired Cramer IT, a small business computer networking and high-speed Internet service business in Iowa City.

- **La Motte Telephone Company, Inc. Acquired Andrew Telephone Company**
  In a 214 Application dated September 19, 2011, the Wireline Competition Bureau approved the application of Andrew Telephone Company, Inc. and LaMotte Telephone Company, Incorporated to transfer control of Andrew to LaMotte.

- **Level 3 Acquired Global Crossing**
  The Global Crossing website confirmed that Level 3 and Global Crossing joined forces under the brand name Level 3 on October 4, 2011.

- **Windstream Acquired PAETEC**
  The News section of the Windstream website dated December 1, 2011, announced that it had completed the acquisition of PAETEC Holding Corp. in a transaction valued at approximately $2.3 billion.

- **Zayo Acquired 360networks**
  On December 2, 2011, the Zayo website announced that it had completed its transaction to purchase 360networks. The resulting company is one of the largest bandwidth infrastructure companies in North America with an estimated annualized pro forma revenue of $393 million.

IOWA FIELD VALIDATION METHODOLOGY

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

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;

- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets 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 Iowa on the following providers: Algona Municipal Utilities; Ambercomm; AT&T, Inc.; Aventure Communications; Ayrshire Farmers Mutual Telephone Company; Brooklyn Mutual Telecommunications Cooperative; Cable ONE, Inc.; Cedar Falls Utilities; Central Scott Telephone; CenturyLink (formerly Qwest Corporation); Chat Mobility; Circle Computer Resources (also d.b.a. Cramer IT); Citizens Mutual Telephone Cooperative; Clarence Telephone Company; CML Telephone Cooperative Association of Meriden, Iowa; Colo Telephone Company; Community Cable Television Agency of O'Brien County; Complete Communications Services; Cooperative Telephone Exchange; Cornbelt Telephone; CoxCom Inc.; Cumberland Telephone; Danville Mutual Telephone Company; East Buchanan Telephone Cooperative; Ellsworth Cooperative Telephone Association; Evertek Enterprises; Farmers & Merchants Mutual Telephone Company; Farmers Cooperative Telephone Company-Dysart; Farmers Mutual Cooperative Telephone Company-Harlan; Farmers Mutual Telephone Company-Jessup; Farmers Mutual Telephone of Stanton; Farmers Telephone Company-Essex (also d.b.a. Heartland Net); Fenton Co-Op Telephone Company; FiberComm L.C.; Frontier Communications Corporation; Goldfield Access Network; Grand Mound Cooperative; Grand River Mutual Telephone Cooperative; Grundy Center Municipal Utilities; Harlan Municipality Utilities; Hubbard Cooperative Telephone Association and Cable; Huxley Communications Cooperative; I-35 Telephone Company; ImOn Communications; Internet Consulting Services LLC; Internet Solvers, Inc.; Jefferson Telephone Company; Kalona Cooperative Telephone Company; KDSC, Inc.; KeyOn Communications (d.b.a. Dynamic Broadband); LaPorte City Telephone Company; Laurens Municipal Communications Utility; Lenox Municipal Utilities; Logannet; Lone Rock Cooperative Telephone Company; Long Lines; Mahaska Communications Group; Marne Elkhorn Telephone; MCC Iowa LLC (d.b.a. Mediacom Iowa LLC); Mediapolis Telephone Company; MidIowa Net; Milford Cable TV, Inc.; Minburn Communications; Minerva Valley Telephone Cablevision, Inc.; Muscatine Power & Water (d.b.a. Machlink); Mutual Telephone Company; Mutual Telephone Company of Morning Sun Iowa; NetConx; Nexgen Integrated Communications, LLC; Northern Iowa Telephone Company; Northwest Telephone Company; Ogden Telephone Company; Panora Communications Cooperative; Partner Communications Cooperative; Prairie iNet; Premier Communications; Radcliffe Telephone Company; RingTel Communications; River Valley

Telecommunications Coop; Royal Telephone Company; RuralWaves Wireless Internet; Sac County Mutual Telephone; Sharon Telephone Company; SpeedNet LLC (d.b.a. Speed Connect); Spencer Municipal Utilities; Sprint Nextel Corporation; Sully Telephone Association; Superior Telephone Cooperative; Terril Telephone Cooperative; T-Mobil USA, Inc.; Traer Municipal Utilities; USA Communications (d.b.a. Farmers Mutual Telephone Cooperative-Shellsburg; Van Buren Telephone Company, Inc.; Verizon Communications, Inc.; Villisca Farmers Telephone Company; Walnut Telephone Company; Webster-Calhoun-Cooper Telephone Association; Wellman Cooperative Telephone Association; West Iowa Telephone Company; West Liberty Telephone Company (also d.b.a. Cloudburst 9 LLC and Liberty Communications); Western Iowa Telephone Association; Windstream (also d.b.a. Iowa Telecom Services); Woolstock Mutual Telephone; and WTC Communications, Inc.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 103 companies (out of a universe of 202 viable providers) totaling 50.99 percent within the state of Iowa. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters. 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.

Alpine Communications, LC
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative indicated that 12 Mbps service is available to customers.

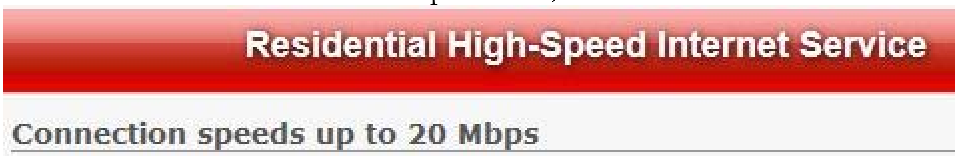
BEVCOMM
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Surf the Internet at speeds from 1Mb to 15Mb/second. All plans allow for multiple users at the same location, business or residential. Stop wasting time waiting for web sites and files to download and see the benefits of BEVCOMM High Speed Internet today!

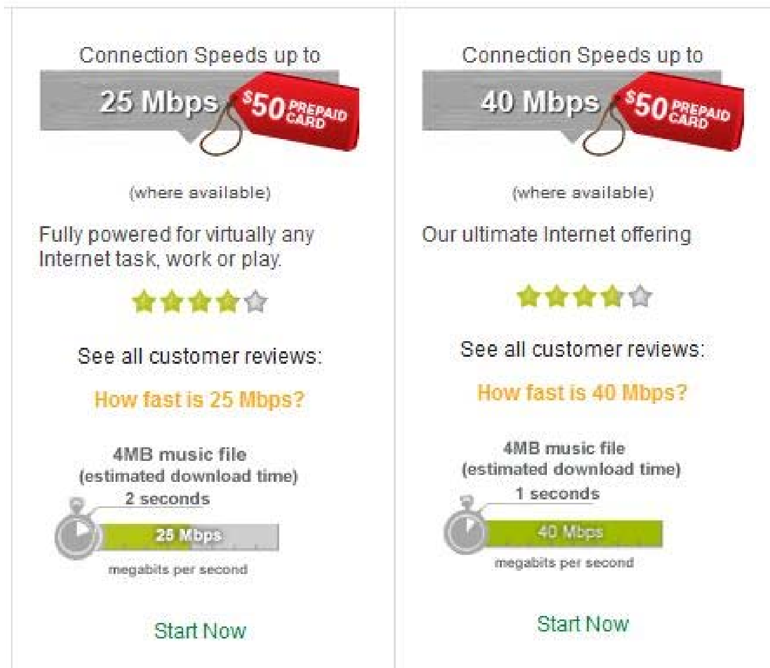
Cascade Communications Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

ZOOM WARP SPEED
Up to 1 Mbps Upload/12 Mbps Download
For just $64.95/month*

Central Scott Telephone Company, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

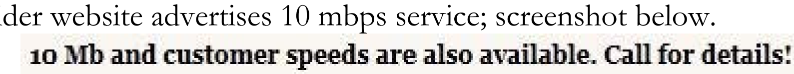


CenturyLink
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 25 and 40 Mbps service; screenshot below.



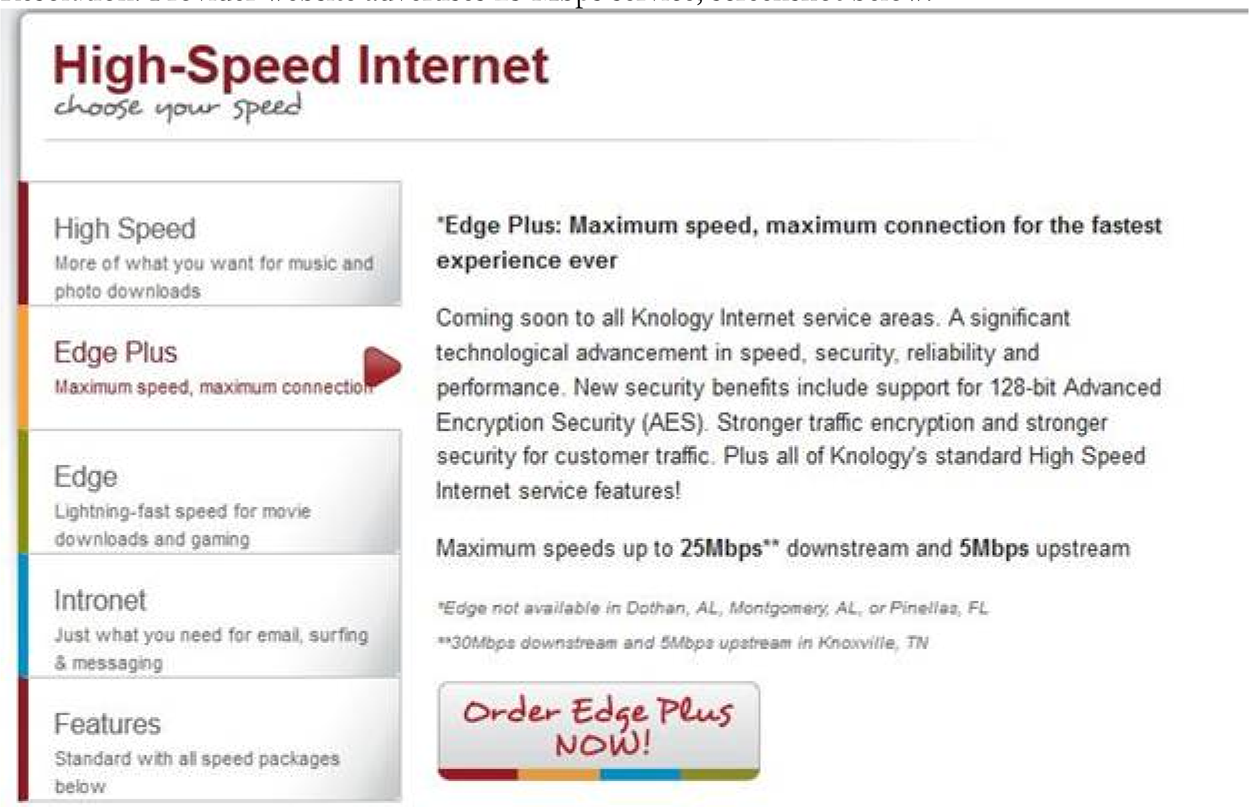
Farmers Mutual Telephone Company – Nora Springs
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Confirmation from provider could not be obtained prior to submission; outreach will continue to obtain explanation or correction for October 2012 submission.

Farmers Mutual Telephone Company of Stanton, Iowa
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 mbps service; screenshot below.



KeyOn Communications, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Confirmation from provider could not be obtained prior to submission; additional research yielded a potential upcoming sale of the company.

Knology of the Plains, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.



Northern Iowa Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Download	128K	3 Meg	8 Meg	15 Meg
Upload	128K	384K	512K	1 meg
Static IP	$10.00	$10.00	$10.00	$10.00
Filtering	$2.00	$2.00	$2.00	$2.00

Preston Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed 10 Mbps service is available and it will be updating its website soon to advertise it.

River Valley Telecommunications Coop
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed that tier 7 service is available, but it is in the process of updating its website to reflect the upgraded speeds.

Terril Telephone Cooperative
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Confirmed with provider that tier 7 service is available, but website has not yet been updated.

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website confirms that download 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.

West Iowa Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

RURAL AREAS

	Breeze	Zip	Whiz	WOW	Crusin'	Bazinga
Download Speeds Up To	128 kbps	1.5MB	3MB	5MB	10MB	20MB
Upload Speeds Up To	64 kbps	768 kbps	1.5MB	2.5MB	2.5MB	2.5MB

Windstream Communications

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises 12 Mbps service; screenshot below.

See which of our speeds matches your online activities. Choose the right Internet speed (WATCH VIDEO)	3 Mbps (Basic Use)	6 Mbps (Most Popular)	12 Mbps (Fastest Option)
E-mail friends	x	x	x
Browse the Internet	x	x	x
Bank online	x	x	x
Shop for deals	x	x	x
Download music	x	x	x
Connect with friends on Facebook and Twitter	x	x	x
Use wireless home networking	x	x	x
Download large files		x	x
Stream video		x	x
Watch TV shows online			x
Play online games			x

WTC Communications Inc.

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises 10 Mbps service; screenshot below.

Here are our new Internet speeds and pricing:

Download	Upload	Price
1 Mbps	512K	34.95
5 Mbps	1 Mbps	49.95
7 Mbps	1 Mbps	64.95
10 Mbps	2 Mbps	79.95

DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDER

InternetSolver, Inc.

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection activities related to Internet Solver, Inc., a DSL provider, located in Urbandale, Iowa, with service areas in Dallas and Polk Counties. The narrative will include information regarding how and where CN obtained publicly available data.

April 2012 Submission Commentary

Connected Nation created this coverage estimation document during the October 2011 submission period as a result of the ongoing non-participatory status of the provider. In addition to the 3 instances of e-mail and/or telephone communication during the October 2011 submission period (as previously reported), CN made 4 additional attempts to contact the provider during this mapping cycle.

CN closely monitored the provider's website to identify any changes in the coverage area or maximum advertised speeds but did not locate evidence of any recent changes. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data.

The Issue

Internet Solver, Inc. has indicated its unwillingness to participate in the Iowa broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on information obtained from a spokesperson of the provider as well as research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website, www.internetsolver.com, to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded an FRN of 0015518053 **(Exhibit C)** with contact information relative to the owner of the company.

Exhibit A: Service Plans

INTERNET SOLVER PREMIER DSL INTERNET ACCESS

Premier DSL coverage is provided by installing our own DSL equipment in the telephone office that services your home or business. This allows us to offer speeds and capabilities that no one else does.

You can use our online qualification system to instantly see which services are available to you!

The Premier service includes all of the benefits of the Standard service, plus additional benefits.

- Unsurpassed Speed and Coverage
- No telephone service required
- Free Installation
- Free Technical Support
- Effective Spam Filtering
- Free Modem Rental
- 30-Day Satisfaction Guarantee

Due to the nature of the advanced technology used to deliver these services, the coverage area is different than the Standard DSL service. All of our DSL services include free onsite installation for one computer. This is a $99 value for free!

The pricing reflects a 1-year contract term with automatic payment from a credit card or checking account.

Home DSL Service		
This service includes an email account, free modem rental, spam filtering, technical support, and free installation.		Per Month
Speed	16-24 Meg	$100.00
	11-15 Meg	$90.00
	8-10 Meg	$80.00
	5-7 Meg	$60.00
	3 Meg	$45.00
	1.5 Meg	$40.00
	256 K	$30.00

Business DSL Service		
This service includes a static IP address, free modem rental, technical support, and free installation.		Per Month
Speed	16-24 Meg	$110.00
	11-15 Meg	$100.00
	8-10 Meg	$90.00
	5-7 Meg	$80.00
	3 Meg	$55.00
	1.5 Meg	$50.00
	256 K	$35.00

Internet Solver offers three types of DSL service to meet the differing needs of our clients.

Exhibit B: Service Area

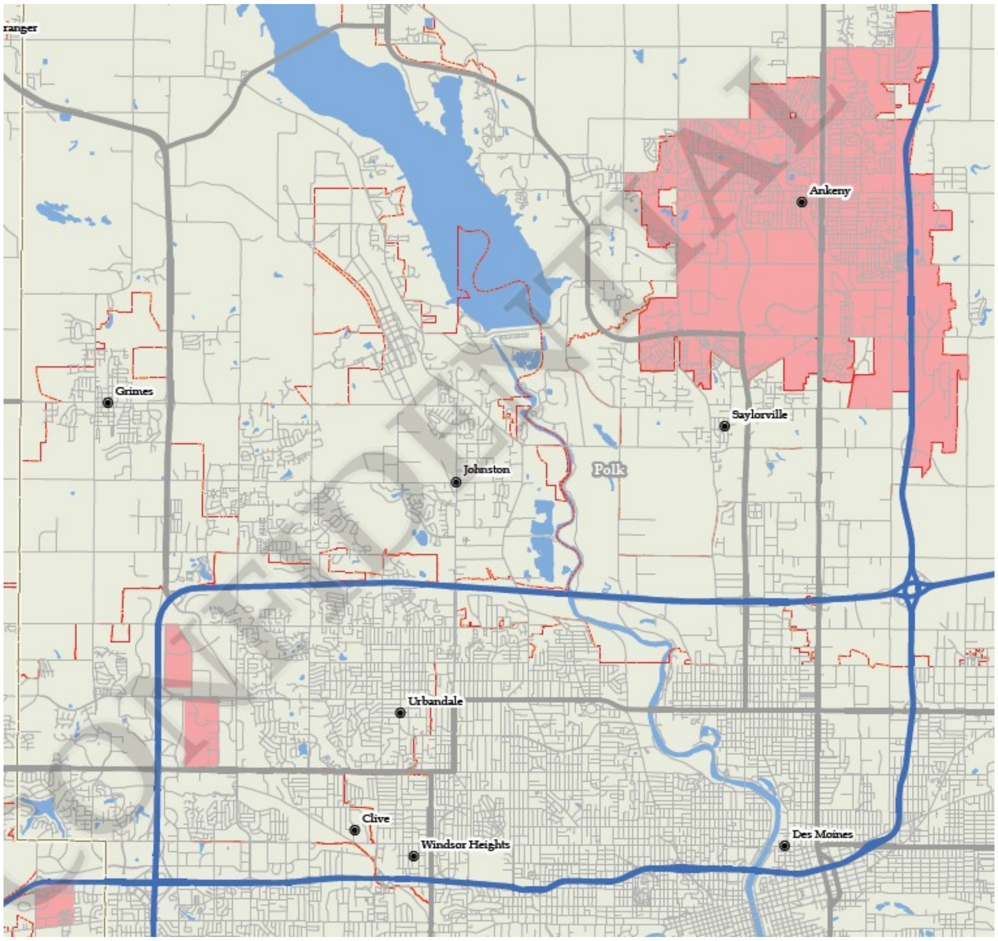


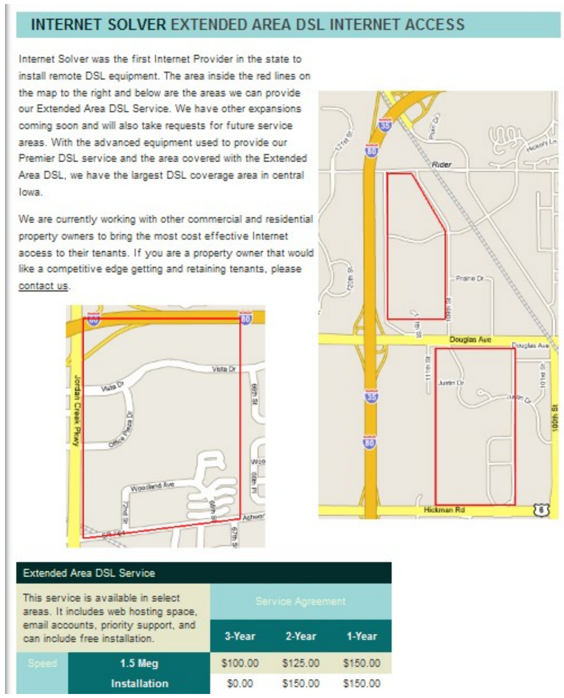
Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0015518053
Registration Date:	09/19/2006 11:28:00 AM
Last Updated:	09/19/2006 12:02:00 PM
Business Name:	Internet Solver, Inc.
Business Type:	Private Sector , Corporation
Contact Organization:	Internet Solver, Inc.
Contact Position:	President
Contact Name:	Mr David J Weis
Contact Address:	1129 42nd Street Des Moines, IA 50311 United States
Contact Email:	djweis@internetsolver.com
ContactPhone:	(515) 224-9229
ContactFax:	(515) 224-0829

<u>Preliminary Identification of Provider's Coverage Area</u>

Connected Nation extracted the Internet Solver, Inc. extended service area map **(Exhibit D)** from the provider's website and the information obtained from the provider in a telephone conversation indicating it provides broadband DSL service within the city limits of Ankeny, Iowa.

Exhibit D: Provider's Extended Service Area



INTERNET SOLVER EXTENDED AREA DSL INTERNET ACCESS

Internet Solver was the first Internet Provider in the state to install remote DSL equipment. The area inside the red lines on the map to the right and below are the areas we can provide our Extended Area DSL Service. We have other expansions coming soon and will also take requests for future service areas. With the advanced equipment used to provide our Premier DSL service and the area covered with the Extended Area DSL, we have the largest DSL coverage area in central Iowa.

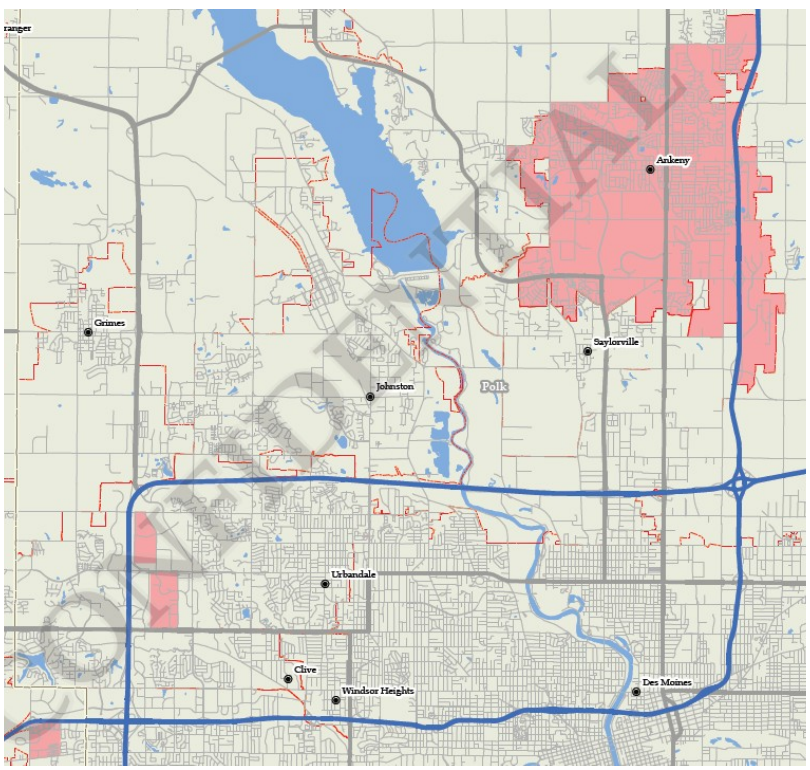
We are currently working with other commercial and residential property owners to bring the most cost effective Internet access to their tenants. If you are a property owner that would like a competitive edge getting and retaining tenants, please contact us.

Extended Area DSL Service				
This service is available in select areas. It includes web hosting space, email accounts, priority support, and can include free installation.		Service Agreement		
		3-Year	2-Year	1-Year
Speed	1.5 Meg	$100.00	$125.00	$150.00
	Installation	$0.00	$150.00	$150.00

Background Results and Submission for April 2012

From the information obtained from a spokesperson for Internet Solver, Inc. and its website, the staff of Connected Nation created a composite coverage map **(Exhibit E)** that was presented to the provider for approval on August 15, 2011. We received an e-mail from the spokesperson on August 22, 2011, stating they are not interested in participating. E-mail notification was sent to the provider advising the information will be submitted to Connect Iowa and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period. Despite that aforementioned call-to-action and the 4 additional contact attempts during this mapping cycle, the provider continues to be non-responsive.

Exhibit E: Internet Solver, Inc. Composite Coverage



RuralWaves, LLC

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 State Broadband Initiative (SBI) program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to RuralWaves, LLC (RW) a wireless Internet service provider (WISP), located in Correctionville, Iowa with a service area around Galva, Holstein, Schaller, Early, Correctionville, Washta, Battle Creek, and Anthony, Iowa. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 13 instances of communication via telephone and e-mail sessions since February 9, 2010, through January, 30, 2012. Only one communication reply was received from a company representative on August 5, 2012, with a response of electing not to participate. Additionally, a CN staff member visited the RW office on February 9, 2012, to discuss the broadband mapping project in person with RW; however, staff was not available to discuss the project.

The Issue

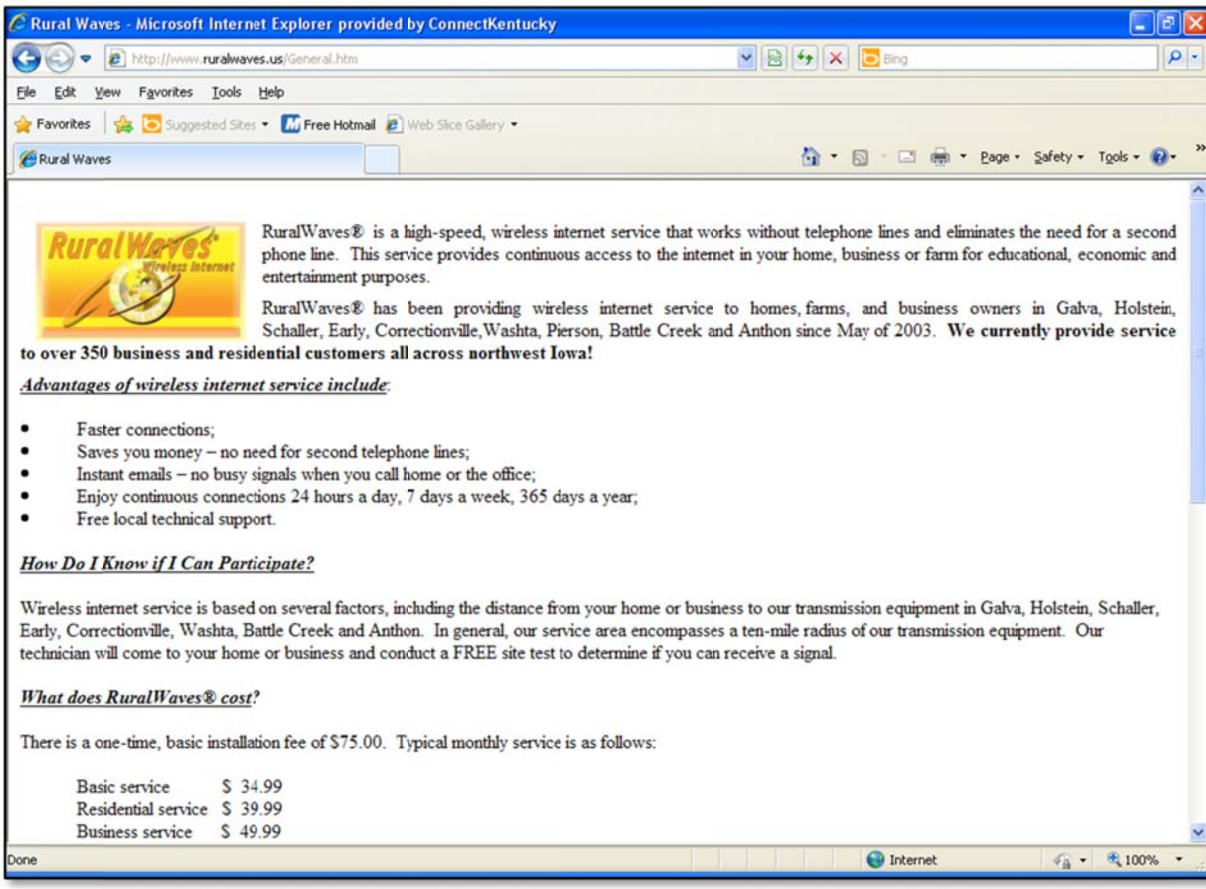
RW by its lack of responsiveness since February 9, 2010, has predicated its unwillingness to participate in the Connect Iowa broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.ruralwaves.us) and called the RW office to determine the residential service plans **(Exhibit A)** as 1 Mbps download x 256 kbps upload of the providers' service area **(Exhibit B)**. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded an FRN of 0016095986 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded license WQKB927 **(Exhibit D)**, Radio Service: NN-3650-3700MHZ with 0 unique locations.

Exhibit A: Service Plans

CLIENT_CITY	ISP	TEST_DATE	SERVER_N	DOWNLO/	UPLOAD_I	LATENCY	ZIP_CODE	LOCATION	COUNTY	ADDRESS	CITY
Correctionville	Long Lines Internet	5/18/2010 08:54:17 CDT	Chicago	1422	495	30	51004	Work	Woodbury	301 E Main St	Anthon
Correctionville	Qwest Communications	5/3/2010 14:38:38 CDT	Chicago	505	240	57	51016	Work	woodbury	312 driftwood street	correctionville
Schaller	netINS	5/18/2010 14:32:44 CDT	Chicago	509	498	26	51020	Work	ida	116 S. Main St.	Galva
Schaller	netINS	5/17/2010 10:16:04 CDT	Chicago	1988	525	30	51338	Work	Clay	202 N. Main St.	Everly
Washta	Qwest Communications	4/23/2010 17:31:40 CDT	Chicago	588	241	61	51016	Home	Woodbury	1488 Lenox Ave	Correctionville
Washta	Qwest Communications	5/12/2010 20:52:12 CDT	Chicago	504	79	89	51048	Home	cherokee	231 650th	pierson


Rural Waves - Microsoft Internet Explorer provided by ConnectKentucky

http://www.ruralwaves.us/General.htm

RuralWaves® is a high-speed, wireless internet service that works without telephone lines and eliminates the need for a second phone line. This service provides continuous access to the internet in your home, business or farm for educational, economic and entertainment purposes.

RuralWaves® has been providing wireless internet service to homes, farms, and business owners in Galva, Holstein, Schaller, Early, Correctionville, Washta, Pierson, Battle Creek and Anthon since May of 2003. **We currently provide service to over 350 business and residential customers all across northwest Iowa!**

***Advantages of wireless internet service include*:**

- Faster connections;
- Saves you money – no need for second telephone lines;
- Instant emails – no busy signals when you call home or the office;
- Enjoy continuous connections 24 hours a day, 7 days a week, 365 days a year;
- Free local technical support.

How Do I Know if I Can Participate?

Wireless internet service is based on several factors, including the distance from your home or business to our transmission equipment in Galva, Holstein, Schaller, Early, Correctionville, Washta, Battle Creek and Anthon. In general, our service area encompasses a ten-mile radius of our transmission equipment. Our technician will come to your home or business and conduct a FREE site test to determine if you can receive a signal.

What does RuralWaves® cost?

There is a one-time, basic installation fee of $75.00. Typical monthly service is as follows:

Basic service	$ 34.99
Residential service	$ 39.99
Business service	$ 49.99

Exhibit B: Service Area

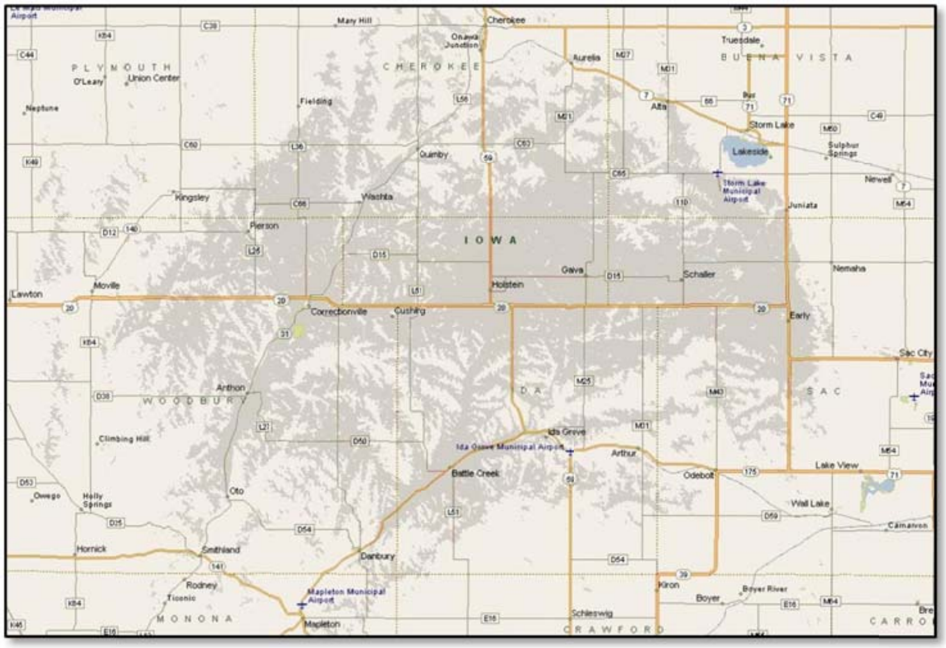
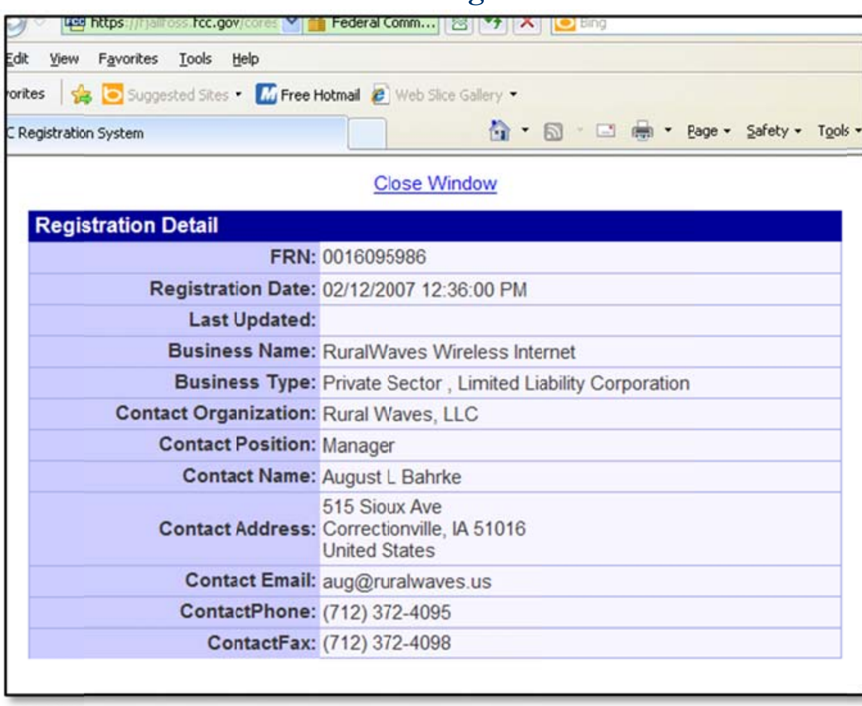


Exhibit C: Federal Registration Number

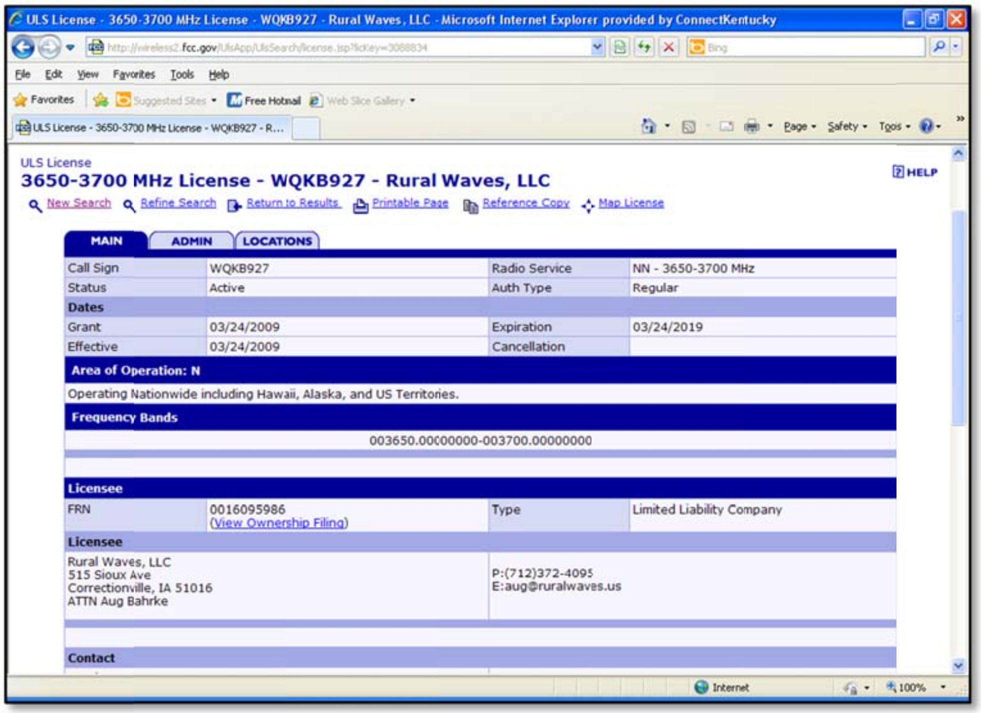

Edit View Favorites Tools Help

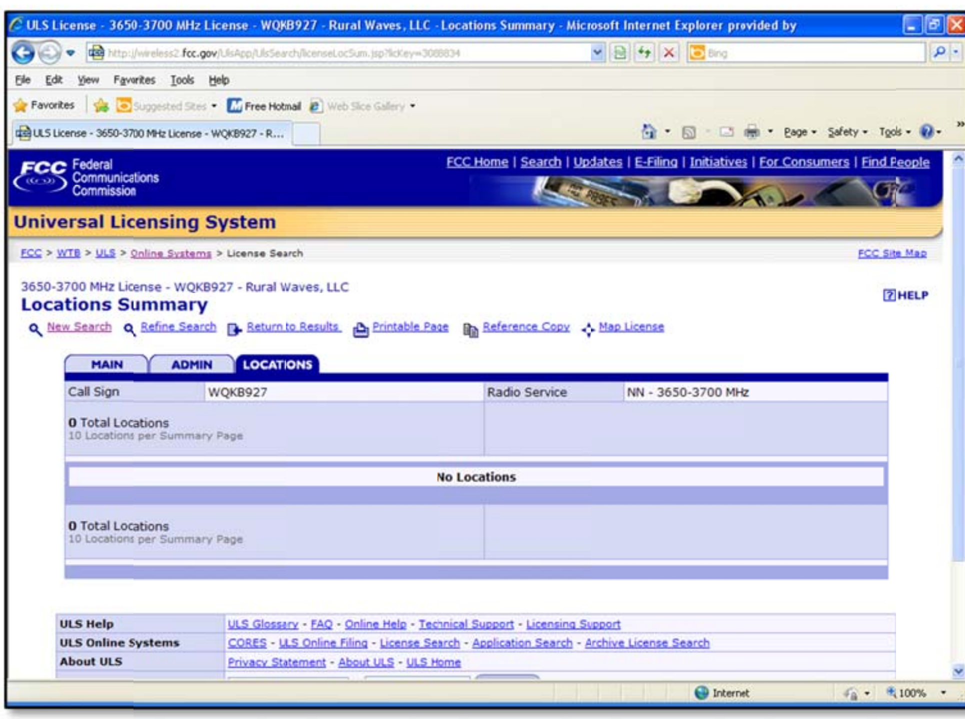
Close Window

Registration Detail

FRN:	0016095986
Registration Date:	02/12/2007 12:36:00 PM
Last Updated:	
Business Name:	RuralWaves Wireless Internet
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	Rural Waves, LLC
Contact Position:	Manager
Contact Name:	August L Bahrke
Contact Address:	515 Sioux Ave Correctionville, IA 51016 United States
Contact Email:	aug@ruralwaves.us
ContactPhone:	(712) 372-4095
ContactFax:	(712) 372-4098

Exhibit D: WQKB927 License Reference



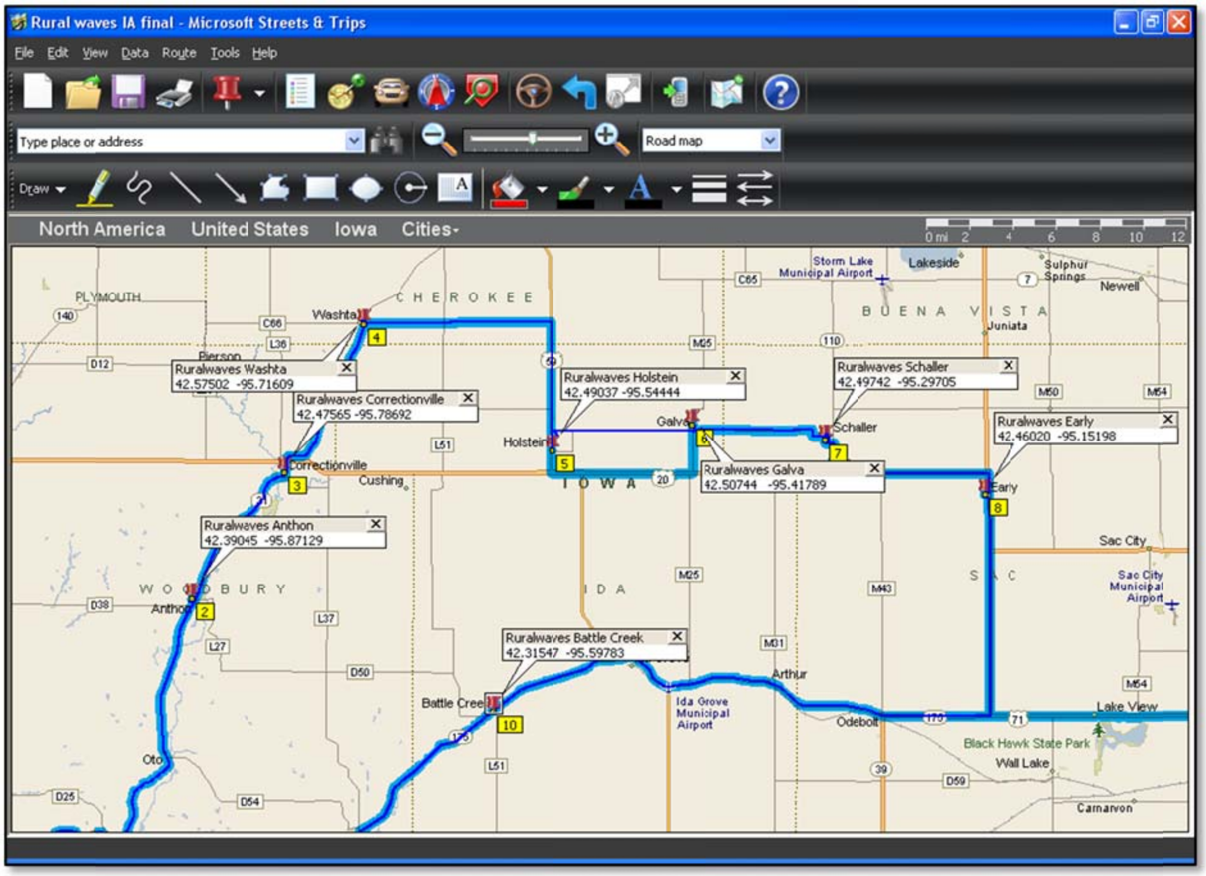


Preliminary Identification of Provider's Coverage Area

CN extracted the RW service area map directly from the provider's website. Information from that website was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .5 mile (2640 ft.) to establish a minimum search criteria of a given wireless access point. The provider's service area depiction is represented by the wireless propagation model as shown in **Exhibit B**. Using the Google Earth overlay each location was examined via an aerial zoom and street level observation to identify possible wireless access point structures at the center points of the studies. The location's center coordinates were inputted into Google Earth and examined utilizing the zoom option of the aerial imagery. A portion of the transmitting locations structures were identified. This process provided a means of establishing coordinates for 10 validation points to identify structures with operational equipment. All 10 locations were entered into the Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

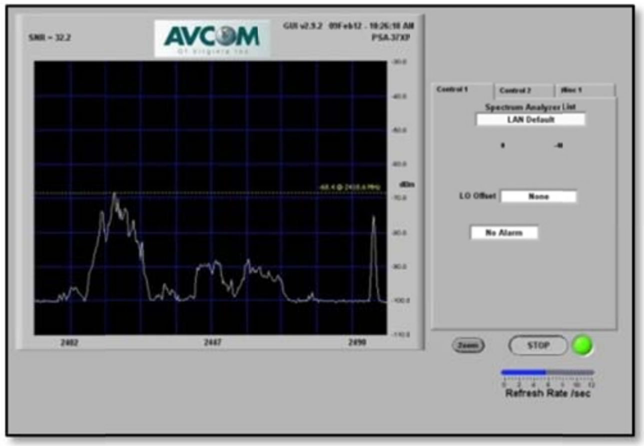
Exhibit F: Validation Points for AP Structures

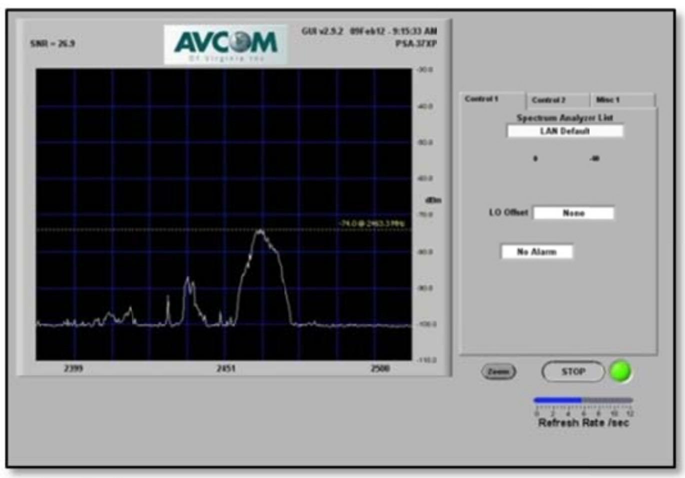


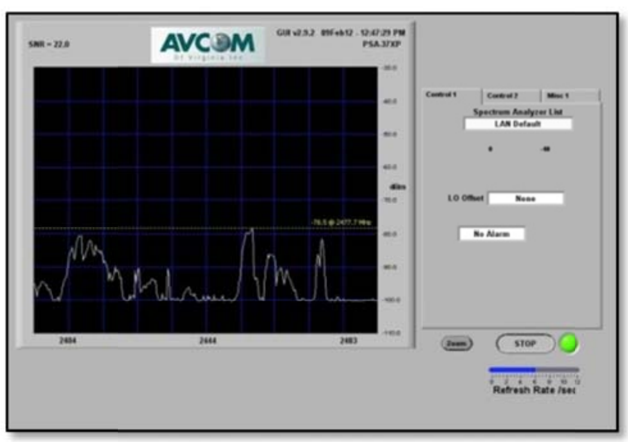
Testing Techniques

CN staff developed a data collection and site validation route based on information derived from the Google Earth image overlay and data obtained from RW's publicly available coverage on its website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored), and photographs were taken of the access points.

Exhibit G: Field Data for Rural Waves, LLC Office/Hub Location's







Primary Population Center Covered by Service (city, county, etc.)	**Transmission Location** (water tank, tower, silo, rooftop or other structure)	**Decimal Degree Conversion** (automatically converted here if you completed columns K, L and M)	**Decimal Degree Conversion** (automatically converted here if you completed columns O, P and Q)	**Is the Transmit Antenna Omni-Directional?**	**Transmit Frequency** (MHz)	**Polarity** (V or H)	**Antenna Elevation** (feet above ground)
Anthon	**Watertower**	*42.390450*	*-95.871290*	☐ Yes ☑ No	**2400**	☐ V ☑ H	**70**
Correctionvillle	**Elevator**	*42.475650*	*-95.786920*	☑ Yes ☐ No	2400	☐ V ☑ H	120
Washta	Elevator	*42.575020*	*-95.716090*	☑ Yes ☐ No	2400	☐ V ☑ H	140
Holstein	Elevator	*42.490370*	*-95.544440*	☐ Yes ☑ No	2400	☐ V ☑ H	200
Galva	Elevator	*42.507440*	*-95.417890*	☐ Yes ☑ No	2400	☐ V ☑ H	180
Schaller	Tower	*42.497420*	*-95.297050*	☑ Yes ☐ No	2400	☐ V ☑ H	110
Early	Elevator	*42.460200*	*-95.151980*	☑ Yes ☐ No	2400	☐ V ☑ H	150
Battle Creek	Elevator	*42.315470*	*-95.597830*	☑ Yes ☐ No	2400	☐ V ☑ H	180

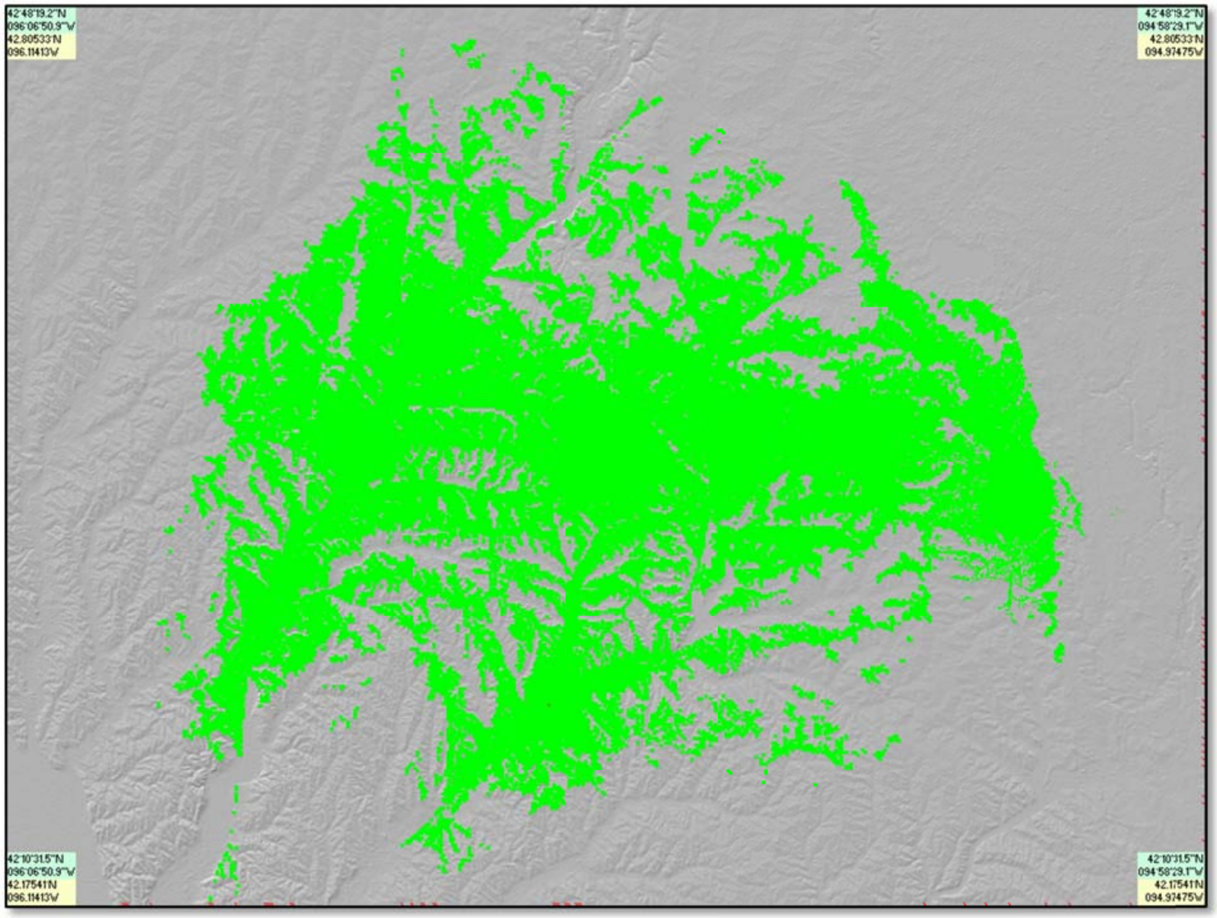
Results and Submission for April 2012

Of the 10 locations visited during the coverage estimation and validation point route, 8 access points were identified and relative information was logged into the RW field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the CN Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to RW as courtesy copies, and the provider was advised that the estimated coverage information will be submitted to Connect Iowa and the NTIA unless the provider notified CN, within 48 hours, of discrepancies of the estimated coverage. The provider did not respond to CN and, as of this date, CN believes the information to be an accurate estimation of the service area of Rural Waves, LLC.

Exhibit H: Field Validation Notes

Test City	Test State	Test County	Location Description	Engineer	(N) Lat Decimal	(-)(W) Long Decimal	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Notes
Anthon	IA	Woodbury	Watertower	John Determan	42.390450	-95.871290	2463	-74	Avcom PSA-37XP	On small water tower on hill low foliage
Correctionvillle	IA	Woodbury	Elevator	John Determan	42.475650	-95.786920	2454	-76	Avcom PSA-37XP	On elevator low foliage
Washta	IA	Cherokee	Elevator	John Determan	42.575020	-95.716090	2433	-79	Avcom PSA-37XP	On elevator low foliage
Holstein	IA	Ida	Elevator	John Determan	42.490370	-95.544440	2418	-64	Avcom PSA-37XP	On elevator low foliage 900 Also
Galva	IA	Ida	Elevator	John Determan	42.507440	-95.417890	2406	-77	Avcom PSA-37XP	On elevator low foliage Comtrend also
Schaller	IA	Sac	Tower	John Determan	42.497420	-95.297050	2460	-79	Avcom PSA-37XP	By school on small tower
Early	IA	Sac	Elevator	John Determan	42.460200	-95.151980	2454	-74	Avcom PSA-37XP	On elevator Low foliage
Battle Creek	IA	Ida	Elevator	John Determan	42.315470	-95.597830	2477	-78	Avcom PSA-37XP	On elevator Low foliage

Exhibit I: RuralWaves Composite Coverage



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 2.30 percent of Iowa households do not have terrestrial fixed broadband service available, and approximately 0.02 percent[1] of Iowa households have neither mobile nor fixed broadband service available.[2]

Within rural areas of the state, results derived from provider-validated data indicate that approximately 3.89 percent of rural Iowa households do not have terrestrial fixed broadband service available, and approximately 0.03 percent[3] of rural Iowa households have neither mobile nor fixed

[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 state.

[3] See footnote 1.

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).
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.

[4] See footnote 2.

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

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information 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 Iowa project has received a total of 16 inquiries (206 grant inception to date). As more inquiries are submitted to Connect Iowa, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

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 Iowa project launched BroadbandStat on June 18, 2010, and has received a total of 6,434 visits to date, of which 616 occurred this reporting period.

Speed Test Methodology

The 441speed tests that are represented in the Connect Iowa Speed Test Report during this reporting period (4,671 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Iowa speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

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

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 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	21Globe, Inc.	n/a	This company is not a broadband provider
2	360networks	http://www.360networks.com/	Acquired by another company
3	650Net	n/a	This company is not a broadband provider
4	A 007 Access	n/a	This company is a nonfacilities-based reseller
5	AAA Internet Service	n/a	This company is no longer in business
6	Aaccess Network Communications	n/a	This company is not a broadband provider
7	Access Media 3, Inc.	n/a	This company has no service offerings in Iowa
8	Access123.net	n/a	This company is not a broadband provider
9	ACERX.NET	n/a	This company is not a broadband provider
10	Affinity Wireless Solutions, LLC	n/a	This company was acquired by KeyOn Communications

11	Airespring, Inc.	http://www.airespring.com/	This company is a nonfacilities-based reseller
12	Airewaves Broadband, LLC	n/a	This company is no longer in business
13	AirNet	n/a	This company is no longer in business
14	American Relay	n/a	This company is not a broadband provider
15	Arrowheadnet.com	n/a	This company is not a broadband provider
16	Bannon Communications	n/a	This company is not a broadband provider
17	bargainisp.net	n/a	This company is not a broadband provider
18	Barnes City Cooperative Telephone Company	n/a	This company is not a broadband provider
19	Bel-Net Network Services	n/a	This company is no longer in business
20	Broadband National	http://www.broadband national.com/	This company is not a broadband provider
21	BTC	n/a	This company was acquired by Western Iowa Networks
22	Cable Television	n/a	This company is no longer in business
23	Calhoun County Electric Co-Op	n/a	This company is not a broadband provider
24	Camino-Net Internet Services	n/a	This company is not a broadband provider
25	Cannon Valley Telecom, Inc.	n/a	This company does business in MN
26	Celito Communications	n/a	This company has no service offerings in Iowa
27	cFree Wireless Network	n/a	This company is no longer in business
28	CFY-CyberNet	n/a	This company is doing business as Cedar Falls Utilities
29	City of Brookings Telephone Fund	http://www.swiftel.net/	This company is a nonfacilities-based reseller of Sprint
30	Cleartouch.Com	n/a	This company is no longer in business
31	Com Link	n/a	This company is no longer in business
32	CommSpeed Iowa, L.L.C.	n/a	This company was acquired by SpeedNet, LLC
33	Community Internet Service	n/a	This company is no longer in business
34	Covad Communications	n/a	This company has no service offerings in Iowa

35	CyberStorm Wireless	n/a	This company is no longer in business
36	Deltaforce	n/a	This company is not a broadband provider
37	deluxehost.com	n/a	This company is not a broadband provider
38	DGUI	n/a	This company is no longer in business
39	Dial National	n/a	This company is no longer in business
40	Dialer.net	n/a	This company is not a broadband provider
41	Digital Telecommunications, Inc.	n/a	This company is no longer in business
42	DSL @ Interlync	http://www.interlync.com/	This company is a nonfacilities-based reseller
43	DTS-NET.COM	n/a	This company is a nonfacilities-based reseller
44	Dura Cable	n/a	This company is not a broadband provider
45	Farmers Telephone Company - Batavia	http://www.bataviatelephone.com	This company offers service but it is below the FCC definition of broadband
46	Fast Dependable Access	n/a	This company is no longer in business
47	Forbin Wireless	http://www.forbin.net/	This company offers service but it is below the FCC definition of broadband
48	fyreSTORM Wireless	n/a	This company is no longer in business
49	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com/	Acquired by another company
50	Great Lakes Communication Corp.	http://www.glccom.com/	This company offers service but it is below the FCC definition of broadband
51	Hubwest	n/a	This company is not a broadband provider
52	Hubwest Protected Networks LLC	n/a	This company is not a broadband provider
53	I Spot ACCESS	n/a	This company is not a broadband provider
54	Imbris, Inc.	n/a	This company is no longer in business
55	IMGISP.NET	n/a	This company is not a broadband provider
56	Incredible Networks	n/a	This company is no longer in business
57	Indianola Municipal Utilities	n/a	This company is not a broadband provider
58	Inercom Communications Inc.	n/a	This company is no longer in business
59	Interactiveinfo.com Inc.	n/a	This company does business in New York and has no service offerings in Iowa
60	Inter-County Cable Company	n/a	This company is doing business as Brooklyn Mutual Telecommunications Cooperative

61	Interlink LC	n/a	This company is no longer in business
62	Internet Solver	http://www.internetsolver.com	Coverage created from data found on provider website
63	Iowa Cable and Telecommunications Association	n/a	This company is not a broadband provider
64	Iowa City Telecommunications	n/a	This company is not a broadband provider
65	IowaOne.net	n/a	This company is no longer in business
66	IPNS	n/a	This company does business in Oregon and has no service offerings in Iowa
67	iRadical	n/a	No information found for this company
68	i-rule.net	n/a	This company is no longer in business
69	ISPartner.net	n/a	No information found for this company
70	Jenco Speed Web	n/a	This company offers fixed wireless in Ohio and has no service offerings in Iowa
71	LCSisp.com	n/a	This company is not a broadband provider
72	LightEdge Solutions, Inc.	n/a	This company is not a broadband provider
73	Lightyear Network Solutions, LLC	http://lightyear.net/	This company is a nonfacilities-based reseller
74	Local Link	n/a	This company has no service offerings in Iowa
75	Longview Communications	n/a	This company has no service offerings in Iowa
76	MainBoard	n/a	This company has no service offerings in Iowa
77	Maine Cable and Wireless	n/a	No information found for this company
78	Manilla Telephone Company	n/a	This company was acquired by Farmers Mutual Telephone Cooperative of Harlan, IA
79	Maple Leaf Networks	n/a	This company has no service offerings in Iowa
80	Marcin Company	n/a	No information found for this company
81	Marshall Economic Development Impact Committee	n/a	This company is not a broadband provider
82	Metropolitan Telecommunications Holding Company	n/a	This company is a nonfacilities-based reseller
83	MFW Cable	n/a	This company is not a broadband provider

84	Millenicom Inc.	http://www.millenicom.com/	This company is a nonfacilities-based reseller
85	Nanomega.Com	n/a	This company is no longer in business
86	NetAccess, Inc.	n/a	This company is not a broadband provider
87	NetSpeed Online	n/a	This company is no longer in business
88	New Century Telecommunications	n/a	This company is not a broadband provider
89	New Edge Network, Inc.	n/a	This company is a nonfacilities-based reseller
90	Northwest Internet Services	n/a	This company has no service offerings in Iowa
91	Northwest ISP	n/a	This company is no longer in business
92	One Communications Corporation	n/a	This company has no service offerings in Iowa
93	Oneota Net	http://www.oneota.net/ wirelessdsl.shtml	This company offers service but it is below the FCC definition of broadband
94	OpenCom, Inc.	n/a	This company is a nonfacilities-based reseller
95	OrbitCom, Inc.	n/a	This company is a nonfacilities-based reseller
96	Overarch Broadband	n/a	This company has no service offerings in Iowa
97	Pacific Internet Exchange	n/a	This company is a nonfacilities-based reseller
98	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company
99	Prairie Communication	n/a	This company is no longer in business
100	Prairie Fire Internet	n/a	This company is no longer in business
101	PremoWeb	n/a	This company is not a broadband provider
102	Professional Computer Solutions	http://www.pcsia.net	This company offers service but it is below the FCC definition of broadband
103	Quad-Cities Online Broadband Plus	n/a	This company is not a broadband provider
104	RACOM	n/a	This company is not a broadband provider
105	Rankin Communication Systems	n/a	This company is not a broadband provider
106	RockRapids.net	n/a	This company is not a broadband provider
107	S & S Wireless Internet	n/a	This company is no longer in business

108	Siebring-Kruss Wireless	n/a	This company is no longer in business
109	Simply Dialup A Metrogeek Company	n/a	This company is not a broadband provider
110	SIRIS	n/a	This company is not a broadband provider
111	Sling Broadband	n/a	This company has no service offerings in Iowa
112	Sparkplug Central, Inc.	n/a	This company was acquired by Airband Communications
113	Speakeasy DSL	n/a	This company is a backhaul provider and a general reseller of DSL; part of a 2010 merger between Covad, Megapath, and Speakeasy
114	State Wireless	n/a	This company is not a broadband provider
115	Support Corps of America	n/a	This company is no longer in business
116	Surferz.Net	n/a	This company is not a broadband provider
117	T1 Shopper	http://www.t1shopper.com/	This company is not a broadband provider
118	Total Access Networks, Inc.	n/a	This company is not a broadband provider
119	TRX, Inc.	n/a	This company is not a broadband provider
120	TSISP.NET	n/a	This company is no longer in business
121	Twin Rivers Valley	n/a	This company is no longer in business
122	United Western Net	n/a	This company is no longer in business
123	UNUM Telecommunications, Inc.	n/a	This company is no longer in business
124	VPM Global Internet Services, Inc.	n/a	This company is a nonfacilities-based reseller
125	WilTel Communications, LLC	n/a	This company was acquired by Level 3 Communications
126	Wireless Roanoke, Inc.	n/a	This company is no longer in business
127	wisbin	n/a	This company is not a broadband provider
128	WispAir	n/a	This company is no longer in business

129	www.AmericanAngel.us	n/a	This company is no longer in business
130	YEYZOO.NET	n/a	This company is no longer in business
131	YLISP (Your Local ISP)	n/a	This company is not a broadband provider
132	YourT1Wifi.com	n/a	This company has no service offerings in Iowa

Broadband Provider Log

Complete	351
Non-Responsive/Refused	6
In Progress	5
Count of Datasets by Status	**362**
Total Unique Providers Represented	**202**

Provider Name	Platform	Status	NDA Execution Date	Notes
Ace Telephone Association	DSL	Data Added to Statewide Inventory	3/8/2010	[JAN-17-12 Matthew Brunt] Change: Provider expanded DSL service area.
Alliance Communications Cooperative, Inc.	DSL	Data Added to Statewide Inventory	1/28/2010	[JAN-03-12 Matthew Brunt] Change: Provider converted portions of DSL service area over to fiber.
Alliance Communications Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/28/2010	[JAN-05-12 Matthew Brunt] Change: Provider expanded fiber service area.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-24-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Atkins Telephone Company	DSL	Data Added to Statewide Inventory	5/14/2010	[FEB-16-12 Matthew Brunt] Change: Provider upgraded a small portion of their DSL infrastructure over to fiber.
Atkins Telephone Company	Fiber	Data Added to Statewide Inventory	5/14/2010	[FEB-16-12 Matthew Brunt] Change: Provider expanded fiber service area.
Baldwin Nashville Telephone Company, Inc.	Fiber	Data Added to Statewide Inventory	2/3/2010	[JAN-25-12 Matthew Brunt] Change: Provider expanded fiber service area.
Board of Water Electric & Communication Trustees of the City of Muscatine	Fixed Wireless	Data Added to Statewide Inventory	5/14/2010	[FEB-10-12 Matthew Brunt] Change: Initial fixed wireless submission for this provider.
Cable ONE Inc.	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-10-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-13-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Chat Mobility	Mobile Wireless	Data Added to Statewide Inventory	1/19/2010	[JAN-25-12 Matthew Brunt] Change: Provider activated additional towers, but service area and speeds did not change.
Citizens Mutual Telephone Cooperative	Fiber	Data Added to Statewide Inventory	2/26/2010	[FEB-08-12 Matthew Brunt] Change: Provider expanded fiber service area.
CML Telephone Cooperative Association of Meriden, Iowa	Fiber	Data Added to Statewide Inventory	1/25/2010	[JAN-17-12 Matthew Brunt] Change: Provider expanded fiber service area.
Community Digital Wireless, LLC	Fixed Wireless	Data Added to Statewide Inventory	5/6/2010	[FEB-10-12 Matthew Brunt] Change: Provider added three additional wireless towers.
Coon Creek Telecommunications Corp.	DSL	Data Added to Statewide Inventory	2/9/2012	[FEB-16-12 Matthew Brunt] Change: Provider submitted initial data for the April 2012 submission.
Cooperative Telephone Exchange	Fiber	Data Added to Statewide Inventory	2/2/2010	[JAN-06-12 Matthew Brunt] Change: Provider infrastructure upgraded to offer speed tier 7 download speeds.
Corn Belt Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	2/15/2010	[FEB-16-12 Matthew Brunt] Change: Provider expanded fixed wireless service area.
Dumont Telephone Company	Fiber	Data Added to Statewide Inventory	2/25/2010	[JAN-12-12 Matthew Brunt] Change: Provider expanded fiber service area.
Farmers Mutual Cooperative Telephone Company - Harlan	DSL	Data Added to Statewide Inventory	2/5/2010	[FEB-20-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Farmers Mutual Cooperative Telephone Company - Harlan	Fiber	Data Added to Statewide Inventory	2/5/2010	[FEB-20-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Farmers Mutual Telephone Company - Jesup	Fiber	Data Added to Statewide Inventory	4/20/2010	[MAR-01-12 Matthew Brunt] Change: Provider now offers fiber broadband to portions of their service area.
Farmers Mutual Telephone Company - Nora Springs	Fiber	Data Added to Statewide Inventory	1/26/2010	[DEC-14-11 Matthew Brunt] Change: Provider expanded fiber service area and can now offer speed tier 10 download speeds.
Farmers Telephone Company-Essex	Fixed Wireless	Data Added to Statewide Inventory	1/27/2010	[JAN-18-12 Matthew Brunt] Change: Provider expanded coverage area by adding a wireless tower.
Grand Mound Cooperative Telephone Association	Fiber	Data Added to Statewide Inventory		[FEB-16-12 Matthew Brunt] Change: Provider expanded fiber service area.
Grand River Mutual Telephone Corporation	Fiber	Data Added to Statewide Inventory	2/5/2010	[FEB-17-12 Matthew Brunt] Change: Provider upgraded portions of their infrastructure to fiber.
HickoryTech Corporation	DSL	Data Added to Statewide Inventory	2/2/2010	[FEB-16-12 Matthew Brunt] Change: Provider upgraded their infrastructure and can now offer tier 6 download speeds in portions of their DSL service area.
I-35 Telephone Company	DSL	Data Added to Statewide Inventory	2/2/2010	[FEB-17-12 Matthew Brunt] Change: DSL coverage decreased due to areas being converted over to fiber.
I-35 Telephone Company	Fiber	Data Added to Statewide Inventory	2/2/2010	[FEB-17-12 Matthew Brunt] Change: Provider expanded fiber service area.
I-35 Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	2/2/2010	[FEB-17-12 Matthew Brunt] Change: Provider expanded fixed wireless service area.
Jefferson Telephone Company	DSL	Data Added to Statewide Inventory	1/22/2010	[JAN-23-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now provide tier 3 upload speeds.
Jefferson Telephone Company	Fiber	Data Added to Statewide Inventory	1/22/2010	[JAN-23-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now provide tier 3 upload speeds.

Kalona Cooperative Telephone Company	Fiber	Data Added to Statewide Inventory	1/20/2010	[FEB-16-12 Matthew Brunt] Change: Provider upgraded their infrastructure and can now provider tier 5 upload speeds.
Kalona Cooperative Telephone Company	DSL	Data Added to Statewide Inventory	1/20/2010	[MAR-19-12 Matthew Brunt] Correction: Provider speeds changed from tier 4 download to tier 3 download.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-16-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
LISCO Wireless	Fiber	Data Added to Statewide Inventory	1/28/2010	[JAN-11-12 Matthew Brunt] Change: Provider expanded fiber service area.
Long Lines	Cable	Data Added to Statewide Inventory	5/4/2010	[JAN-17-12 Matthew Brunt] Change: Provider infrastructure upgraded to offer speed tier 9 download speeds.
Massena Telephone Company	DSL	Data Added to Statewide Inventory	6/18/2010	[FEB-17-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Midwest Broadband LLC	Fixed Wireless	Data Added to Statewide Inventory	7/6/2010	[FEB-24-12 Matthew Brunt] Change: Provider expanded wireless service area.
Mutual Telephone Company	Fiber	Data Added to Statewide Inventory	1/25/2010	[FEB-08-12 Matthew Brunt] Change: Provider converted entire DSL service area to fiber.
Mutual Telephone Company of Morning Sun, Iowa	DSL	Data Added to Statewide Inventory	5/5/2010	[FEB-21-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now provider speed tier 6 download and speed tier 4 upload.
Mutual Telephone Company of Morning Sun, Iowa	DSL	Data Added to Statewide Inventory	5/5/2010	[JAN-25-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now provider speed tier 6 download and speed tier 4 upload.
Mutual Telephone Company of Morning Sun, Iowa	Fixed Wireless	Data Added to Statewide Inventory	5/5/2010	[FEB-10-12 Matthew Brunt] Change: First time reporting fixed wireless coverage for this provider.
North English Cooperative Telephone Company	DSL	Data Added to Statewide Inventory	5/12/2010	[JAN-17-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer speed tier 6 download speeds and tier 3 upload speeds.
Northeast Iowa Telephone Company	DSL	Data Added to Statewide Inventory	4/13/2010	[FEB-17-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Northeast Iowa Telephone Company	Fiber	Data Added to Statewide Inventory	4/13/2010	[FEB-17-12 Matthew Brunt] Change: Provider converted portions of their service area to fiber.
Northeast Iowa Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	4/13/2010	[FEB-17-12 Matthew Brunt] Change: Provider expanded their fixed wireless service area.
Northwest Telephone Cooperative Association	DSL	Data Added to Statewide Inventory	2/17/2010	[JAN-06-12 Matthew Brunt] Change: Provider infrastructure upgraded to offer speed tier 6 download speeds.
Osage Municipal Communications Utility	Cable	Data Added to Statewide Inventory	5/18/2010	[JAN-17-12 Matthew Brunt] Change: Provider infrastructure upgraded to offer speed tier 7 download speeds.
Panora Communications Cooperative	Fiber	Data Added to Statewide Inventory	1/29/2010	[FEB-16-12 Matthew Brunt] Change: Provider expanded fiber service area.
Partner Communications Cooperative	DSL	Data Added to Statewide Inventory	5/15/2010	[FEB-07-12 Matthew Brunt] Change: Provider converted portions of their DSL service area strictly to fiber. DSL footprint decreased.
Premier Communications	Fiber	Data Added to Statewide Inventory	1/25/2010	[FEB-08-12 Matthew Brunt] Change: Provider upgraded portions of their DSL service area to fiber.
Preston Telephone Company	DSL	Data Added to Statewide Inventory	2/5/2010	[JAN-17-12 Matthew Brunt] Change: Provider infrastructure upgraded to offer speed tier 7 download speeds.
South Slope Cooperative Telephone Company	Fiber	Data Added to Statewide Inventory	2/2/2010	[JAN-20-12 Matthew Brunt] Change: Provider expanded fiber service area.
SpeedNet, LLC	Fixed Wireless	Data Added to Statewide Inventory		[FEB-21-12 Matthew Brunt] Change: Provider expanded fixed wireless service area, and can now provide tier 6 download speeds.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[MAR-01-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-14-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Terril Telephone Cooperative	DSL	Data Added to Statewide Inventory	2/12/2010	[FEB-07-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds and tier 5 upload speeds.
USA Communications	Fiber	Data Added to Statewide Inventory	1/27/2010	[JAN-09-12 Matthew Brunt] Change: Fiber coverage area expanded and speeds upgraded to 6 Meg download/4 Meg Upload.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-16-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[FEB-16-12 Matthew Brunt] Changes: Provider can now offer tier 5 download and tier 3 upload speeds to portions of their service area.
Wellman Cooperative Telephone Association	Fiber	Data Added to Statewide Inventory	5/19/2010	[FEB-17-12 Matthew Brunt] Change: Provider now offers fiber service throughout exchange.
West Iowa Telephone Company	Fiber	Data Added to Statewide Inventory	1/27/2010	[FEB-20-12 Matthew Brunt] Change: Provider submitted initial fiber data for the April 2012 submission.
West Liberty Telephone Company	Fiber	Data Added to Statewide Inventory	1/25/2010	[JAN-06-12 Matthew Brunt] Change: Provider expanded fiber coverage area.
West Liberty Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	1/25/2010	[JAN-06-12 Matthew Brunt] Change: Provider infrastructure upgraded to offer speed tier 5 download speeds.
WTC Communications, Inc.	DSL	Data Added to Statewide Inventory	3/22/2010	[FEB-07-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer speed tier 7 download speeds.

Mediacom Iowa, LLC	Backhaul	Backhaul Provider Only Processing Complete	1/12/2010	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010	
Zayo Group, LLC	Backhaul	Backhaul Provider Only Processing Complete		
Internet Solver, Inc.	DSL	No Update-Estimated Coverage Submitted for Non-Participating		
RuralWaves Wireless Internet	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		
Ace Telephone Association	Backhaul	No Update to Provide	3/8/2010	
Algona Municipal Utilities	Cable	No Update to Provide	2/9/2010	
Algona Municipal Utilities	Fiber	No Update to Provide	2/9/2010	
Alliance Communications Cooperative, Inc.	Backhaul	No Update to Provide	1/28/2010	
Alpine Communications, LC	DSL	No Update to Provide	2/24/2010	
Alpine Communications, LC	Fiber	No Update to Provide	2/24/2010	
Alta Municipal Utilities	Cable	No Update to Provide	5/18/2010	
Andrew Telephone Company	DSL	No Update to Provide	1/19/2010	
Arcadia Telephone Cooperative	DSL	No Update to Provide	5/6/2010	
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Aventure Communications	Backhaul	No Update to Provide	4/8/2010	
Aventure Communications	Fixed Wireless	No Update to Provide	4/8/2010	
Ayrshire Farmers Mutual Telephone Company	Fixed Wireless	No Update to Provide	2/17/2010	
Ayrshire Farmers Mutual Telephone Company	DSL	No Update to Provide	2/17/2010	
Baldwin Nashville Telephone Company, Inc.	DSL	No Update to Provide	2/3/2010	
Bellevue Municipal Utilities	Fiber	No Update to Provide	5/20/2010	
Bernard Telephone Company, Inc.	DSL	No Update to Provide	5/19/2010	
Bernard Telephone Company, Inc.	Fiber	No Update to Provide	5/19/2010	
Bernard Telephone Company, Inc.	Fixed Wireless	No Update to Provide	5/19/2010	
Bernard Telephone Company, Inc.	Backhaul	No Update to Provide	5/19/2010	
BEVCOMM	DSL	No Update to Provide	6/16/2010	
BitWind Communications, LLC	Fixed Wireless	No Update to Provide		
Board of Water Electric & Communication Trustees of the City of Muscatine	Fiber	No Update to Provide	5/14/2010	
Board of Water Electric & Communication Trustees of the City of Muscatine	DSL	No Update to Provide	5/14/2010	
Board of Water Electric & Communication Trustees of the City of Muscatine	Cable	No Update to Provide	5/14/2010	
Brooklyn Mutual Telecommunications Cooperative	DSL	No Update to Provide	4/21/2010	
Butler-Bremer Communications	Fiber	No Update to Provide	4/20/2010	
Butler-Bremer Communications	DSL	No Update to Provide	4/20/2010	
Butler-Bremer Communications	Cable	No Update to Provide	4/20/2010	
Cascade Communications Company	Fiber	No Update to Provide	1/23/2010	
Cascade Communications Company	DSL	No Update to Provide	1/23/2010	
Casey Mutual Telephone Company	DSL	No Update to Provide	5/3/2010	
Casey Mutual Telephone Company	Backhaul	No Update to Provide	5/3/2010	
Cedar Falls Utilities	Fiber	No Update to Provide	6/16/2010	
Cedar Falls Utilities	Cable	No Update to Provide	6/16/2010	
Center Junction Telephone Company	DSL	No Update to Provide	3/12/2010	
Central Scott Telephone Company, Inc.	Fixed Wireless	No Update to Provide	4/22/2010	
Central Scott Telephone Company, Inc.	DSL	No Update to Provide	4/22/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Circle Computer Resources	Fixed Wireless	No Update to Provide	7/6/2010	
Citizens Mutual Telephone Cooperative	DSL	No Update to Provide	2/26/2010	
City of Hawarden	Cable	No Update to Provide	5/20/2010	
Clear Lake Independent Telephone Company	Fiber	No Update to Provide	5/6/2020	
Clear Lake Independent Telephone Company	DSL	No Update to Provide	5/6/2020	
Colo Telephone Company	Fiber	No Update to Provide	1/28/2010	
Comelec Services, Inc.	Fixed Wireless	No Update to Provide	5/7/2010	
Communications 1 Network, Inc.	Fiber	No Update to Provide	4/14/2010	
Community Cable Television Agency of O'Brien County	Fixed Wireless	No Update to Provide	5/5/2010	
Community Cable Television Agency of O'Brien County	Cable	No Update to Provide	5/5/2010	
Complete Communication Services	Fiber	No Update to Provide	6/17/2010	
Complete Communication Services	Cable	No Update to Provide	6/17/2010	
Coon Rapids Municipal Utilities	Cable	No Update to Provide	4/22/2010	
Coon Valley Co-op Telephone Association, Inc.	Fixed Wireless	No Update to Provide		
Coon Valley Co-op Telephone Association, Inc.	DSL	No Update to Provide		
Cooperative Telephone Company	Fixed Wireless	No Update to Provide	2/2/2010	
Cooperative Telephone Company	DSL	No Update to Provide	2/2/2010	
Cooperative Telephone Exchange	Backhaul	No Update to Provide	2/2/2010	
Corn Belt Telephone Company	DSL	No Update to Provide	2/15/2010	
Corn Belt Telephone Company	Fiber	No Update to Provide	2/15/2010	
CoxCom Inc.	Cable	No Update to Provide	1/29/2010	
Cumberland Telephone Company	Fixed Wireless	No Update to Provide	4/27/2010	
Cumberland Telephone Company	DSL	No Update to Provide	4/27/2010	
Danville Mutual Telephone Company	DSL	No Update to Provide		
DISH Network Corporation	Satellite	No Update to Provide	1/27/2010	
Dixon Telephone Company	Cable	No Update to Provide	5/5/2010	
Dumont Telephone Company	DSL	No Update to Provide	2/25/2010	
Dunkerton Telephone Cooperative	DSL	No Update to Provide	4/15/2010	
East Buchanan Telephone Cooperative	DSL	No Update to Provide	4/30/2010	
East Buchanan Telephone Cooperative	Fixed Wireless	No Update to Provide	4/30/2010	
Eastlight, LLC	Fixed Wireless	No Update to Provide		
Ellsworth Cooperative Telephone Association	DSL	No Update to Provide	1/25/2010	
Evertek Enterprises	Fixed Wireless	No Update to Provide	2/3/2010	
Evertek Enterprises	Cable	No Update to Provide	2/3/2010	
Evertek Enterprises	Fiber	No Update to Provide	2/3/2010	
F&B Communications, Inc.	Fixed Wireless	No Update to Provide	2/19/2010	
F&B Communications, Inc.	DSL	No Update to Provide	2/19/2010	
Farmers & Merchants Mutual Telephone Company	Fixed Wireless	No Update to Provide	5/7/2010	
Farmers & Merchants Mutual Telephone Company	Fiber	No Update to Provide	5/7/2010	
Farmers Cooperative Telephone Company-Dysart	DSL	No Update to Provide	3/12/2010	[MAR-19-12 Matthew Brunt] Correction: Provider corrected speeds to be tier 5 download and tier 3 upload.
Farmers Mutual Cooperative Telephone Company -	Fixed Wireless	No Update to Provide	2/5/2010	
Farmers Mutual Cooperative Telephone Company -	Cable	No Update to Provide	2/5/2010	
Farmers Mutual Cooperative Telephone Company-	Fiber	No Update to Provide	5/21/2010	
Farmers Mutual Telephone Company - Jesup	DSL	No Update to Provide	4/20/2010	
Farmers Mutual Telephone Company - Nora Springs	Fixed Wireless	No Update to Provide	1/26/2010	
Farmers Mutual Telephone Company - Nora Springs	Cable	No Update to Provide	1/26/2010	
Farmers Mutual Telephone Company - Nora Springs	DSL	No Update to Provide	1/26/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	Backhaul	No Update to Provide	4/9/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	DSL	No Update to Provide	4/9/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	Cable	No Update to Provide	4/9/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	DSL	No Update to Provide	4/9/2010	

Farmers Telephone Company-Essex	DSL	No Update to Provide	1/27/2010	
FiberComm L.C.	DSL	No Update to Provide	2/15/2010	
FiberComm L.C.	Fixed Wireless	No Update to Provide	2/15/2010	
FiberComm L.C.	Backhaul	No Update to Provide	2/15/2010	
Fibernet Communications, LLC	Backhaul	No Update to Provide	3/9/2010	
Frontier Communications Corporation	Backhaul	No Update to Provide	1/22/2010	
Frontier Communications Corporation	DSL	No Update to Provide	1/22/2010	
Goldfield Access Network, L.C.	DSL	No Update to Provide	1/22/2010	
Goldfield Access Network, L.C.	DSL	No Update to Provide	1/22/2010	
Grand Mound Cooperative Telephone Association	Fixed Wireless	No Update to Provide		
Grand Mound Cooperative Telephone Association	DSL	No Update to Provide		
Grand River Mutual Telephone Corporation	Fixed Wireless	No Update to Provide	2/5/2010	
Grand River Mutual Telephone Corporation	DSL	No Update to Provide	2/5/2010	
Grand River Mutual Telephone Corporation	DSL	No Update to Provide	2/5/2010	
Griswold Cooperative Telephone Company	DSL	No Update to Provide	4/21/2010	
Grundy Center Municipal Utilities	Fixed Wireless	No Update to Provide		
Grundy Center Municipal Utilities	Cable	No Update to Provide		
Harlan Municipal Utilities	Cable	No Update to Provide	5/5/2010	
Harmony Telephone Company	Fiber	No Update to Provide	1/12/2010	
Hawkeye Telephone Company	DSL	No Update to Provide	2/12/2010	
Heart of Iowa Communications Cooperative	DSL	No Update to Provide	1/7/2010	
Heart of Iowa Communications Cooperative	Fiber	No Update to Provide	1/7/2010	
Heart of Iowa Communications Cooperative	Backhaul	No Update to Provide	1/7/2010	
Hospers Telephone Exchange, Inc.	Cable	No Update to Provide	1/11/2010	
Hospers Telephone Exchange, Inc.	DSL	No Update to Provide	1/11/2010	
Hubbard Cooperative Telephone Association and Cable	DSL	No Update to Provide	5/14/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
Huxley Communications Cooperative	Backhaul	No Update to Provide	1/25/2010	
Huxley Communications Cooperative	DSL	No Update to Provide	1/25/2010	
Huxley Communications Cooperative	Fiber	No Update to Provide	1/25/2010	
IAMO Telephone Company	Fixed Wireless	No Update to Provide	1/25/2010	
IAMO Telephone Company	DSL	No Update to Provide	1/25/2010	
ImOn Communications, LLC	Cable	No Update to Provide	2/8/2012	
Independence Telecommunications Utility	Cable	No Update to Provide	4/9/2010	
Iowa Connect, Inc.	Fixed Wireless	No Update to Provide	5/12/2010	
Iowa Network Services	Backhaul	No Update to Provide	3/5/2010	
KDSC, Inc.	Fixed Wireless	No Update to Provide	5/18/2010	
Keystone Farmers Cooperative Telephone Company	DSL	No Update to Provide	4/12/2010	
Killduff Telephone Company	DSL	No Update to Provide		
Knology of the Plains, Inc.	Cable	No Update to Provide	7/13/2011	
La Motte Telephone Company, Inc.	Fixed Wireless	No Update to Provide	2/16/2010	
La Motte Telephone Company, Inc.	DSL	No Update to Provide	2/16/2010	
La Porte City Telephone Co	DSL	No Update to Provide	2/22/2010	
Laurens Municipal Communications Utility	Cable	No Update to Provide	6/2/2010	
Lehigh Valley Cooperative Telephone Association	Fiber	No Update to Provide	4/16/2010	
Lenox Municipal Utilities	Cable	No Update to Provide	4/20/2010	
LISCO Wireless	DSL	No Update to Provide	1/28/2010	
LISCO Wireless	Backhaul	No Update to Provide	1/28/2010	
Loganet	Fixed Wireless	No Update to Provide		
Lone Rock Cooperative Telephone Company	DSL	No Update to Provide	2/15/2010	
Long Lines	DSL	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Long Lines	Backhaul	No Update to Provide	5/4/2010	
Lost Nation-Elwood Telephone Company	Fiber	No Update to Provide	4/13/2010	
Lynnville Telephone Company, Inc.	DSL	No Update to Provide		
Mabel Cooperative Telephone Company	DSL	No Update to Provide	4/8/2010	
Mahaska Communication Group	Fixed Wireless	No Update to Provide	5/10/2010	
Mahaska Communication Group	Fiber	No Update to Provide	5/10/2010	
Manning Municipal Communication & Television System	Fixed Wireless	No Update to Provide	4/22/2010	
Manning Municipal Communication & Television System	Cable	No Update to Provide	4/22/2010	
Marne & Elk Horn Telephone Company	DSL	No Update to Provide	2/11/2010	
Marne & Elk Horn Telephone Company	Fixed Wireless	No Update to Provide	2/11/2010	
Marne & Elk Horn Telephone Company	Backhaul	No Update to Provide	2/11/2010	
Martelle Cooperative Telephone Association	Cable	No Update to Provide	5/5/2010	
Martelle Cooperative Telephone Association	DSL	No Update to Provide	5/5/2010	
Massena Telephone Company	Backhaul	No Update to Provide	6/18/2010	
Mediacom Iowa, LLC	Cable	No Update to Provide	1/12/2010	
Mediapolis Telephone Company	DSL	No Update to Provide	4/14/2010	
MidIowa Net	DSL	No Update to Provide		
MidIowa Net	Fixed Wireless	No Update to Provide		
Miles Cooperative Telephone Association	DSL	No Update to Provide	5/17/2010	
Milford Cable TV Inc.	Cable	No Update to Provide	4/21/2010	
Minburn Communications	Fiber	No Update to Provide	4/7/2010	
Minburn Communications	DSL	No Update to Provide	4/7/2010	
Minburn Communications	Fiber	No Update to Provide	4/7/2010	
Minburn Communications	DSL	No Update to Provide	4/7/2010	
Minerva Valley Telephone Cablevision, Inc.	DSL	No Update to Provide	4/7/2010	
Modern Cooperative Telephone Company Inc.	DSL	No Update to Provide		
Monarc Technologies	Fiber	No Update to Provide	2/16/2011	
NetConX, Inc.	Fixed Wireless	No Update to Provide	4/6/2010	
New Ulm Telecom, Inc.	DSL	No Update to Provide	3/10/2010	
Nexgen Integrated Communications, LLC	Fiber	No Update to Provide		
Nexgen Integrated Communications, LLC	DSL	No Update to Provide		[MAR-19-12 Ashley Littell] Correction: Revised coverage to download speed tier 5 after additional outreach to provider to confirm speeds.
Northeast Iowa Telephone Company	Backhaul	No Update to Provide	4/13/2010	
Northern Iowa Telephone Company	DSL	No Update to Provide	1/25/2010	
Northwest Telephone Cooperative Association	Fixed Wireless	No Update to Provide	2/17/2010	
Northwest Telephone Cooperative Association	Backhaul	No Update to Provide	2/17/2010	
Ogden Telephone Company	DSL	No Update to Provide	3/17/2010	
Ogden Telephone Company	Backhaul	No Update to Provide	3/17/2010	
Olin Telephone Company, Inc.	DSL	No Update to Provide	2/23/2010	
Onslow Cooperative Telephone Association	DSL	No Update to Provide	2/3/2010	
Oran Mutual Telephone Company	DSL	No Update to Provide	2/8/2010	
Osage Municipal Communications Utility	Fixed Wireless	No Update to Provide	5/18/2010	
Palmer Mutual Telephone Company	DSL	No Update to Provide	1/21/2010	
Palo Cooperative Telephone Association	DSL	No Update to Provide	5/19/2010	
Panora Communications Cooperative	Cable	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Cable	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Fixed Wireless	No Update to Provide	1/29/2010	

Panora Communications Cooperative	Fixed Wireless	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Fiber	No Update to Provide	1/29/2010	
Partner Communications Cooperative	Cable	No Update to Provide	5/15/2010	
Partner Communications Cooperative	Fiber	No Update to Provide	5/15/2010	
Prairieburg Telephone Company, Inc	Fixed Wireless	No Update to Provide	3/25/2010	
Prairieburg Telephone Company, Inc	DSL	No Update to Provide	3/25/2010	
Premier Communications	Cable	No Update to Provide	1/25/2010	
Radcliffe Telephone Company, Inc.	Fiber	No Update to Provide	4/26/2010	
Radcliffe Telephone Company, Inc.	Backhaul	No Update to Provide	4/26/2010	
Readlyn Telephone Company	Fiber	No Update to Provide	2/23/2010	
Readlyn Telephone Company	DSL	No Update to Provide	2/23/2010	
Reasnor Telephone Company, LLC	DSL	No Update to Provide		
RingTel Communications	DSL	No Update to Provide	2/17/2010	
River Valley Telecommunications Coop	Fixed Wireless	No Update to Provide	3/23/2010	
River Valley Telecommunications Coop	DSL	No Update to Provide	3/23/2010	
River Valley Telecommunications Coop	Fiber	No Update to Provide	3/23/2010	
Rockwell Cooperative Telephone Association	DSL	No Update to Provide	5/12/2010	
Rockwell Cooperative Telephone Association	Fiber	No Update to Provide	5/12/2010	
Rockwell Cooperative Telephone Association	Backhaul	No Update to Provide	5/12/2010	
Royal Telephone Company	Fiber	No Update to Provide	2/12/2010	
Sac County Mutual Telephone Co.	DSL	No Update to Provide	2/15/2010	
Sac County Mutual Telephone Co.	Backhaul	No Update to Provide	2/15/2010	
Scranton Telephone Company	DSL	No Update to Provide	2/1/2010	
Scranton Telephone Company	Backhaul	No Update to Provide	2/1/2010	
Searsboro Telephone Company	DSL	No Update to Provide		
Sharon Telephone Company	Backhaul	No Update to Provide	5/20/2010	
Sharon Telephone Company	DSL	No Update to Provide	5/20/2010	
Sharon Telephone Company	Fiber	No Update to Provide	5/20/2010	
Sharon Telephone Company	Fixed Wireless	No Update to Provide	5/20/2010	
Sioux Valley Wireless	Fixed Wireless	No Update to Provide	6/7/2010	
South Slope Cooperative Telephone Company	DSL	No Update to Provide	2/2/2010	
Spencer Municipal Utilities	Cable	No Update to Provide	2/18/2010	
Spencer Municipal Utilities	Fiber	No Update to Provide	2/18/2010	
Spencer Municipal Utilities	Backhaul	No Update to Provide	2/18/2010	
Spring Grove Cooperative Telephone Co	Fiber	No Update to Provide		
Springville Cooperative Telephone Association, Inc.	DSL	No Update to Provide	2/15/2010	
Sully Telephone Association Inc	Fiber	No Update to Provide	4/28/2010	
Sully Telephone Association Inc	DSL	No Update to Provide	4/28/2010	
Superior Telephone Cooperative	DSL	No Update to Provide	5/24/2010	
Swisher Telephone Company	Fiber	No Update to Provide	2/2/2010	
Templeton Telephone Company	DSL	No Update to Provide	3/12/2010	
Templeton Telephone Company	Backhaul	No Update to Provide	3/12/2010	
Titonka Telephone Company	Backhaul	No Update to Provide	5/4/2010	
Titonka Telephone Company	DSL	No Update to Provide	5/4/2010	
Traer Municipal Utilities	Fixed Wireless	No Update to Provide	4/14/2010	
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
USA Communications	DSL	No Update to Provide	1/27/2010	
USA Communications	Cable	No Update to Provide	1/27/2010	
Van Buren Telephone Co Inc	DSL	No Update to Provide	1/26/2010	
Van Horne Cooperative Telephone Company	DSL	No Update to Provide	5/18/2010	
Van Horne Cooperative Telephone Company	Fiber	No Update to Provide	5/18/2010	
Van Horne Cooperative Telephone Company	Backhaul	No Update to Provide	5/18/2010	
Walnut Telephone Company	DSL	No Update to Provide	4/14/2010	
Walnut Telephone Company	Cable	No Update to Provide	4/14/2010	
Walnut Telephone Company	Fiber	No Update to Provide	4/14/2010	
Walnut Telephone Company	Fixed Wireless	No Update to Provide	4/14/2010	
Walnut Telephone Company	Backhaul	No Update to Provide	4/14/2010	
Webb-Dickens Telephone Corporation	Fiber	No Update to Provide	1/25/2010	
Webster-Calhoun Cooperative Telephone Association	Fiber	No Update to Provide	5/21/2010	
Wellman Cooperative Telephone Association	Fixed Wireless	No Update to Provide	5/19/2010	
Wellman Cooperative Telephone Association	DSL	No Update to Provide	5/19/2010	
West Iowa Telephone Company	Cable	No Update to Provide	1/27/2010	
West Iowa Telephone Company	DSL	No Update to Provide	1/27/2010	
West Liberty Telephone Company	DSL	No Update to Provide	1/25/2010	
West Liberty Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Western Iowa Networks	Fixed Wireless	No Update to Provide	2/22/2010	
Western Iowa Networks	DSL	No Update to Provide	2/22/2010	
Western Iowa Networks	Fiber	No Update to Provide	2/22/2010	
Western Iowa Telephone Association	DSL	No Update to Provide	4/22/2010	
Windstream Communications	DSL	No Update to Provide		
Winnebago Cooperative Telecom Association	Fixed Wireless	No Update to Provide	1/22/2010	
Winnebago Cooperative Telecom Association	DSL	No Update to Provide	1/22/2010	
Winnebago Cooperative Telecom Association	Fiber	No Update to Provide	1/22/2010	
Winnebago Cooperative Telecom Association	Backhaul	No Update to Provide	1/22/2010	
Woolstock Mutual Telephone	DSL	No Update to Provide	5/19/2010	
Woolstock Mutual Telephone	Fixed Wireless	No Update to Provide	5/19/2010	
WTC Communications, Inc.	Fixed Wireless	No Update to Provide	3/22/2010	
WTC Communications, Inc.	Cable	No Update to Provide	3/22/2010	[MAR-19-12 Matthew Brunt] Correction: Provider corrected speeds to be tier 3 download and technology of transmission code was changed to 41.
Wyoming Mutual Telephone Company	DSL	No Update to Provide	2/19/2010	
Clarence Telephone Company, Inc.	Fiber	No Update Provided - Use Last Submission Data		
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
Fenton Co-Op Telephone Company	DSL	No Update Provided - Use Last Submission Data	4/16/2010	
Internet Consulting Services, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	5/19/2010	
Kalnet	Fixed Wireless	No Update Provided - Use Last Submission Data	5/21/2010	
KeyOn Communications, Inc.	DSL	No Update Provided - Use Last Submission Data	10/15/2009	
KeyOn Communications, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	10/15/2009	
KeyOn Communications, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	10/15/2009	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Prairie iNet	Fixed Wireless	No Update Provided - Use Last Submission Data	3/16/2010	
Knology of the Plains, Inc.	Backhaul	Solicited Initial Data	7/13/2011	

ImOn Communications, LLC	Fiber	Other	2/8/2012	[FEB-09-12 Matthew Brunt] Correction: Provider stated that the previously sent fiber coverage was proposed fiber coverage, not active fiber coverage.
ImOn Communications, LLC	Backhaul	Other	2/8/2012	[FEB-09-12 Matthew Brunt] Provider stated that they do not provide backhaul to anyone other than themselves.
Mutual Telephone Company	DSL	Other	1/25/2010	[FEB-08-12 Layne Wagner] Received an email from a company representative stating they no longer offer DSL service. All broadband has been converted to FTTH.
Windstream Communications	DSL	Other		[FEB-01-12 Wes Kerr] Company representative notified us that they do not have the ability at this time to provide data for the acquired company.
Netconnect	Fixed Wireless	Refused to Participate		[JAN-13-12 Layne Wagner] A company representative declined to participate.
Amberwave Communications	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 6 additional contact attempts were made this period.

State Broadband Initiative Mapping Methodology

For the State of Idaho Revised March 30, 2012

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

The following documentation provides an overview of how the fifth required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Idaho.

This submission marks the first separation of distinct methodology deliverables for each state we work with. In terms of broadband data development and data presentation, we strive to maintain a consistent process across the States. This cross-state approach also helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning a sustainable program leadership to the respective states.

As our team enters the third year of the SBI program, more work has shifted to in state partners. Much of this work focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that our in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this third program year we also anticipate inState partners taking over the state web presence, both in terms of content and hosting.

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

Significant changes include additions covering:

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

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods
3. Provider advertised speed and coverage validation

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

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

We also note that the mapping deliverable is increasingly important to state policy makers as each of the states we work with continues to assess the policy ecosystem that supports the advancement of broadband access and adoption.

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

Purpose of This Manual

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

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

Data Sources

Developing the Provider List

Provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Independent web searches
- Interviews with key state staff members and important community influencers

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

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

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

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

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

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

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

Provider Survey

Since four prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 5. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 5 survey process was designed to accommodate both

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

new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

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

Returning providers: For Round 5 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 5 survey in early January 2012, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of January and February. The initial data submission deadline was set for February 17, but we continued to accept "straggler" submissions into March.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the vast majority of those we were unable to reach were providers who have simply ceased to exist[2].

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 5, given the data vintage of December 31, 2011, we began this process in January and the last submissions were accepted in March, 2012.

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

Third Party Data Used

Beyond the data obtained from providers, we acquired the following commercial/restricted use data products:

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

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- MapInfo ExchangeInfo, Professional. This data was used in the verification of telephone Broadband provider data. Where a public domain exchange boundary wasn't available, the MapInfo boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service. In very rough terms the contained boundaries were used to test the location of some provider data. FCC 477 restricted use data were analyzed to find valid providers within a given area.

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

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

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

Geographic Data Files
US Census TIGER data[4]
Sources that helped isolate providers, identity management or provider service areas
NECA Tariff 4
State produced exchange boundaries
Carrier produced wirecenter boundaries (sometimes proprietary to provider)
FCC Coals reports (321/325)
FCC FRN API lookup tool
FCC/FAA Antenna Registration System
FCC FRN Lookup Tool (plain text search)
USAC High Cost FCC Filing Appendices

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[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.
[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

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

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

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

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

Confidentiality and the Use of Licensed Materials

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

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

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

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

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the state programs overall and engage more citizens in the work at hand. In addition to the various opportunities the public has to provide input via the online service coverage maps and the related 'Broadband story' process, our crowd sourcing efforts are grounded in a time tested telephone survey approach focused on the consumer market. In addition, we continue to advance our process to include certain initiatives centered in two social media outlets – Facebook and Twitter. These initiatives are discussed below.

Consumer Surveys

Working under contract for the state of Alabama in 2009, our initial consumer survey was performed before the NTIA SBI grant was in place. Subsequent consumer surveys funded by the SBI grant were hosted in 2010 for the states of Idaho, Wisconsin and Wyoming and then again in 2011 for Alabama (as noted below). These surveys will be repeated after two years to establish and evaluate trends. Survey results from the most recent effort in Alabama are currently under evaluation. These primarily telephone based surveys include two distinct and carefully scripted tracks: one for Internet users and one for non-users. The telephone survey approach allows us to reach the non-Internet user group as well as the current Internet user. A secondary online approach is also used to augment input from current Internet users. In the most recent Alabama survey we added a third tier to our approach as we equipped local field survey teams with an iPad-based survey tool and targeted their time to reaching the younger market. For non-users, the surveys help determine why they don't have or don't use Broadband. For current Broadband users, the survey helps determine the nature of their Broadband access and how they use that connectivity in their daily lives. In addition to our state-specific surveys a nation-wide survey was also hosted to provide a broader view of consumer views for comparison purposes. State-specific surveys are, where possible, framed to match the state's regional Broadband planning structure (e.g., the updated consumer survey in Alabama was designed to produce results relevant to the state's twelve Broadband planning regions).

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

Our ongoing consumer survey process adheres to a consistent process. For example, consistent with prior practice the 2011 Alabama survey was launched in June 2011 with a test number of survey calls to confirm (and adjust as needed) the structure of the survey and the underlying survey process. Our surveys typically run for three to four months. All telephone surveys are completely random beginning with the acquisition of a list of state-specific, randomly selected landline telephone numbers. Mobile phones are not typically included in the surveys. Upon evaluation of the survey statistics, auxiliary surveys are executed to ensure appropriate representation is achieved on both demographic and geographic fronts. For example and as noted above, the recent Alabama survey was augmented with a field effort to ensure the younger demographic (i.e., age 18 – 25) was adequately represented. This secondary step is required because of the continued migration (by younger markets) to non-landline based communications. This younger market is also surveyed by reaching out through social media outlets (primarily Facebook and Twitter) to encourage their participation in an online survey process.

Survey statistics from the Alabama update survey are currently being developed and evaluated. Survey statistics from our initial surveys in Idaho, Wisconsin and Wyoming were summarized in our last filing. Survey volumes are designed to achieve statistical validity.

As noted above, our telephone survey process is augmented by providing online access to the survey. Participation in the online survey is promoted on all of our state-specific public web sites and selected social media.

As a final relevant point with respect to the consumer survey process the length of the survey is noteworthy. By survey standards, these tend to be long surveys. The surveys typically average just over fifteen minutes. While this clearly contributes to the number of survey call attempts that were required to reach the level of statistical validity, it is not insurmountable.

Social Media

The phenomenon of social media is widely documented and yet still emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Different states have different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. As noted above, we are able to promote additional input on the consumer surveys through a social media outreach program aimed at our younger market segments.

In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners. As we move into program year 3, distinct tasks are migrating to the responsibility of our State partners.

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

Alabama plans to continue the transition process though the end of year 3 assuming more responsibility for the interactive State maps and website. In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs for this round. Other States are looking more towards the end of program year 3 and the in-State hire of a Broadband Coordinator as the initiation point to support their transition efforts. Broadband Coordinators were brought on board in both Idaho and Wyoming over the past six months. An open position is posted for Wisconsin and that position is expected to fill soon. Alabama has had a broadband coordinator in place for over a year.

Trends in Submitted Data

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

We note the following trends:

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

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

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

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio

manufacturers specific to very high speed wireless services. Although the service can be deployed within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category.

Data Production Process

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

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

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

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

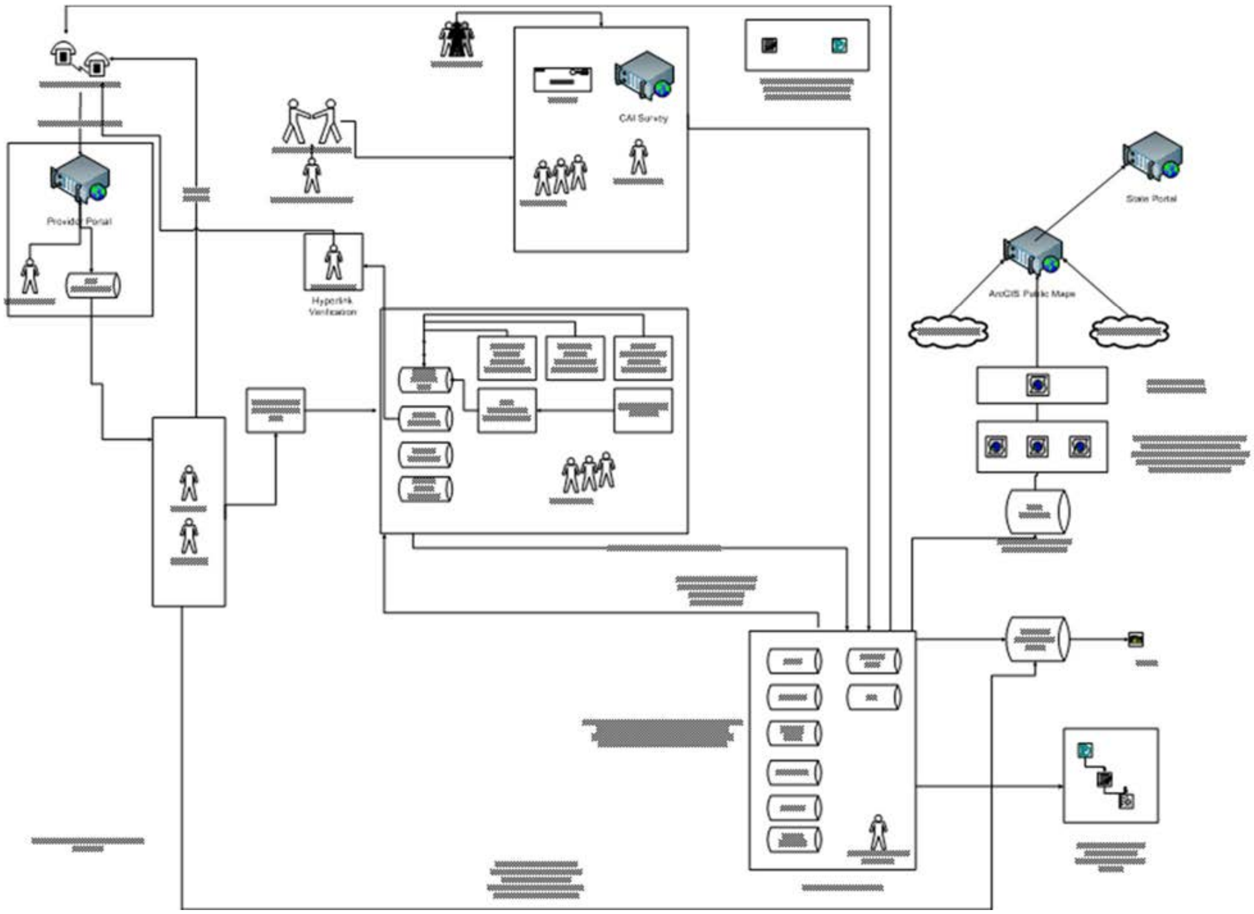

Figure 1—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

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

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

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

Data Production Methods

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

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

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

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

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

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

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

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

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

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

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

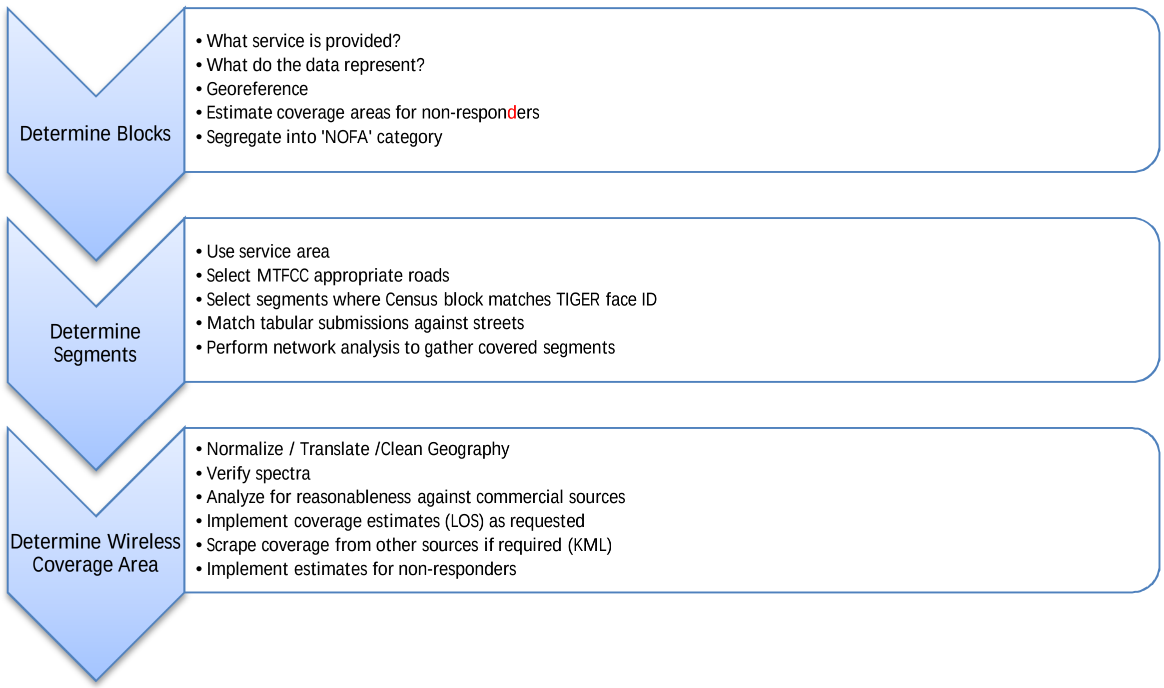

Figure 2-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 5.

Speed Examination

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

Based upon these conversations we learned

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

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

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

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers.

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

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

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11) directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[10]. In some cases this involved using simple

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

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

polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

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

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

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

After the Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[11]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

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

In most cases, in Round 5 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[12]

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

[12] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

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

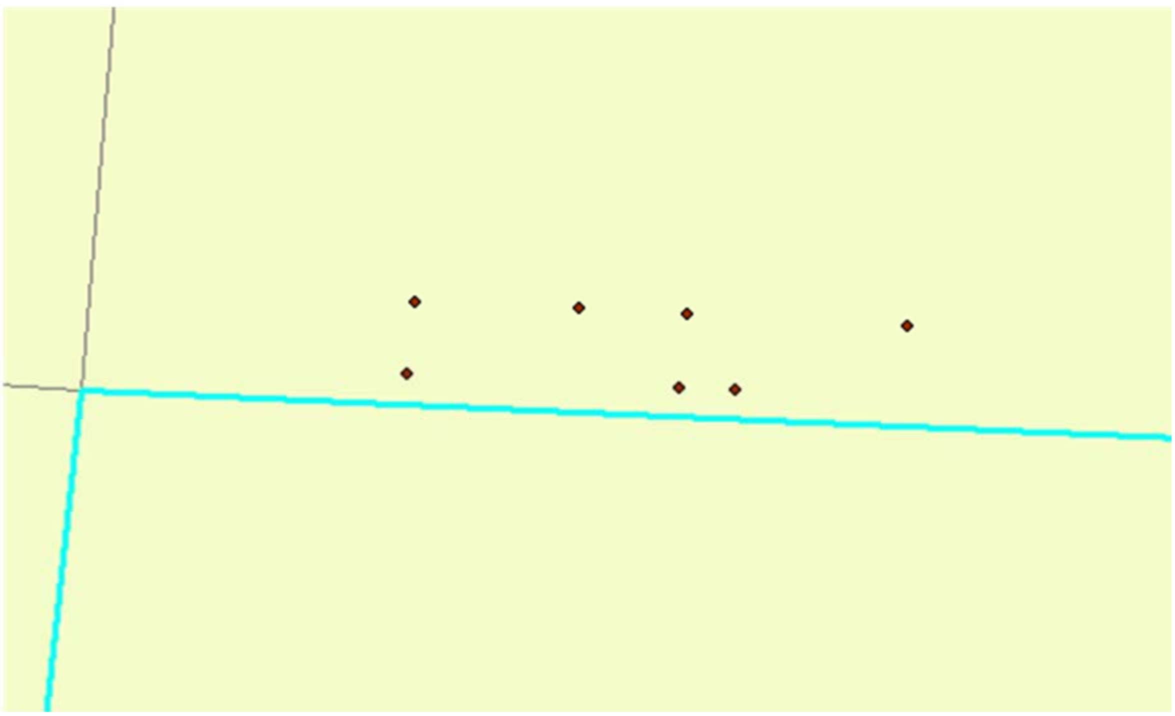


Figure 3-Internal inconsistency in submitted data

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

cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

Figure 4-Block Coverage

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

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

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

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

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

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

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

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

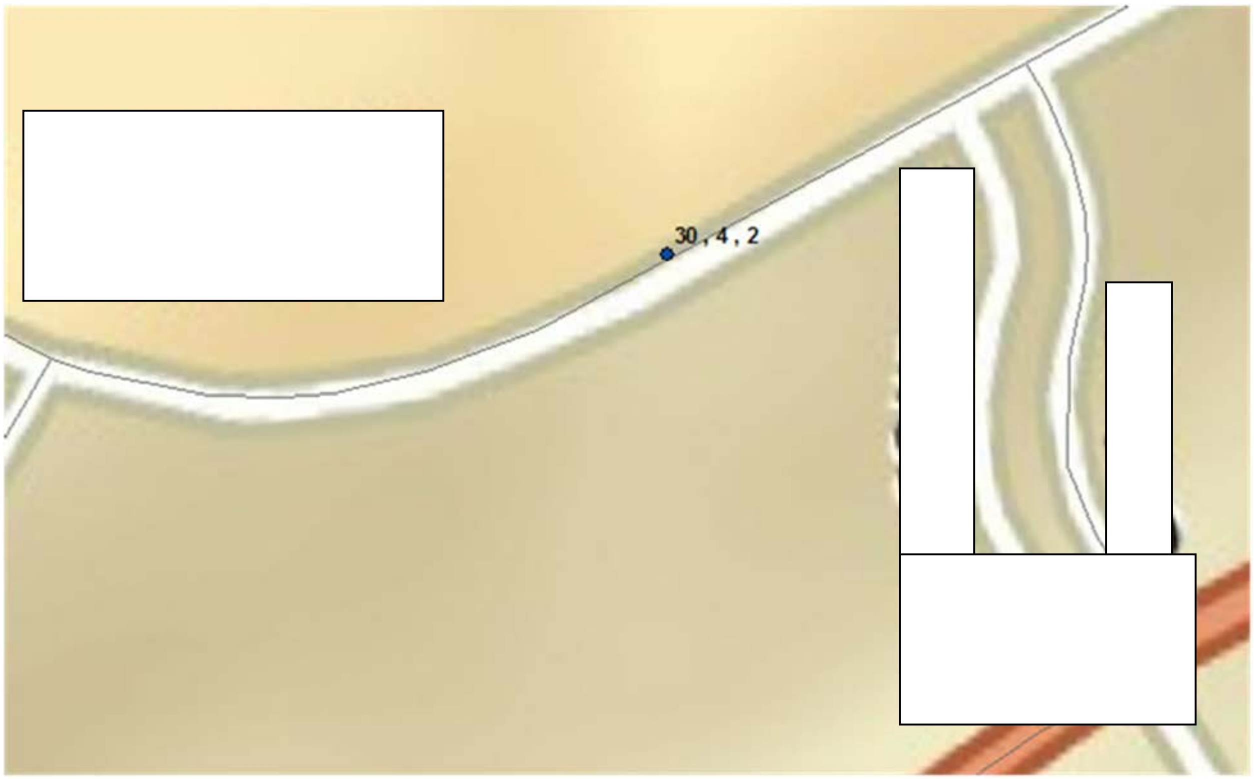


Figure 5-Plant Point level data

Coverage Derivation Using Linear Facilities Data

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

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

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

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

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

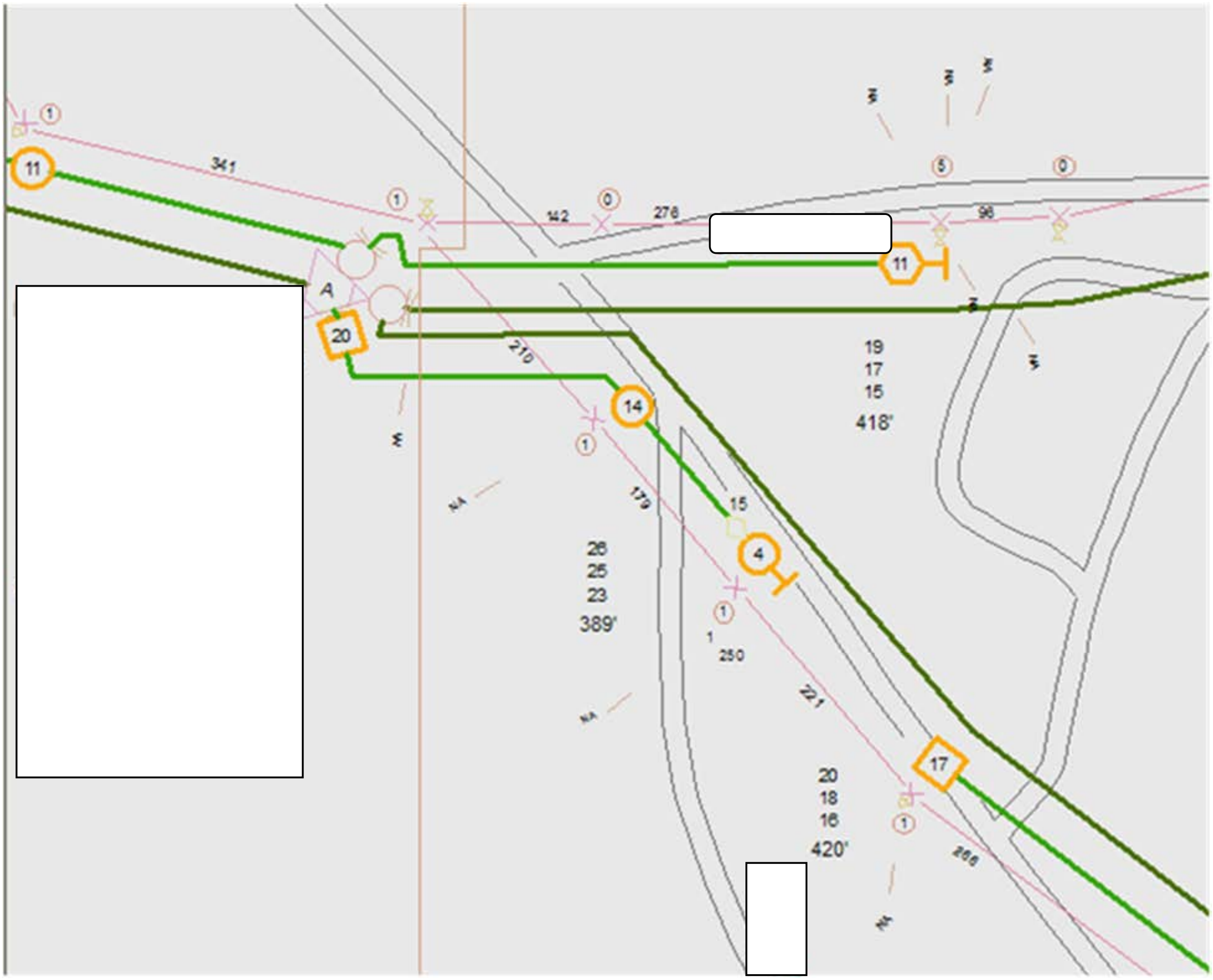


Figure 6-Georeferenced CAD information supplied by Broadband provider

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

Coverage Derivation Using Covered Street Segment Data

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

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

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

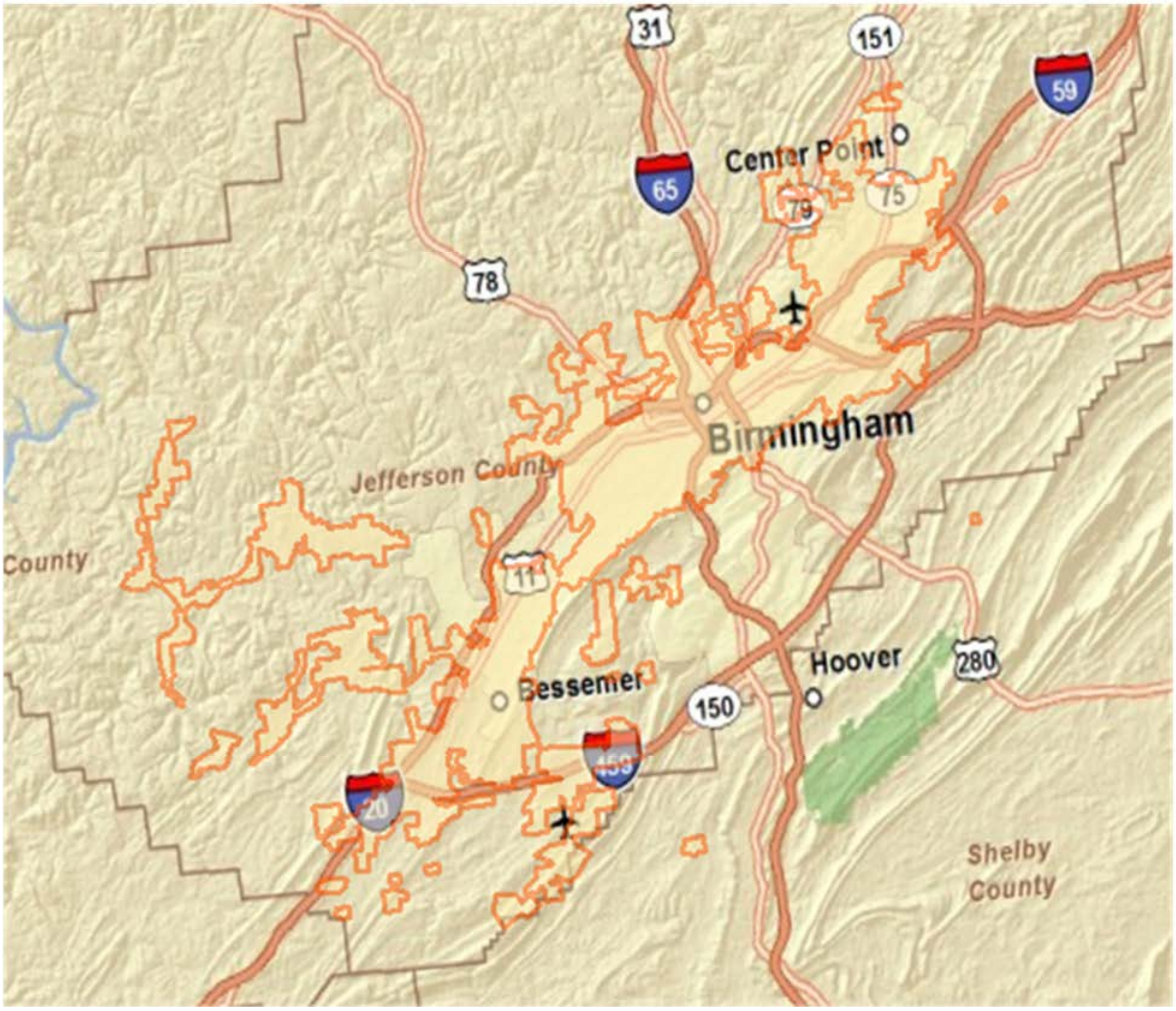


Figure 7-Coverage derived from street segments

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

Coverage Derivation Using Serving Area Point Submission Data

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

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

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

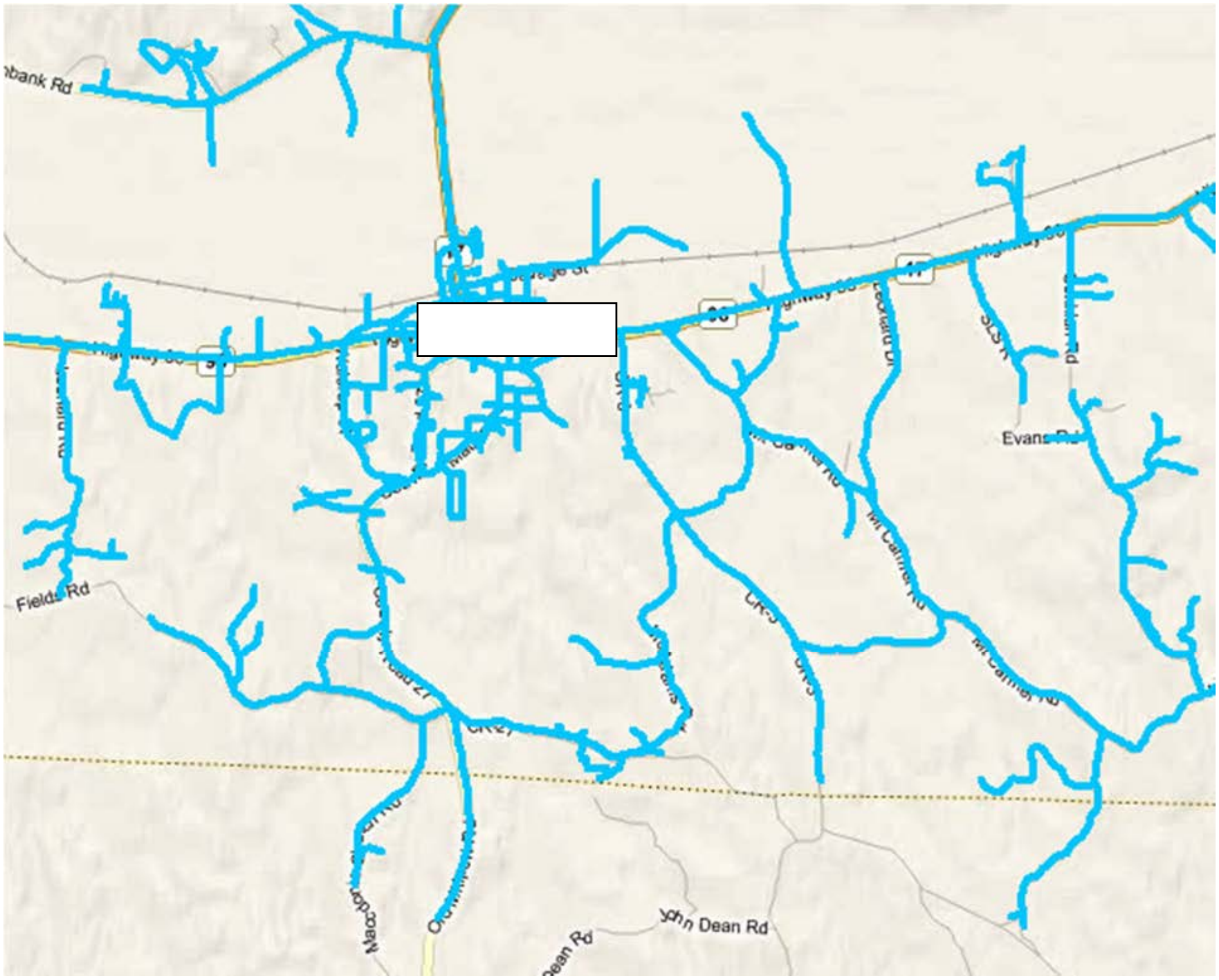


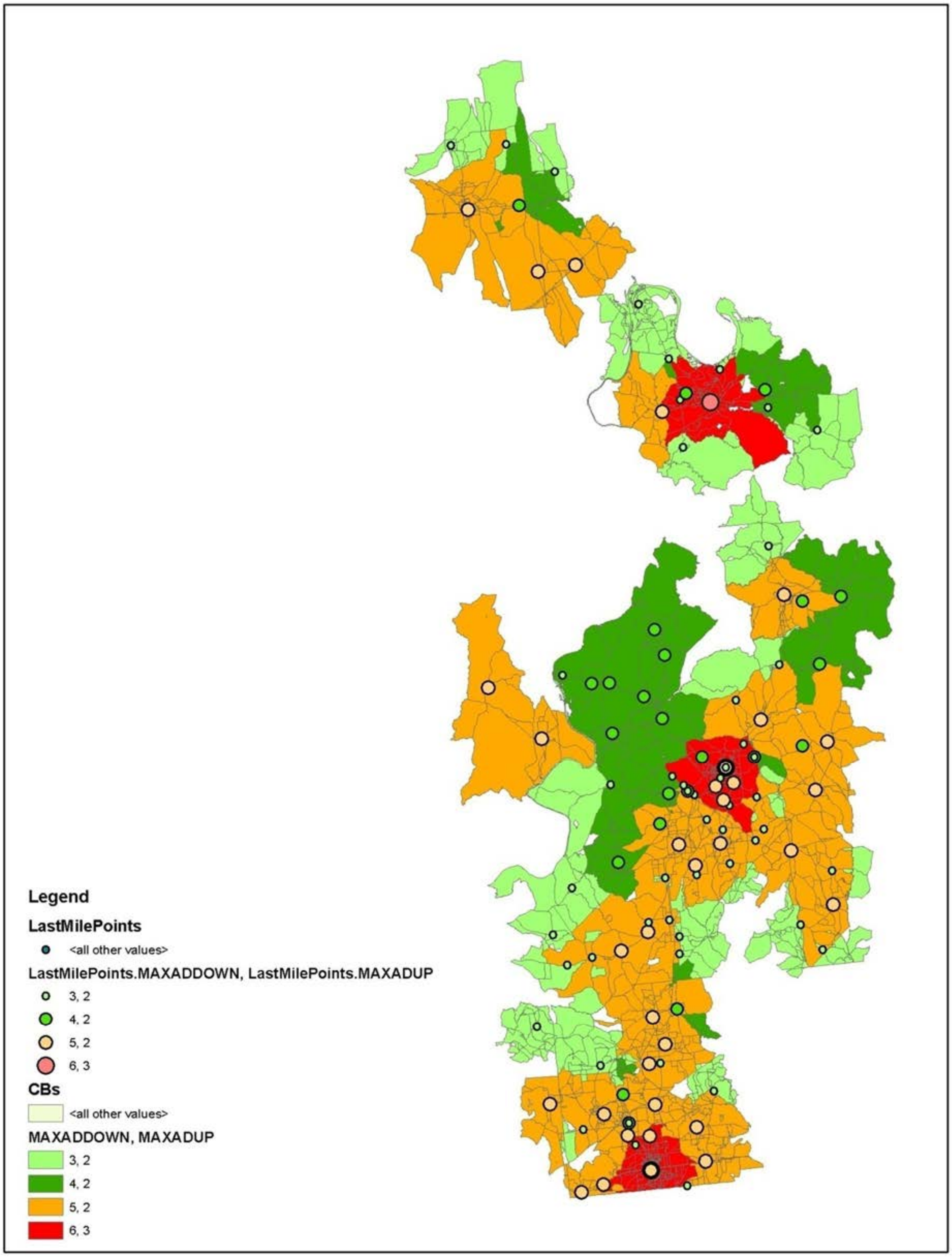
Figure 8-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[13]

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

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

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


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

Coverage Derivation Using Polygon/Polyline Serving Areas

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

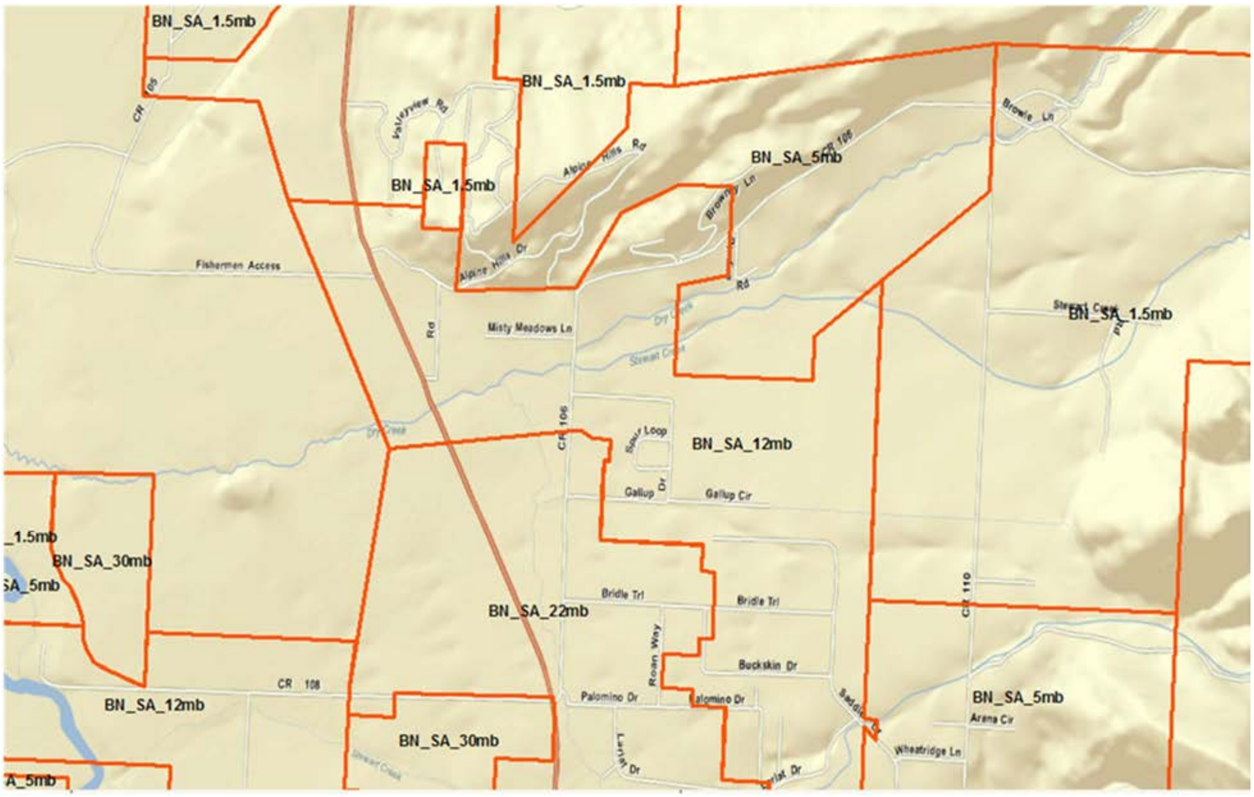


Figure 9-Coverage derived through serving area polygons

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

Street Segment Derivation, Large Blocks

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

With respect to segments we had four sources of data:

Covered large Blocks
Tabular street segments and address ranges for large Blocks

Geographic segments either with street attributes or without
Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format. Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded segment coverage pattern, like

the image shown below.[14]

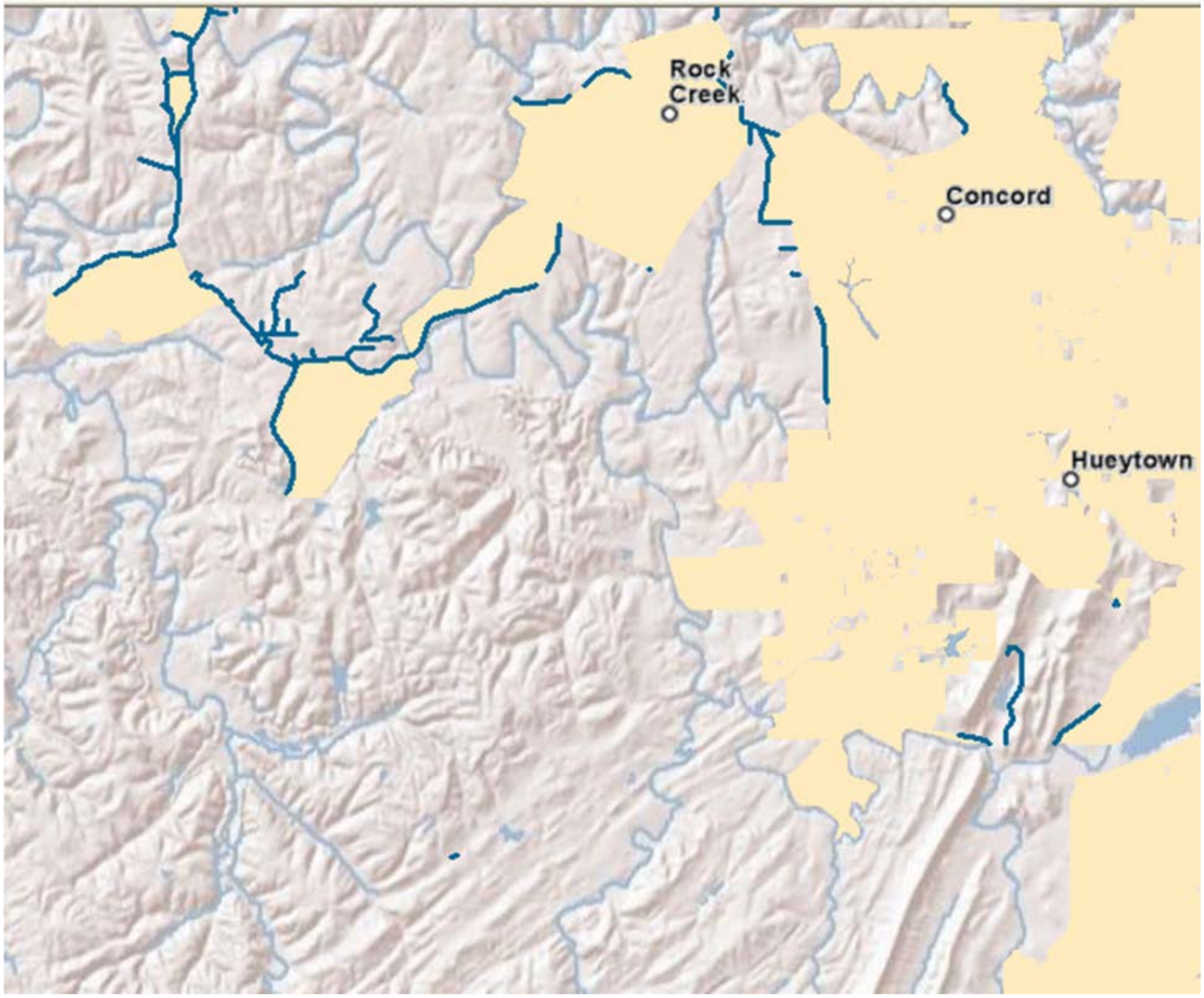


Figure 10-Blue road segments adjacent to peach covered small Blocks

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

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

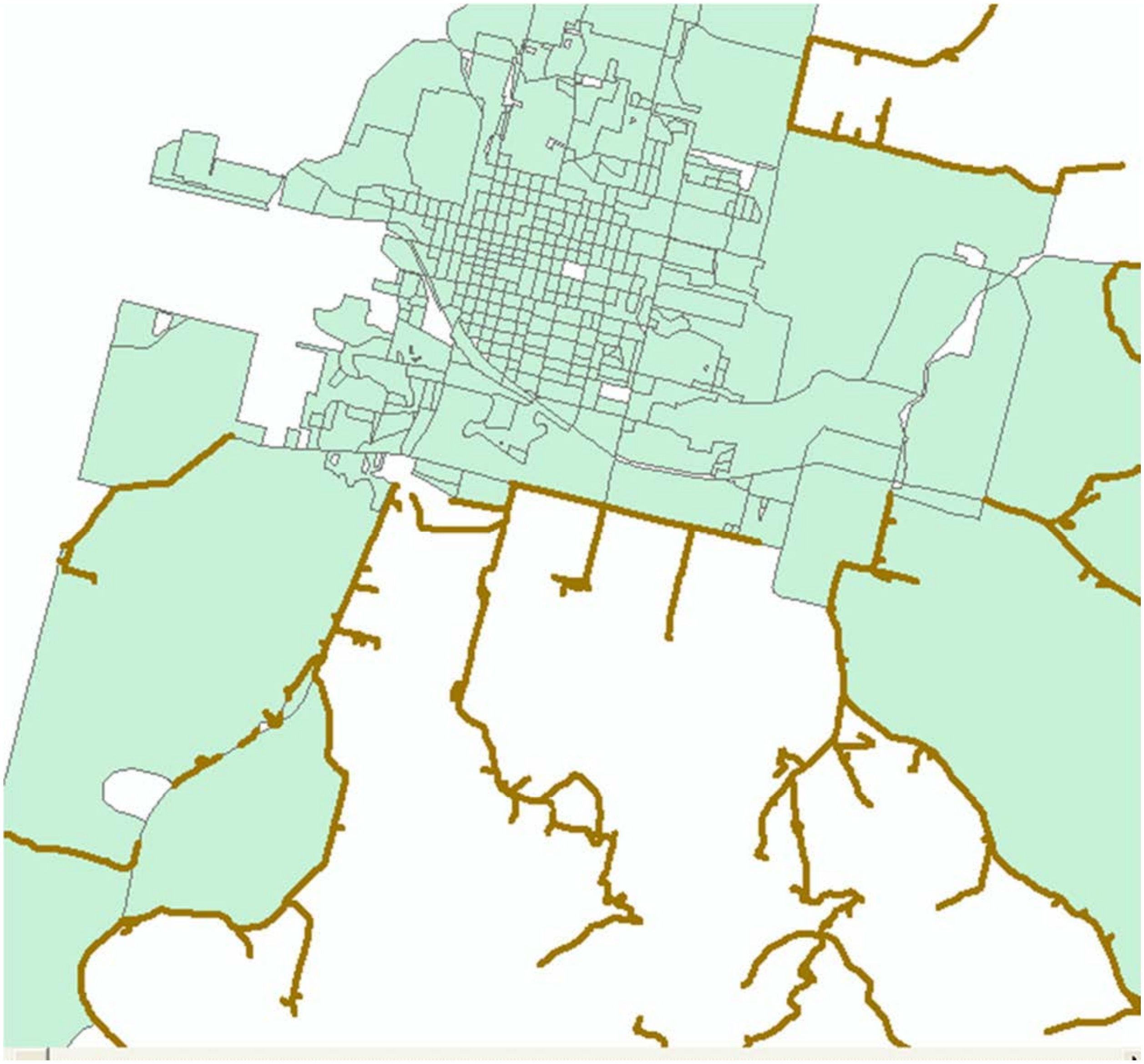


Figure 11-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

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

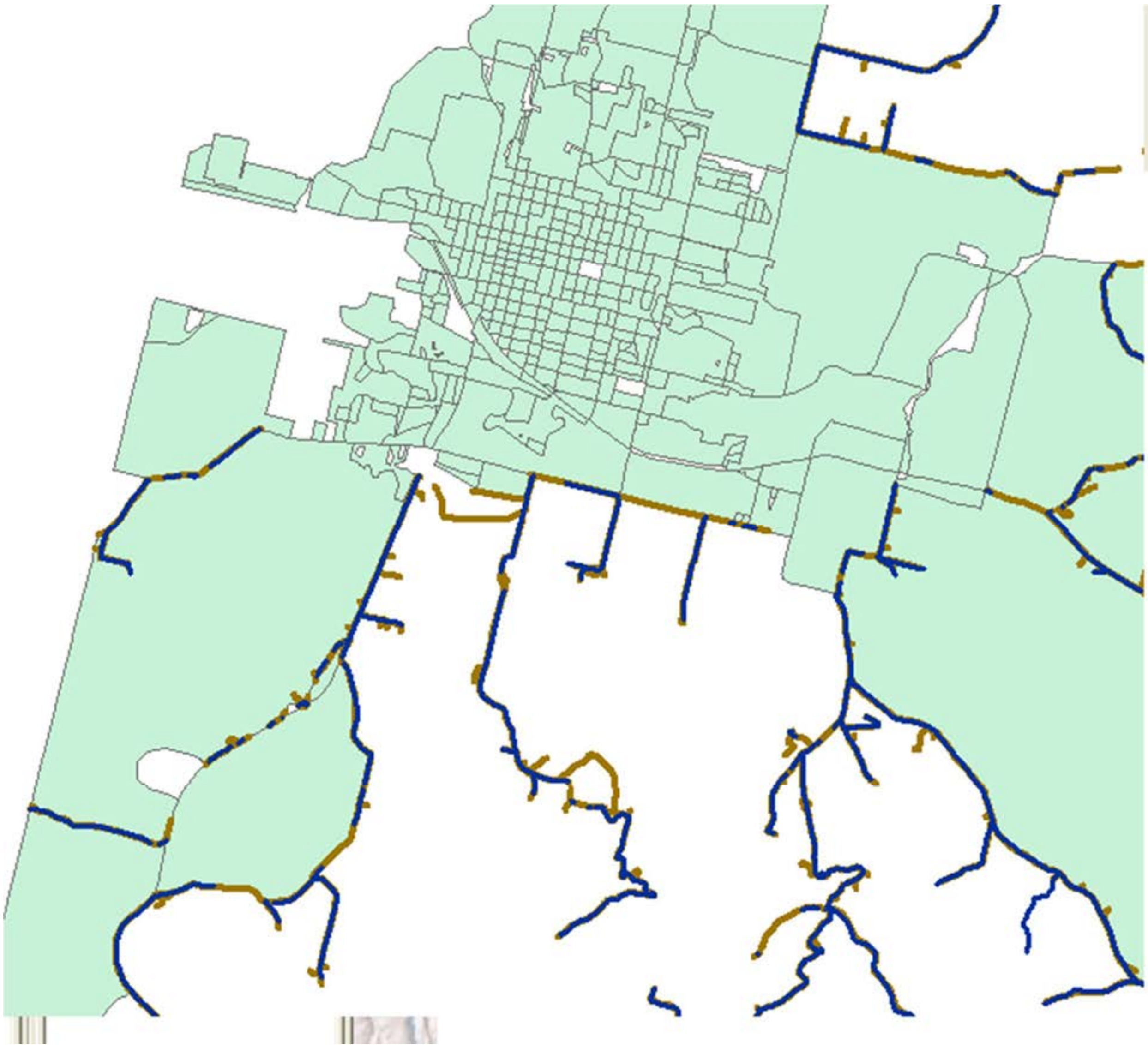


Figure 12-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

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

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

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

Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
Join TIGER roads feature class to temporary table on TLID
Select covered segments (Python script)
Select service area polygons for provider
Clip selected facing segments with selected service area
Export clipped segments to staging feature class, keyed by providerID
In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[15]

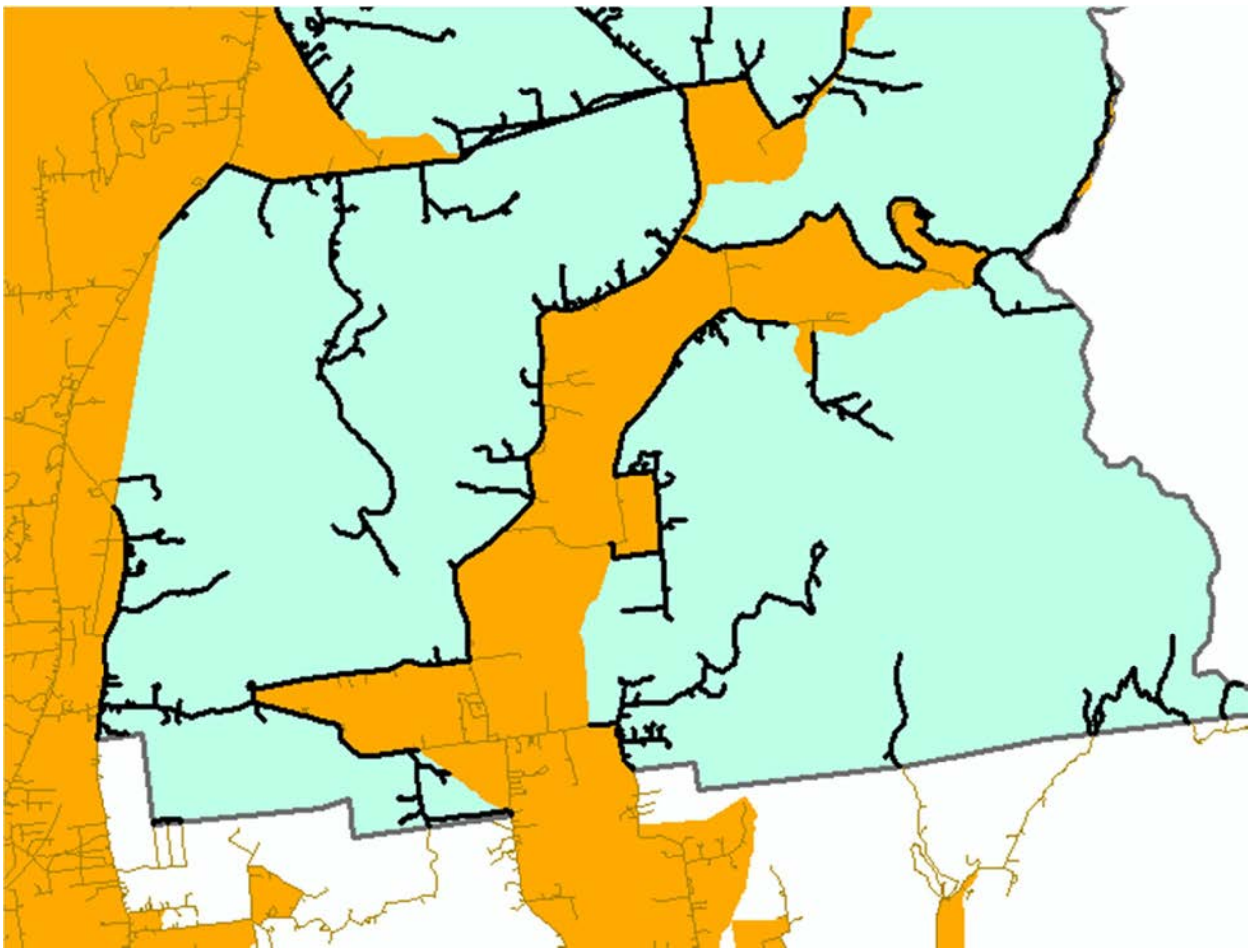


Figure 13-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[16]

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

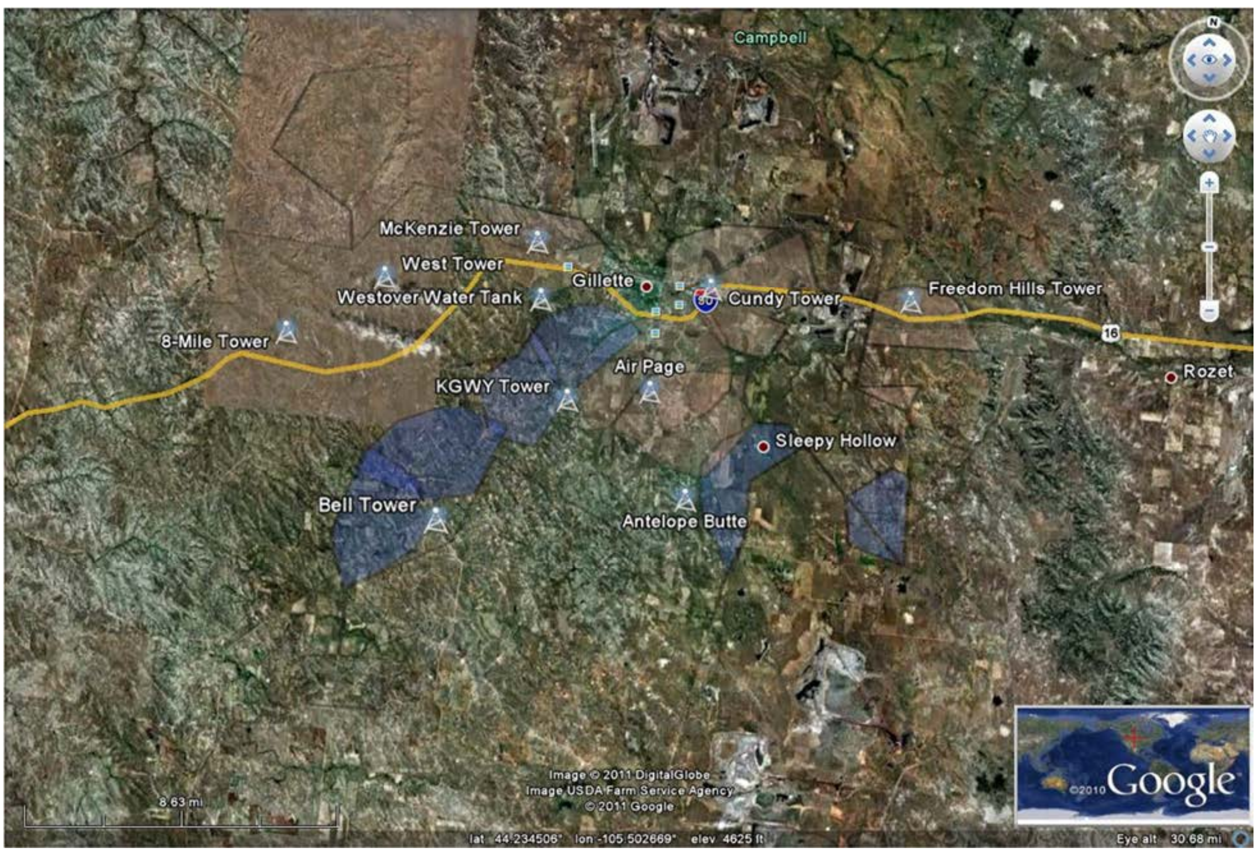
LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid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

In Round 5 fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored.

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

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



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

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

If the provider is advertising using this coverage they must have specific confidence in its accuracy.
If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information.

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

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary strength (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location.. Fourth, it was very difficult getting providers to identify spectra used for Broadband data services[17]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area.

Service Address Point Process

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

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

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

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

and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[18] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[19].

We typically resorted to three possible estimation paths.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[20] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[21]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be

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[18] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue is address quality but also difficulties in geocoding in very rural areas.
[19] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.
[20] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.
[21] Central Office location was derived from MapInfo ExchangeInfo Professional. Wirecenter boundaries also came from this commercial product.

provided, we used a view shed analysis and estimated line of sight coverage at 10mi per tower[22]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

Speed

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

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

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

We continue to request advertised speed at the block level. Nevertheless we appear to be getting speeds that do not vary over a large geographic area – leading us to believe that providers may still be submitting the maximum speed advertised in local media for the entire market. For the most part, we have been unsuccessful in messaging that advertised speed should not correspond to a market area, but instead, the maximum speed, which can be provided to a household—what some may describe as a 'qualified speed.'[23]

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

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

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but

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

[23] As an example of a response to our request for Block level advertised speeds, we received the following comment from one anonymous provider, "This is and of itself does not require anything new of us – just states the NTIA supports efforts focused on getting that information on the CB level." It would be helpful to have broader messaging so that providers understand this new direction.

extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted "something," there was a significant variance in what that "something" represented.

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

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

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

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

A number of providers refused to answer the question on grounds of confidentiality[25]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

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

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

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

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

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL). In Round 5, the check submission script no longer accepts negative elevation values. For a number of providers who submitted negative elevation data (facilities buried underground) we changed the value to zero, per Program Office direction.

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

Mobile Wireless Coverage

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

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

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

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

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

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

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an

fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats and expands in more depth on the confidence analysis within the data.

Verification Methods Summary

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

We believe three broad verification themes are important to consider

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

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

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

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

	Data Types			
Verification Method	Census Block, Road segment or, address specific service availability	Mobile wireless service availability	Middle mile infrastructure locations	Community anchor institutions
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review	METHOD USED			METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling	METHOD USED			METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED

Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

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

	Definition	Methodology	Purpose	Benefit
Provider Verification	Provider verification is the process of assembling a broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	Provider verification involves combining multiple data sources, interviewing providers and classifying the broadband provider type.	Without a consistent understanding of the provider 'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	The main benefit of this verification process is understanding who is providing broadband services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider data consistent with prior submissions. This would be an	Most of this validation is performed using our spatial databases and running queries that compare submissions. We also use a similar set of queries to isolate transmission	The purpose of this type of validation is to understand how things change over time and why. It also helps informs us for circumstances where we	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a change.

	examination of this submission relative to a prior submission. Second is this submission consistent with the technical specifications of the service offered.	of technology outliers. These would be data sets which offer speed technology combinations which are unusual relative to other data received across all states.	have data points which appear to be outside of the norm. If these outliers are detected, they can be pursued directly with the provider.	
External data consistency checks	An external data consistency check is a measure of the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	External validation can be performed by verifying supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to tower locations.	We don't believe a single, exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	External validation provides an external measure of data quality assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier	Carrier	We use two	One of the	Carrier confirmation

confirmation	confirmation is the process of sending processed data back to the service provider to ensure that translation into NTIA formats is fair and appropriately accurate.	techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	more critical steps in broadband mapping is translating carrier supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) is a an important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted	The benefit is to provide feedback and also display real time the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the

	improve/validate the submitted data.	maps are also discussed within the context of planning teams within each state. We receive feedback from these meetings.	data.	mapping process.
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution broadband market.	We have used three methods to verify anchor institution data. The first is a targeted series of telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	As Anchor Institutions represent a different class of coverage information as well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven

		appears plausible for a given technology. It may also involve a cross check on data from a second source—can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to understand ambiguous information in submissions.	submission formats and innovative ways to supply broadband, it is always helpful to have multiple sets of eyes available to reduce errors from misunderstanding.	process making all the decisions.
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information.

		monitor access and use trends at a regional level.	consumers to better understand attitudes.	
Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based surveys	Web based surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider	In the case where a web survey is a compliment to phone or in person a survey, instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application.	The purpose in all cases is to gather additional information via the Web.	The benefits of web survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.

	information.	We currently use both approaches depending on our goal.		
Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording observations. To date most of our field survey work has been in engaging CAIs into the process. We have performed limited wireless testing and infrastructure verification.	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment presence or the strength of a wireless broadband signal.	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

Verification Standard

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

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

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

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

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

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

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

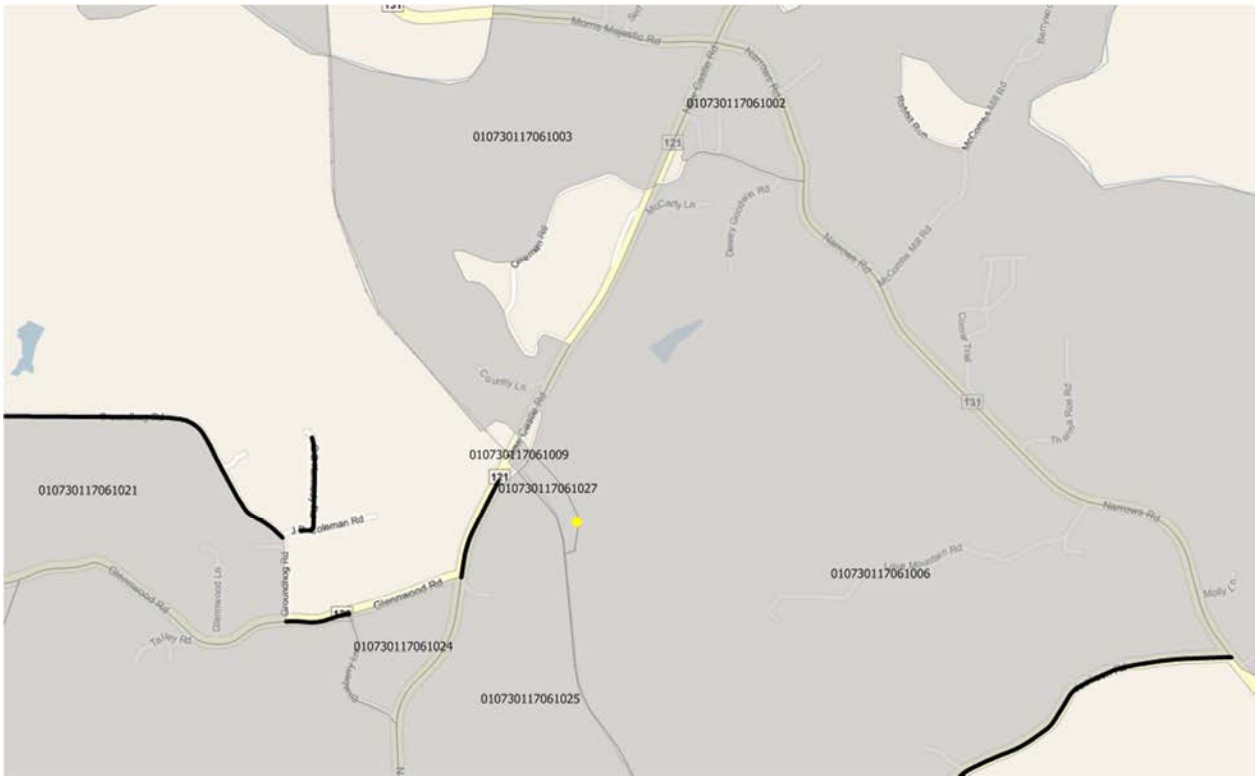


Figure 14--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

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

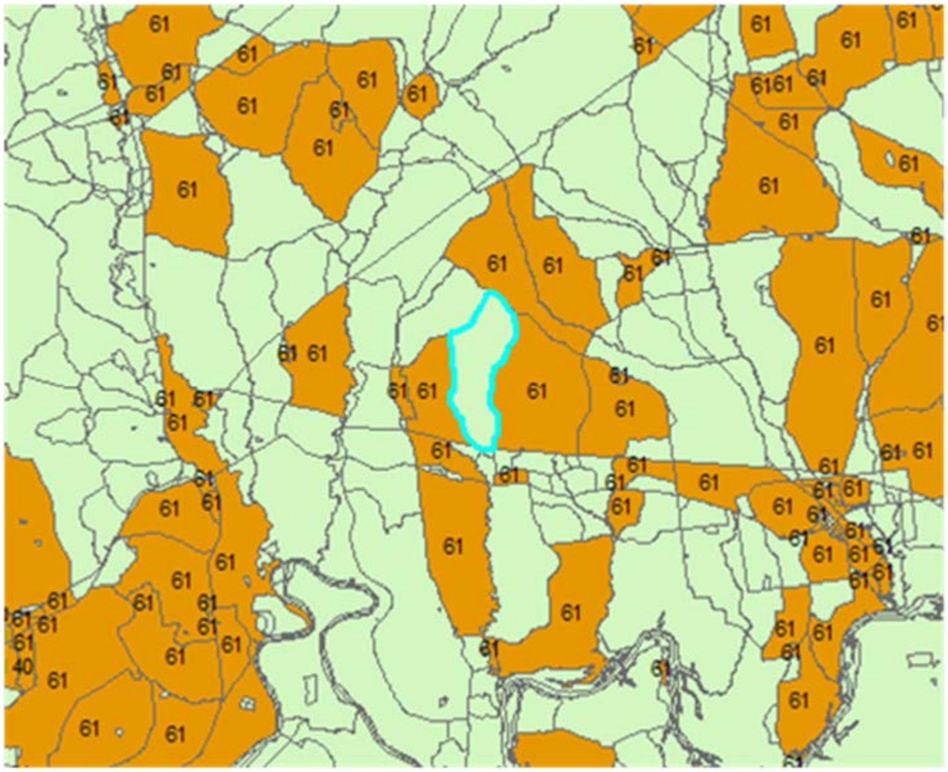


Figure 15--Dispersion in Submitted Data

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

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

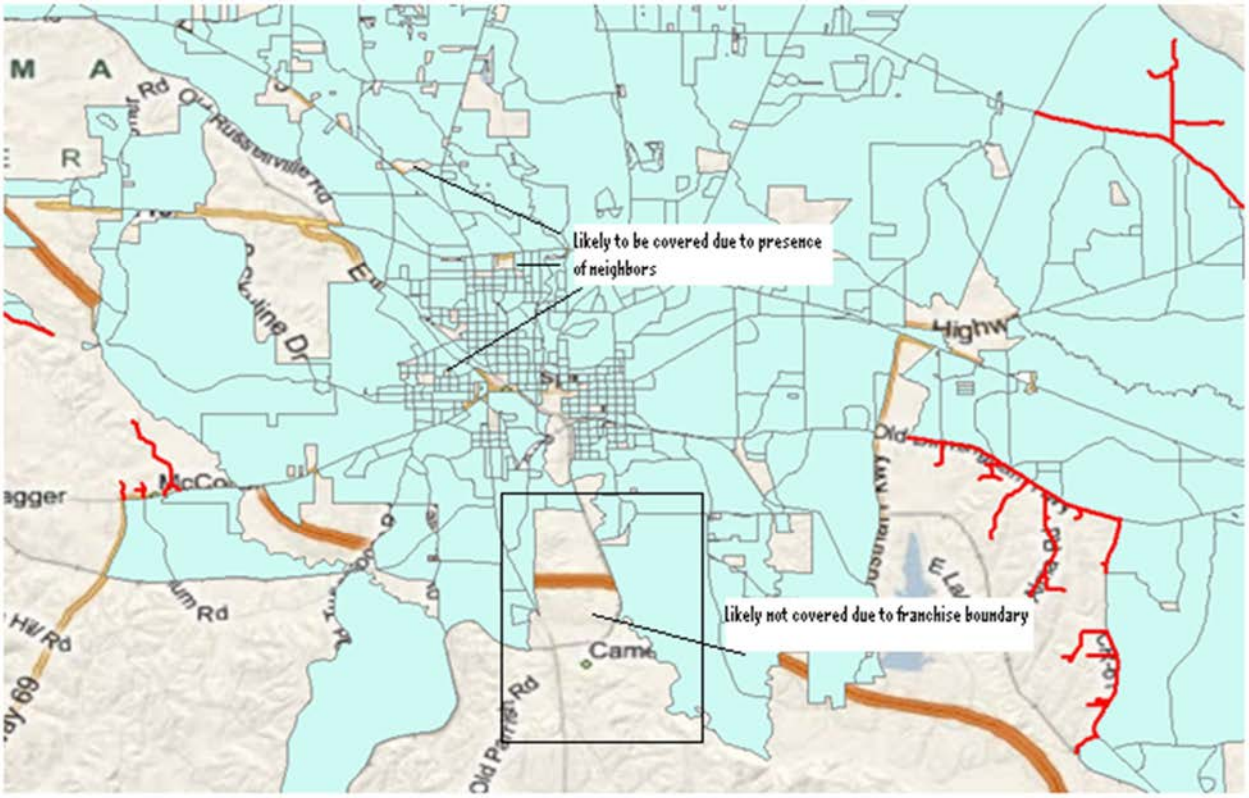


Figure 16-Where do you stop interpolating?

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

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

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

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

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

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

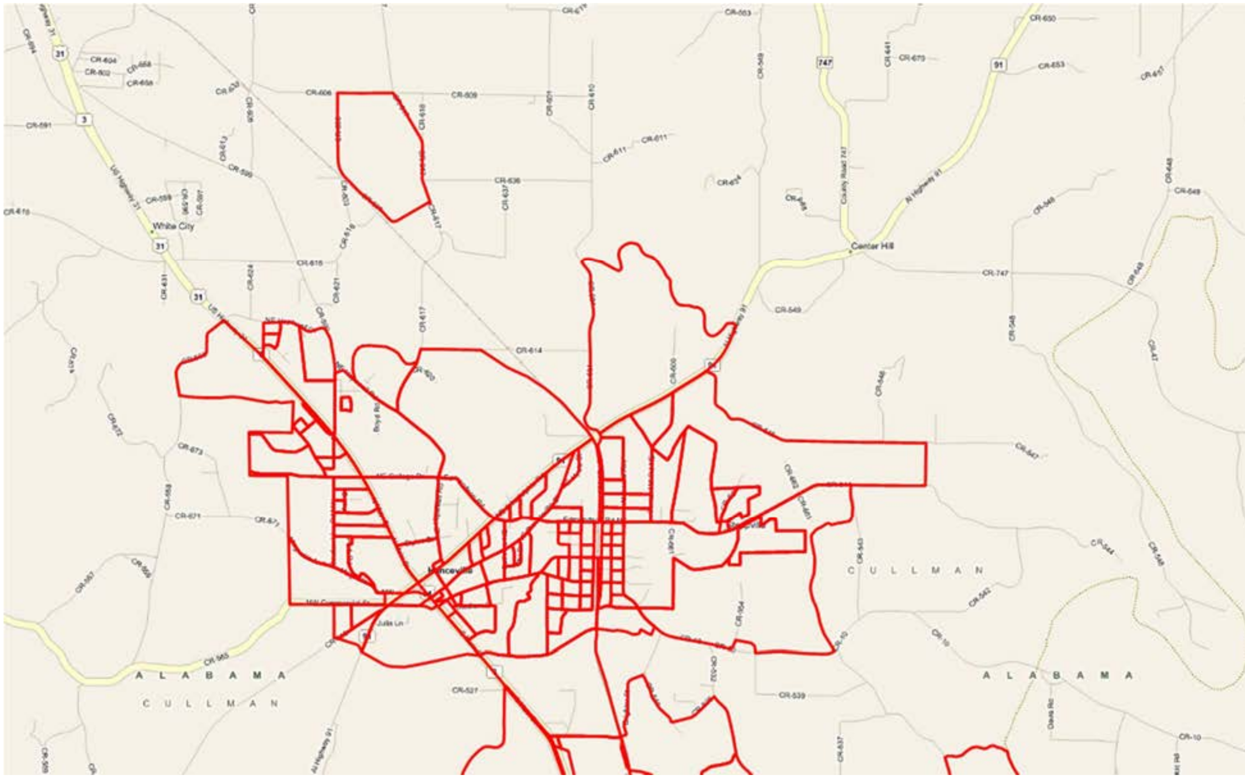


Figure 17-Dispersion in covered Blocks

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

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

Figure 18--DSL Coverage outside of exchange boundary

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

Verification Work Process

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

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

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

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

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

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

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

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

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

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

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

Consumer and Provider Responses to Deliverables

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

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

Online Map Experiences

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

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Online Display of Consumer Feedback

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

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

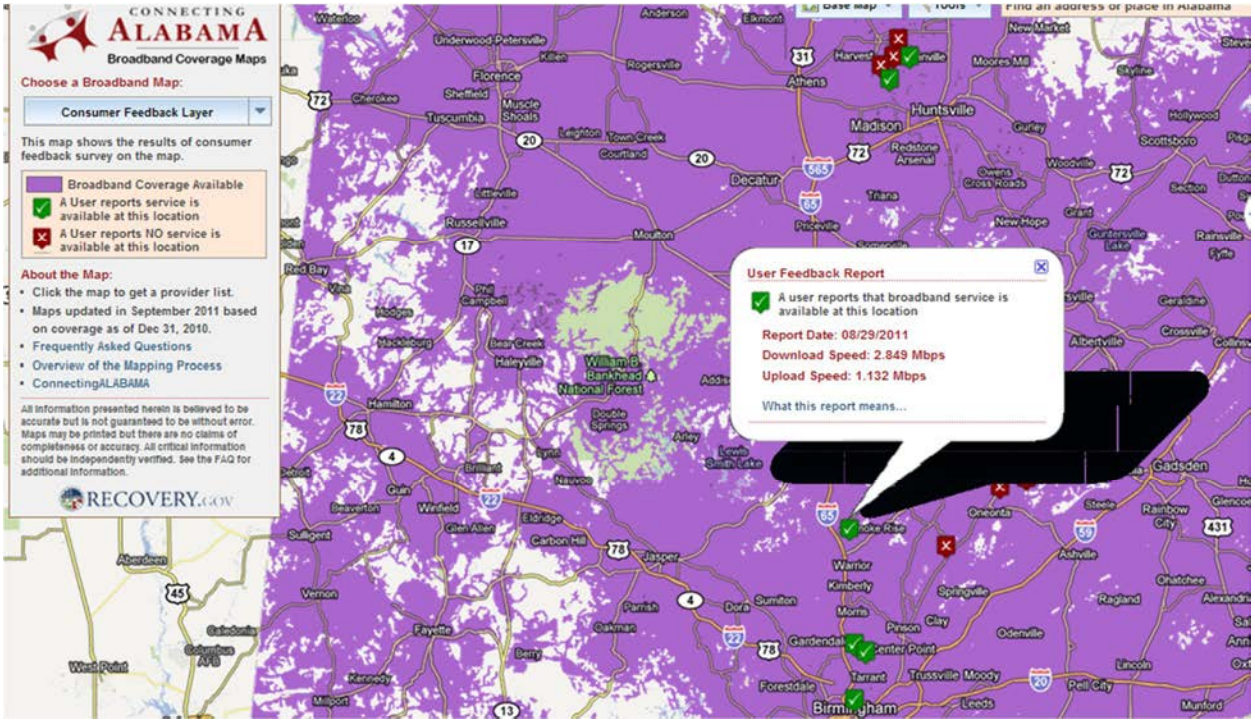
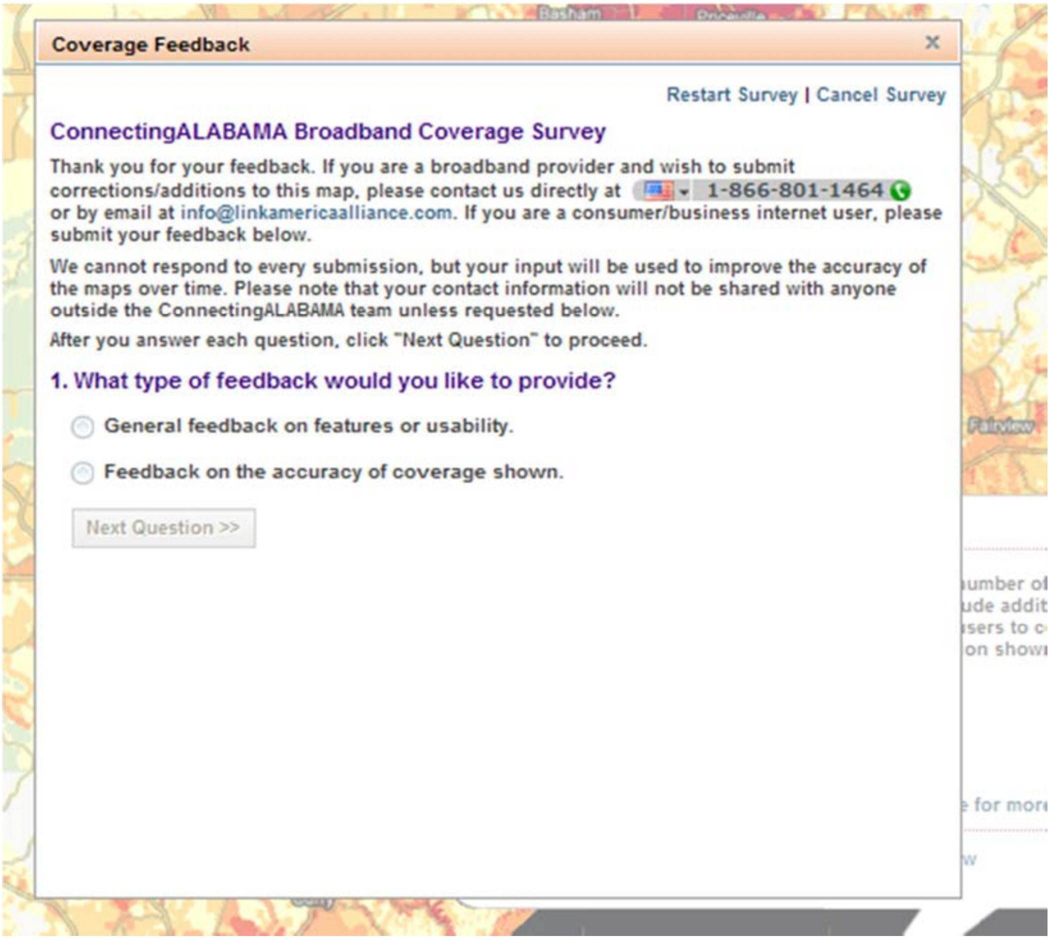


Figure 19--Consumer Feedback Layer

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



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

Perception of Unfair Treatment Across Technologies

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

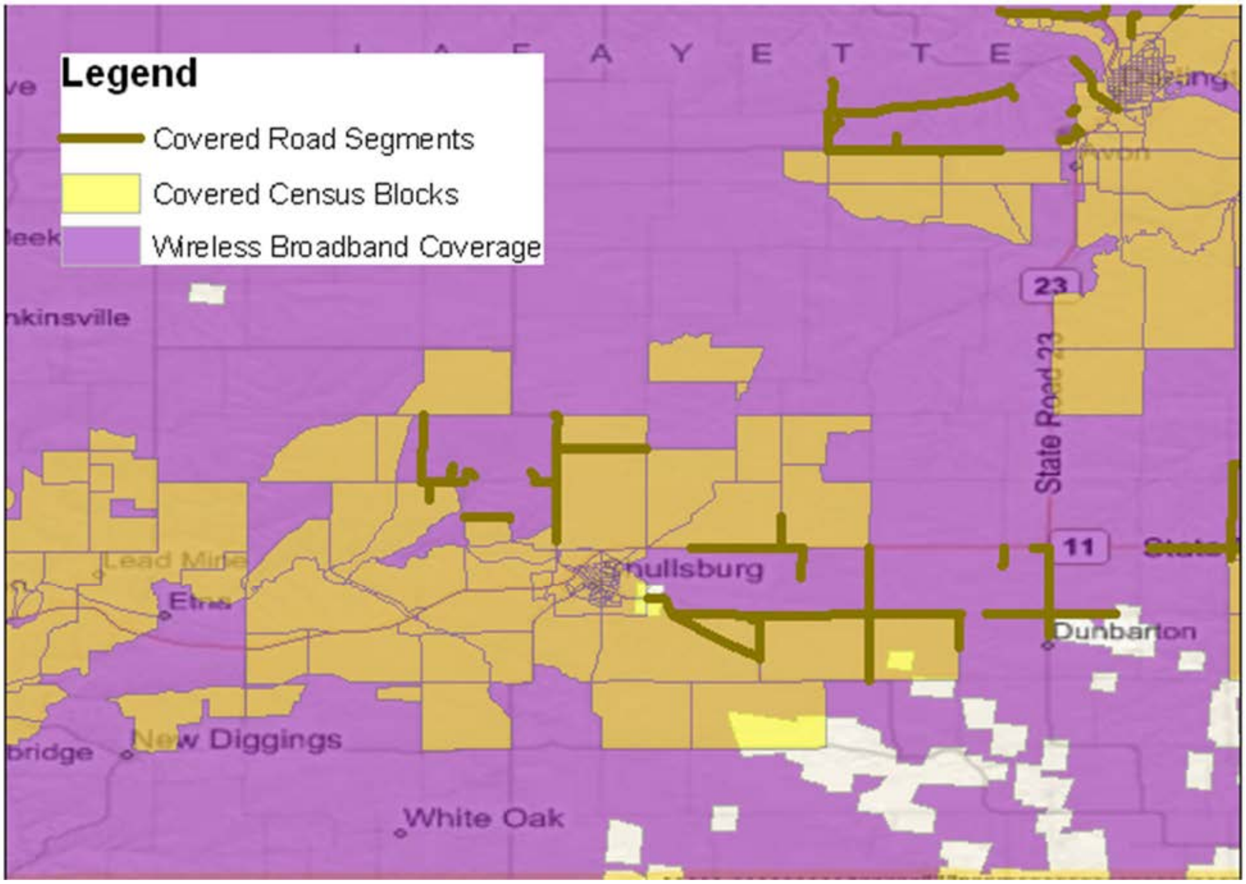


Figure 20--Multi Network Coverage portrayal

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

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many

dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

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

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

Appendix One

Community Anchor Institutions

Understanding the role that Community Anchor Institutions (CAIs) play in Idaho has demonstrated to be a complex process. In a state characterized by such a diverse geography and spread out rural communities it is challenging to identify a clear pattern that encompasses the workflows of each CAI in its community. The mapping team continues to focus on collecting CAIs' broadband access information with a very flexible and creative approach that attempts to address the particular situations of CAIs. The team expects that this approach will lead to the establishment of sound communications with CAIs, improved responses and therefore that the data collected will help inform policy makers and support the SBI planning process.

The work performed in the previous four submissions has yielded a stable and comprehensive dataset of CAIs in Idaho. The ongoing online survey continues to offer an efficient means for CAIs to provide connectivity data for their institutions. More specifically, as of the date of this report a little over a third of the data collected has been through survey responses. In the current submission we worked to achieve three objectives:

Update the physical addresses of the CAIs.
Raise awareness of the broadband mapping program to organizations associated with the CAI categories with special emphasis to relevant local and, state government agencies.
Reach out to public safety and higher education institutions to invite them to become engaged with the SBI program by participating in the online survey.

CAI Philosophy

The work performed for this submission was guided by three principles:

First, CAIs are important stakeholders within the planning process. CAIs are traditionally active participants of the communities planning processes. The challenge of the team is to encourage CAIs to include broadband accessibility in their discussions as an instrumental tool to improve their services to the community. It also allows broadband planning to tie into existing organizational and planning networks.

Second, we believe that CAIs will likely be one of the primary beneficiaries of targeted broadband funding. Some CAI categories are especially positioned to perform the dual functionality of 1) availing on the extended applications offered by broadband to improve the efficiency of the services they provide to the community (e.g., improved emergency planning, management and response, better medical services, etc.) and 2) providing a portal for people to access the increasing number of applications available through broadband (e.g., online training; job postings, goods and services, etc).

Third, we continue to use a rational and targeted approach to derive information. This means we will utilize our planning teams for as much ground work as possible. This also means that a goal of our CAI process is not an exhaustive Census of anything that could be a CAI; rather, it is the discovery, inventory and integration of Broadband planning activities into those CAIs that stand to produce the greatest synergies with the SBI planning process.

Based on these principles, the team directs its efforts to integrate broadband mapping in the ongoing fabric of the communities. We want to reach out to CAIs and help them realize viable ways to harness the potential of broadband access. We want to support CAIs to be able to become active voices in their communities to continuously encourage the inclusion of broadband in the community planning processes.

Anchor Institution Survey

In round 5 we contacted CAIs using an adaptive approach that consisted of three methods: 1) Emails were sent to 615 CAIs in Idaho inviting them to participate in an on-line survey regarding broadband access ; 2) we identified and reached out to central contacts based on the regional workflows already in place, and 3) we spoke to associations relevant to the targeted CAI categories with the goal of engaging their members in the SBI program. Contacting CAIs directly (first by email and then follow up phone calls) proved to be fruitful because we were able to get to know individual CAIs briefly, have a sense of what their perspective was relative to broadband, and invite them to participate in the on-line survey. From our perspective, although this method is very time consuming and work intensive, it allows the opportunity to personally explain the objectives of the program and answer questions. It also provides an opportunity for the individual institutions to become engaged in the broadband planning process. The on-line survey remains open between collection periods to provide opportunity for the Regional Planning Teams to update information as they engage with the community and to allow responding institutions to update their data as necessary. Additionally, where possible, CAIs were individually visited and encouraged to participate in the survey.

The second method included extending our network to a number of working groups at local, regional and state levels. We attended a variety of meetings such as public safety workgroups, state agencies meetings, risk management training sessions, etc. where the information about the broadband mapping program was presented and the participants were encouraged to share the information with their contacts and work groups. Through this effort we were able to establish a relationship with the GIS department manager of Clearwater County, who is also the Public Safety Coordinator, with important contacts within the police and fire department. She has volunteered to raise awareness of the broadband project within her county and with other public safety officials in the region. Through personal contacts such as this, the work of the team acquires a different dimension. Follow-up contact is better received by the CAI organizations when they have heard about the SBI program from somebody they already know and trust.

Another tool the team employed was the use of a GIS listserv to efficiently raise awareness about the project on different networks. For instance, by posting information about the SBI program on the Geotech list, which is accessed by several public safety authorities, the program is introduced with the intent of making future outreach to these organizations easier. Our hope is that having knowledge about the program will make them more willing to participate in the survey.

The third method included visits and communications with government offices of a particular type of CAI such as the Office of the State Fire Marshall. Since the location of his office is in Boise, it was inexpensive and easy for the team to pay him a visit and talk about the broadband project. He committed to pass the word to the fire departments in his distribution list. The team also made a specific effort to reach out to the Idaho Medical Association and the Idaho Hospital Association to provide information about the SBI program providing their members an opportunity to participate in a Healthcare Demand survey.

Anchor Institution Trends

To date we have focused our efforts on identifying community anchor institutions, verifying physical address information for the institutions, assigning appropriate NTIA tracking codes to the institutions when appropriate and seeking connectivity data from the institutions. We have placed a priority on reaching out to schools (K-12), libraries, and hospitals. Moving forward we will continue to reach out to the above groups but will increase our efforts to collect better data for the remaining CAI groups with specific emphasis on higher education and public safety institutions.

We are also exploring opportunities to partner with groups doing similar work for other agencies. In Round 5 an important relationship was established with Idaho Department of Water Resources. They house an effort -- in cooperation with the Federal Emergency Management Agency (FEMA) -- to model damage caused by natural disasters using GIS, and have developed a dataset of essential facilities in Idaho. This dataset was provided to us and we have used it as a validation tool for the CAI dataset that we have developed.

As a final verification step, the team is continuously striving to improve the CAIs positional accuracy. GIS methods were used to plot CAIs as points in a map based on the listed longitude and latitude fields. The location of each point was then compared to the essential facilities dataset and CAIs points were repositioned when necessary. We look forward to continue this work in subsequent submissions by utilizing this method or alternative ones such as geocoding. Another aspect of verification includes updating CAIs names as information becomes available and accounting for CAIs that are no longer operating.

Appendix Two

Data Collection Challenges

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

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

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

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

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

Census Block and Road Standards are not clear

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

Providers Not Wishing for Block Level Aggregation of Their Data

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

Broadband providers not Meeting the NOFA "provider" Definition

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

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

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

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

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

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

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

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

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

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

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

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

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

As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results.

Community Anchor Institution Surveys

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

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

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

Finally, as we survey groups we find a wider sampling of broadband technologies used. Fixed wireless and mobile wireless definitely exist in the CAI universe. NTIA may want to reconsider the automatic warning that comes from the check submission script from a non-wireline technology.

Granular Data Collection Issues

Non-Uniform Submission Standards

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

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

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to December 31, 2011. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

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

Confidentiality

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

Unclear on Definitions

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

Perception of Data Use

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

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

Location Uncertainty In Source Data

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

Covered Segment Process

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

Record Level Metadata

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

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

1. There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
2. In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
3. We believe some providers are trimming their coverage to honor license area boundaries.
4. Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
5. In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
6. As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
7. We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed over 10 Mbps.
8. We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.

9. We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the lower of the speed tiers.
10. Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.
11. In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.
12. In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to different than what would be returned in geocoding.
13. We made a modification to the NTIA supplied verification script. For the CAI layer we allow the TRANSTECH to be-9999, as per the default value in the fGDB.
14. We made a modification to the NTIA supplied verification script. In the script. The ' theST' variable is not correct for Wyoming.
15. We are aware of several warnings from the output of the validation script. The majority of the warnings are related to speed. In the cases where xDSL speeds are faster than 10 Mbps, we note in our data processing notes discussions with provider. This warning impacts address points, census blocks and road segments. In the case of cable broadband (Techtrans 40, 41) we have warnings associated with speed tier 8. In these cases we have verified the speed availability. Nonetheless, speed category 8 creates a warning for both DOCSIS 3 and non-DOCSIS 3 systems. We have one fail related to address points with multiple speed. Per the webinar on 3/26/12, the address fail is allowable.

Appendix Three

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

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

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

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

Appendix Four

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

Provider Categorization

Provider Type and Status Definitions

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

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant. Satellite providers are currently included in this category due to uncertainty over satellite reporting requirements.
4	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

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

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.
	S	Satellite	Satellite providers .
	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
N/A	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
X			No status codes associated with this Provider Type

Provider Disposition

Provider State	Provider ID	Provider Name	DBA	Provider Type	Provider Status
ID	679	360 NETWORKS	360 NETWORKS	O	NC
ID	148	A & W SATELLITE	A & W SATELLITE	O	S
ID	120027	ADVANCED CABLE TECHNOLOGY	ADVANCED CABLE TECHNOLOGY	N/A	NP
ID	153	ALL IDAHO INTERNET	ALL IDAHO INTERNET	R	R
ID	678	AMERICAN FIBER SYSTEMS, INC.	AMERICAN FIBER SYSTEMS, INC.	O	NC
ID	704	ASOTIN TELEPHONE COMPANY	TDS	P	V
ID	120000	AT&T INC.	NEW CINGULAR WIRELESS SERVICES, INC.	P	V
ID	661	AT&T MOBILITY LLC	AT&T MOBILITY LLC	p	P
ID	115	ATC COMMUNICATIONS	ALBION TELEPHONE COMPANY, INC.	P	P
ID	120028	ATLANTIC TELE-NETWORK	ALLIED WIRELESS COMMUNICATIONS CORPORATION	P	NR
ID	154	BIG SKY TELECOM	BIG SKY TELECOM	R	R
ID	155	BITSMART	BITSMART	P	P
ID	135	BRESNAN INTERNET	BRESNAN INTERNET	N/A	NP
ID	136	CABLE ONE	CABLE ONE	P	P
ID	120029	CACHE BROADBAND	CACHE BROADBAND	N/A	NP
ID	120002	CACTUS INTERNATIONAL, INC.	CACTUS COMPUTER	P	D
ID	116	CAMBRIDGE TELEPHONE	CTC TELECOM, INC.	P	P
ID	638	CAMBRIDGE TELEPHONE COMPANY, INC.	CAMBRIDGE TELEPHONE	P	P
ID	129	CENTURYTEL, INC.	CENTURYLINK	P	V
ID	131	CENTURYTEL, INC.	CENTURYLINK	P	P
ID	142	CEQUEL COMMUNICATIONS, LLC	SUDDENLINK COMMUNICATIONS	P	E
ID	132	CITIZENS TELECOMMUNICATIONS COMPANY OF IDAHO	FRONTIER COMMUNICATIONS OF IDAHO	P	P
ID	189	CLEARWIRE CORPORATION	CLEARWIRE CORPORATION	P	P
ID	149	COEUR D'ALENE TRIBE	RED SPECTRUM COMMUNICATION	P	E
ID	722	COLUMBINE TELEPHONE COMPANY, INC.	SILVER STAR COMMUNICATIONS	P	P
ID	527	COMCAST	COMCAST	P	P
ID	120003	COMMWORLD	COMMWORLD	P	NR
ID	120004	CONCEPT CABLE TV	CONCEPT CABLE TV	O	U
ID	156	CONVERTEC INTERNET SERVICES	CONVERTEC INTERNET SERVICES	N/A	NP
ID	754	COUNTRY CABLE	COUNTRY CABLE	P	NR
ID	137	COXCOM, INC.	COX COMMUNICATIONS	P	P
ID	120030	CRANER TECHNOLOGY SERVICES	CRANER TECHNOLOGY SERVICES	P	NR
ID	671	CUSTER TELEPHONE BROADBAND SERVICES, LLC	CUSTER TELEPHONE BROADBAND SERVICES	P	P
ID	117	CUSTER TELEPHONE COOPERATIVE INC.	CUSTER TELEPHONE COOPERATIVE, INC.	P	P
ID	157	DATAWAV-IS	DATAWAV-IS	X	NP
ID	134	DEUTSCHE TELEKOM AG	T-MOBILE USA, INC.	P	P
ID	158	DIGI-COMM	DIGI-COMM	X	NP
ID	170	DIGIS	LAST MILE WIRELESS	P	V
ID	686	DIGITAL BRIDGE	BRIDGEMAXX	P	P

		COMMUNICATIONS CORP.			
ID	118	DIRECT COMMUNICATIONS	DIRECT COMMUNICATIONS	P	P
ID	138	DIRECT COMMUNICATIONS	DIRECT COMMUNICATIONS	P	P
ID	159	DIRECT COMMUNICATIONS - WIRELESS	DIRECT COMMUNICATION	P	V
ID	139	DISH NETWORK	DISH NETWORK	N/A	NP
ID	716	ELK RIVER TV CABLE COMPANY	ELK RIVER TV CABLE COMPANY	P	NR
ID	119	FAIRPOINT COMMUNICATIONS, INC.	FREMONT TELCOM	P	P
ID	769	FAIRPOINT COMMUNICATIONS, INC.	FRETEL COMMUNICATIONS, LLC	O	P
ID	120	FARMERS MUTUAL TELEPHONE COMPANY, INC	FARMERS MUTUAL TELEPHONE COMPANY, INC.	P	P
ID	121	FILER MUTUAL TELEPHONE COMPANY	FILER MUTUAL TELEPHONE COMPANY	P	P
ID	162	FIRST STEP INTERNET, LLC	FIRST STEP INTERNET	P	P
ID	120005	FIRST STEP INTERNET, LLC	GLOBAL CROSSING TELECOMMUNICATIONS, INC.	R	R
ID	130	FRONTIER - PKA - VERIZON NORTH	FRONTIER COMMUNICATIONS OF THE NORTHWEST	P	P
ID	164	GEM STATE COMMUNICATIONS	GSC WIRELESS	P	P
ID	723	GOLD STAR COMMUNICATIONS	SILVER STAR WIRELESS	P	P
ID	120006	GREENFLY	CLEARFLY	R	R
ID	165	HERITAGE WIRELESS INTERNET (DIGIS)	HERITAGE WIRELESS INTERNET	P	V
ID	120007	HUGHES COMMUNICATIONS, INC.	HNS LICENSE SUB, LLC	O	S
ID	740	IDAHO REGIONAL OPTICAL NETWORK	IRON	O	NC
ID	166	IMBRIS, INC.	IMBRIS, INC.	N/A	NP
ID	120008	INLAND CELLULAR TELEPHONE COMPANY	WASHINGTON RSA NO 8 LIMITED PARTNERSHIP	P	V
ID	167	INLAND INTERNET	INLAND INTERNET	P	V
ID	122	INLAND TELEPHONE COMPANY	INLAND TELEPHONE COMPANY	P	P
ID	695	INTEGRA TELECOM HOLDINGS, INC.	ELECTRIC LIGHTWAVE, LLC	O	P
ID	120032	INTERMAX NETWORKS		p	NR
ID	169	ISPEED WIRELESS	ISPEED WIRELESS	P	NR
ID	687	JAB BROADBAND - DIGIS	JAB BROADBAND - DIGIS	P	P
ID	120009	KEYON COMMUNICATIONS HOLDINGS, INC.	KEYON COMMUNICATIONS HOLDINGS, INC.	X	NP
ID	120031	LASER IMAGE INC	LASER IMAGE INC	N/A	NP
ID	151	LEADER COMMUNICATIONS SERVICES (ST. MARIES WIRELESS)	LEADER COMMUNICATIONS SERVICES (ST. MARIES WIRELESS)	X	NP
ID	729	LEAP WIRELESS INTERNATIONAL, INC.	CRICKET COMMUNICATIONS	P	P
ID	660	LEVEL 3 COMMUNICATIONS, LLC	LEVEL 3 COMMUNICATIONS, LLC	P	P
ID	120010	LEVEL 3 COMMUNICATIONS, LLC	BROADWING COMMUNICATIONS, LLC	P	V
ID	171	LTLINK	FAMILY FRIENDLY INTERNET SERVICE	P	NR
ID	127	MARTELL ENTERPRISES, INC.	RURAL TELEPHONE COMPANY	P	P
ID	172	MEADOW CREEK COMPUTER WORKS	MEADOW CREEK COMPUTER WORKS	R	R
ID	645	MEGAPATH, INC.	DSLNET COMMUNICATIONS, LLC	O	P

ID	120011	METROPOLITAN TELECOMMUNICATIONS HOLDING CO	METROPOLITAN TELECOMMUNICATIONS HOLDING CO	R	R
ID	173	MICROSERV	MICROSERV	P	NR
ID	174	MICROWAVE DSL (HIBEK.NET)	MICROWAVE DSL	P	D
ID	123	MIDVALE TELEPHONE EXCHANGE, INC.	MTE COMMUNICATIONS	P	P
ID	124	MUD LAKE TELEPHONE COOPERATIVE ASSN., INC.	MUD LAKE TELEPHONE COOPERATIVE ASSN, INC.	P	E
ID	145	MULLAN CABLE	MULLAN CABLE	P	E
ID	674	NEW EDGE HOLDING COMPANY - EARTHLINK	NEW EDGE NETWORK, INC.	O	NC
ID	168	NEWMAX LLC	INTERMAX NETWORKS	P	P
ID	768	NEZ PERCE RESERVATION	NEZ PERCE RESERVATION	P	P
ID	175	NIDAHO.NET	NORTH IDAHO CONNECTION	P	NR
ID	146	NORTHLAND COMMUNICATIONS CORP.	NORTHLAND CABLE TELEVISION	P	P
ID	690	ONEEIGHTY NETWORKS	ORBITCOM, INC.	P	NR
ID	125	OREGON-IDAHO UTILITIES INC	OREGON-IDAHO UTILITIES INC	P	P
ID	176	OVERARCH BROADBAND	OVERARCH BROADBAND	P	NR
ID	737	PAETEC HOLDING CORP	MCLEODUSA TELECOMMUNICATIONS SERVICES, INC.	N/A	NP
ID	161	PASS WORD PKA -FASTLANE-I.COM	PASSWORD	N/A	NP
ID	705	POTLATCH TELCO	TDS TELECOMMUNICATIONS CORPORATION	P	P
ID	126	PROJECT MUTUAL TELEPHONE COOPERATIVE ASSOCIATION,	PROJECT MUTUAL TELEPHONE COOPERATIVE ASSOCIATION, INC.	P	P
ID	178	PTERA WIRELESS INTERNET	PTERA WIRELESS INTERNET	P	P
ID	179	QRO WIRELESS OF IDAHO	QRO WIRELESS OF IDAHO	P	P
ID	120012	RURAL NETWORK SERVICES (OWNED BY MIDVALE TEL)	RURAL NETWORK SERVICES	N/A	NP
ID	120025	RURAL NETWORK SERVICES (OWNED BY MIDVALE TEL)	RURAL NETWORK SERVICES	P	P
ID	180	SAFELINK INTERNET	SAFELINK INTERNET	P	E
ID	141	SILVER STAR BROADBAND PKA INDEPENDENT CABLE SYSTEMS/ (ICS)	SILVER STAR BROADBAND	P	P
ID	128	SILVER STAR TELEPHONE CO.	SILVER STAR COMMUNICATIONS	P	P
ID	181	SISNA (DIALUP)	SISNA	N/A	NP
ID	188	SKY BLUE	SKY BLUE	O	S
ID	120023	SKYBEAM	SKYBEAM	N/A	NP
ID	182	SPEEDYQUICK NETWORKS	SPEEDYQUICK NETWORKS	P	NR
ID	183	SPOKANE SKYNET	SPOKANE SKYNET	O	S
ID	651	SPRINT NEXTEL CORPORATION	SPRINT NEXTEL CORPORATION	P	P
ID	163	ST. MARIES GAZETTE WIRELESS	ST. MARIES GAZETTE RECORD	P	V
ID	191	ST. MARIES GAZETTE WIRELESS	ST. MARIES GAZETTE RECORD	P	P
ID	120013	STARBAND COMMUNICATIONS INC.	STARBAND COMMUNICATIONS INC.	O	S
ID	120014	STAT NETWORK SOLUTIONS	STAT NETWORK SOLUTIONS	P	NR
ID	120015	STRATOS GLOBAL CORPORATION	STRATOS OFFSHORE SERVICES COMPANY	O	S
ID	143	SUPERIOR SATELLITE	SUPERIOR SATELLITE	O	S
ID	184	SURF1	SURF1	P	NR

ID	696	SYRINGA NETWORKS, LLC	SYRINGA NETWORKS, LLC	O	NC
ID	133	TELEPHONE AND DATA SYSTEMS, INC.	TDS TELECOMMUNICATIONS CORPORATION	P	V
ID	185	TETON WIRELESS	TETON WIRELESS	X	NP
ID	653	TIME WARNER, INC.	TIME WARNER CABLE LLC	P	P
ID	144	TROY CABLE	TROY CABLE	P	E
ID	759	TW TELECOM INC.	TW TELECOM HOLDINGS INC.	P	P
ID	120017	VERIZON BUSINESS GLOBAL LLC	VERIZON BUSINESS	O	NC
ID	713	VERIZON COMMUNICATIONS INC.	CELLCO PARTNERSHIP	P	P
ID	766	WESTCOM LLC	WESTEL FIBER	P	P
ID	666	WILDBLUE COMMUNICATIONS, INC.	WILDBLUE COMMUNICATIONS, INC.	P	P
ID	186	WILDERNESS WIRELESS	WILDERNESS WIRELESS	P	P
ID	147	WINDJAMMER COMMUNICATIONS LLC	WINDJAMMER CABLE	P	P
ID	152	WIRED OR WIRELESS, INC.	AIR PIPE	P	P
ID	120019	XO HOLDINGS, INC.	XO COMMUNICATIONS, LLC	R	R
ID	120020	ZAYO BANDWIDTH NORTHWEST, INC.	ZAYO GROUP, LLC (FIBERNET)	O	NC

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OFFICIAL APRIL 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND DATA AND DEVELOPMENT GRANT PROGRAM FOR THE STATE OF ILLINOIS

Partnership for a Connected Illinois

broadbandillinois.org

April 2012

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Cover Letter

April 2012

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

Dear Ms. Neville:

Please accept this submission from the Partnership for a Connected Illinois (PCI), the Designated Entity for Illinois.

These artifacts should be found to be compliant with the April 1, 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.

This cycle, PCI continued its full responsibility for the data-collection activities from broadband providers in the State. Assuming this role is vital to achieve the State's goals with regard to improving broadband access and adoption – and which are in turn central objectives of the Partnership for a Connected Illinois. All facets of this data-collection transition, and the activities that flowed from it, are included in the narrative that follows.

If you have any questions about this Data Narrative, please do not hesitate to contact me, at 217-816-4151.

Respectfully submitted,

Drew Clark

Drew Clark
Executive Director
Partnership for a Connected Illinois, Inc.

INTRODUCTION

The data submission cycle ending on April 1, 2012 marks the second round that PCI has held the full responsibility of data collection and publishing for the entirety of the six months. In this round, PCI used creative new strategies in its outreach to the carriers. PCI continued to establish Non-Disclosure Agreements (NDAs) with broadband providers for confidential information. The data that accompanies this narrative contains edited data for 57 out of the 138 carriers included in the submission. This round gave PCI the opportunity to refine its data verification process through the use of GeoPDF maps and third party data sources. PCI also improved its Community Anchor Institution database through a comprehensive survey strategy.

In this round, the Partnership for a Connected Illinois (PCI) took major steps in its three-fold mission to collect and publish broadband data, to ensure broadband access throughout the State, and to maximize broadband's impact. Assuming this data collection role is vital to achieve the State's goals with regard to improving broadband access and adoption. PCI appreciates the assistance provided by NTIA as PCI improved its collection, processing, and verification of broadband data for submission according to NTIA standards.

PCI has continued to refine the Broadband Illinois web site. This consumer-friendly interface allows for residents of the State to intuitively access the information collected by PCI – and provides the ability to "crowdsource" the collection of price information, actual speed data, and to let consumers verify the data provided by broadband providers. Since the last submission cycle that ended on October 1, 2011, PCI has included a range of maps not previously available. The Broadband Illinois website contains county-level GeoPDFs for each of Illinois's 102 counties, as well as pages for each broadband provider in the State of Illinois. These maps can be downloaded and edited using the TerraGo Technologies toolbar, which will be explained in great depth in various parts of this narrative.

This narrative will summarize the carrier outreach, the data production methods, carrier data verification, and the community anchor institution data. It will conclude with an examination of the Broadband Illinois website and the ways in which PCI is publishing carrier data in a user-friendly manner that allows for feedback from the consumer.

CARRIER OUTREACH

From January 9 through January 11, 2012, all providers currently in the PCI census block and wireless layers were sent GeoPDFs that displayed their coverage area in the State of Illinois. The GeoPDFs were fully editable by the provider using the TerraGo technologies' toolbar. As part of this e-mail, PCI requested that updated data be submitted to PCI for its Cycle 5 submission to the NTIA and for the update to the Illinois Broadband map. For those providers who had not previously established a Non-Disclosure Agreement with PCI, a copy of PCI's draft version accompanied these maps.

This entire outreach process was tracked on Salesforce, PCI's content management tool. As maps were created, distributed, and verified, fields were populated in Salesforce to denote that a map that met the approval of the provider had been created. For those providers who did not respond to their initial map request, multiple follow-up e-mail and phone call attempts were made. PCI also tracked whether there would be an update to the data for this submission, what version number of the data PCI would be submitting, and the dates in which an NDA had been established.

This section will explain the way in which PCI conducted its outreach to the carriers and the different ways in which it received data. It will outline some of the major updates that were received in this round as well as describe both quantitatively and qualitatively the extent to which data was updated in this round.

NDA

PCI continues to offer and abide by the terms of our NDA. If providers did not establish an NDA in a previous round, they were given the opportunity to do so in this round. In other instances, NDA's were individually negotiated to address specific provider concerns.

When an NDA was established with a provider, the date that the NDA was established was recorded in Salesforce. A field in Salesforce was also populated as to whether or not the provider would be submitting new data for this Cycle 5 submission. If a provider responded with no change to the data, PCI removed priority from that provider and refocused attention on those providers who reported that there was a change to their data as of December 31, 2011. PCI wanted to establish the NDAs by focusing on those providers with new data to submit.

To date, PCI has established 92 NDA's with the 138 providers in the database that accompanies this submission. Many of the carriers who have chosen not to establish an NDA with PCI, never had one with the previous mapping contractor, and continue to work with PCI to refine the data. The data package demonstrates that PCI is providing updated data for several providers with whom an NDA has not been established.

Updates to Data

Of these 138 providers submitted as part of the data package in this round, edited data has been submitted for 57 of them. This data comes in the form of new infrastructure, speed changes, and corrections from PCI's previously submitted data. In this round, the Partnership for a Connected Illinois added twelve new carriers: New Wave Net Corp, Open Air Wireless, Illinois Rural Electric Cooperative, Illinois Century Network, Kaizennet, Sonic Spectrum, Essec Telecom, Park TV & Electronics, 4SIWI, Highland Communications, Hughes Networks, and WildBlue Communications. A merger between Leap Wireless and Denali Spectrum resulted in data for only Leap Wireless in this round. Also, Comcast sold all of its equipment to Telecommunications Management in Southern Illinois.

Broadband service providers submitted coverage in terms of the areas that they served, either in edited GeoPDFs, direct geospatial formats, CAD files, excel databases, text files, Google Earth files, or as paper maps. The submitted polygons were overlaid on the census block polygons and those blocks touching were selected and used. The proper speed tier categories were assigned as necessary.

Throughout February and early March, the PCI data team formatted data as it was received. A cutoff date of February 17, 2012 was established for the acquisition of new data to include in this submission. However, PCI continued to accept data well after that date, and all providers who submitted updated coverage in this round are included in this submission.

The table below summarizes the status of data among providers.

No update to coverage area/ verified previous data/previous data submitted	81
Previous provider provided an update to coverage area that was included in this cycle.	45
New provider for this round	12
Total number of providers included in this submission	**138**

Total number of providers included in this submission	138
Potential identified Illinois providers that have never participated in mapping project	46
Total number of providers identified in the State of Illinois	**184**

Changes and Corrections

On August 19, 2011, PCI along with the other SBDD's designated entities submitted a changes and corrections document to the NTIA for the data that was submitted in Round 3. PCI felt this was a very useful document, and would like to incorporate it into this narrative to demonstrate the extent to which PCI updated its data in this round. While the last section quantitatively expressed how data was changed, this section qualitatively explains each of the updates that were made. Some of the more extensive changes and corrections will be described in later sections.

Provider	Change	Correction	Desription
4SIWI		X	New Wireless and FTTH Provider
Adams Networks Incorporated	X		Added FTTH to Several Rural Towns
Alhambra-Grantfork Telephone Company	X		Increased Speed in Rural Towns
AT&T	X		Added new dataset for middle mile, mobile, and census block.
		X	Corrected mobile, middle mile, and census block data, that was incorrectly reported in last round
Cass Communications Management, Inc.	X		Increased TT71 Speed
		X	Added cable towns not previously included.
Cellular Properties, Inc.	X		Updated new fixed wireless data and coverage area
		X	Added mobile wireless coverage
CenturyLink		X	Corrected Coverage to comply with speed tier check in script
Cequel Communications	X		Increased Coverage and Speed

		X	Addressed duplicate error
Charter Communications	X		Increase Coverage and Speed
Clearwire Corporation	X		Increase Coverage and Speed
Comcast	X		Comcast sold infrastructure in Southern Illinois. Updated Census Blocks and Roads
		X	Corrected previous census block issues,
Computer Dynamics	X		Increase Speed and Coverage
Corn Belt Wireless	X		Increased Coverage and Speed
Covad Communications	X		Updated Street, Census Block and MiddleMile
		X	Correced issue When Joining Data
Delta Communications		X	Added DSL by 20 wire center central offices, as well as updating wireless
ESSEC TELCOM, INC.		X	New Provider in wireless layer
Fairpoint	X		Corrected Speed Tiers Change: Regocoded Address to get Census Blocks, increase coverage
		X	Added Service Address.
Frontier Communications		x	Trimmed existing data using wirecenter boundaries
Full Choice	X		Increase Speed and Coverage for DSL and Wireless
Heartland Cable	X		Added 2 Towers
Highland Communications	X		New municipality providing FTTH since last round.
Hughes Network Systems		X	New satellite provider in wireless layer
Illinois Century Network		X	New provider in middle mile layer
Illinois Rural Electric Cooperative		X	New provider in wireless layer
Intelligent Computing Solutions	X		No Change to Coverage, Increase MaxAdDown Speed
Jo-Carroll	X		Added 34 Towers
Joink	X		Updated Wireless data and coverage area
		X	Added DSL as a reseller
Kaizennet		X	New provider in wireless layer
KWISP Wireless Internet Services	X		Updated Coverage and Speed
Leap Wireless International, Inc.	X		Updated TT80 Coverage, merger with Leap and Denali
McDonough Telephone Cooperative	X		Added FTTH
McNabb Telephone Company	X		Increase Speed and Coverage
		X	Coverage increase
Mediacom		X	Trimmed data, and mapped based on service addresses, also added service

			address
Mount Vernon.Net, Inc.	X		Updated Coverage and Speed
New Wave Net Corp.		X	New provider in wireless layer
New Windsor Telephone Company	X		Added FTTH
		X	Addressed issue of duplicate census blocks with varying speeds.
One-Eleven Internet Service, Inc.	X		Increased Coverage and Speed
Oneida Telephone Exchange, Inc.	X		Added FTTH in rural community
Open Air Wireless		X	New provider in wireless layer
Park TV & Electronics		X	New provider in wireless and census block layer
RCN Regulatory	X		New Database Geocoded added
		X	Added Service Address
Shawnee Telephone Co	X		Added FTTH connection as a result of BTOP project
Sidera LLC	X		Added 3 Middle-Mile Points
Sonic Spectrum, Inc		X	New provider in wireless layer
Sprint Nextel	X		Mobile Wireless Update
		X	Corrected to have 3G in 4G coverage, per NTIA requests
T-Mobile	X		Mobile Wireless Update
Telelcommunications Management, LLC	X		Added Cities in Southern Illinois, bought from Comcast, added D3 to towns
Time Warner Cable	x		Updated data and coverage area
Tw Telecom of Illinois, LLC	X		Middle Mile Update
US Cellular		X	Mobile Wireless Update
US Signal Company, LLC	X		Middle Mile Update
Verizon Communications, Inc.	X		Mobile Wireless Update
Wabash Telephone Cooperative, INC		X	Added DSL
WildBlue Communications		X	New satellite provider in wireless layer
Wireless Data Net, LLC	X		Increased Coverage and Speed
Wisper ISP, Inc.	X		Increase in Speed and Coverage
Woodhull Telephone Company		x	Increased Speed

SBDD Data Transfer Model Methodology

The submission of the broadband dataset for April 1, 2012 is contained within the SBDD Data Transfer Model. PCI has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the State, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

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

Inventory of Deliverables, Partnership for a Connected Illinois: October 1, 2011:

NOFA Requirement	Data Transfer Model	Data Description
AppendixA: 1(a)	BB_Service_Address	List of addresses at which broadband service is available to end users in the provider's service area.
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census blocks Larger in Area Than Two Square Miles
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing

The provider data collected by PCI on behalf of the State of Illinois have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBDD Data Transfer Model. Wireline availability is contained within census blocks and road segments. Wireless availability is contained as polygons of coverage areas. Middle-mile connections and community anchor institutions are contained as point data. The subscriber weighted nominal speed (if available) is contained within the overview feature class. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible. (Methodology Paper, April 2011)

Commenting on previous round of data submission, NTIA cited issues with data gaps near the borders of the state and recommended using the U.S. Census Bureau state boundary data. Thus, in this round of data submission, we are including the U.S. Census Bureau 2010 Census Illinois state boundary in its native GCS_North_American_1983 coordinate system.

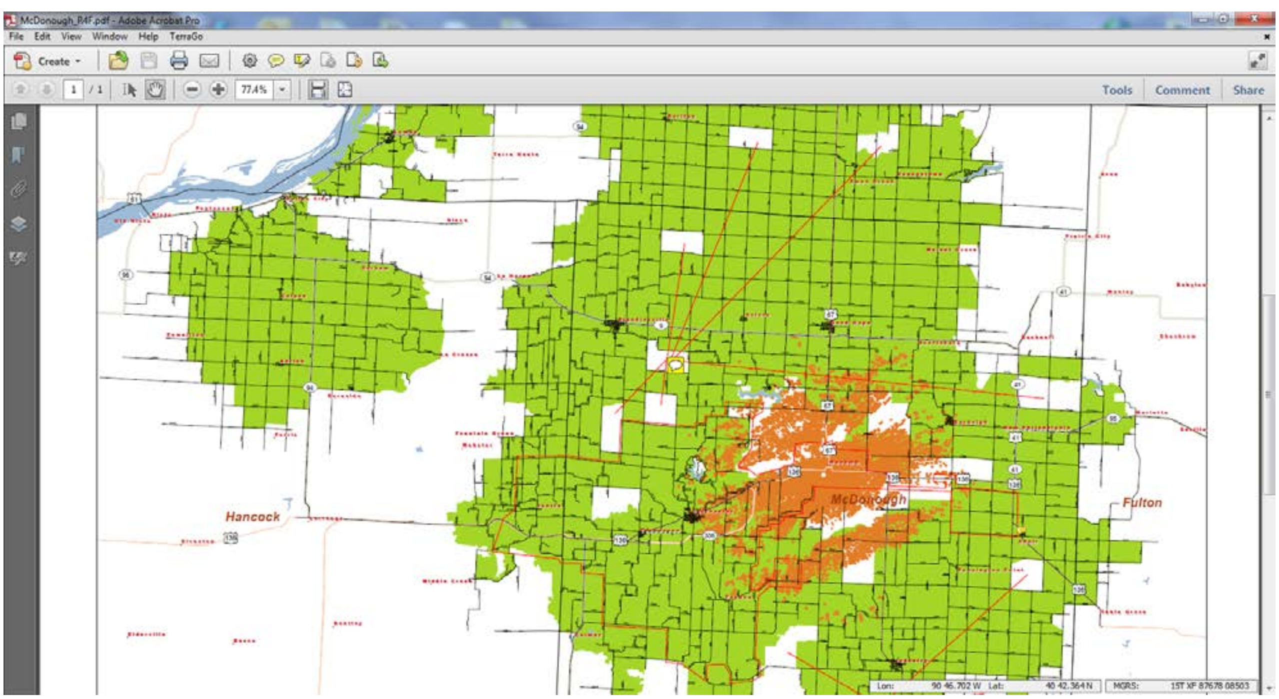
DATA PRODUCTION METHODS

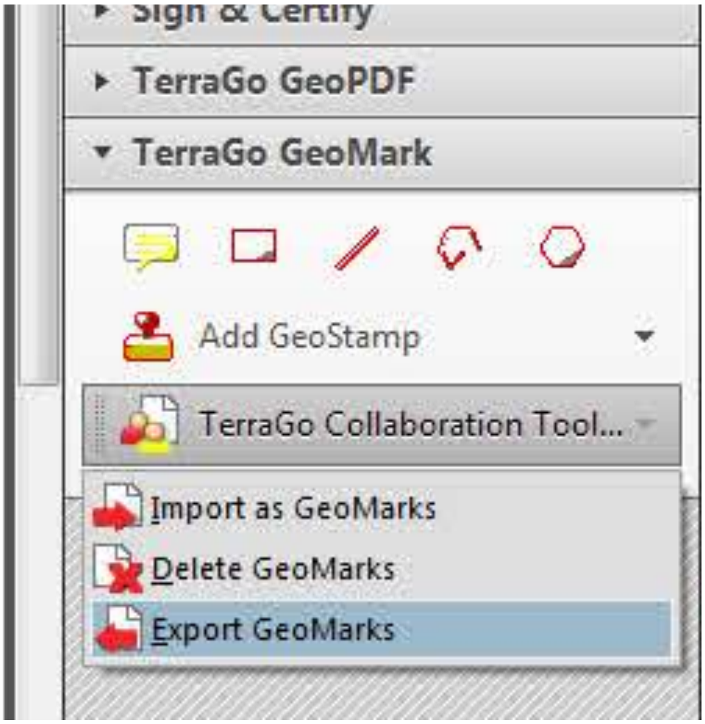
As mentioned, data was received in a number of formats that required processing in order to prepare the data for submission in accordance with NTIA requirements. This section discusses various means PCI used to process raw data received from the provider, as well as how PCI assisted the provider in making the update process as easy as possible. It will examine each layer and the steps PCI took in updating the data that submitted to NTIA.

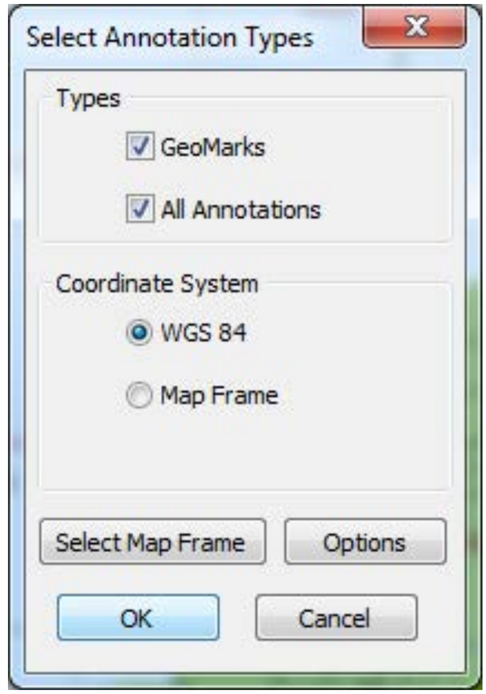
GEOPDF AND TERRAGO TECHNOLOGIES TOOLBAR (DSL & FTTH)

In the initial outreach made to the providers from January 9 through January 11, they received a map of their existing coverage area. We do this through the use of TerraGo GeoPDF maps. This allows the provider to mark up the map with corrections and allows PCI to bring those corrections into ArcGIS. Instructions on how to install and use TerraGo GeoPDF toolbar were made available here: http://broadbandillinois.org/maps/Carrier-Maps/About-GeoPDF-Maps.html .
This toolbar created several opportunities for the provider to really zoom in and edit their coverage area according to how it was actually represented. When it comes to verifying carrier level data, PCI felt the GeoPDF and the virtual meetings where PCI and the provider started carving up the data were extremely useful. The images on the next several pages demonstrate how DSL and FTTH providers were able to use the toolbar to carve up coverage areas to update their data.

The provider, upon opening the map was instructed to use the icon to turn layers on and off, and follow the instructions to mark up the map. The image below is a marked up GeoPDF of McDonough Telephone Cooperative in which they indicate where they have had FTTH deployment since their previous submission.

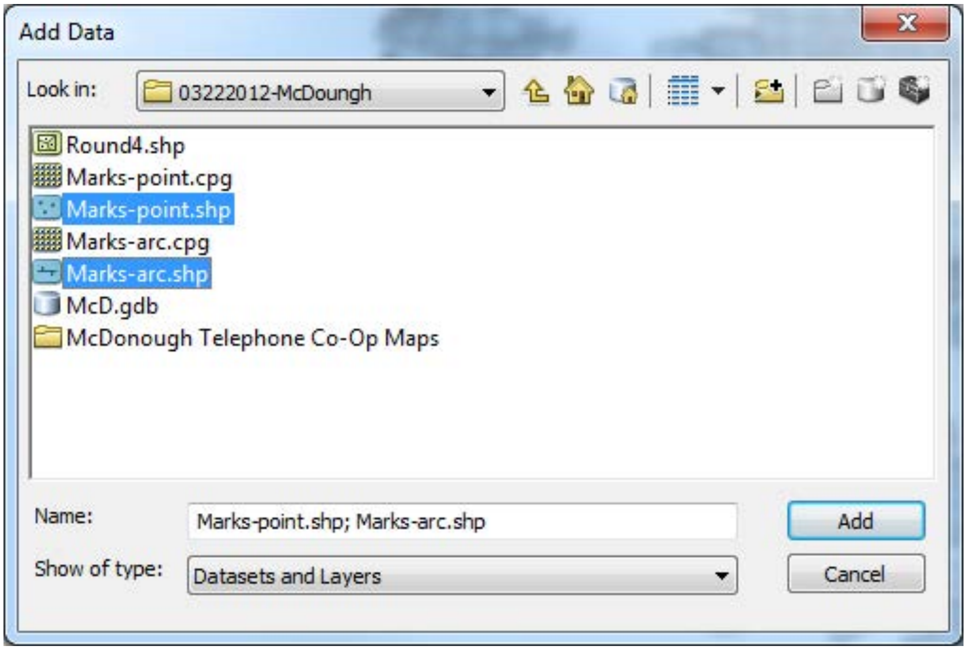


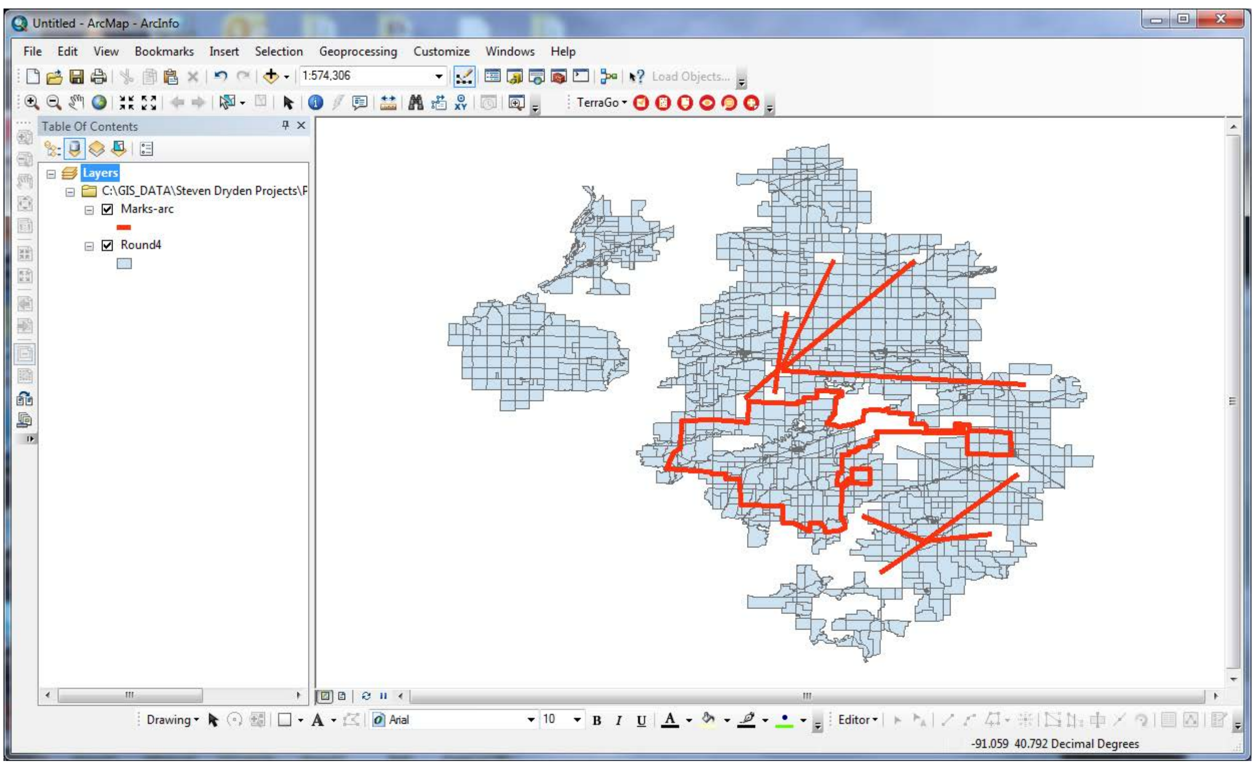




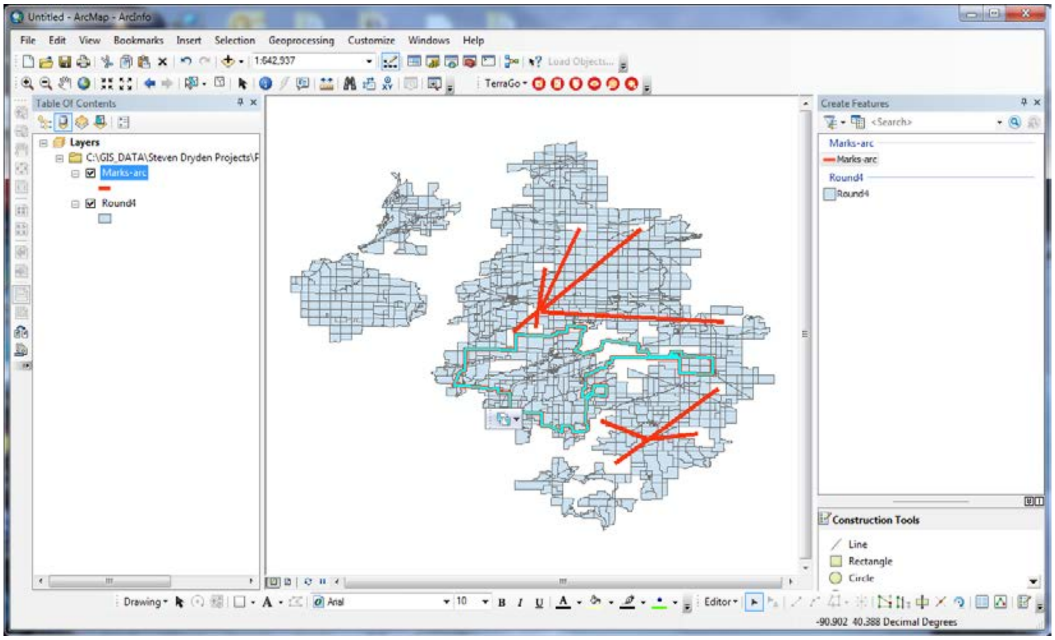
With this tool, providers can draw lines, comments, polygons, and points as indicated in the image to the top-left. From here we can export comments and geomarks as an ESRI Shapefile as demonstrated by the images above.

After exporting the geomarks from the GeoPDF, we can now import them into ArcGIS. This provider has drawn lines to show where they have added FTTH and where they want us to fill in holes in their other census block coverage. The geomarks are indicated by the red lines on the bottom image.

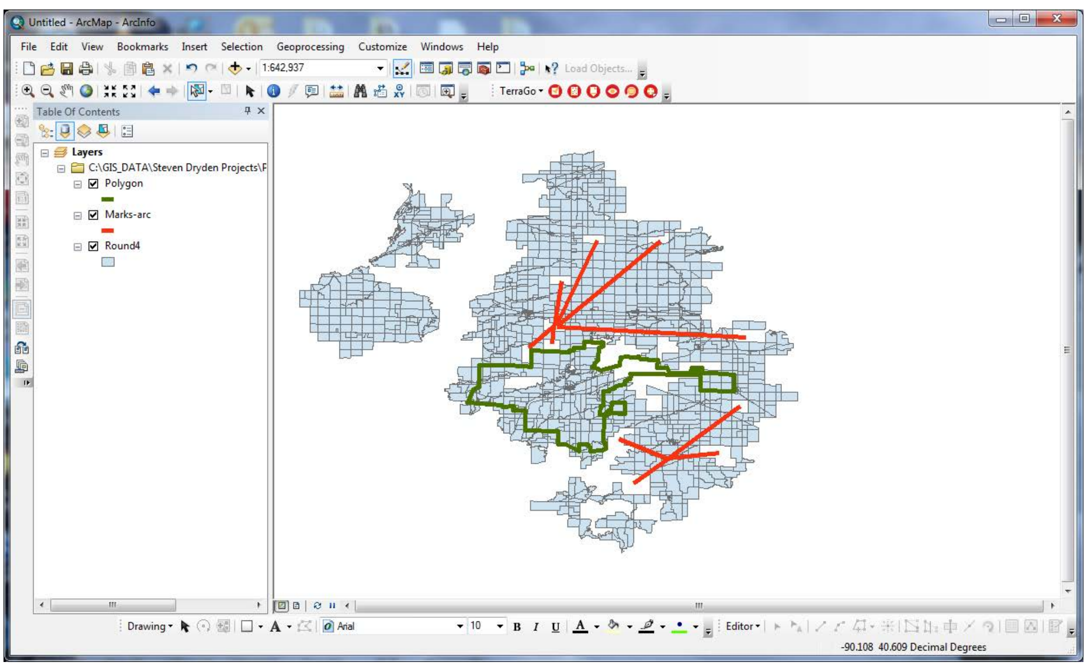




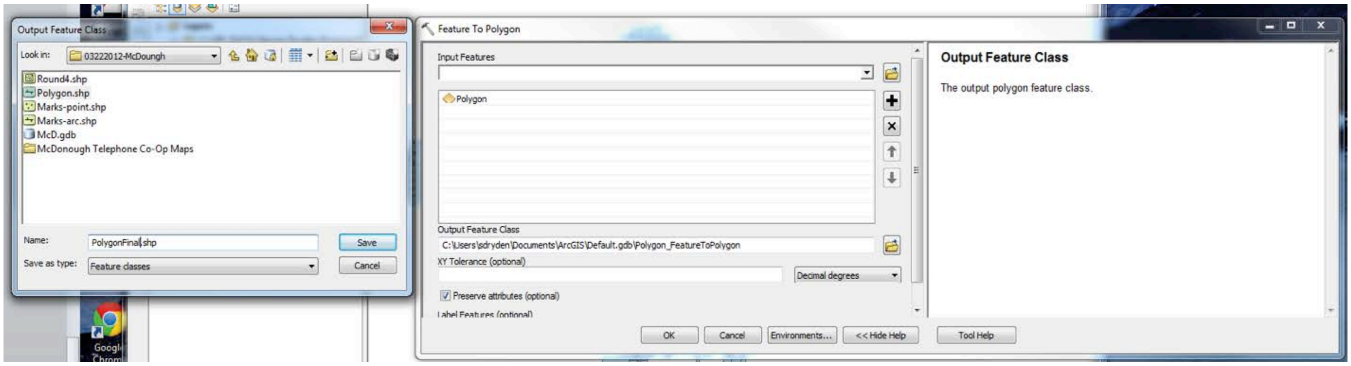
From here, we add Census Blocks as needed. For lines that represent an area, we can convert to a polygon so we can easily select Census Blocks. First we select the lines that need to be converted into a polygon (highlighted in Blue), we will export the selected.



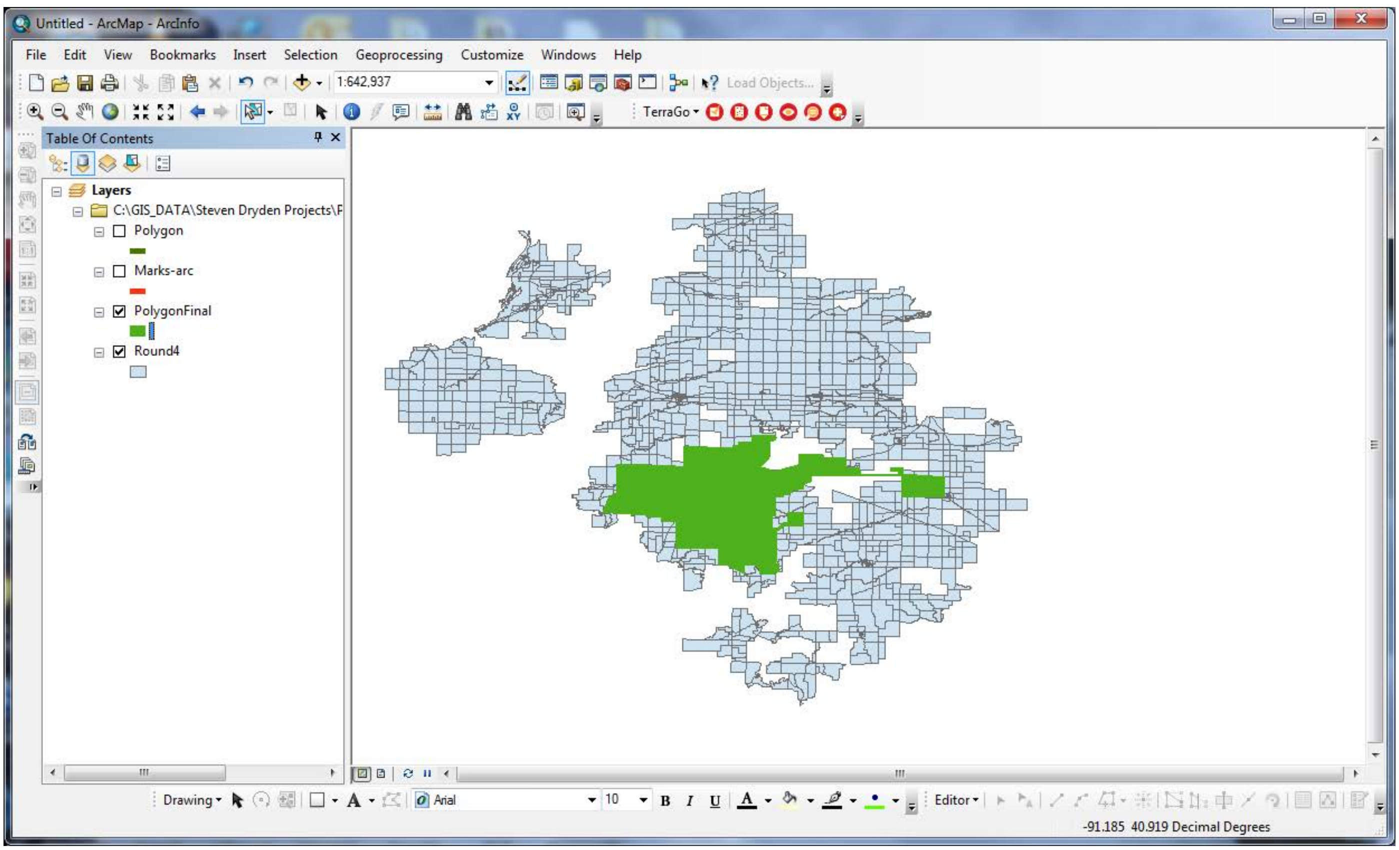
Here you can see we now have separated the polygon line we need. Now we can convert this to a true polygon.



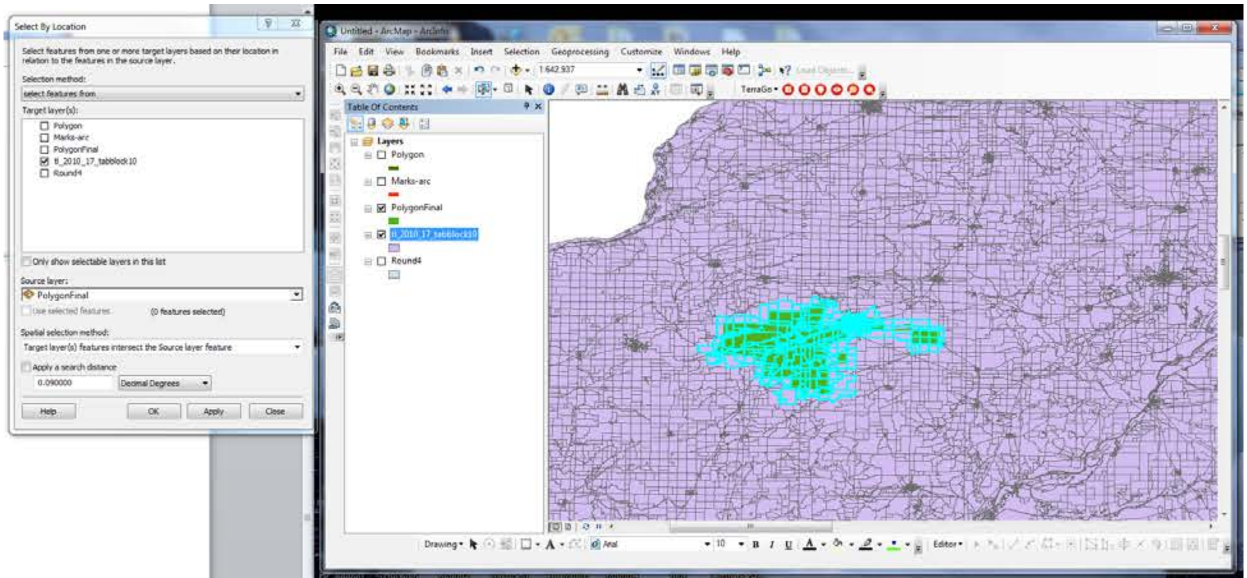
To convert a line to a Polygon, we used the Feature To Polygon tool in ArcGIS

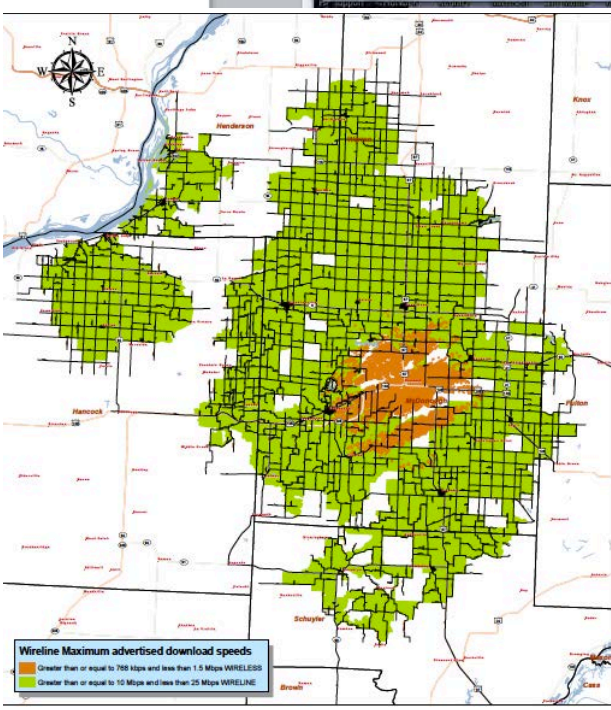


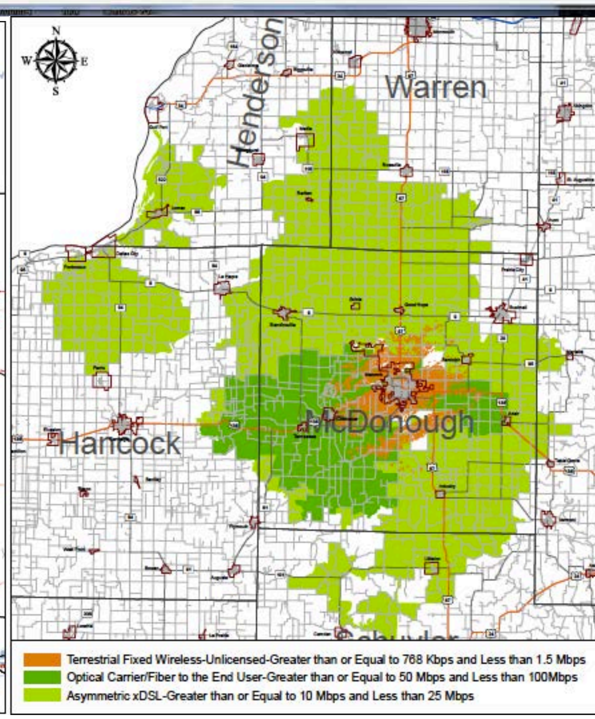
The end result is a polygon that will be used to select Census Blocks that are inside or touch the boundary.



To obtain the Census Blocks needed, we will use Select By Location process. As you can see, the Census Blocks are now selected. All that is needed now is to export the specified census blocks out, and provide the data with attributes as indicated by the provider. The maps below show the initial data and the data after the updates are made through the GeoPDF software.

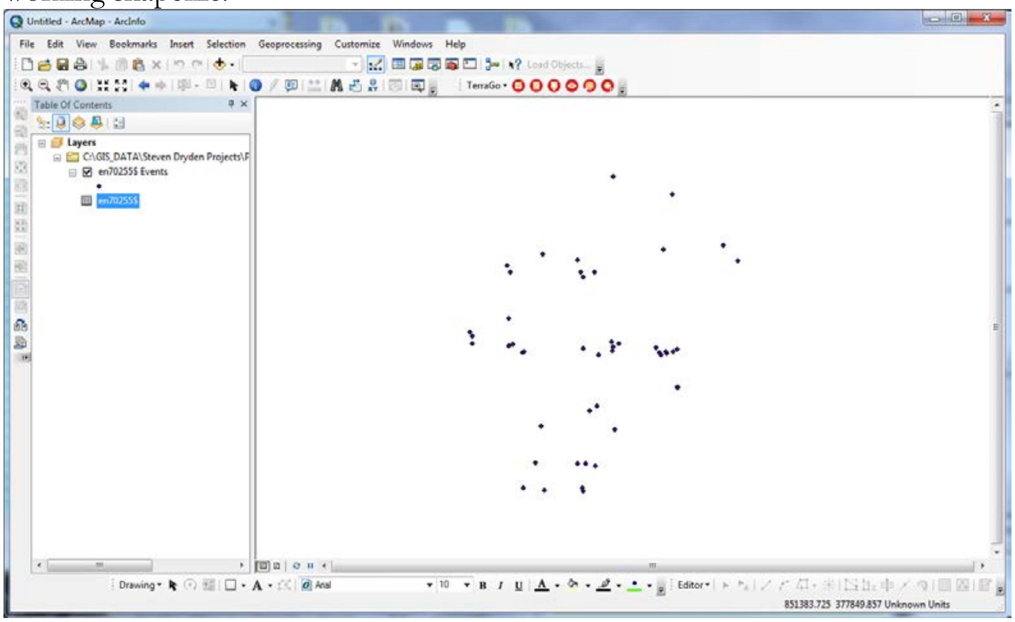




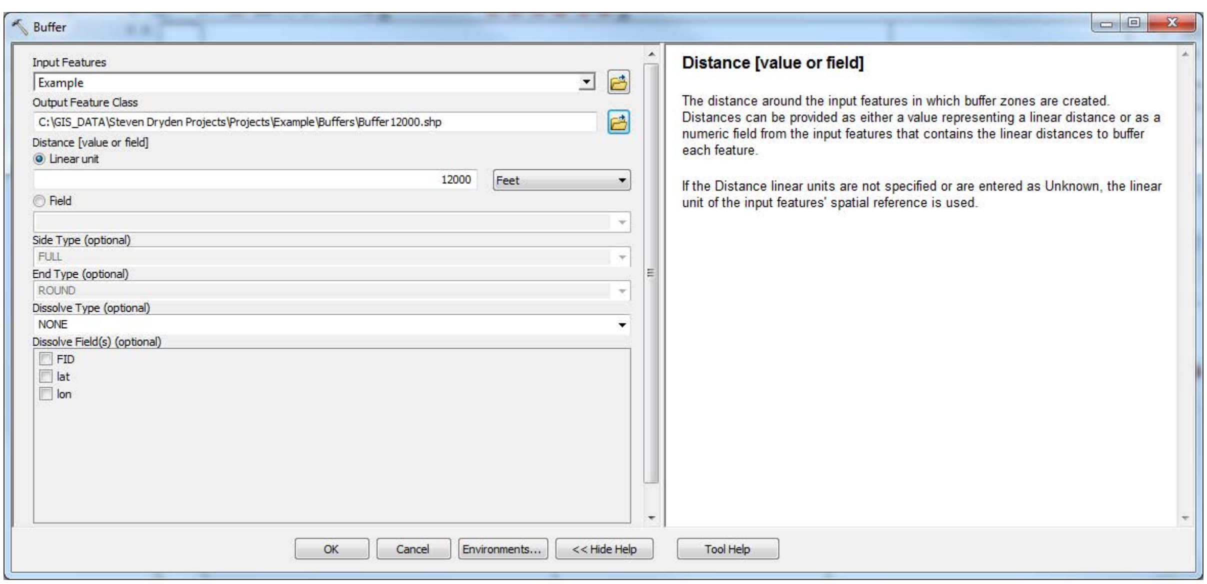


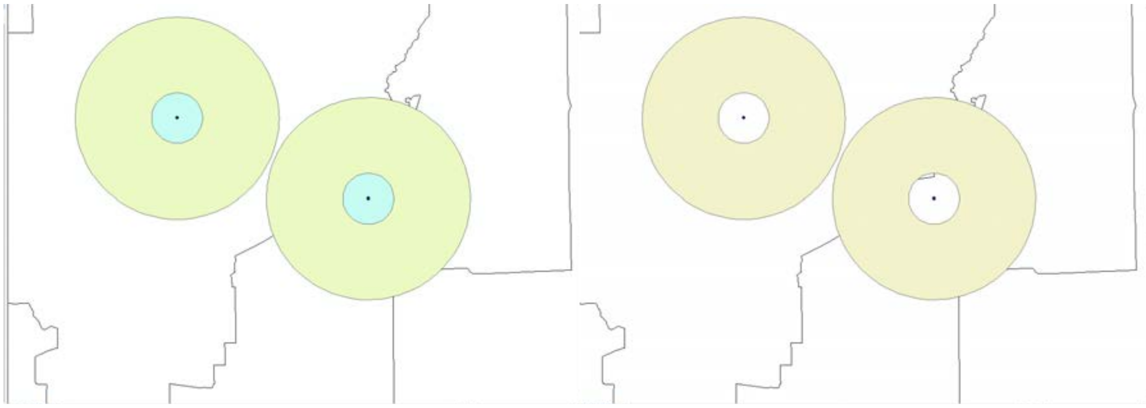
WIRE CENTER BOUNDARY CLIPPING

Some DSL providers provided an Excel table that displayed latitude and longitude for central office and remote terminal locations. This creates a special challenge for us because DSL service extends 12,000 feet from the center, but is not allowed to cross the wire center boundaries. Also, we must factor in that at 3000 feet from the wire center, speed decreases from speed tier 5 to speed tier 4. First, we load the Excel table into ESRI ArcGIS. In ArcGIS, we can use latitude and longitude information to display data on a map using the Display XY Data. We will use this here to get a working shapefile.

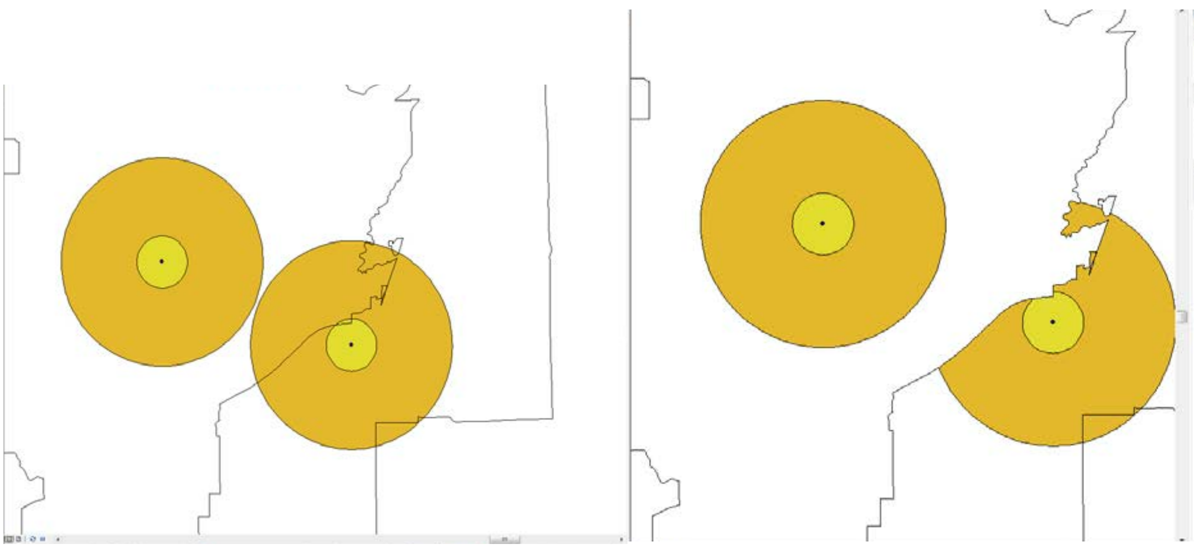


Now with a working shapefile, we will now need to buffer around each point for speed and coverage. We will be using 2 buffers of 3000ft and 12000ft.



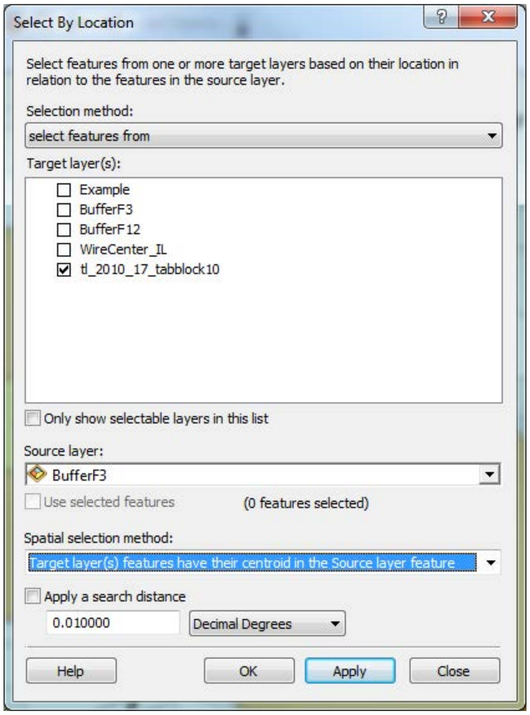


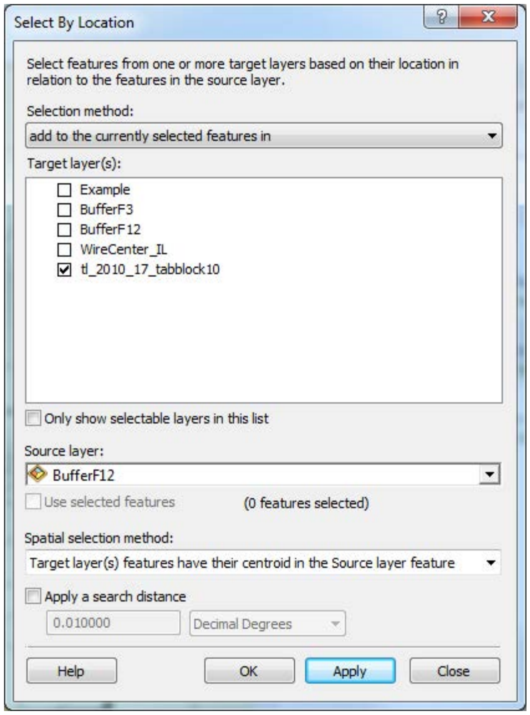
The resulting buffers are found in the above image to the left. We will now need to clip the innermost 3000 feet from the 12,000 foot buffer. In the image on the right, we have turned off the 3000ft Buffer to show that there is nothing under them now. Coverage for wire centers can not cross wire center boundaries, so we now need to trim the buffers so that they remain inside the boundary where they are located. We will use the Intersect tool to break apart the coverages based on the wire center boundaries.

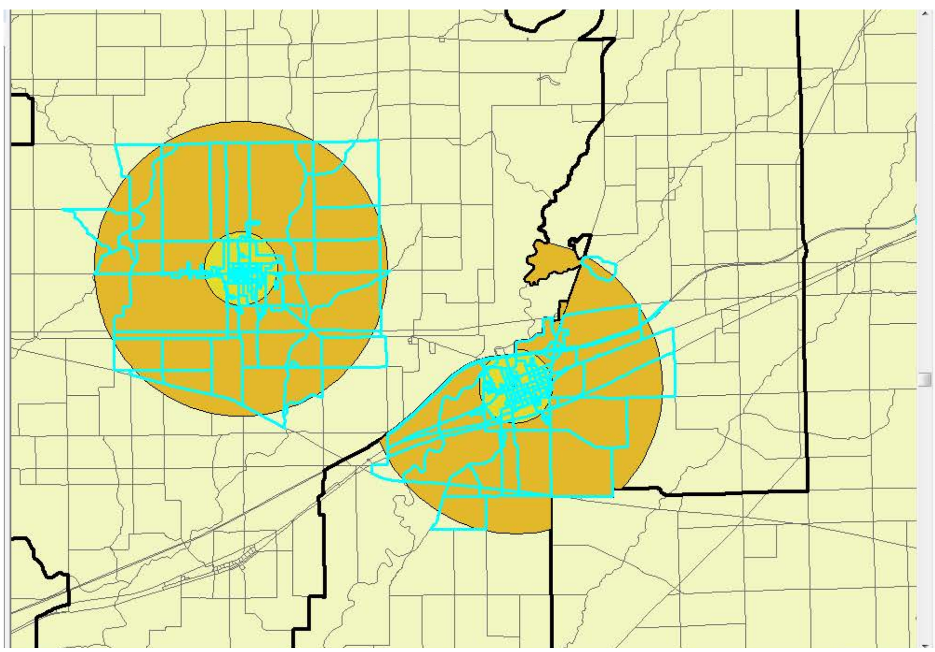


As you can see, the polygon is now broken apart by the wire center lines. From here, we will start an editing session and delete those areas that fall outside the wire centers boundary. Select the area outside the boundary and press "delete" to remove the selected area.

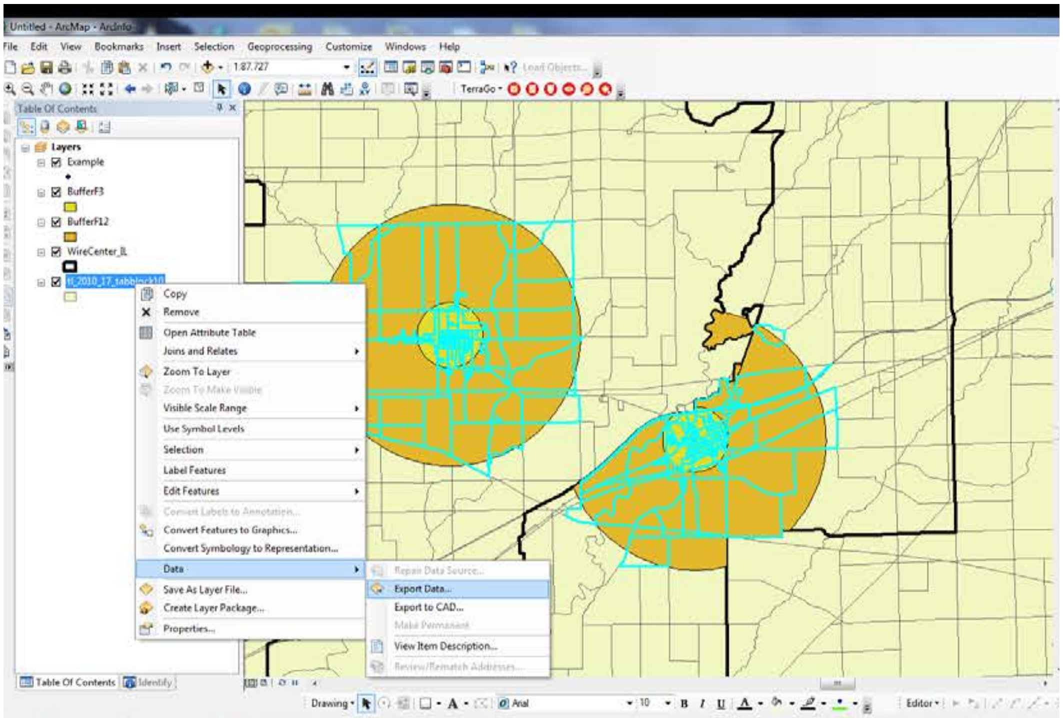
We will do this for all wire centers, and then save our edits. After we are through with this, we will then use these buffers to select census blocks by location. In this case we will specify that a census blocks centroid be within either the 3000ft buffer or the 12000ft buffer in order to count.

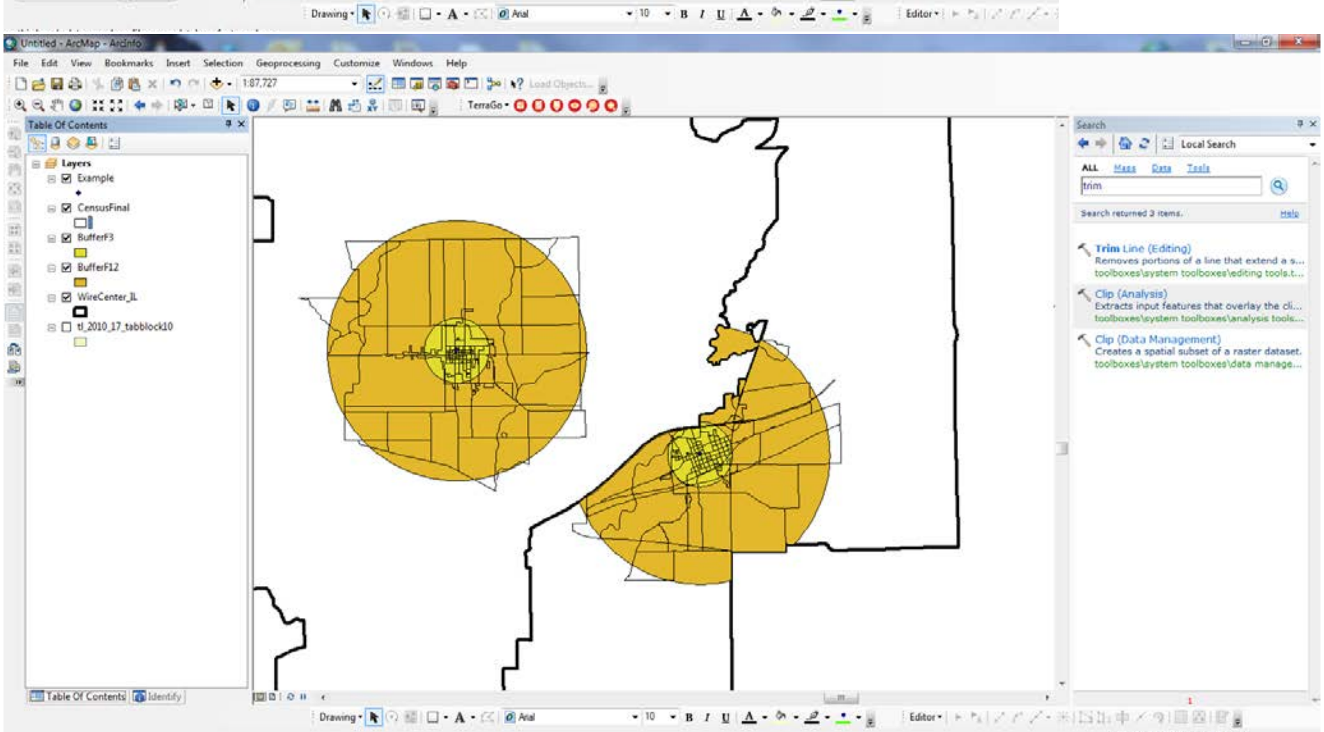






At this point we are ready to export the selected Census blocks, and assign speeds based on which buffer the census blocks fall within.



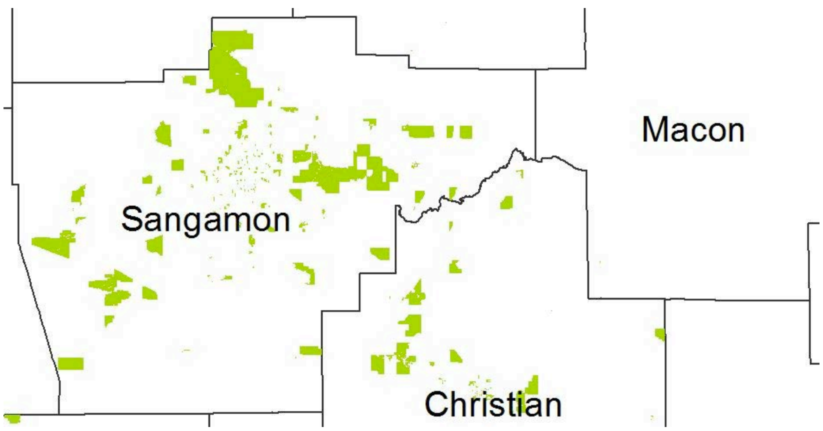


After we provide the census blocks with attribute information, we will send a GeoPDF to the carrier for approval, and then load it into the master geodatabase.

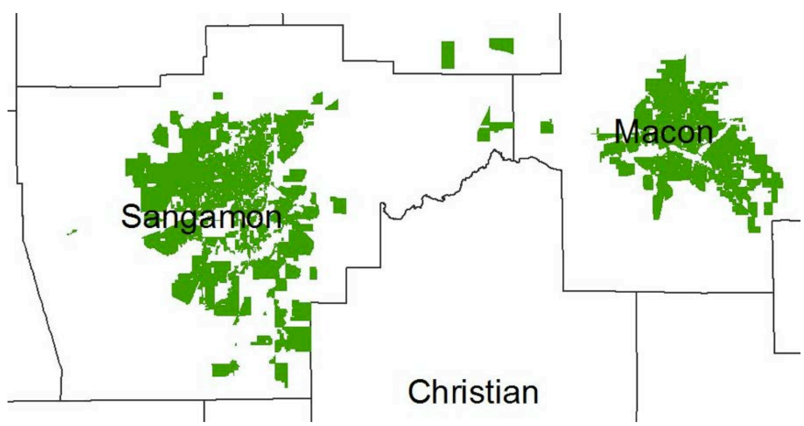
ILLINOIS TELECOMMUNICATIONS ASSOCIATION (ITA)

Due to concerns raised outside the scope of the mapping project, the Partnership for a Connected Illinois had a difficult time receiving updates in this round from members of the Illinois Telecommunications Association (ITA). However, all nationally recognized carriers did provide data. For the small handful of carriers who did not provide data, PCI examined the carrier's website to see if the advertised services were similar to the data that already existed in PCI's database. PCI went to great lengths in Round 4 to reel in coverage using the GeoPDF tool, so the only changes that were found were a small handful of FTTH communities and speed upgrades. Several of these carriers chose to provide data very late in the process, as late as Monday March 26, but PCI made every effort to include them.

CABLE COVERAGE



Some cable carriers submitted their service area coverage data in the form of a spreadsheet citing customer addresses. These addresses were converted to a point layer via a geocoding process. These points were then superimposed on top of a 2010 census block layer, and all of the census blocks that had one or more address-derived points associated with them were selected. The selected blocks were then converted into a polygon layer which was attributed with appropriate broadband provider information such as provider name, technology of transmission, maximum advertised downstream speed and so on. A portion of the Mediacom map above depicts the end result of this process.



Other cable carriers including Comcast submitted a series of spreadsheet records which were matched with the corresponding Illinois 2010 census blocks polygon layer. The matching polygons were then superimposed on the Census CBSA layer which was joined with the provided maximum advertised (MAXAD) speeds spreadsheet. This way each individual census block was attributed with the corresponding MAXADDOWN and MAXADUP value.

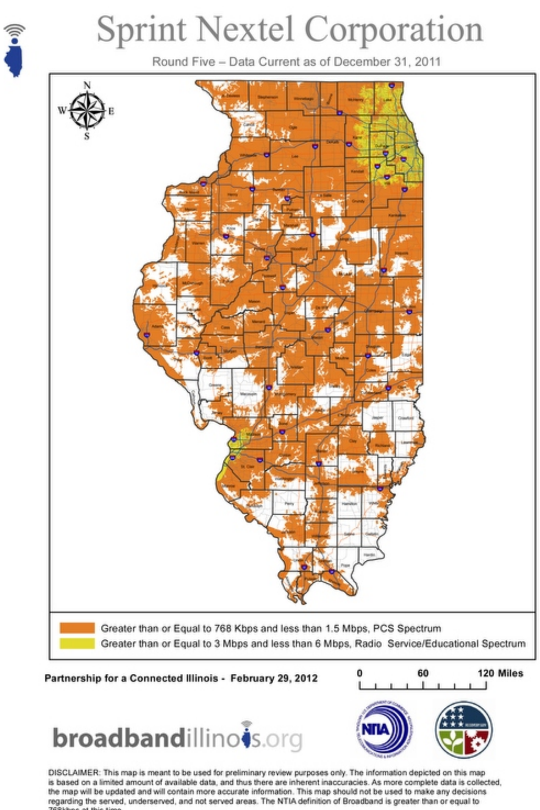
Street segment spreadsheet data records were geocoded based on mid-point value of the reported street segment address range. A point layer thus derived was next overlaid with the 2010 census street layer. Census street layer segments that were associated with the geocoded points were then examined, one-at-a-time, to make sure that they matched the reported street, city and census block information. Some of the reported records had to be discarded as they could not be located via the above process.

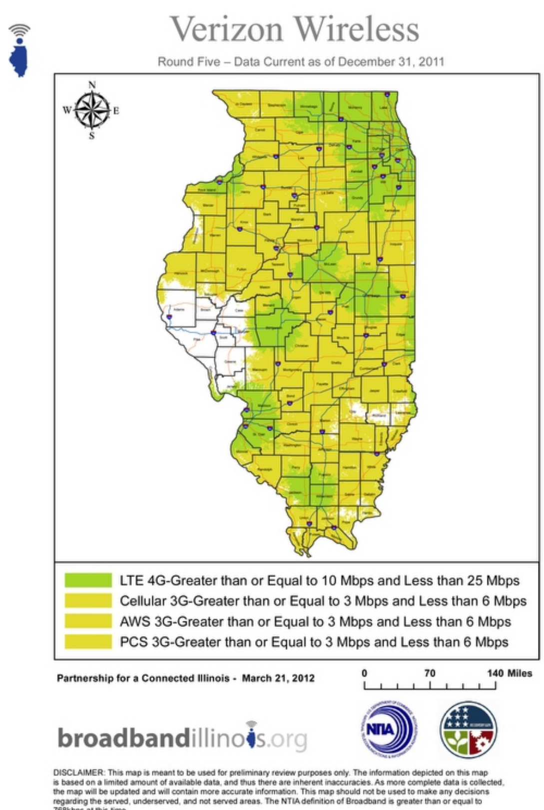
A GeoPDF map depicting both, census block and road segment data, was reviewed by Comcast and a number of census block records were deleted as a result of Comcast feedback. From the originally submitted 117,386 census block records, 115,153 were retained for the final submission. All of the successfully matched street segment records were retained and included in the final submission.

MOBILE WIRELESS COVERAGE

PCI has collected mobile wireless coverage from most providers in the State. These shapefiles were imported into the database and assigned attributes. Every mobile wireless provider submitted updated data in this round. An example of this data is below.

PCI also received notification about issues along the State lines where mobile wireless coverage did not extend to the State Boundary the NTIA was using, thus creating small gaps. Upon further examination, because mobile providers have not been instructed by the NOFA and/or the NTIA to use a specific boundary when clipping their data, this problem exists. Likewise, PCI does not clip the mobile data of any carrier upon receipt, thus not complicating this issue any further.

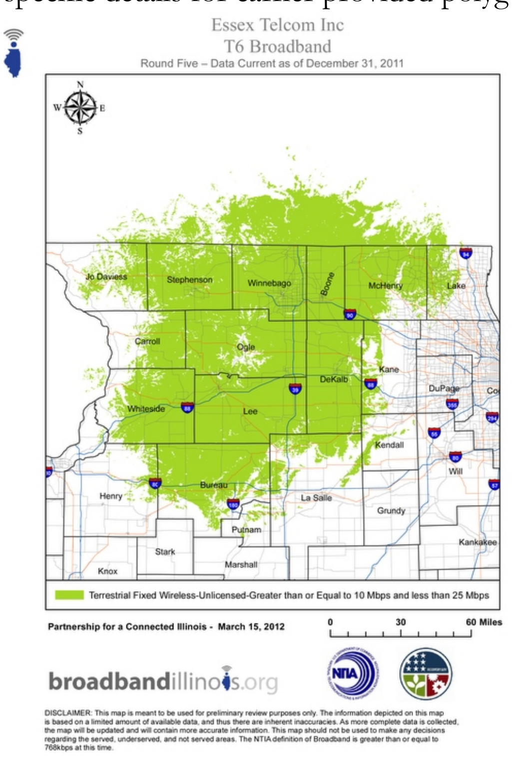


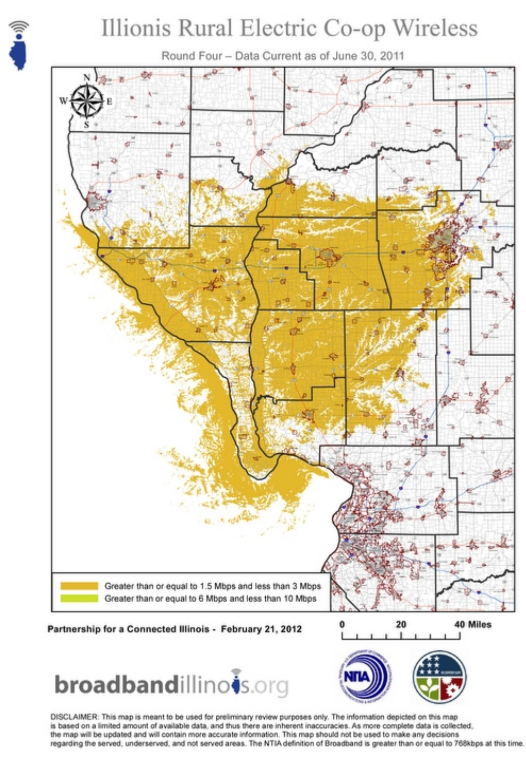


WIRELESS METHODOLOGY

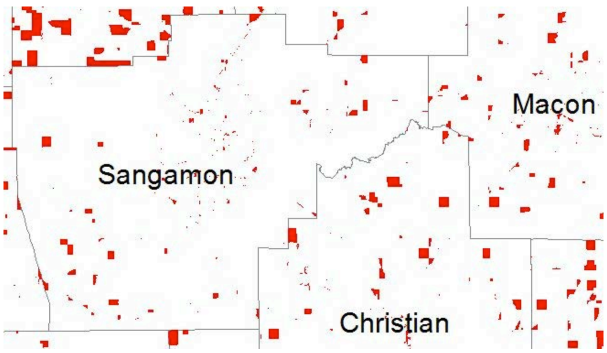
In this cycle, almost every fixed wireless provider allowed us to use their tower locations, antenna heights, equipment selection and direction/spread of coverage to derive coverage areas. With the provided tower information, professionally prepared radio frequency coverage studies were conducted and converted to shape file format. These studies have proven to be very accurate and represent service areas where the maximum advertised speeds can be delivered. These studies take into account full consideration for terrain and tree clutter data. For any carriers who could not provide their own RF propagation coverage polygon, RF propagation studies were done in house. The Longley-Rice propagation model was used. Studies were conducted using 10 meter resolution terrain data. Tree and vegetation clutter data resolution is 30 meters. All propagation results had a minimum of a 10 dB signal fade margin built it to the results in addition to losses calculated for clutter. Signal level minimum thresholds were set on the study maps to a level that each carrier deems reliable and serviceable at those speed tiers, not just the minimum to establish a connection. These maps are not based on the manufacturers best case scenario radio capabilities in a lab environment. These coverage polygons represent what can be delivered in the face of interference in the shared spectrum used for those with transtech codes of 70 and spectrum code 6.

There appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary strength (e.g. -80 dB, -98 dB, -120 dB, etc.) to provide the appropriate quality of service for data services and still be able to deliver the maximum advertised speeds. While we took these issues into account for our internally generated RF propagation studies, we do not have specific details for carrier provided polygons such as cellular mobile data and 4G service footprints.





SATELLITE



This round of data updates includes two broadband satellite service providers – WildBlue Communications and HughesNet. WildBlue communicated their service area coverage via a shapefile encompassing full extent of Illinois. HughesNet service area coverage was transmitted via an Excel spreadsheet with 16,383 records referencing state, county, census tract and block (FIPS) codes. These codes were concatenated into a single (FULLFIPSID) code which was then used to join Excel data with the U.S. Census Bureau block data for the 2000 census. This process resulted in a successful match of all 16,383 records. Census blocks thus identified were dissolved into a single polygon which was next attributed and included in the submission cycle. An example of this is depicted above.

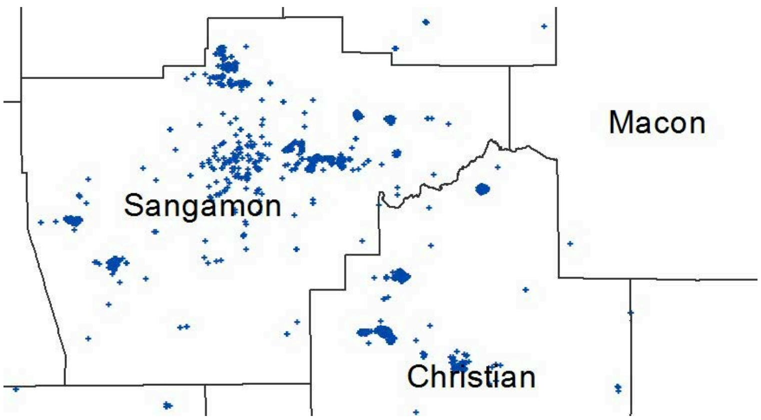
MIDDLE MILE

Middle-Mile (MM) data is acquired via either a direct carrier submission in the form of a spreadsheet or a text document citing specific MM hub coordinate pair values, or by obtaining the general MM hub location from the carrier's web site.

In the case where specific coordinate pair values are available, a point layer is generated using ArcGIS software. This process entails bringing tabular XY coordinate pair values into ArcGIS, and creating an "event theme". The "event theme" is then exported into a stand-alone point layer which is then attributed with the necessary information.

General, web-derived locations are converted to a point layer by citing towns where the MM hub presence is identified by the carrier. Town point locations are next attributed with relevant data.

ADDRESS LAYER DATA



Three carriers provided Service Address information – Mediacom Illinois LLC, FairPoint Communications and RCN Telecom Services of Illinois, Inc. Supplied address data was geocoded. Great care was taken to successfully rematch addresses that were not matched during the initial geocoding run. The resulting point layer was used to derive the missing latitude and longitude coordinate pair values which were then added to the Service Address layer attribute table. An example of this is above.

METADATA

Metadata, which literally means data about data, represent PCI's attempt to document procedures, coding, and overall methodology used in managing broadband supply data. Both short and long terms goals of developing PCI's metadata are to improve communication on Geographic Information Systems (GIS) data management issues for both internal and external partners. PCI's metadata is organized and structured around Federal Geographic Data Committee (FGDC) standards associated with key information impacting the following issues:

- What GIS data layers are managed by an organization?
- How is data coded or classified in assisting outside partners or organization use the GIS data developed?
- When was the data developed and how often is it updated?
- Who developed the data layers and who should be contacted if anyone has questions?

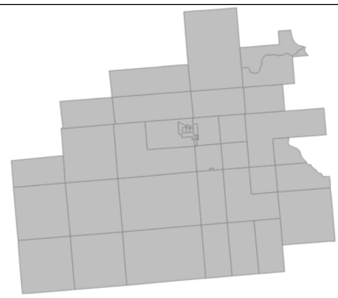
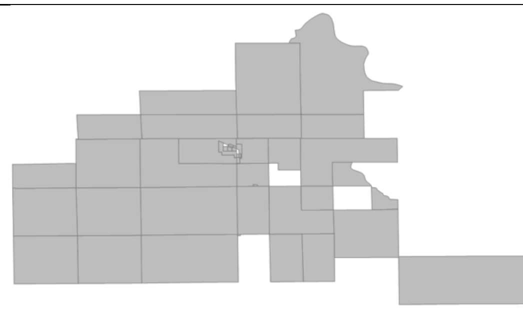
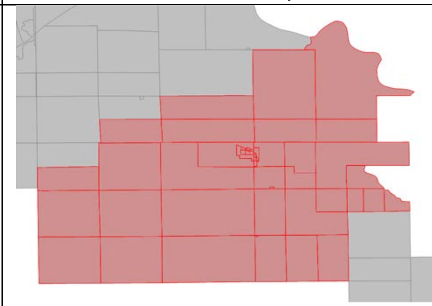
The net result of developing PCI's metadata connects to the idea of communication and standards. When applied correctly over time PCI's metadata will assist in educating other users on essential questions needed when applying GIS data. In addition, it will assist PCI internally as metadata will help the organization identify and document critical developing issues shaping data development. Any new employee or organization will be pointed to metadata files when asking questions relating to methodology, attribute codes, dates of data edits or updates, and follow-up contact information within PCI's data team.

ROUND 4: CENSUS BLOCK CONVERSION

In round 4, PCI made the conversion from 2000 to 2010 census blocks at the instruction of the NTIA. Using existing 2000 coverage, PCI created coverage polygons based upon provider, transtech, and maximum advertised download speeds. Using a spatial overlay, PCI selected census blocks in the 2010 layer with a centroid point in the carrier polygons. These new census blocks then inherited the same attributes as they were previously recognized in the 2000 census block layer.

PCI initially attempted to use the conversion table that was provided by the Census Bureau to make the conversion from 2000 to 2010 census blocks. PCI noticed holes in the data when this process was used. The images that follow demonstrate the difference in the conversion from 2000 census blocks to 2010 using the spatial overlay as opposed to the conversion table.

Using the conversion table process, we had a total of only 605,038 census blocks covered. The all-inclusive spatial overlay filled these holes and contained a more accurate 652,602 census blocks.

2000	Conversion using Conversion Table	Conversion using all-inclusive spatial overlay
		

DATA VERIFICATION

Verification has become an evolving and ongoing process at PCI. The development of the Broadband Illinois website, along with the use of the GeoPDF process has created a feedback loop between provider and consumer and PCI that allows PCI to verify the carrier level data that it submits semi-annually to the NTIA. PCI continues to develop eTeams throughout the state that are able to take county and provider level maps and visualize the data and begin indicating areas where the data may not be accurate. PCI has also published a Supply Side Inventory in which PCI developed a system to rank Illinois's counties by broadband connectivity and looked at two major sets of third-party data to verify the data it had collected. Various means are as well being used to aggregate demand in parts of the State, which indicate there is a need for better broadband and better data. The following sections go in to greater detail on the verification process but the outline below shows the basis for the verification process:

- Provider verification through extensive mapping GeoPDF process
- User verification through online web tools
- Trusted user verification through eTeam groups
- Third Party verification using third party data sets (ex. Gadberry, FCC Speed Test)
- Demand verification using demand gauging activities

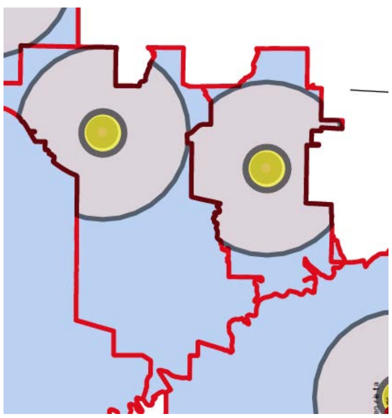
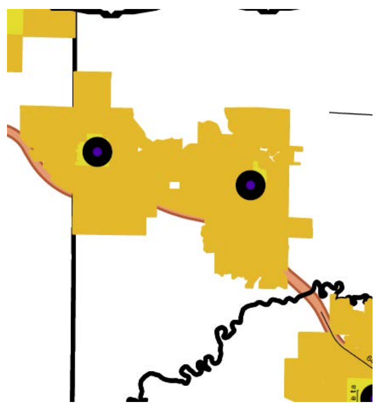
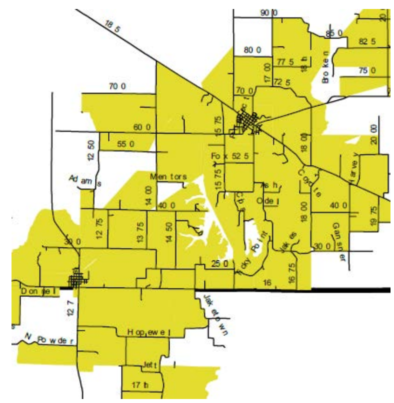
PROVIDER

In this Round, PCI worked very closely with the provider sending back versions of the GeoPDF until the data was represented according to the provider. PCI considers this process to be the first of five forms of verification PCI has and will continue to carry out to ensure the data that is submitted to the National Broadband Map is as accurate as possible.

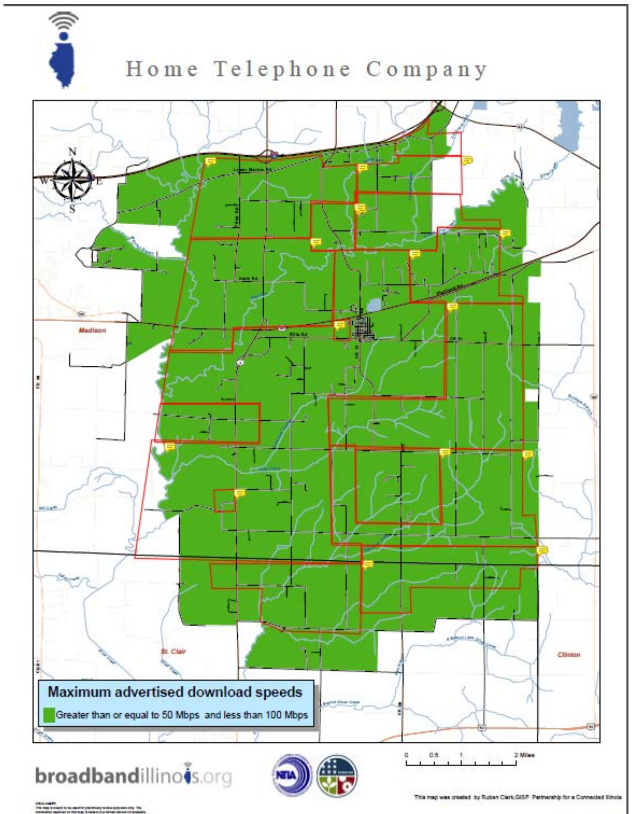
In the last round, PCI purchased a set of wire center boundaries, which PCI used to map out DSL coverage for a couple of providers. Knowing that a DSL provider's Central Office or Remote Terminal that fell in a certain wire boundary could not extend service outside that boundary allowed PCI to map out these locations and create buffers around these locations based upon the speed. PCI recognized that locations 7500 feet from a DSL C.O. or R.T. would not receive the same speeds as locations only 1000 feet from that location. These buffers allowed PCI to make these changes.

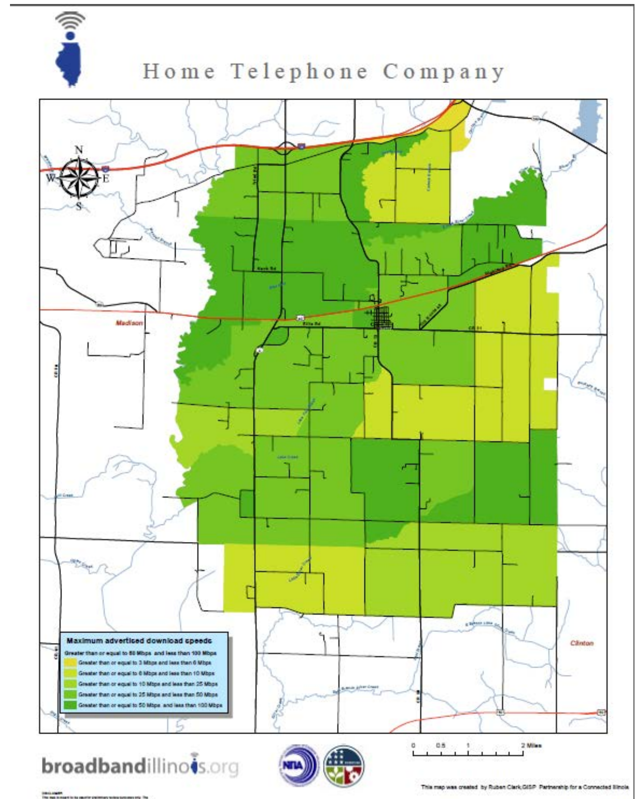
Due to confidentiality of these locations, maps that contain these locations with these buffers and boundaries are protected under the NDAs that have been established.

However, the images below provide an example of how PCI would use a C.O. or R.T. location to map out the coverage that a provider is able to provide in that wire center boundary. The image on the left shows two wire center boundaries that contain a C.O. The buffers are indicating that the areas closest to the C.O. receive speeds that are in Tier 5 while areas outside that initial ring receive download speeds in Tier 4. The second image shows how the data beneath these buffers looks when the wire boundaries and buffers are removed. The third image shows how the previous mapping contractor would have submitted this data in a previous round. As you can see, the same flat speed is dispersed across the entire region surrounding C.O. and R.T. locations.

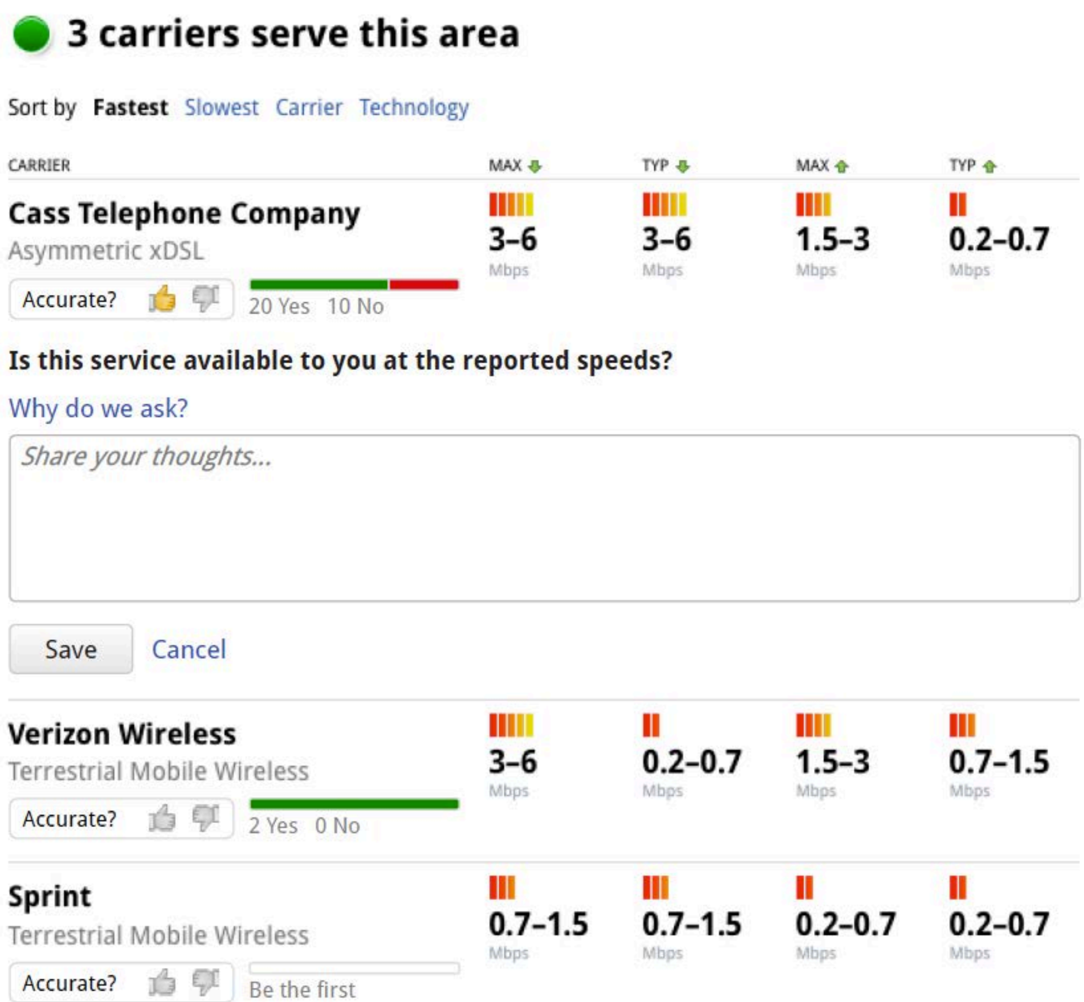
PCI has worked through this process for one of the two largest DSL providers in Illinois as well as a handful of small telephone companies throughout the State. In some instances, small telephone companies admittingly provided this data without sharing the locations and the GeoPDFs made this possible. The images of Home Telephone Company on the next page demonstrate how they used the TerraGo toolbar to reel back the previous data that was incorrectly submitted as DSL data with speeds across the region in Tier 9.





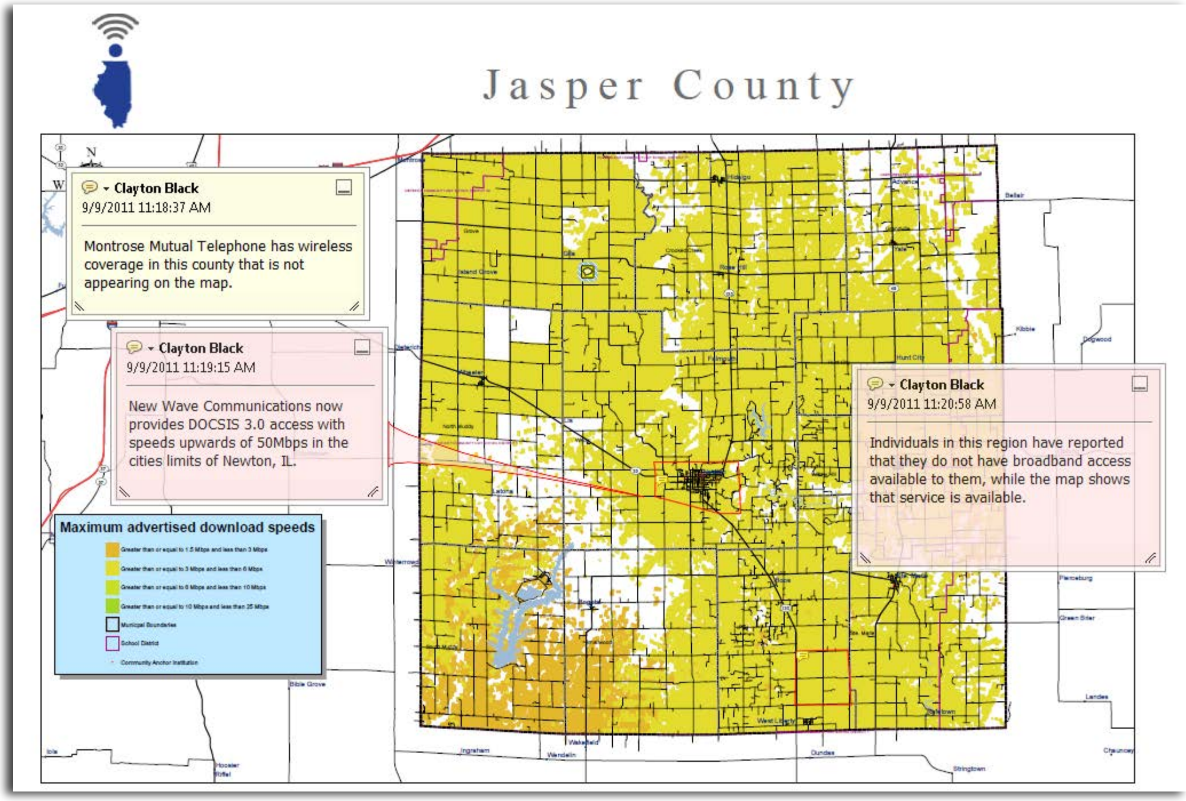
USER

PCI views the user as the second form of verification and has developed a tool to allow feedback on the data that is on the Illinois Broadband Map and in the semi-annual submission to the NTIA. When a consumer clicks on Broadband Illinois's search map they see the carriers that service that census block. The widget below allows the consumer to give PCI feedback on the providers that service that location. PCI is preparing to launch this tool in the upcoming round of data collection. The data that PCI receives from this tool will be used to start plotting points on a map that can be given to the provider to show areas the consumer is claiming does not have coverage.



TRUSTED USER

The third form of verification comes from the Trusted User. PCI has created GeoPDFs of all 102 of Illinois's counties that are available on the Broadband Illinois website. It has also deployed eTeams throughout the state that are capable of editing these maps and returning them to PCI as a form of verification. The map below shows an example of all the changes that PCI made to Jasper County in this round thanks to user feedback from eTeam members on the ground. As you can see, New Wave Communications launched DOCSIS 3.0 technology to the city of Newton in this round. PCI had also not been including wireless data for Montrose Mutual Telephone Company. PCI recognized this error and included this data in this round. The county maps are currently available on the website, and the provider level GeoPDFs will soon be published and available for editing as well.



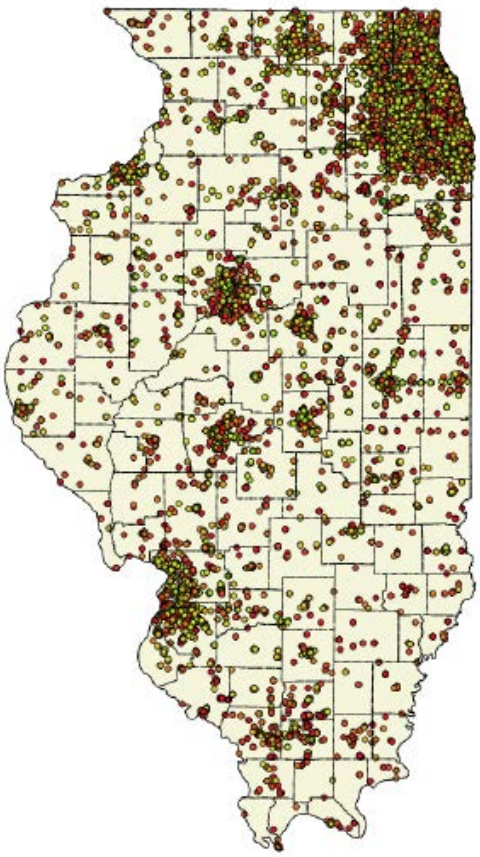
THIRD PARTY DATA SOURCES

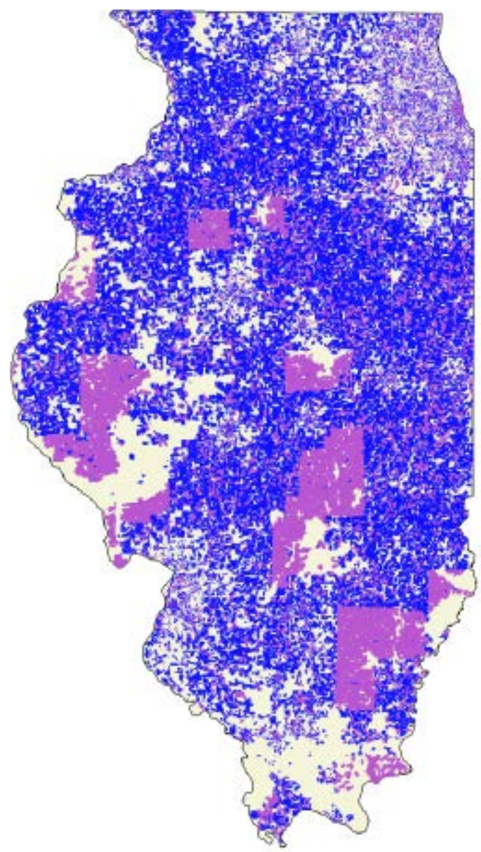
On August 15, 2011, PCI published a Supply Baseline Study, "Broadband Access in Illinois: A Baseline Snapshot", that summarized the state of broadband supply in Illinois. The report, a product of the data analysis by the PCI data team aims to quantify what is known about broadband data in Illinois and publish it along with an analysis of Third-Party data sources.

The first method of third-party verification used in this examination was user speed test data through the broadbad.gov website. Through this website, the NTIA and the FCC solicited street address information with each speed test. They provided PCI with speed test data gathered over a 12 month period. This has been mapped and some limited studies have been conducted. These speed tests were accompanied by mini surveys which allowed for some analysis. The users were asked to input their street address and the type of internet connection they were using.

The second set of third-party data used for verification in this study was gathered by the Gadberry Company. The Gadberry data is a combination of various user/crowd sourced data sets. They indicate if there is broadband activity at the street address level and they then incorporate that information at the census block level. We have compared blocks showing coverage as stated by the carriers against the user reported information. There are some areas of the state where there are low or no user reported information.

The maps below show these third party data sources projected on a map of Illinois. The map on the left shows the location and results of the FCC speed tests, while the image on the right shows census blocks where the Gadberry dataset did not provide enough results for a significant analysis. On the Gadberry map, census blocks in blue indicate where there is a low sample rate, and census blocks in pink show where no samples were obtained. For more information on these third party data analyses, the Supply Side Baseline has been included in the appendix of this paper.

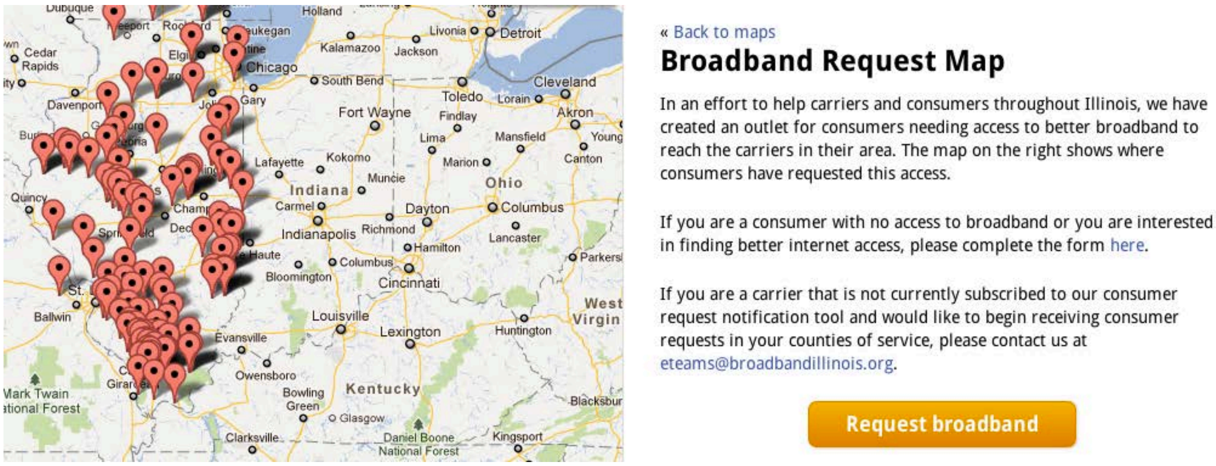




DEMAND RESEARCH

PCI is undergoing efforts to develop a survey process to survey demand across the state of Illinois. This demand research is the fifth form of data verification that PCI is using to verify the data. This survey process once developed will identify current broadband adoption trends, applications, and barriers for community anchor institutions, businesses, and residents. It will be referenced around critical geographic units for analysis.

Connect SI, a regional broadband initiative in Southern Illinois, developed a tool called "I Want My Broadband" that surveyed consumers who felt they were underserved or unserved in terms of broadband service. Working with eTeams, PCI has followed the Connect SI model to launch this tool in other regions around the State. The images below demonstrate just how powerful this tool can be. The image on the left shows how the current broadband supply data sits in a given part of the state. As you can see, the reported speeds fall in download tiers 3 &4. The image on the right shows the same part of the state and displays locations where consumers have reported that they need better service. While PCI continues to think of the best way to launch a similar effort state wide, this demand aggregation is an exceptional form of verification.



ILLINOIS COMMUNITY ANCHOR INSTITUTIONS

PCI has established an ongoing procedure for gathering data on the physical location and broadband connectivity of Community Anchor Institutions (CAIs) in accordance with the data requirements of the SBDD NOFA Technical Appendix. In this Round, PCI has partnered with the Strategic Networking Group (SNG) and the Illinois Institute of Rural Affairs (IIRA) to carry out a comprehensive survey outreach process to all anchor institutions and select businesses and households in the State of Illinois. The survey outreach began in mid-February and will continue through at least the end of April. While the research initiative was separate from the PCI mapping project, PCI has utilized the data to further enhance the CAI data that is being submitted in this round.

As with all previous submittals, PCI has identified existing, centralized sources for CAI connectivity data. PCI geocoded each submitted data point by using ESRI software and Google batch geocoding programs. In this round, PCI further refined the geocoding process as all institutions that geocoded to the city center were individually mapped to the rooftop using Google Earth software.

This section will describe the process used to build the foundation of the Illinois CAI database in much the same way it has been described in previous rounds, but it will focus on how the dataset has been improved for this submission.

STRATEGIC NETWORKING GROUP SURVEY PROCESS

In this round, the Illinois Institute of Rural Affairs in conjunction with the Partnership for a Connected Illinois' communication team reached out to fifty major Illinois Stakeholder Groups to market and promote the comprehensive survey on broadband demand and access. While the survey asked all of the required questions for the NTIA mapping project, it also asked a range of questions on Internet use at the anchor institution.

As a result of this outreach process, PCI is now submitting a dataset with updated information for anchor institutions who had previously responded to PCI requests for data, as well as a larger range of anchor institutions in categories 6 & 7.

The table below summarizes the set of data that PCI will be submitting in this round. As one can tell, over the last three rounds of data submission, the total number of anchor institutions with connectivity data has continued to increase. The total number of anchor institutions stands at 12,948

	April 2012			Oct 2011			April 2011		
Cat	**Total**	**Connected Points**	**% with connectivity data**	**Total**	**Connected Points**	**% with connectivity data**	**Total**	**Connected Points**	**% with connectivity data**
1	5,331	3,278	61.49%	5,314	3236	60.90%	5,604	1,417	25.29%
2	1,338	710	53.06%	1,422	721	50.70%	1,444	713	49.38%
3	1,373	210	15.29%	1,327	138	10.40%	15,267	138	0.90%
4	2,314	497	21.48%	2,319	449	19.36%	2,339	433	18.12%
5	294	146	49.66%	271	115	42.44%	266	111	29.47%
6	1,527	1,526	99.93%	1,446	1445	99.93%	1,449	1,449	100.00%
7	321	135	42.06%	235	37	15.74%	230	27	11.74%
Totals	12,498	6,502	52.02%	12,334	6,141	49.79%	26,599	4,288	16.12%

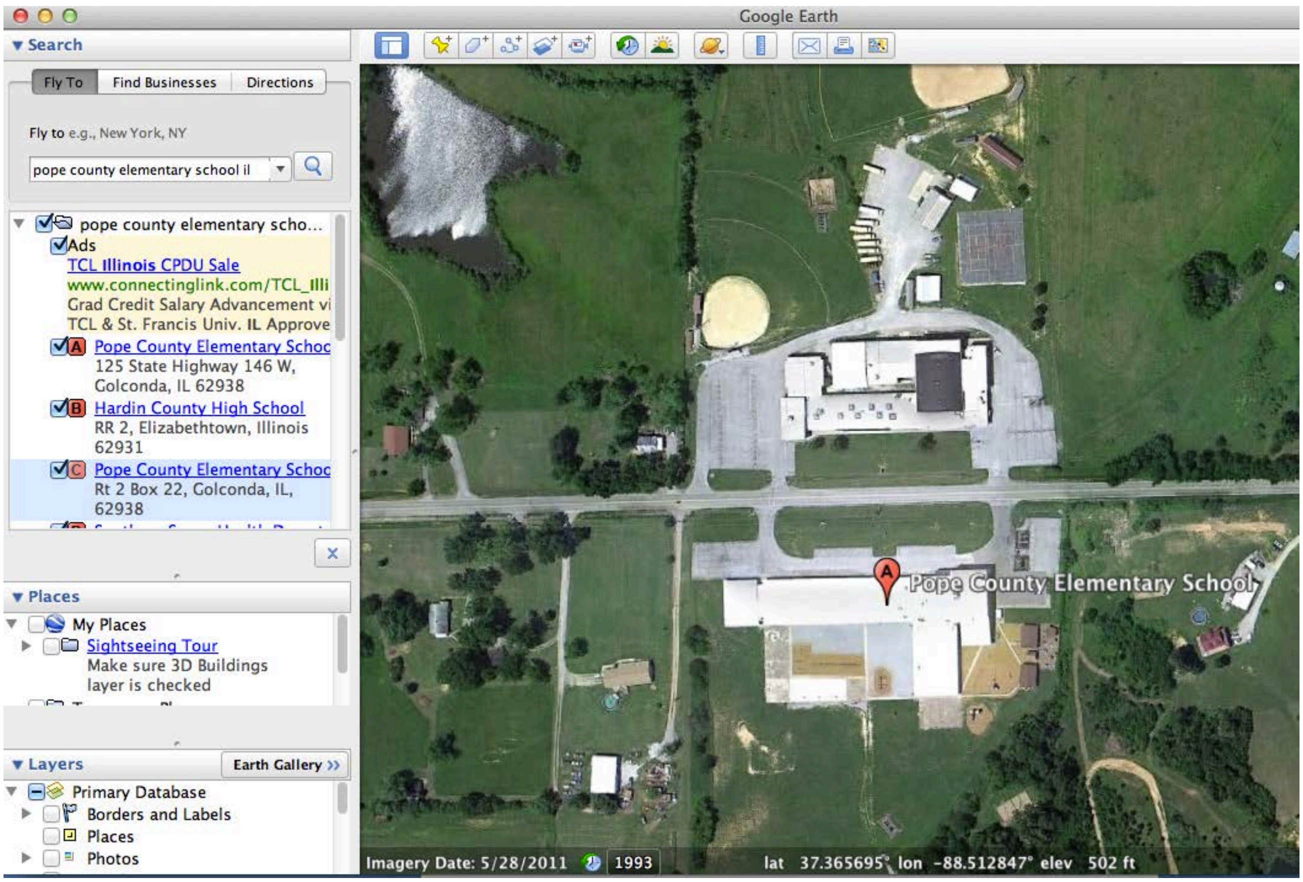
While PCI made some of the greatest data improvements in Round 4 to the K-12 and library datasets, in this round, some of the most substantial increases have occurred within the healthcare, public safety, higher education, and other non-governmental categories.

In the past, the non-governmental anchor institution category included only workforce development centers and other computer training centers. The anchor institutions that are now in category 7 include economic development centers, park districts, farm bureaus, and other community hubs. The SNG and IIRA survey process will continue through at least the end of April 2012 so overall reports on the data and their findings for non-NTIA mapping purposes will be made available in May 2012. Likewise, the data that is included as part of this submittal will continue to improve.

Round 5 Corrections to CAI Database

In this round, PCI re geocoded every community anchor institution in the geodatabase, after recognizing latitudes and longitudes were wrong in previous rounds. Likewise, multiple anchor institutions that had identical names (i.e. Lincoln Elementary School) had an issue where the address of the anchor institution in one city was associated with an anchor institution by the same name in a separate city. This caused geocoding problems in previous rounds, thus creating the need for an extensive re geocoding process.

After addresses were corrected, anchor institutions were recoded using ESRI software and batch geocoding processes. A total of 787 anchor institutions geocoded to the center of the city due to rural route addresses, PO Box addresses, slight misspellings, and/or incomplete addresses. All 787 of the anchor institutions were individually mapped using Google Earth software. The image below shows a county elementary school with a rural route address. In previous rounds, the anchor institution geocoded to a location within the county but 15 miles away from the actual anchor institution. In this round, the latitude and longitude that was indicated in Google Earth was captured.



PREVIOUS ROUNDS

Outreach in Round 1 focused on collecting the point and address data while subsequent submissions in Rounds 2 & 3 focused heavily on survey development, web site database research and teleconferences. Together with the Illinois Department of Commerce and Economic Opportunity (DCEO), PCI engaged in a process of working with CAIs on an organized basis. Other state agencies and organizations have included the Illinois Commerce Commission, Illinois Board of Education, and the Illinois State Police.

PCI created a survey using Survey Monkey and both carrier and price information were requested, and the speed test became a required item for completion of the survey. The speed test(s) that was administered was the one on the Federal Communications Commission web site.

PCI worked with a number of organizations in gathering data for these submissions. We are encouraged that the relationships with these organizations have continued to develop and facilitate other facets of our organization. These organizations are listed below:

K-12	Illinois Association of Regional School Superintendents, Illinois State Board of Education
Libraries	Illinois Library Association
Healthcare	Illinois Critical Access Hospital Network, Illinois Rural HealthNet, Illinois Healthcare Association
Public Safety	Existing Database
Colleges & Universities	Illinois Community Colleges Board
Other Government	Existing Database
Other Non-Government	Illinois Workforce Development

In Round 4, as opposed to previous rounds where PCI submitted secondary CAI's that did not fit perfectly into NTIA parameters, PCI decided to submit only those CAI's that clearly fell into the seven categories laid forth by the NTIA. This led to a significant decrease in the total number of CAI's submitted, but a significant increase in the quality of the data that is being submitted. PCI continued to follow some of the same outreach methods developed in previous rounds, but in this round made the greatest gains in terms of data quality in the areas of K-12 schools and libraries.

As an example, of the 26,869 locations submitted in October 2011, there were 14,000 Category 3 Healthcare locations which were geocoded, yet had no connectivity data. Many of these were for actual practitioners as opposed to clinics, or what might be considered institutions. PCI elected to remove this larger number for the October filing. PCI also removed duplicates where they existed in the other categories. For instance, the previous mapping contractor included a record for each individual college and university in both the K-12 and Higher Education categories. PCI felt it made sense to include only one record of this category in only the Category 5 Higher Education category. In Round 4, PCI enhanced the quality of the data in the K-12 category through the use of an eRate database that showed what schools had applied for the eRate and what providers were servicing their location. This allowed PCI to populate the BBService and TransTech fields for those CAI's.

BROADBAND ILLINOIS WEBSITE

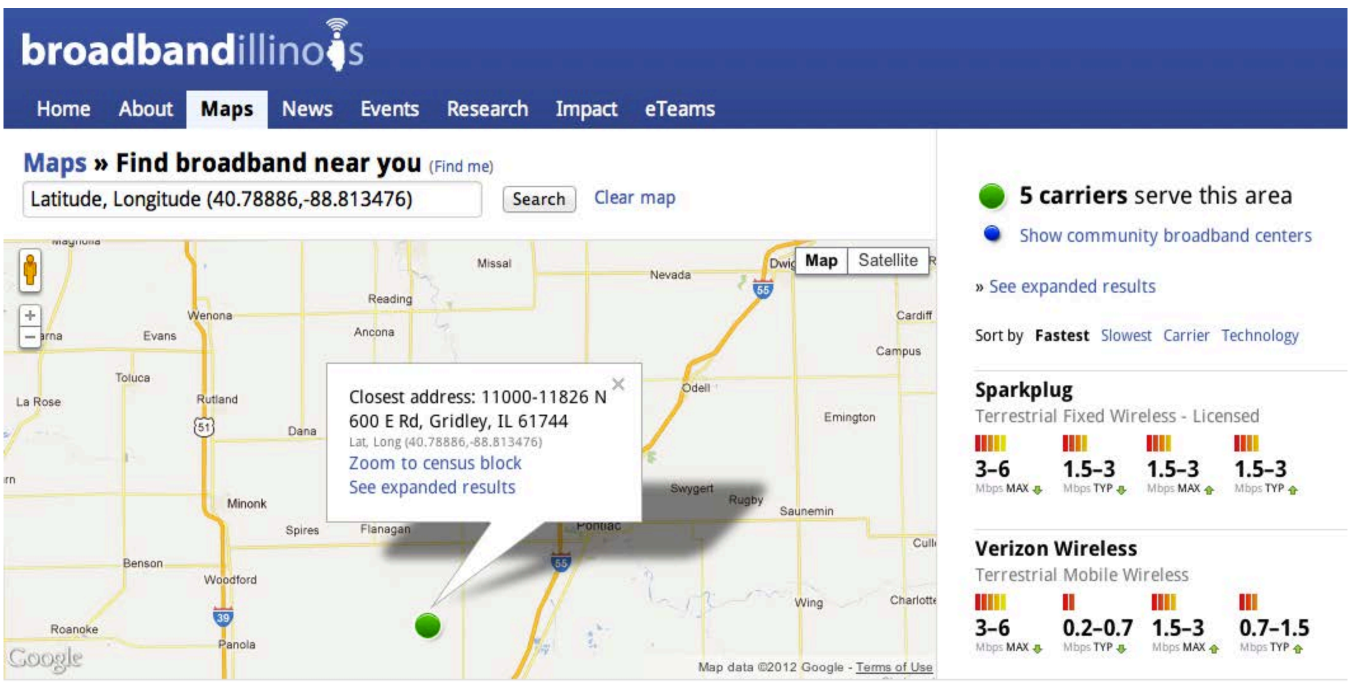
On February 17, 2011, the Partnership for a Connected Illinois launched its new web site, featuring an easy graphical interface for accessing PCI data about broadband providers with a single mouse click or touch on a smart phone. In this first, initial version, the web site offered a broadband location finder with detailed service provider information and assessments of internet speeds, as well as locations of community broadband providers. This map remains on the website along with other maps in the "Maps" section of the website. The aforementioned county GeoPDFs have also been made available, along with individual map pages for each carrier in the State with the data current as of this submission, allowing for near instantaneous presentation of updated data.

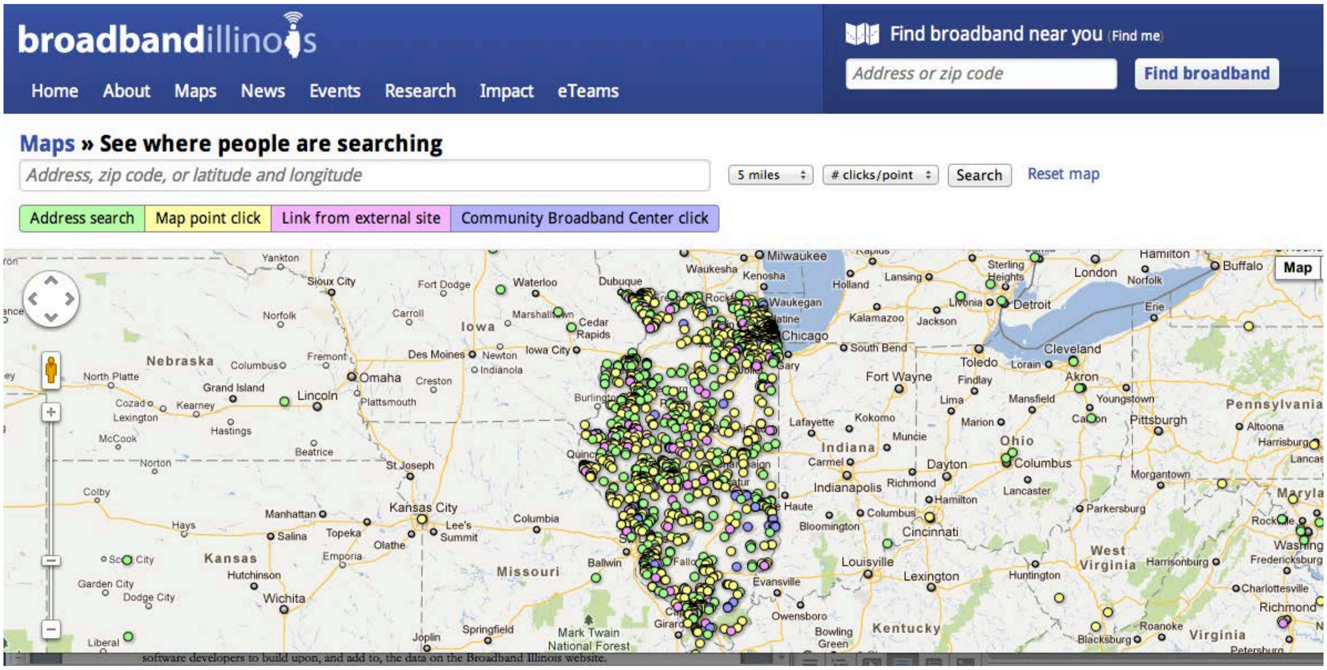
METHODOLOGY FOR THE BROADBANDILLINOIS.ORG WEB SITE

Clicking on the home page map opens a side panel with broadband providers. Expanded results also show the libraries, schools, and public buildings in the area with broadband. As the State-designated entity under the NTIA's State Broadband Data and Development, PCI provides, on http://broadbandillinois.org, the same data that it submits to the NTIA for inclusion in the national broadband map.

The web site is built around open and transparent data-sharing tools. As with the national broadband map, PCI aims to encourage user feedback as a means of helping to improve and promote broadband in Illinois. For example, the site's "eTeam" section encourages citizens to get involved with Broadband Illinois eTeams. These community leadership groups are working to help connect rural residents and others throughout Illinois. The site's "Impact" section is beginning to assemble materials that pertain to broadband adoption. There are also sections for "News" and "Events" where the latest relevant broadband related news and events can be accessed.

The image below shows the primary search map that the user is able to use to search for broadband providers at their location. The other image displays locations that have been searched since PCI launched the map in February 2011. The third and final image shows one of the many provider pages that became available on the PCI website in March 2012.

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Raw Data
Telecommunications Management, LLC
Newwave Communications
Telecommunications Management, LLC
Round Five – Data Current as of December 31, 2011

THE APPLICATION PROGRAMMING INTERFACE FOR BROADBAND ILLINOIS DATA

PCI's web site is built around an open source Application Program Interface. This free tool allows software developers to build upon, and add to, the data on the Broadband Illinois website. Documentation for the PCI's API is available at http://developer.broadbandillinois.org.

CONCLUSION

The data submission cycle ending on April 1, 2012, has been the second round that the Partnership for a Connected Illinois has conducted every facet of the data collection process. PCI has become much more comfortable in this round, with a new and improved mapping team. Likewise, PCI is confident many of the issues that were found in previous PCI submittals have been resolved thanks in large part to the experience of previous rounds. Now that PCI has assumed full discretion over this process, it has brought the data "closer to home" for Illinois. PCI has taken major steps in its three-fold mission to collect and publish broadband data, to ensure broadband access throughout the State, and to maximize broadband's impact, and the data has helped drive each of these steps.

STATE OF INDIANA

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Round 5 (Spring 2012)
Data Submission to NTIA
April 1, 2012

Data Description

File Name	Contents	Description
IN_SBDD_20120401.ZIP	This Delivery Package	A zip file containing all of the files described below
IN_SBDD_2012_04_01.gdb	Data Transfer Model	Current NTIA approved data model with the assembled data properly loaded into the data transfer model
IN_DataPackage. 2012_04_01.xls	Data Package	A formatted file containing associated documentation about Indiana's submission
IN_2011_04_01.txt	Data Submission Receipt	File containing the results of the submission check tool
IN_ Methodology _2012_04_01.pdf	Methodology White Paper	Documentation about our process
IN_ Readme_2012_04_01.pdf	Readme Doc	A document that contains added notes about the delivery

Provider Participation

91 Internet Providers

- 51 Wireline Providers
- 48 Wireless Providers

75 Data Sets Received

- 27 Wireline Providers
- 48 Wireless Providers

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Data Collection

We continue to collect and compare data from these sources, including:

- The Indiana Utility Regulatory Commission (comparison broadband data)
- Office of Utility Consumer Counselor (comparison broadband data)
- The Indiana Business Research Center (demographic data)
- Indiana Department of Local Government Finance (residential versus commercial status by address)
- Indiana Counties (point addresses, land parcels, road centerlines with address ranges, and administrative boundaries, aggregated and integrated into the IndianaMap)
- Indiana Department of Natural Resources (state forests and parks)
- Indiana Department of Homeland Security (locations of emergency medical service (EMS) stations, fire stations, and hospitals)
- Department of Education (school locations)
- Indiana Libraries (point of connectivity for low income/unemployed consumers—provide vital speed information for respective geographical locations)
- Commission for Higher Education (locations of colleges and universities)
- Reference USA /Infogroup (community anchors)
- **Broadband service providers, and others**

This information is processed according to the current data submission model offered by the National States Geographic Information Council and to be able to perform spatial comparisons, logic rules and other checks.

We also add emphasis to the collection of speed information using the “crowd sourcing” web-based application already implemented.

Integration and Verification Processes Used in the Mapping Indiana Broadband Project Data Integration

When data is received from a service provider, it is loaded into either Excel or Access depending on the number of records and file size. This table is then joined with a copy of the Census Block *.dbf file from our census block shapefile. After the data has been joined, it is exported as a new *.dbf. The original Census block *.dbf is renamed to preserve the original integrity and the newly exported *.dbf is renamed to the same name as the shapefile. The shapefile is then loaded into ArcMap and a Feature Class is generated. The number of records is then validated against the number of records that were originally imported into either Excel or Access.

Data Loading: A final integration check occurs when the data is loaded into the data model. This includes the logic checks for values.

Validation Processes:

• ***Comparing source documents that duplicate geographies or content.*** We have public domain data that covers most of the state. We compare this data to that provided by the Internet Service Providers. We note areas of discrepancy for follow-up using other verification methods listed here.

• ***Collecting end-user data***. We are working with The Polis Center at Indiana University Purdue University Indianapolis and have created a Google Map-based, user-friendly web application hosted on the IndianaMap portal to collect information from end-users about their location, broadband service provider, and speed (as captured from a speed test). The information collected from this website is valuable for data verification as the database grows. T

• ***Using service providers' websites***, especially those that contain service area information. Many service providers have websites that give service area information (often address by address) to assist consumers. These sites are useful for spot checking.

• ***Inspection of high-resolution orthophotography.*** High-resolution orthophotography has been used to verify the existence and location of wireless towers. Where recent six-inch resolution orthophotography exists (cities and counties), it can also be used to verify the existence of residence connection boxes.

•***"Boots on the ground"*** inspection. We visually inspect the existence of physical features, where feasible, when we have a question or conflict that can be resolved by an on-site inspection.

Indiana Broadband Providers Website

A URL is available http://www.in.gov/iot/Broadband.htm to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letter to providers
- Non-Disclosure Agreement
- Data Submission Guidelines
- Broadband Data Submittal Templates (Spreadsheets)
- Data Submittal Assistance Contact Information

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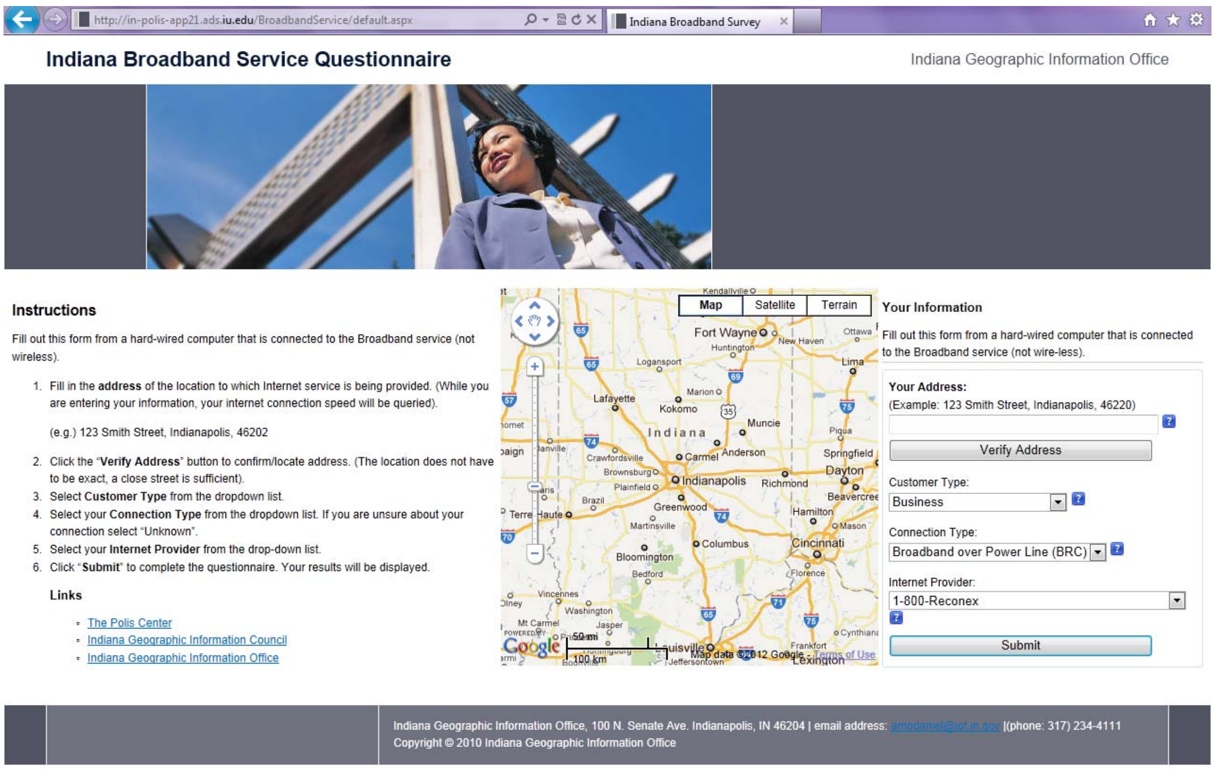
Indiana Broadband Service Questionnaire

http://www.in.gov/iot/BroadbandQuestionnaire.htm
http://in-polis-app21.ads.iu.edu/BroadbandService/default.aspx
www.in.gov/survey



The information collected from this website is valuable for data verification. The Polis Center works with communities in Indiana and beyond to develop and apply knowledge, to build collaborations and to find innovative solutions to common problems. The center excels in community-based research and advanced information technologies, especially geographic information systems (GIS).

Small Service Provider Support

We also support small service providers (and those with smaller information technology teams) in the area of data submission. We recognize the challenge that some providers have in submitting data in the formats and specifications required.

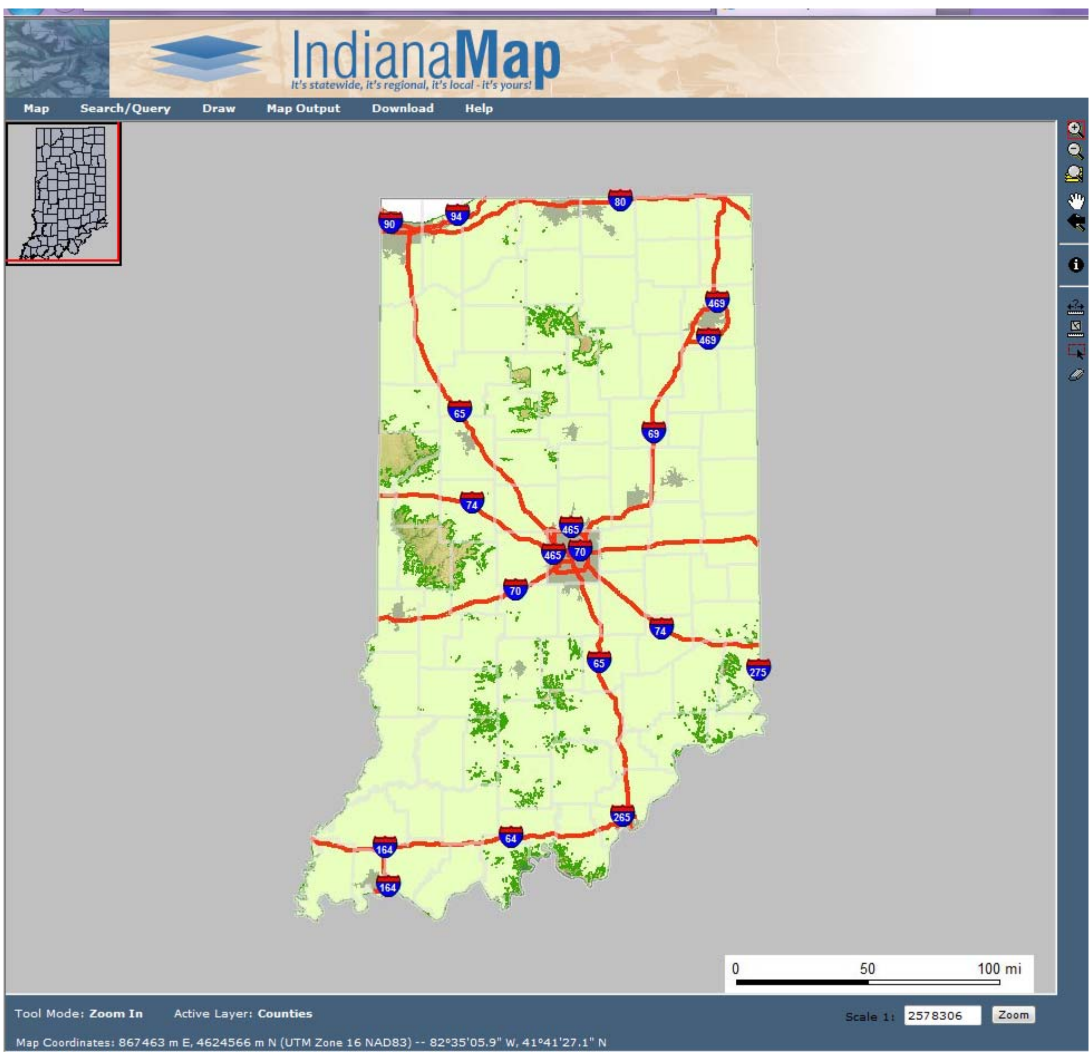
We have entered into a contract with AfterImage GIS to provide support to these providers in the area of data submission and assist with the challenges that some providers have in submitting data in the formats and specifications required by National Telecommunications and

Information Administration (NTIA) for the National Broadband Map. Since we have engaged in this contract, we have been to acquire five new provider data sets.

Data Display

Indiana Map

We are currently displaying the mapping results as additional geospatial layers added to the 220-plus layers already on the IndianaMap (www.indianamap.org)



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Indiana Business Research Center (IBRC)

We have integrated the broadband map data with economic data available from IBRC
www.stats.indiana.edu/broadband/

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Indiana Broadband Map

We have developed a new web-based information tool that will provide information about broadband service availability at a user-specified location.

www.indianabroadbandmap.com

This application is provides tools for searching and displaying broadband availability information anywhere in Indiana.

Public Use

- Zoom to County
- Zoom to Address and retrieve Broadband Information for that address
- Buffer Address for additional Broadband Information in the area
- View Provider Results
- Filter Broadband Information by Speed
- Filter Broadband Information by Technology (i.e. Wireless, Wireline)
- Filter Broadband Information by Service Provider
- Query Census Blocks

Provider Use

- All of the above
- Edit Broadband Information via Secure Login
    - Multiple webinars were hosted by IOT and our web developer 39°north to train the broadband providers how to update their data. Each broadband provider was given their own unique login information. The website was then released to the public so that they can view the available provider information for their area.
    - Through this secure login, the original provider data may be modified to more accurately reflect the various broadband provider's territories.

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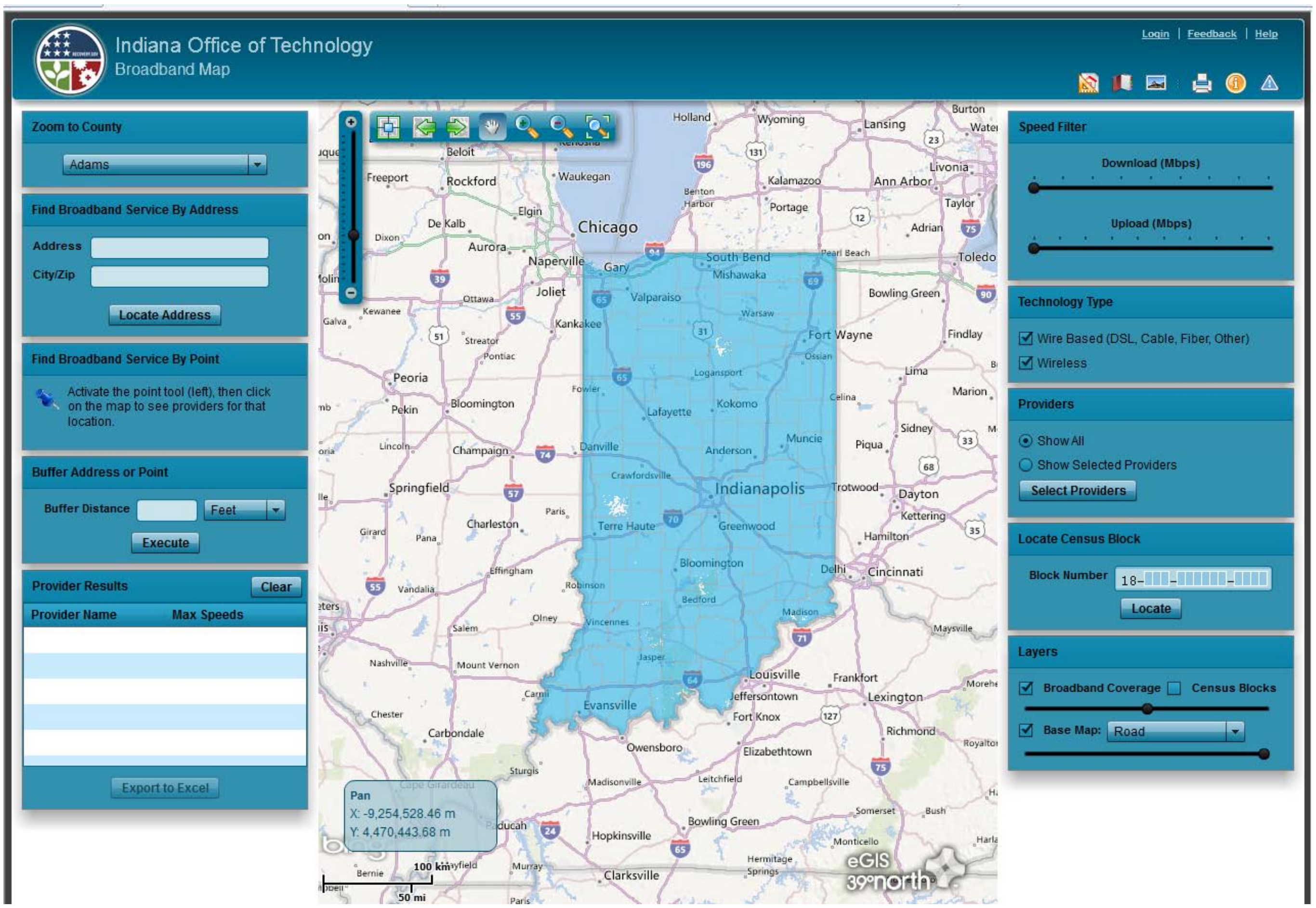

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Address Level Data Collection

We continue to collect address level data. Indeed, as described above, Indiana is well on the way to creating address level reference data to facilitate the collection of address level broadband service availability, not just in census blocks larger than two square miles, but statewide. These data will be invaluable as the lowest common denominator to allow the construction of any geography in support of broadband map display and analysis. This expands the options for how to depict speed across multiple geographies, and facilitates the inquiry of service data at a given x,y.

We are a third of the way in our acquisition of new orthophotography imagery to serve as the foundation for all other geospatial data, including centerlines and address level data.

Here is a graphic showing our orthophotography flight schedule.

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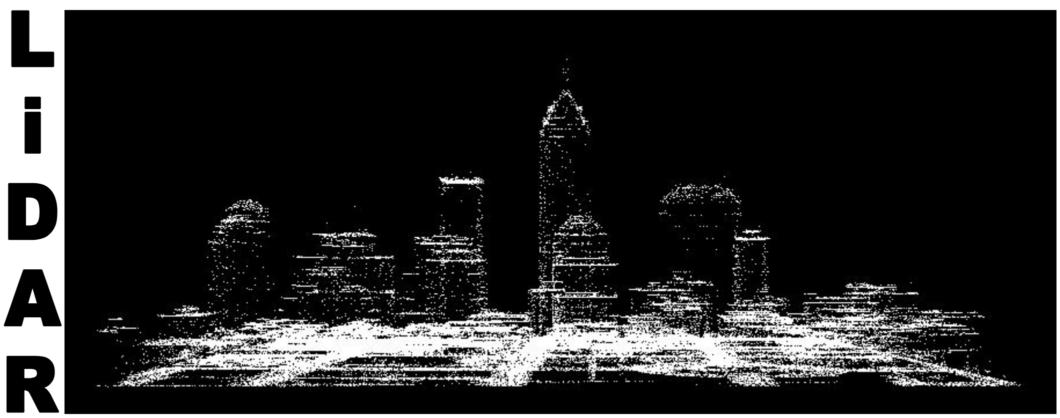
Orthophotography and LiDAR data were acquired for 28 counties in 2011, 6 of which added funds to pay for higher (6-inch resolution) orthophotography. These data will be sent to each county, stored at the state, and also made available to the public via the IndianaMap. Volunteers from INDOT, IDEM, and DNR are performing the QA/QC of this data prior to acceptance.



Flights have started in the eastern tier of counties to begin the acquisition for this year. The western tier will be acquired in 2013.

We currently have about $1.5 million committed by partners that include USGS, Indiana Department of Homeland Security, Indiana Department of Transportation, Indiana Department of Environmental Management, and others. We anticipate contributions from most of the Metropolitan Planning Organizations in Indiana and from many Indiana cities and counties.

Efforts in Process

Community Anchor Institutions

We identified community anchor institutions by cross referencing a statewide land parcel dataset with a data set from the Indiana Local Government Finance office containing, among other information, institution name, location by address, and use category. The results of this analysis have been included in previous deliveries for records containing name, location, and category at a minimum. These data, however, did not have sufficient broadband service information. Therefore, we have engaged a third party to survey the institutions to complete

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the attributes defined in the NOFA for these institutions. We anticipate that this additional data will be included in the fall 2012 submission.

The Indiana Office of Technology has engaged Infogroup to identify and contact all anchor institutions in the State of Indiana. The goal was to determine broadband service and internet service providers that meet the definitions of "broadband" as outlined in the broadband mapping Notice of Funds Availability. The definition is inclusive of two-way data transmission with advertised speeds of 768 kbps downstream and 200 kbps upstream.

Infogroup had the ability to identify state anchor institutions and developed a script designed to gather the information required to answer to the requirements of the NTIA.

There data compilation process telephone verified all businesses, including those identified as anchor institutes, to ensure the highest level of accuracy with business name, business type and contact information. After compiling the list, Infogroup prepared a script and software to assist in capturing the necessary information. They then begin the telephone survey and data collection process and created a report in the tab-delimited text file format of the required information. This survey included institution name, complete address, latitude/longitude, category of institution, broadband service, technology of transmission and advertised downstream/upstream service speed where they are collected in a tab-delimited text file.

The Indiana Office of Technology is currently reviewing this data and will include the results in our fall 2012 submission.

IURC Data Replacement

Per our approved project methodology, we began this project by taking advantage of public data that existing in Indiana about broadband service. While we recognized that these data were not granular enough geographically to satisfy the long term goals of this project, they were nonetheless informative and could provide value until more granular data was obtained from the service providers and verified.

As of this submission, all the original IRUC data has either been confirmed with the provider, replaced or removed.

Data Submission Report

Broadband Service Provider Data as of December 31, 2011

Report date: April 1, 2012

Submitted to:

National Telecommunications and Information Administration
United States Department of Commerce

Submitted by:

Kansas Statewide Broadband Initiative
State of Kansas Department of Commerce

and

Kansas Data Access & Support Center (DASC)

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KansasCommerce.com

Pat George, Secretary

Department of Commerce

Sam Brownback, Governor

March 30, 2012

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

Dear Ms. Neville,

Please accept this submission from the State of Kansas Department of Commerce, the Designated Entity for the Kansas State Broadband Initiative.

During this reporting period, the Department of Commerce took over responsibility of the broadband service provider data collection and related activities for the State of Kansas.

In a very short period of time, we have been able to engage the necessary state resources to ensure a smooth transition and a complete semi-annual broadband service provider data package submitted by the April 1 deadline. We engaged the State's Data Access and Support Center (DASC) GIS experts to carry out the core data collection activities. They were able to build a complete contact list of Kansas service providers and conduct data updates in accordance with the NOFA, culminating in the attached data submission package.

Continued refinements to this data set gives the State of Kansas an excellent method of better understanding our broadband landscape and combined with our active planning projects, promises to establish a sustainable effort with demonstrated positive impact on the Kansas digital economy.

Respectfully,

Stanley Adams
Program Director, Kansas Statewide Broadband Initiative

Cc:
Pat George, Secretary of Commerce
Steve Kelly, Deputy Secretary of Commerce – Business & Community Development
Anthony Schlinsog, Chief Information Technology Officer, Executive Branch
Mark Sievers, Kansas Corporation Commission
Jo Budler, State of Kansas Librarian
Stan Ahlerich, Executive Director – Governor's Economic Development Council – Kansas Department of Commerce
Representative Carl Holmes, Chairman Kansas House of Representatives Energy and Utilities Committee
Senator Pat Apple, Chairman Kansas Senate Utilities Committee

Transition Activities from Connected Nation to Kansas Department of Commerce

During the data collection period ending April 1, 2012, the Kansas Department of Commerce (KDoC) undertook steps to assume the Designated Entity Status from Connected Nation. The State of Kansas engaged Connected Nation to support the initial grant application preparation and to conduct data collection for both periods in 2010 and the first submittal in 2011. This transition of activities was an important strategic step in building and preserving the institutional knowledge of the state's broadband resources, and ensuring the long-term vision of the Kansas Broadband Initiative. KDoC, in collaboration with the State of Kansas Data Access & Support Center (DASC), worked to identify viable service providers, obtain new Non-Disclosure Agreements (NDA), and collect updates for the April, 2012 broadband data submission. While the initial transition phase represented considerable work, it ultimately was of great benefit to the State and was the first step in building a lasting relationship with the broadband service provider industry. The details of these activities are outlined herein.

Provider Outreach

Communication Activities

As part of the initial request for participation in the April, 2012 data submission, KDoC distributed a letter via email to known providers across the state. Additionally, this letter was re-distributed to the membership of the cable and rural telecommunications trade associations in the state to ensure maximum provider coverage. The initial communication included background on the transition of mapping activities, as well as a request for a new Non-Disclosure Agreement (NDA) to facilitate transition work. Also included was a link to an on-line survey for providers to confirm their contact information and to answer a few questions regarding their upcoming data submission. A total of 41 providers completed the survey, which resulted in an opportunity for follow-up communication with many of the providers. Additionally, multiple phone calls were made to those providers who did not respond to either the KDoC email or survey communications in order to solicit their participation in the broadband mapping initiative.

In addition to direct contact with individual service providers, KDoC partnered with the State Independent Telephone Association (SITA) and the Kansas Telecommunications Industry Association (KTIA) in support of provider outreach and maximum participation. These professional associations encouraged their member organizations to participate in the state's broadband mapping initiative and proved to be an effective communication resource.

Through significant effort on the part of KDoC and DASC team, and the connections with the trade associations, all known providers in the state where contacted for this data collection cycle. A summary of provider status as of April 1, 2012 is included in Appendix A of this report.

Non-Disclosure Agreement Development Process

As part of KDoC's transition of the data collection activities from Connected Nation, DASC was engaged to update the service provider data and broadband inventory map. New NDA's were executed between the broadband service providers, KDoC and DASC. During the collection period, NDA's were secured from 42 Kansas broadband service providers. There were no cases where data was not included in this submission due to lack of an NDA.

Data Collection Summary

- As of this submission, there are 105 actual Kansas broadband service providers
- As of this submission, 122 potential Kansas broadband service providers have been identified (105 confirmed providers + 17 potential = 122 total potential providers)
- 88 of the 105 actual service providers submitted data or confirmed no changes to their previous submission during this reporting period

Data Processing

Information was collected from the Kansas broadband service provider industry in a variety of formats including GIS data files, database tables and spreadsheets, CAD files, and paper maps. As files were received, they were reviewed to determine if they contained the required spatial and/or attribute information, and if there was a need for further communication with the provider. In many cases, DASC staff made follow-up phone calls, sent emails, or held Adobe Connect sessions in order to ensure that the information given by the provider was accurately reflected in the database.

All data submissions to the DASC office were processed according to the following steps:

1. Initial data review to determine quality and fitness for processing. Follow-up with broadband provider if necessary.
2. Creation of provider-specific “staging” geodatabase
3. Process edits according to information and materials submitted by provider
4. Review by editing technician
5. Quality Assurance/Quality Control (QA/QC) review by project staff
6. Integration into statewide geodatabase model

The following describes the general steps taken to integrate information provided in the various submission formats.

GIS Data (Shapefile/Geodatabase)

Service area descriptions submitted in a GIS data file format are loaded into a provider-specific staging geodatabase where they are used to determine their intersection with census block and road segment geometry. If a census block is less than two square miles, it is added to the *CensusBlock* feature class. If a census block is larger than two square miles, the corresponding road segments are added to the *RoadSegment* feature class. All required attribute information is then calculated for each feature class.

Database Tables/Spreadsheets/Text-file (Census Block ID/TIGER-Line ID)

It is common for providers to supply information regarding their service availability in a tabular format including a list of Census Block ID and/or TIGER-Line ID numbers. In these cases, the tabular data is joined to the Census geography to select *CensusBlock* and/or *RoadSegment* features. If a census block is larger than two square miles, the corresponding road segments are added to the *RoadSegment* feature class. Attribute items are then calculated for each feature class in the staging geodatabase.

Database Tables/Spreadsheets/Text-file (Address List)

In cases where service providers submit a table of customer addresses, this information is geocoded (sometimes referred to as address matching) to determine a location for each address in the table. This process results in a point data layer that is used to determine the corresponding census block and road segment assignment. If a point falls within a block that is less than two square miles, the block is added to the *CensusBlock* feature class. If a point falls with a block that is larger than two square miles, it is assigned to the nearest road segment and that feature is added to the *RoadSegment* feature class. Attribute items are then calculated for each feature class in the staging geodatabase.

CAD Files/Paper Maps

Some providers submit their service area descriptions as paper map, PDF maps, or CAD drawings. In these cases, this information is interpreted to determine the intersection with census block and road segment geometry. Again, the two square mile threshold is observed for determining census block and road segment assignments, and the necessary attribute information is encoded into the database.

Wireless Service Area

Wireless service providers typically supply a GIS data file (polygon feature class) describing their service area, or a spreadsheet/text-file containing tower locations and characteristics. Service area polygon features are loaded into the provider-specific staging geodatabase and processed into the NTIA geodatabase model. For providers that supply tower locations and characteristics, the information is used to determine a signal propagation model for each tower.

Middle Mile/Last Mile Infrastructure

A limited number of middle mile/last mile points were provided during this data submission cycle. This information, however, was provided in either Shapefile or text-file format, containing the necessary location and attribute information.

Community Anchor Institutions (CAI)

A limited number of CAI features were added during this data submission cycle. The State Library of Kansas supplied data containing location and speed test information. However, further work is required to integrate this value-added data into the data model, and will be included in the next database update. Kansas also has an extensive structures geodatabase containing features such as schools, hospitals, fire stations, EMS stations, and other community based entities. This data will be used to validate the existing CAI data and make updates where necessary. Additionally, DASC will reach out to organizations throughout the state to obtain speed test data for CAI locations in the coming months.

Data Review

In order to ensure that information supplied by the providers is correctly interpreted and incorporated into the database, DASC employed a variety of quality assurance techniques.

1. Comparison of revised/updated boundary delineation or provider information with previous submissions (change detection) – all service area updates are compared to the previous submission to determine if the change in geographic extent or attribute information is reasonable. While major revisions to a service area or technology may be accurate, it is also reasonable to follow-up with the provider to ensure that the submission materials have been provided and/or interpreted correctly.

2. Conference calls – As necessary, follow-up phone calls were made to providers to resolve issues related to submission materials. While this process was time consuming, it was also viewed as part of the relationship building process. It helped to ensure that database edits followed the intent of the provider. Additionally, the GIS technical staff had the opportunity to provide additional background on how the data is collected, aggregated, and used. These connections are important and will be leveraged for future database update cycles.

3. GeoPDF/Hardcopy map generation – several providers requested PDF or hardcopy maps that could be used to review their data. In these cases, custom maps were generated using the previous data submission as the baseline. Follow-up correspondence (phone/email) was used to determine if changes were required.

4. Interactive Web Meetings – using Adobe Connect, interactive desktop GIS sessions were held with some providers to verify service area definitions, transmission technology, and required edits. This proved to be the most effective communication tool utilized during the data collection and editing phase of the project and will continue to be employed for future update cycles.

Data Collection and Mapping Accuracy Enhancement Plan

Industry Roundtables - The most important component of the continued development and maintenance of the state's broadband assets is a strong and ongoing relationship with the service provider industry. During the collection phase DASC identified numerous service providers which expressed interest in supporting subsequent efforts to streamline the process and improve accuracy of the mapping output. To that end, planning is currently underway to convene a pilot industry roundtable to review the future database collection needs and methodology to provide the most accurate picture of broadband in Kansas, and to solicit input from providers across the state on building the next generation of the statewide map.

Provider Feedback Package - Kansas will be creating a 'Provider Feedback Package' for each service provider contained in the current data submission. The feedback package will contain PDF maps of their service area, a provider-specific file geodatabase, and summary information describing their data submission. This tool will be used to maintain communication in between data submission cycles, and to provide another opportunity for providers to review the information submitted on their behalf. This approach is modeled after best-practices indentified from the State of Utah and collaborations with other state programs.

Web-based Mapper – a web-based interactive mapping application is under development and is expected to be released in April of this year. The application will provide a mechanism for the broadband provider industry, government officials, and citizens to visualize the landscape of broadband availability across the state. The application is being developed using Esri's ArcGIS Server software and the JavaScript API, and will implement a lightweight, user-friendly interface that makes it easy to determine broadband availability for a broad region or a specific address.

The Kansas Statewide Broadband Initiative team has established solid working relationships with many providers across the state. During the coming months, the team will continue to work towards expanding these relationships to ensure an accurate, high quality depiction of broadband service in Kansas.

Appendix A – Service Provider Status Table

Provider	DBA Name	FRN	NDA	State Database Status	Reporting Period Status
Access One Online Services	Access One Online Services	9999	No	Data included in KS State Submission	No updates this reporting period
TC Wireless, Inc.	Advantage Plus	0018587469	No	Data included in KS State Submission	No updates this reporting period
Allegiance Communications, LLC	Allegiance CATV	0010267862	No	Data included in KS State Submission	No updates this reporting period
AT&T Mobility LLC	AT&T Mobility LLC	0004979233	Yes	Data included in KS State Submission	Updates included this reporting period
AT&T Communications of Texas, Inc	AT&T Southwest	0016657918	Yes	Data included in KS State Submission	Updates included this reporting period
Atwood Cable Systems, Inc.	Atwood Cable Systems, Inc.	0003789765	No	Data included in KS State Submission	No updates this reporting period
Blue Valley Tele-Communications, Inc.	Blue Valley Tele-Communications, Inc.	0002331262	Yes	Data included in KS State Submission	No updates this reporting period
Haug Communications, Inc.	BroadBand Wireless Internet	0005600242	Yes	Data included in KS State Submission	Updates included this reporting period
Benson Tel Service Inc.	Btsskynet.net	0018562207	No	Data included in KS State Submission	No updates this reporting period
Benkelman Telephone Company	BWTelcom	0002387264	Yes	Data included in KS State Submission	No updates this reporting period
Cable ONE	Cable ONE	0003474327	Yes	Data included in KS State Submission	No updates this reporting period
CenturyTel, Inc.	CenturyLink	0018626853	Yes	Data included in KS State Submission	Updates included this reporting period
City of Chanute	City of Chanute	0002295400	No	Data included in KS State Submission	Updates included this reporting period
City of Coffeyville	City of Coffeyville	0018535427	No	Data included in KS State Submission	No updates this reporting period
Clearwire Corporation	Clear	0017775628	No	Data included in KS State Submission	Updates included this reporting period
Columbus Telephone Company	Columbus Telephone Company	0003734167	Yes	Data included in KS State Submission	No updates this reporting period
Comcast Cable Communications, LLC.	Comcast	0004441663	Yes	Data included in KS State Submission	Updates included this reporting period
	Cogent Communications, Inc.	0019066034	No	Data included in KS State Submission	Updates included this reporting period
Conterra Telecom Services	Conterra Ultra	0009750324	Yes	Data included in KS State Submission	Updates included this reporting period
DIECA Communications, Inc.	Covad Communications Company	0003753753	Yes	Data included in KS State Submission	Updates included this reporting period
CoxCom Inc.	Cox Communications	0001524461	Yes	Data included in KS State Submission	No updates this reporting period
Craw-Kan Telephone Cooperative, Inc.	Craw-Kan Telephone Cooperative, Inc.	0002334225	Yes	Data included in KS State Submission	Updates included this reporting period
Leap Wireless International, Inc.	Cricket Communications, Inc.	0002963528	Yes	Data included in KS State Submission	Updates included this reporting period
Cunningham Communications, Inc.	Cunningham Telephone & Cable	0004985818	Yes	Data included in KS State Submission	Updates included this reporting period
Cyber Lodge Internet Services, Inc.	Cyber Lodge Internet Services, Inc.	9999	No	Data included in KS State Submission	No updates this reporting period
Diller Telephone Company	Diller Telephone Company	0002393379	No	Data included in KS State Submission	No updates this reporting period

DISH Network Corporation	DISH Network Corporation	0010500338	No	Data included in KS State Submission	No response to recent data request
Eagle Communications, Inc.	Eagle Communications, Inc.	0013339973	No	Data included in KS State Submission	Updates included this reporting period
Elkhart Telephone Company, Inc.	Epic Touch Company, Inc.	0002330843	Yes	Data included in KS State Submission	Updates included this reporting period
Bluestem Telephone Company	FairPoint Communications	0003723491	No	Non-Responsive	No response to recent data request
Sunflower Telephone Co., Inc.	FairPoint Communications	0003723236	No	Non-Responsive	No response to recent data request
FairPoint Communications	FairPoint Communications	0014710388	No	Non-Responsive	No response to recent data request
GBT Communications	GBT Communications	0012141842	No	Data included in KS State Submission	Updates included this reporting period
Giant Communications, Inc.	Giant Communications	0008830846	No	Will Provide Data	Data expected next reporting period
Gorham Telephone Company, Inc.	Gorham Telephone Company	0004322889	Yes	Data included in KS State Submission	Updates included this reporting period
H&B Cable Service, Inc.	H&B Communications, Inc.	0002331601	Yes	Data included in KS State Submission	Updates included this reporting period
H&B Cable Service, Inc.	H&B Communications, Inc.	0003764545	Yes	Data included in KS State Submission	Updates included this reporting period
Haviland Telephone Company, Inc.	Haviland Telephone Company, Inc.	0005081567	Yes	Data included in KS State Submission	Updates included this reporting period
Home Communications, Inc.	Home Communications, Inc.	0010627446	No	Non-Responsive	No response to recent data request
Home Communications, Inc.	Home Telephone Company, Inc.	0010627446	No	Non-Responsive	No response to recent data request
Hughes Network Systems, LLC	Hughes Network Systems, LLC	0017434911	Yes	Data included in KS State Submission	No updates this reporting period
JBN Telephone Company, Inc.	JBN Telephone Company, Inc.	0004340410	No	Will Provide Data	Data expected next reporting period
The KanOkla Telephone Association, Inc.	KanOkla Networks	0004362364	Yes	Data included in KS State Submission	Updates included this reporting period
KanOkla Communications, Inc.	KanOkla Networks	0002323731	Yes	Data included in KS State Submission	Updates included this reporting period
Kansas Broadband Internet, Inc.	Kansas Broadband Internet, Inc.	0016893455	No	Will Provide Data	Data expected next reporting period
Kansas Data Internet, Inc.	KASINET	9999	No	Data included in KS State Submission	No updates this reporting period
	KITUSA	9999	No	Non-Responsive	No response to recent data request
Knology of Kansas, Inc.	Knology of Kansas, Inc.	0020113197	No	Data included in KS State Submission	No updates this reporting period
LaHarpe Telephone Company, Inc.	LaHarpe Telephone Company, Inc.	0004322053	No	Data included in KS State Submission	Updates included this reporting period
Lawrence Freenet	Lawrence Freenet	0014524193	No	Will Not Provide Data	Data expected next reporting period
	Lightyear Network Solutions, LLC	0010045128	No	Non-Responsive	No response to recent data request
Madison Telephone LLC	Madison Telephone LLC	0004322079	No	Data included in KS State Submission	Updates included this reporting period
MCC Missouri LLC	Mediacom	0005184247	No	Data included in KS State Submission	No updates this reporting period
Mercury Wireless, LLC	Mercury Wireless, LLC	0018603027	No	Non-Responsive	No response to recent data request
	MidwestIS.net	9999	No	Non-Responsive	No response to recent data request
	Midwest Connections, Inc	9999	No	Non-Responsive	No response to recent data request
St. Joe Wireless	Midwest Mobile Radio Service, Inc.	0002545929	Yes	Data included in KS State Submission	Updates included this reporting period
	MOBIL1.NET	9999	No	Will Not Provide Data	Data expected next reporting period

Moundridge Telephone Company, Inc.	Moundridge Telephone Company, Inc.	0002339976	Yes	Data included in KS State Submission	Updates included this reporting period
LR Communications, Inc.	Mutual Telecommunications	0014024640	Yes	Data included in KS State Submission	Updates included this reporting period
Nautilus Net	Nautilus Net	9999	No	Non-Responsive	No response to recent data request
North Central Kansas Community Network	NCKCN	9999	No	Data included in KS State Submission	Updates included this reporting period
Nex-Tech, Inc.	Nex-Tech, Inc.	0017125808	Yes	Data included in KS State Submission	Updates included this reporting period
	Osprey Network Technologies, Inc.	9999	No	Non-Responsive	No response to recent data request
	PAETEC Communications, Inc.	0003744869	No	Non-Responsive	No response to recent data request
Peoples Telecommunications, LLC	Peoples Telecommunications, LLC	0004310694	Yes	Data included in KS State Submission	Updates included this reporting period
Pioneer Telephone Association, Inc.	Pioneer Communications	0002334795	Yes	Data included in KS State Submission	Updates included this reporting period
Pixius Communications LLC	Pixius Communications	0019389949	No	Data included in KS State Submission	No
Carson Communications	Rainbow Communications	0000013722	Yes	Data included in KS State Submission	Updates included this reporting period
Rainbow Telecommunications Association, Inc.	Rainbow Communications	0002333649	Yes	Data included in KS State Submission	Updates included this reporting period
Rebeltec Communications LLC	Rebeltec Communications LLC	0016084675	No	Data included in KS State Submission	Updates included this reporting period
Rural Telephone Service Company, Inc.	Rural Telephone	0002336105	Yes	Data included in KS State Submission	Updates included this reporting period
Nex-Tech, Inc.	Rural Telephone	0006192041	Yes	Data included in KS State Submission	Updates included this reporting period
S&A Communications, Inc.	S&A Communications, Inc.	0015987969	Yes	Data included in KS State Submission	No updates this reporting period
S&A Telephone Company, Inc.	S&A Telephone Company, Inc.	0002329662	Yes	Data included in KS State Submission	No updates this reporting period
S&T Telephone Cooperative Association	S&T Communications	0002285260	Yes	Data included in KS State Submission	No updates this reporting period
S&T Communications LLC	S&T Communications	0008460081	Yes	Data included in KS State Submission	No updates this reporting period
	SCI Cable, Inc.	9999	No	Non-Responsive	No response to recent data request
South Central Telephone Assn., Inc.	SCTelcom	0003771235	Yes	Data included in KS State Submission	Updates included this reporting period
South Central Wireless, Inc.	SCTelcom	0003771169	Yes	Data included in KS State Submission	Updates included this reporting period
	Seamless Data Systems	9999	No	Non-Responsive	No response to recent data request
Southeast Nebraska Communications, Inc.	Southeast Nebraska Telephone Company	0006764948	No	Data included in KS State Submission	No updates this reporting period
Southern Kansas Telephone Company, Inc.	Southern Kansas Telephone Company, Inc.	0002333888	No	Data included in KS State Submission	No updates this reporting period
SWKO, Inc.	SouthWest Kansas Online	0020608121	No	Data included in KS State Submission	No updates this reporting period
KeyOn Communications, Inc.	SpeedNet	0015082621	No	Non-Responsive	No
Sprint Nextel Corporation	Sprint	0003774593	Yes	Data included in KS State Submission	Updates included this reporting period
Stelera Wireless, LLC	Stelera Broadband	0015021066	No	Data included in KS State Submission	No updates this reporting period

Stouffer Communications, Inc.	Stouffer Communications	0006716666	No	Non-Responsive	No response to recent data request
Friendship Cable of Arkansas, Inc.	Suddenlink Communications	0004999025	No	Data included in KS State Submission	Updates included this reporting period
Universal Cable Holdings, Inc.	Suddenlink Communications	0004998969	No	Data included in KS State Submission	Updates included this reporting period
W.K. Communications, Inc.	Suddenlink Communications	0004999736	No	Data included in KS State Submission	Updates included this reporting period
Sumner Cable TV, Inc.	Sumner Communications	0007631187	Yes	Data included in KS State Submission	Updates included this reporting period
Superior iNET	Superior iNET	0013527619	No	Non-Responsive	No response to recent data request
	SureWest Kansas Operations, LLC	00143027194	Yes	Will Provide Data	Data expected next reporting period
SwiftLink Communications	SwiftLink Communications	0018595439	No	Non-Responsive	No response to recent data request
The Tri-County Telephone Association	The Tri-County Telephone Association	0001630433	No	Data included in KS State Submission	Updates included this reporting period
Time Warner Cable LLC	Time Warner Cable	0013430244	Yes	Data included in KS State Submission	Updates included this reporting period
T-Mobile USA, Inc.	T-Mobile	0006945950	Yes	Data included in KS State Submission	Updates included this reporting period
Totah Communications, Inc.	Totah Communications, Inc.	0005010996	No	Data included in KS State Submission	No updates this reporting period
Mokan Dial, Inc.	Townes Telecommunications Services Company	0004928750	Yes	Data included in KS State Submission	No updates this reporting period
Twin Valley Communications, Inc.	Twin Valley Communications, Inc.	0010059640	Yes	Data included in KS State Submission	Updates included this reporting period
Twin Valley Telephone, Inc.	Twin Valley Telephone, Inc.	0002334407	Yes	Data included in KS State Submission	Updates included this reporting period
Twinmounds.com	Twinmounds.com	0018333211	No	Data included in KS State Submission	No updates this reporting period
United States Cellular Corporation	U.S. Cellular	0004372322	Yes	Data included in KS State Submission	No updates this reporting period
United Communications Association, Inc.	United Communications Association	0002327153	Yes	Data included in KS State Submission	Updates included this reporting period
United Wireless Communications, Inc.	United Wireless	0012662698	Yes	Data included in KS State Submission	Updates included this reporting period
	University Corporation for Advanced Internet Development		No	Non-Responsive	No response to recent data request
	Utopian Wireless Corporation	0016320061	No	Non-Responsive	No response to recent data request
Valnet	Valnet	0018198572	Yes	Data included in KS State Submission	Updates included this reporting period
Cellco Partnership and its Affiliated Entities	Verizon Wireless	0003290673	No	Data included in KS State Submission	Updates included this reporting period
Wamego Telecommunications Company, Inc.	Wamego Telecommunications Company, Inc.	0003746088	No	Data included in KS State Submission	Updates included this reporting period
Wave Wireless LLC	Wave Wireless LLC	0018057257	No	Data included in KS State Submission	No updates this reporting period
Wheat State Telephone, Inc.	Wheat State Telephone, Inc.	0002333672	No	Data included in KS State Submission	No updates this reporting period
Wheatland Broadband Services	Wheatland Broadband	0006150783	Yes	Data included in KS State Submission	Updates included this reporting period

WildBlue Communications, Inc.	WildBlue Communications, Inc.	0007843766	No	Data included in KS State Submission	Updates included this reporting period
Ideatek Systems Inc.	Wildflower Internet	0016098857	No	Data included in KS State Submission	Updates included this reporting period
Wilson Telephone Company, Inc.	Wilson Telephone Company, Inc.	0003722444	Yes	Data included in KS State Submission	Updates included this reporting period
Windjammer Communications LLC	Windjammer Cable	0017915182	No	Data included in KS State Submission	Updates included this reporting period
	WISP-Router, Inc.	0016099509	No	Non-Responsive	No response to recent data request
	Zayo Group, LLC	0019133826	No	Non-Responsive	No response to recent data request
	Zenda Telephone Company, Inc.	0004948253	No	Data included in KS State Submission	No updates this reporting period
Zito Midwest, LLC	Zito Media	0020111225	No	Non-Responsive	No response to recent data request

DATA DEVELOPMENT & VALIDATION METHODOLOGIES WHITE PAPER

Commonwealth of Kentucky
State Broadband Initiative (SBI)
Broadband Mapping Project

COMMONWEALTH OFFICE OF BROADBAND OUTREACH AND DEVELOPMENT
Promoting a 21st century economy

NTIA Data Submittal
April 1, 2012

Baker

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Appendices

Introduction

The following sections of this document provide an overview of the process used for the SBI Broadband Mapping data development for the Commonwealth of Kentucky. The following narrative is depicted in Appendix A, Commonwealth of Kentucky SBI Process Workflow, and Appendix B, State Broadband Data Validation Workflow, included at the end of this document.

Broadband Provider Outreach Results

As a result of the outreach to broadband providers and investigating whether an internet service provider (ISP) meets the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

- 207 Total Investigated ISPs
- 119 Total Confirmed Broadband Service Providers (unique Provider/DBA combinations)
- 93 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 procedure provides the framework for communicating with Broadband Service Providers (Providers). The primary goals of the outreach approach documented herein are to:

- Promote Provider understanding and acceptance of the Broadband Mapping process, results and benefits
- Clarify NTIA Broadband Mapping requirements
- Facilitate data confidentiality agreements as required
- Minimize the submittal of invalid data
- Enhance provider understanding of the semi-annual update process
- Work with Providers to evaluate submittal options to facilitate data submittals

Data Submission Guidelines

Guidelines for the providers' submission of Broadband Mapping Data are documented in the "Data Submission Guidelines". These Guidelines define technical requirements, submission specifications, and coordination and documentation activities.

Kentucky Broadband Providers Website

A URL was deployed (http://www.bakergis.com/kyBroadbandProvider/) to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letters to providers
- Non-Disclosure Agreement
- Quick Start Guides

- Data Submission Guidelines
- Data Transmittal Letter
- Broadband Data Submittal Templates
- Census TIGER Data
- Data Submittal Assistance Contact Information

Outreach Delivery Vehicles

- A State Broadband Mapping Initiative Call for Data letter from the Kentucky Commonwealth Office of Technology (COT) was emailed to all Broadband Service Providers in the Commonwealth. This initial provider contact letter described the program and the role of Michael baker Jr., Inc. (Baker) acting on behalf of the COT for Broadband Data Collection and Mapping.
- Baker distributed a follow-up letter to all Providers describing the data submittal requirements and material and help available to aid with the data submittals.
- Submittal assistance was provided to providers that needed help with data submittals.
- Presentations were conducted with various broadband provider associations to present the data submittal requirements and answer questions.
- Email communication and electronic transfer of data was encouraged to facilitate a faster delivery of data and information.
- A URL was deployed and promoted to distribute outreach material and information concerning the Broadband Mapping Project.
- A secure FTP URL was provided for submittal of broadband data by providers.
- A secure Broadband Provider Data Update Webportal was deployed for providers to redline/update their service coverage, rather than supply their updated coverage for the semi-annual data updates.

Inclusion of Resellers

With the request for data current as of December 31, 2011, resellers are being included in all of the outreach, data collection, data aggregation, and verification tasks.

Secure Broadband Provider Data Update Webportal

A secure web-based application for broadband service providers has been deployed to simplify and automate the semi-annual process for collecting and verifying data. The webportal provides an easy-to-use map redlining tool for updating a provider broadband service area and attributes. It is expected that the simplification and automation of the data collection process will increase participation and improve the timeliness of provider response, data accuracy and consistency. Providers are being encouraged to utilize this tool but data is still being accepted through other means and formats.

Figure 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. Picklists of valid database attributes eliminates entry errors and create consistency. It also contains a workflow from initial provider input, saving of a provider's work-in-progress, provider formally submitting edits, aggregation into the master geodatabase, soliciting provider approval of aggregated data, and final approval of the edit.

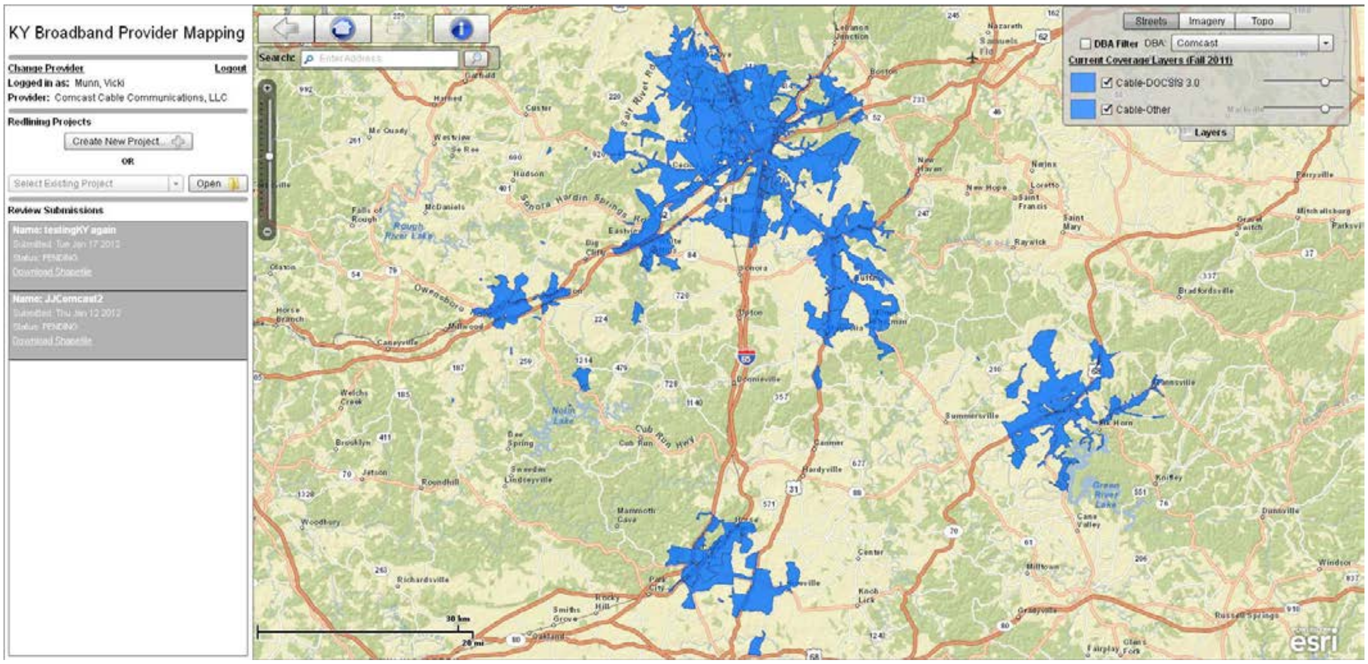


Figure 2 Provider Data Update Webportal –View/Edit Coverage Map Environment

Broadband Outreach Tracker Application

The Tracker application (Figure 3) was utilized to collect all correspondence with Providers and feedback on the effectiveness of the outreach activities by tracking items such as:

- The number and content of incoming e-mails and letters submitted from the Providers
- The number and source of comments, questions, and suggestions made by Providers
- The number and source of comments, questions, and suggestions made by attendees at Provider meetings and conference calls
- Provider contact information and data submittal status.

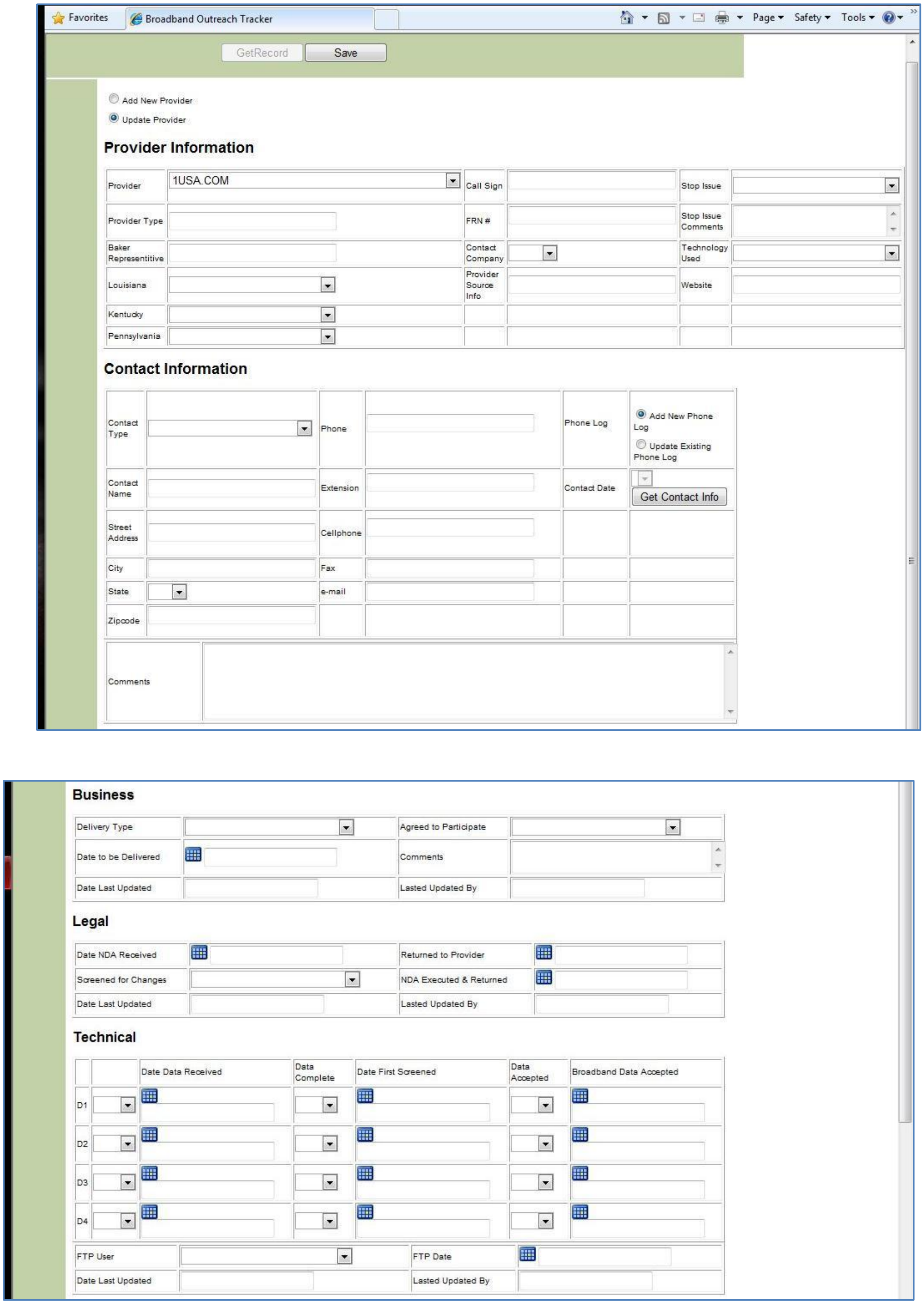


Figure 3 Broadband Outreach Tracker

Provider Submittal Validation

When a data submittal is received from a broadband service provider it is updated in the Broadband Outreach Tracker and run through an initial validation process to assure that it meets the submittal guidelines.

Validation Checklist

The following items are part of this initial data validation process:

- Verify the provider Transmittal Letter is complete and matches submitted data
- Verify the file naming conventions
- Verify each file is machine readable
- Verify data is in the correct GIS or Tabular format/file type
- Verify each field is populated and no empty or NULL values are present for mandatory fields
- Verify all ID (record number points) are unique within the submittal
- Verify all attribute data is formatted according to the submittal guidelines
- Verify topology for all geospatial submissions
- Verify Metadata for all submissions
- Verify the required contact information is included
- Verify adherence to Data Submittal Guidelines (see http://www.bakergis.com/kyBroadbandProvider/ to access Data Submittal Guidelines)

  Broadband Service Availability (at least one)
  - Individual Street Addresses (Sec 3.1 & 4.1)
  - Census Blocks < 2 sq mi (3.3 & 4.3)
  - Street Segments for Census Blocks > 2 sq mi (3.2 & 4.2)
  - Service Overview (Sec 3.4 & 4.4)
  - Polygonal Boundary Area(s) (Sec 3.8 & 4.8)

  Middle-mile Points (Sec 3.5 & 4.5)

  Community Anchor Institutions (Sec 3.7 & 4.7)

  Last Mile Connection Points (Sec 3.6 & 4.6)

  WISP Antennas (Sec 4.9)

Data Usability Determination

The validation results are evaluated by the outreach and aggregation persons to determine the usability of the data. If the data meets the submission specifications, it is forwarded on for data aggregation. If it is determined to be unusable, it is returned to the provider for resolution. If the data can be manipulated to get it into a usable format, it is manipulated as required, and then forwarded on for data aggregation.

SBI Data Development

Data from the providers may be submitted in various formats as defined in the Data Submittal Guidelines, or in some cases unspecified formats may be accepted to help facilitate provider participation. Depending on the format of the submitted data, it is processed through one of the following processes to upgrade it to the NTIA SBI data standards.

Spatial Data

After validation and any required manipulation of any spatial data submitted by the providers, it is georeferenced and simply loaded into the appropriate NTIA geodatabase feature class.

Address Data Geocoding

If not already in the standard address point template, the provider tabular address data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. ArcGIS geocoding tools are then utilized geospatially locate the address points for the tabular records. Interactive address rematching is performed against two additional street centerline datasets as needed to increase geocoding matching results. The NTIA deliverable is the geocoded address point geodatabase table. The geocoded address points are also subsequently aggregated to the census block or road segment feature class for public web map display.

Census Block Aggregation

If not already in the standard census block template, the provider tabular census block data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider tabular census block records are then joined to the geodatabase 2010 U.S. Census Block. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination. The NTIA deliverable is the census block geodatabase table.

If the list of census blocks contains blocks > 2 sq. miles then these blocks are used to select all the 2010 U.S. Census TIGER centerlines that intersect those blocks. The Census Block record data is aggregated to each Road Segment within the Census Block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination.

Road Segment Aggregation

If not already in the standard road segment template, the provider road segment data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. If the provider submittal included graphic centerline segments, these are migrated into the delivery geodatabase along with the linked attribute records. If the provider submittal was tabular road segment records only, they are then joined to the geodatabase 2010 U.S. Census TIGER centerline feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

If the provider road segment data lie within census blocks <= 2 sq. miles then the road segment data is aggregated to the census block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

Overview Data Aggregation

Provider Service Availability Areas submitted for entire county areas are loaded into the NTIA geodatabase Overview table. If not already in the standard template, the provider data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The Provider Overview records are then joined to the geodatabase 2010 U.S. Census County feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination.

Polygonal Boundary Aggregation/Integration

Providers submitting polygonal service area data are handled in two ways. Wireline Provider data is aggregated to the census block feature class for areas where census blocks <= 2 sq. mi., or road segment feature class for areas where census blocks > 2 sq. mi. Wireless Provider Service Availability Areas submitted by polygonal area are simply loaded into the NTIA geodatabase Poly_Bndry feature class.

Wireline Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Depending on the area, census blocks < or => 2 sq. mi., a selection set of either census blocks or road segments that intersect the polygon boundary is created. The attributed polygon boundary is then joined with census blocks or road segments table to attribute accordingly. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination. The NTIA deliverable is the census block or road segment geodatabase table.

Wireless Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Multiple Poly_Bndry records are created for multiple Trans Tech values for each Provider. The NTIA deliverable is the polygon boundary geodatabase table.

Middle/Last Mile Data Integration

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. The NTIA deliverable is the middle or last mile geodatabase table.

Community Anchor Institution Integration

Providers supplied some Community Anchor Institution (CAI) data with the data submittals. But the majority of the data was collected from existing GIS Layers maintained by the COT on their KYGEONET public website. Some of the data was collected by outreaching to CAIs through state agencies and their contacts, and having CAIs complete an online survey at http://www.bakerbb.com/ky_institution_survey/.

Provider CAIs

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. Address data is used to geocode locations only when Lat/Long data is not provided.

Commonwealth CAIs

CAI shapefiles were downloaded from the KYGEONET website. The shapefiles were then exported to the NTIA geodatabase CAI feature class. Various sources for obtaining broadband information for the CAIs were utilized. Various state agencies provided some of the information, i.e.; Council on Post Secondary Education (CPE) provided tabular broadband information for schools and libraries and COT provided tabular broadband information for health departments. A CAI data survey website was also deployed and the URL distributed by various state agencies to the CAI contacts. Data from all of these sources were then aggregated into the CAI geodatabase table for the NTIA deliverable.

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. In addition, the calculated typical speeds are compared against the Centris average speed verification data to be certain that the calculated typical speeds are within reason. The end result is a more complete data submittal to NTIA.

Propagation Mapping

Because not all fixed wireless broadband providers have participated, may not have a propagation map readily available, or have supplied data of marginal accuracy, the years 3-5 NTIA funding has supplied the means to generate a propagation map for these situations. In addition, the NTIA has also pointed out fixed wireless service coverages with unusual shapes. To generate the propagation mapping, additional information is needed to generate the model to resolve the above mentioned situations and will be resolved over time (i.e. beyond the April 2012 deliverable time frame) through coordination and outreach with the Providers.

Data Verification Summary

Kentucky's broadband mapping project employs a multi-prong approach to ensure the provider data is accurate and complete.

In summary, the project employs the following validation methodologies and resources:

- Provider Validation
- Data Validation via Market Intelligence Sources
- Data Validation Using State Supplied Data Points
- Field Validation
- Wireless Coverage Analysis
- Topology Validation
- Automated Validation Processing
- Confidence Level/Statistical Modeling
- SBDD Check Submission
- Stakeholder Validation

The remainder of this verification section describes the various methods in greater detail.

Provider Validation

After data development, service availability maps are generated and submitted to the providers to validate their mapping results. This provides a "sign off" on the interpretation of the submitted data and extends the outreach efforts by providing a visual representation of the data to be delivered to the State and the NTIA.

Types of Provider Maps

Provider maps generally consist of the following types.

Outreach Maps

Often, providers will send data which does not contain all the information needed for a NTIA compliant dataset. In such cases, as an aid to the outreach communication, it may be necessary to produce a map to help the provider locate their service area or verify data they have provided. These maps may take many forms, but generally are of two types:

- General Location Maps – these maps are often produced when the provider does not have a list of address or other standard submittal data and needs help defining their service area. A typical map will show counties, major roads, and towns of the general area the provider has stated as their service area. The intent of the map is to give the provider a way to markup or delineate their service area. If a provider has not provided required attribute information such as Technology of Transmission, Speed Data, etc. then it may be necessary to add a visual clue to this data like an information stamp on the map that they can easily fill out. If the provider sends the map back with a service area boundary, this can then be digitized and sent back to the provider for verification.
- Verification of Provider Supplied Boundaries – these maps are produced when the provider has sent service area boundary information which is confusing or otherwise unclear. Often these are produced when providers send CAD maps, hand drawn maps that need digitization, or lists of zip codes or counties served. A typical map will place the interpreted boundary over a location map so the provider can verify the service area. As with the General Location Map, information stamps or other visual clues may be placed on the map.

Initial Verification Maps

Once the provider data has been processed and the census block and road segment feature classes created, an Initial Verification Map (Figure 4) is produced to give the provider a visual representation of their service area by census block. These maps enable the provider to verify their service area and make changes if necessary. Initial Verification Maps are produced using a set of standards and produced at the highest resolution necessary to convey the map information to the provider. Initial Verification Maps are also produced for Wireless Polygon areas.

Detailed Verification Maps

Providers who have questions about their service areas may request additional information to help clarify issues. In these cases it may be necessary to create a Detailed Verification Map to highlight the areas in question. Detailed Verification Maps provide the same information as Initial Verification Maps only at a higher resolution. Several maps may be needed to accurately portray an area in question.

Revised Maps

Revised maps take two forms:

- Initial or Detailed Verification Maps which have been annotated or marked-up by the provider
- Outreach produced Initial or Detailed Verification Maps incorporating provider changes

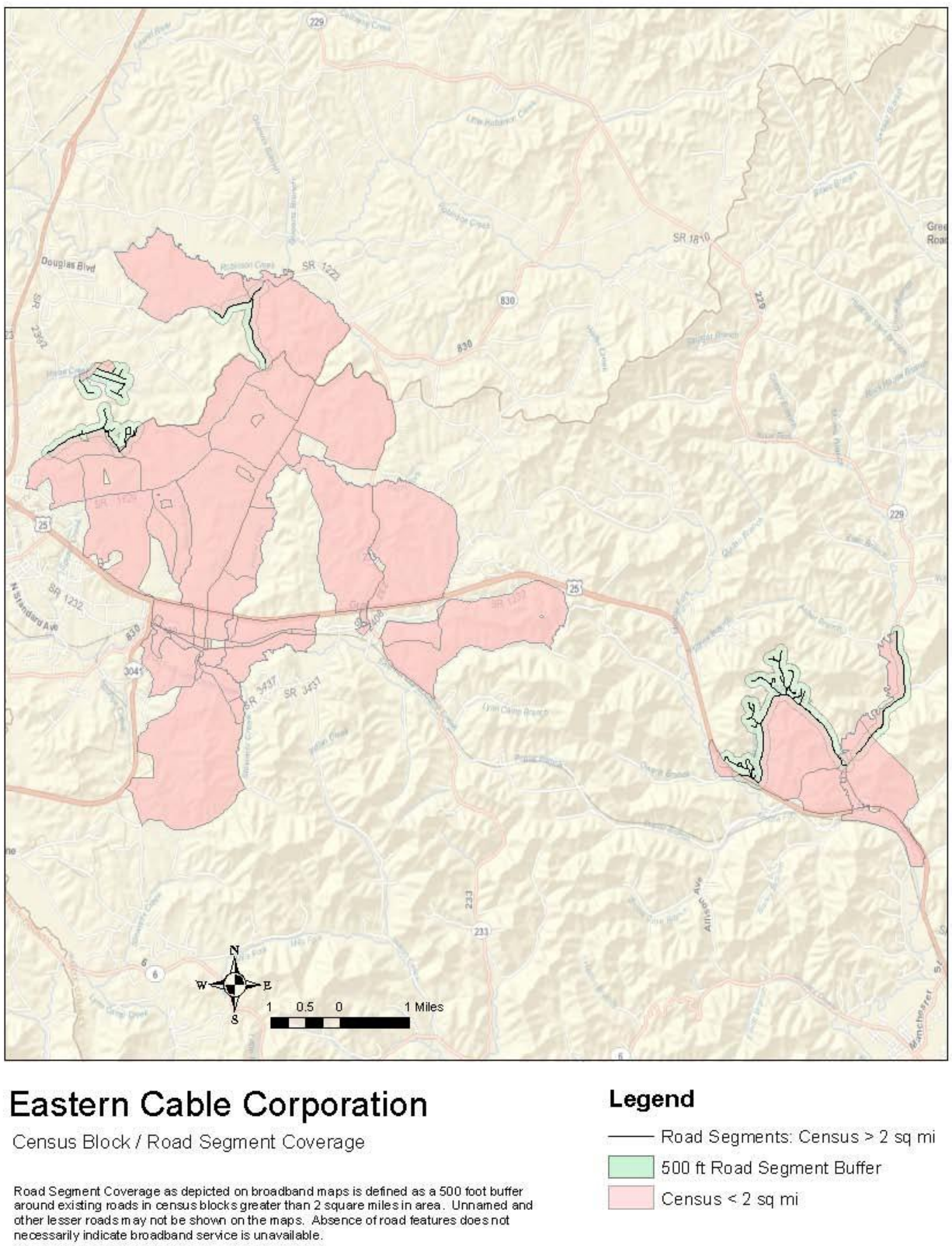


Figure 4 Provider Map

Data Validation

A critical component of the project is the validation of the data submitted by the broadband service providers. Data from various sources, as described in more detail in the following sections, is utilized to develop a level of confidence in the data received from the broadband providers.

Validation Data Set Collection and Development

This validation process employs data sets developed or acquired from different sources as described in the following sections.

Provider Feedback Loop: Maps of completed provider service areas and data are furnished back to the providers for confirmation of the processed/aggregated information. Feedback is integrated into the each Provider's dataset.

Broadband Market Analysis (BMA) Wireline Market Intelligence Data: Data is extracted from internal and commercial databases defining geographic service areas of telephone and cable companies and locations of central office (CO) switches and areas upgraded with fiber. The geographic areas are overlaid with Census demographic data on housing unit counts and density. The areas are then modified based on standard business practices for conducting service build-out and offering broadband service relative to housing density and other variables, such as distance from CO and other infrastructure elements, type of cable franchise (e.g., Census Place vs. Unincorporated County) This represents the first pass conservative estimate of coverage.

The above methods and data sources are supplemented by other data sources and methodologies, including: 1) connectivity data points acquired from InfoUSA that include ISP and type of connection (e.g., DSL, cable modem, dial-up, wireless, fiber) providing Internet service to specific geo-coded (i.e., by Latitude and Longitude) residential addresses; 2) web-based and telephone research, including address-level service-availability queries of web sites operated by service providers and independent entities. This multi-sourced MBA dataset is used as a validation source for provider service area coverage, Technology of Transmission, and Speed.

American Roamer Wireless Market Intelligence Data: Commercially available dataset used as an independent source to verify information submitted by Providers of wireless broadband service. This dataset is used as a validation source for provider service area coverage.

Online Public Survey and Speed Test: A Broadband Mapping Public Survey Site is deployed. Site visitors are requested to provide data on broadband availability, technology, service type (e.g., speed tier) service provider name; monthly prices paid and measured downstream and upstream speeds. In addition to State promotion via press releases to the general public, the State Council on Post Secondary Education (CPE) also promoting participation on this survey to the faculty and student population. This dataset is used as a validation source for provider service area coverage, Technology of Transmission, and Speed.

Prior Broadband Mapping: Statewide coverage areas for Cable, DSL, and Fixed Wireless providers that were aggregated as part of a previous broadband mapping effort for the Commonwealth of Kentucky are used to validate against Provider submitted data. In addition to the service areas, the DSL and Fixed Wireless layers contain general speed information that can be compared against Provider submitted data.

FCC Speed Test: The FCC speed test data includes the IP addresses for each specific speed test conducted. This IP address is queried against a web search engine to determine the Provider assigned to that address and is used as a validation source for provider service coverage and typical speeds.

Field Data Acquisition: Broadband technicians visited a sampling of census block locations to gather broadband data to be used for validation. The following criteria were taken into account when developing the census block sampling dataset:

- urban vs. rural census block characteristic
- censes block grouping
- land vs. water census block characteristic

The overarching mission of the Federal broadband stimulus program is to expand Broadband service to areas that are currently unserved and underserved. Also, the market intelligence validation sources typically represent some rural, but more urban areas. Thus, our field data collection efforts were targeted more towards the rural areas; split 90% rural, 10% urban.

Additionally, a study by Penn State University (Glasmeier 2002) notes that a large number of census block groups typically fit within any given cable or telephone company service areas. Therefore, our field sample was also based on selection of one census block per block group. The selected census block also had greater than 50% land area, versus water. There are a total of 3, 158 census block groups statewide. Using a statistical sample size calculator based upon the number of block groups in the state and +/- 4% margin of error at a 95% confidence level, the sample size is 529 census block locations (Figure 5).

For the 529 census blocks that were visited, 2455 individual wired/wireless data elements were recorded and 3024 pictures were taken at those locations. This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

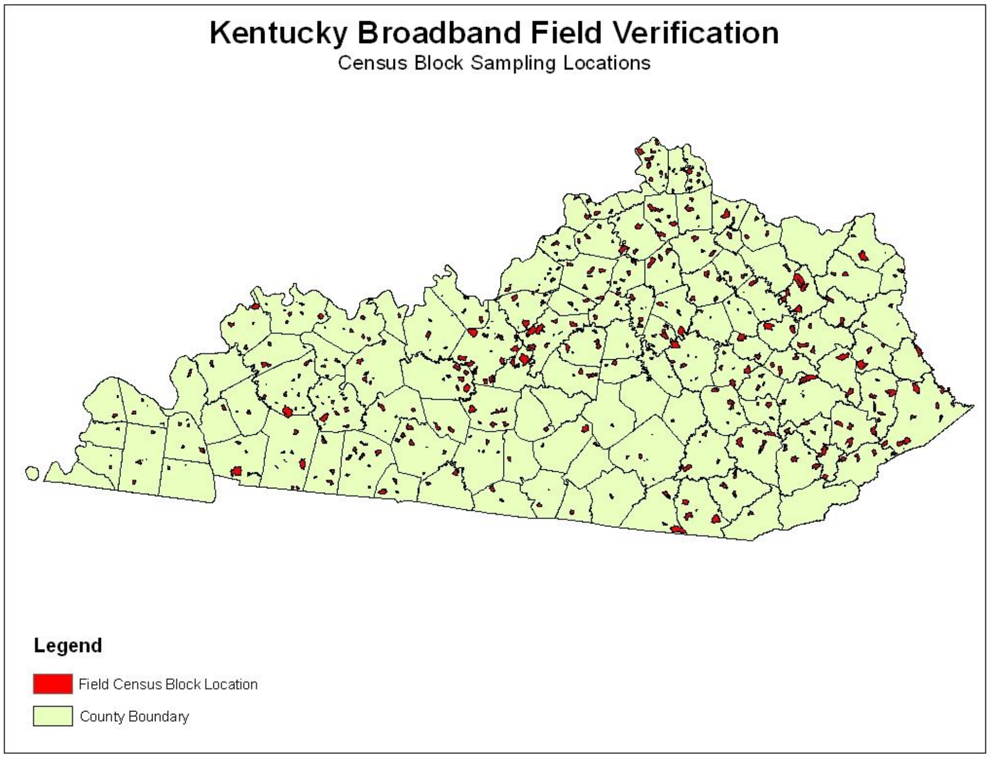


Figure 5 Field Verification Sampling Locations

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.

Independent 3rd Party Validation: Murray State University coordinated the efforts of resources at the University of Louisville and the Kentucky Community and Technical College System (validation team) to validate the collection methods and collected data associated with the collection of broadband availability data. This validation data developed from this effort was subsequently integrated into the Statistical Evaluation and Assessment System (SEAS) to verify the data submitted by the broadband providers.

The validation team review included:

a. Validating the list of providers being used by the mapping vendor to make sure all providers are included.
b. Validating the list of state-provided and Census Tiger Data to identify the location of health facilities, schools, libraries, hospitals, universities, public buildings, etc.
c. Reviewing provider outreach methodology being used by the mapping vendor.
d. Reviewing submission options, the Non-Disclosure Agreement and the timeframe for submission.
e. Identifying Business Intelligence data sources to validate provider information.
f. Reviewing mapping vendor's website used to collect comment/survey forms from visitors to validate the broadband coverage in their area.
g. Observing the data collection and data entry process and the ongoing steps in the development of the final products.

Once data was collected, the validation team provided a review that included:

a. Cross checking of data for accuracy
b. Statistically representative and significant samples to validate data, especially in rural and potentially underserved.

Limited field census and telephone surveys were also used to validate data in situations where the data cross checks and statistical samples are not able to validate data provided by the mapping vendor. Faculty and students from campuses of the Kentucky Community and Technical and College System (KCTCS) conducted the field census work to validate local adoption rates. KCTCS has 16 colleges and over 60 campuses to provide state-wide coverage for field census work.

The work performed, and being performed by the validation team can be summarized in four areas: (1) Audit, (2) Selective Surveys, (3) Reconcile Survey and Provider Data, and (4) Field Test to Resolve Discrepancies.

Audit – At the beginning of the project it was decided that the best way to obtain quality data was to make sure that the initial data collection was of the highest quality that it could be. The validation team concentration its initial efforts in working with the mapping vendor to get the best quality data and also the largest quantity of data that could be obtained. Mapping vendor processes were reviewed and suggested improvements provided. Web sites and documents that were to be used for data collection were evaluated and improvements suggested. Provider lists were reviewed and additional vendors or potential vendors were identified by the validation team. Once data collection began, the validation team also worked with the mapping team to increase the amount of data collected. KCTCS provided web survey sites to students and faculty across the state to increase participation. Once the data was collected the validation team worked to identify data anomalies and locations where additional data collection was required.

Selective Surveys – The data audits identified locations where there was insufficient data to make valid conclusions about broadband availability. The validation team used a call center to place selective surveys in the targeted areas within the state. In many cases the insufficient data was the result of the failure of vendors to provide data to the mapping vendor. The selective surveys provide validation of the availability of broadband or the absence of broadband within a specific area. This information allows the mapping vendor to concentrate their efforts to obtain the required data from the appropriate vendor. The call center efforts reached almost 10,000 new households that had not been sampled by other methods. The data indicated that 68.8% had computers, 64.7% has access to the Internet, and 56.7% has broadband access. The new data points were located in rural areas of the state and were focused on areas that had been underrepresented in prior data collection efforts.

Reconcile Survey and Provider Data – The mapping vendor survey data (from web surveys), the provider data, and the selective surveys done by the validation team provide an additional reconciliation of the data. While the importance of knowing where broadband is available is critical, it is just as important to know where broadband is not available. The comparison of the various data sources allow for a high confidence in identifying where broadband is available. Additionally, the data reported on the web surveys and the phone surveys identify pockets of citizens of the Commonwealth that don't have access to broadband. The validation team used the data reported by the providers, the data collected by the mapping vendor, and the validation survey data to identify areas of interest for the field data collection efforts. The focus of the field data collection efforts are areas with no reported service, areas where individuals report no availability, and areas where only mobile wireless has been reported as being available for broadband service.

Field Test to Resolve Discrepancies – The reported territory covered by wired broadband infrastructure is reliable. However, the reported territory covered by wireless broadband infrastructure (especially mobile wireless) is less reliable. Many factors can impact the availability of the wireless signal. We simply have to think about our cell phone usage and the frequency of dropped calls or no service availability. It is relatively easy for a vendor to say they provide service to an entire geographic area. The validation team developed software to check on the level of mobile wireless availability and to make sure it is at broadband speeds. The validation team drove mobile devices around the state collecting signal strength and doing periodic speed test to validate the availability of broadband. The initial focus was on areas reported to have no service and areas that only have mobile broadband reported. Test data was collected to validate the data collection process and identify required equipment.

Provider Data Validation Process

Provider Feedback Loop: Feedback received from the providers is visually inspected and integrated directly into the mapping GIS database.

Service Area Validation Data: The MBA wireline service area data is tabular and contains a separate record for each provider/technology of transmission combination with an associated census block or TIGER road segment, depending on the whether the size of the census block area (=/< or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer and Prior Mapping service area data is already in and ArcGIS data format. The validation data is then joined to the Provider service area data by census block or TIGER road segment ID. Any database records in the Provider or Validation tables that cannot be joined are output to a separate layer that indicates the areas of discrepancy between the two datasets. The joined tables are then queried to detect any speed discrepancies which are also output to a separate discrepancy layer.

Online Surveys, Field and Independent 3rd Party Validation Data: The Public and Targeted Business/Household survey, field and independent 3rd party validation data are also collected in tabular database format, and represent a specific lat/long spatial location for each record. This data is exported into ArcGIS data format, joined to the provider data, queried to validate pertinent attribution. Again, records not joined and or with detected attribution discrepancies are output to separate GIS layers.

Topology: The ArcGIS Validate Topology Tool is used to flag any topology issues in the broadband data. Flagged issues are reviewed to identify false positives and update true errors as required.

SBI Check Submission: The NTIA-provided SBI Check Submission tool is utilized to validate that the deliverable broadband data is consistent with the business logic rules set forth by the NTIA and a passing receipt is provided with the data submittal to NTIA.

Stakeholder Feedback: The state broadband mapping website includes a feedback function. Comments received from stakeholders are reviewed and used to validate provider data submissions.

Validation and Confidence Level Reporting

To facilitate validation and confidence level reporting, Baker deployed a validation application called Statistical Evaluation and Assessment System (SEAS), shown in Figure 6, which automatically compares the multiple independent validation datasets against the broadband service provider's supplied information. The SEAS uses statistical methodologies to report the confidence level in the spatial and attribute accuracy of the information. Appendix B shows the validation workflow.

The SEAS comparison is a three-part validation process:

1. Comparison of the collected validation source against the aggregated broadband provider data.
2. Match percentage calculation for each provider reported in the DataPackage.xls, "Provider Table" tab, "Comments" column.
3. Confidence score calculation displayed on the state broadband website.

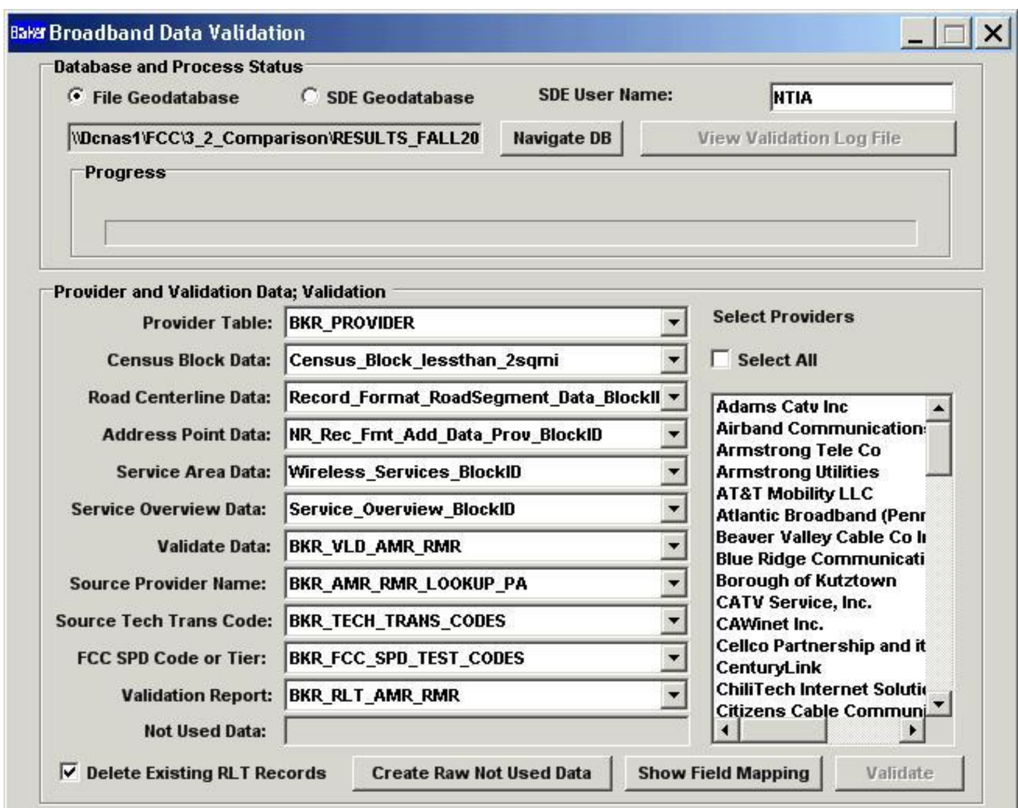


Figure 6 Statistical Evaluation and Assessment System (SEAS)

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 Commonwealth’s public broadband mapping website (www.bakerbb.com/kybroadbandmapping/) 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...	★★★★☆

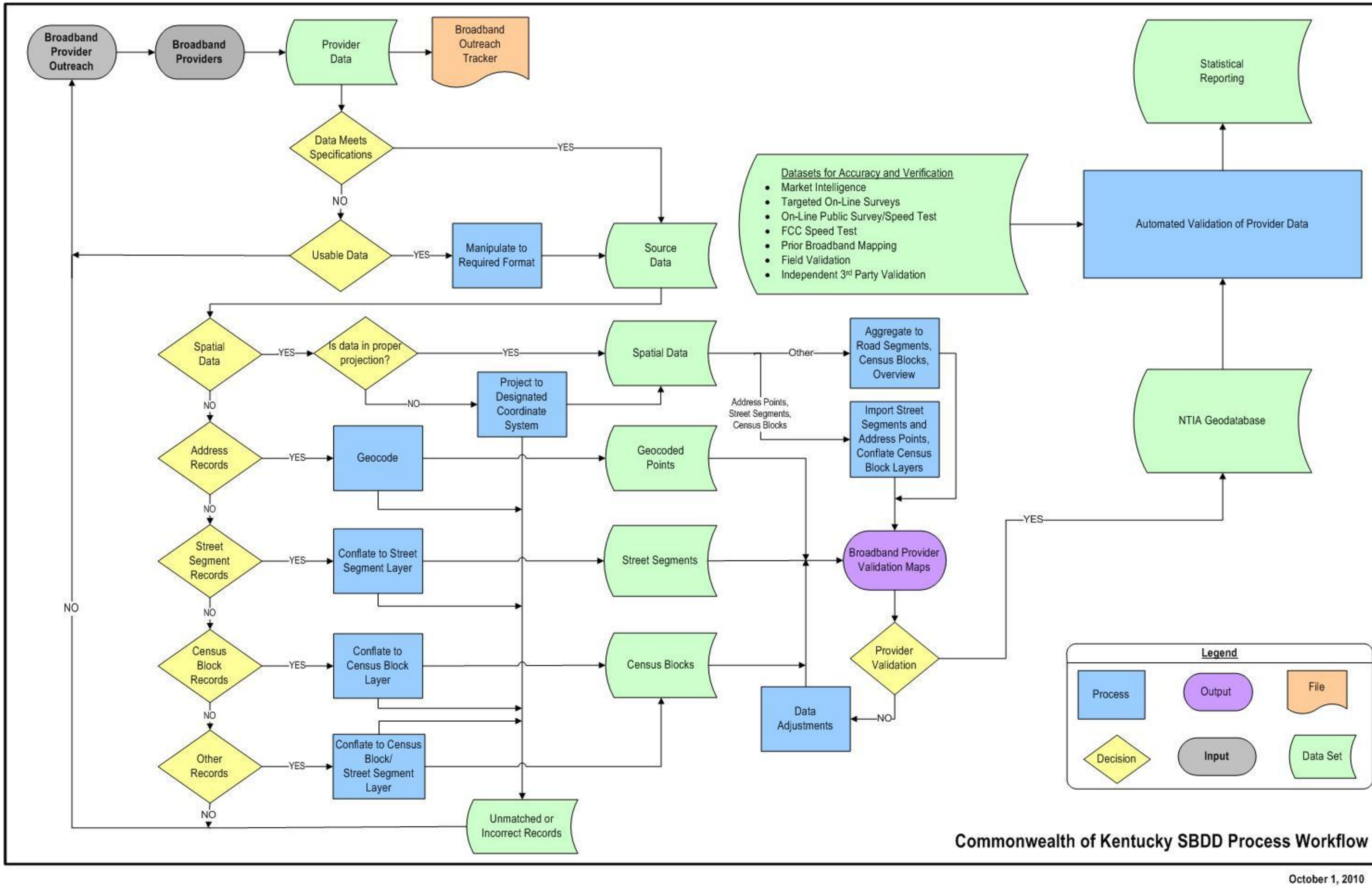
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

Low Confidence Provider Feedback

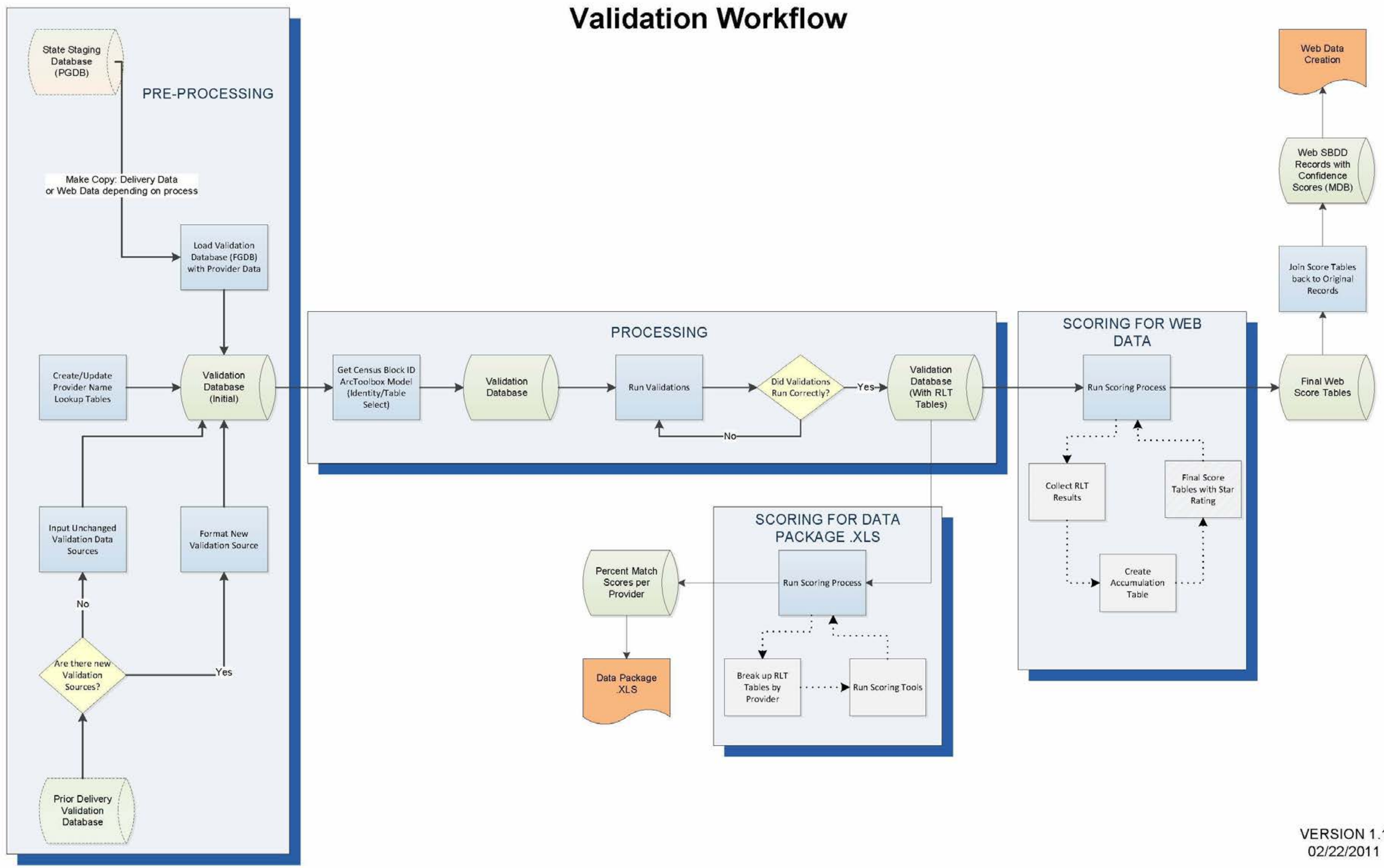
Provider data which is assigned a low confidence (1 or 2 stars) through the SEAS process is communicated back to the provider through a feedback loop. Generally, the low confidence feedback and reconciliation is a continuous refinement process and will occur between update cycles. The goal is to provide 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 NTIA semiannual data submittal, changes and corrections documentation is provided. Significant changes in a provider’s status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.


Broadband Provider Outreach
Broadband Providers
Provider Data
Broadband Outreach Tracker
Data Meets Specifications
YES
NO
Usable Data
YES
Manipulate to Required Format
Source Data
NO
Datasets for Accuracy and Verification
Market Intelligence
Targeted On-Line Surveys
On-Line Public Survey/Speed Test
FCC Speed Test
Prior Broadband Mapping
Field Validation
Independent 3rd Party Validation
Automated Validation of Provider Data
Statistical Reporting
Spatial Data
YES
Is data in proper projection?
YES
NO
Project to Designated Coordinate System
Spatial Data
Other
Aggregate to Road Segments, Census Blocks, Overview
Address Points, Street Segments, Census Blocks
Import Street Segments and Address Points, Conflate Census Block Layers
NTIA Geodatabase
Address Records
YES
Geocode
Geocoded Points
Street Segment Records
YES
Conflate to Street Segment Layer
Street Segments
Broadband Provider Validation Maps
YES
Census Block Records
YES
Conflate to Census Block Layer
Census Blocks
Provider Validation
NO
Data Adjustments
Other Records
YES
Conflate to Census Block/ Street Segment Layer
Unmatched or Incorrect Records
Legend
Process
Output
File
Decision
Input
Data Set
Commonwealth of Kentucky SBDD Process Workflow
October 1, 2010

State Broadband Data Validation Workflow



Appendix C: Master Outreach List

Filing Company DBA	Filing Company Name	Status
Access Cable Television, Inc.	Access Cable Television, Inc.	Provider
ALTIUS Broadband	ALTIUS Broadband	Provider
Appalacian Wireless	East Kentucky Network, LLC	Provider
Armstrong Utilities	Armstrong Utilities	Provider
AT&T Corp, Inc.	AT&T Corp, Inc.	Provider
AT&T Kentucky	BellSouth Telecommunications, Inc.	Provider
AT&T Mobility LLC	AT&T Mobility LLC	Provider
Avolutia, LLC	Shelby Broadband	Provider
Ballard Telephone Cooperative	BTC	Provider
Ballard Telephone Cooperative	BTC	Provider
Barbourville Online	Barbourville Utility Commission	Provider
Bardstown Cable TV	City of Bardstown	Provider
BGMU	Bowling Green Municipal Utilities	Provider
Big Sandy Broadband, Inc.	Big Sandy Broadband	Provider
Bluegrass Cellular	Bluegrass Wireless LLC	Provider
Bluegrass Cellular	Cumberland Cellular Partnership	Provider
Bluegrass Cellular	Kentucky RSA #3 Cellular General Partnership	Provider
Bluegrass Cellular	Kentucky RSA #4 Cellular General Partnership	Provider
Bracken Cablevision	Standard Tobacco Company, Inc.	Provider
Bracken Cablevision	Standard Tobacco Company, Inc.	Provider
Brandenburg Telecom LLC	Brandenburg Telecom LLC	Provider
Brandenburg Telephone Company	Brandenburg Telephone Company	Provider
CBW of Kentucky	Cincinnati Bell Wireless LLC	Provider
Cincinnati Bell Telephone	Cincinnati Bell Telephone Company LLC	Provider
City of Williamstown, Cable & internet Service	City of Williamstown, Cable & internet Service	Provider
Clearwire Corporation	Clearwire Corporation	Provider
Coalfields Telephone Company, Inc.	Gearheart Communications	Provider
Comcast	Comcast Cable Communications, LLC.	Provider
Community Telecom Services	Community Telecom Services	Provider
ConnectGRADD	Windstream / Norlight Inc	Provider
Covad Communications Company	DIECA Communications, Inc.	Provider
Cricket Communications, Inc.	Leap Wireless International, Inc.	Provider
Duo County Telecom	Duo County Telephone Cooperative	Provider
Duo County Telephone Cooperative, Inc.	Duo County Telephone Cooperative	Provider
Eastern Cable Corp	Eastern Cable Corporation	Provider
EPBNET	Electric Plant Board of Russellville Ky	Provider
FiberNet LLC	FiberNet LLC	Provider
Foothills Broadband	Foothills Rural Telephone Cooperative Corporation Inc.	Provider
Frank Howard TV Cable	Frank Howard TV Cable	Provider
Frankfort Plant Board	Frankfort Electric & Water Plant Board	Provider
Galaxy Cablevision	Galaxy Cable Inc.	Provider

Glasgow Electric Plant Board	Glasgow Electric Plant Board	Provider
Harlan Community Television, Inc.	Harlan Community Television, Inc.	Provider
Highland Telephone Cooperative	Highland Telephone Cooperative	Provider
Hopkinsville Electric System	Electric Plant Board of the City of Hopkinsville	Provider
HughesNet	Hughes Communications, Inc.	Provider
Inside Connect Cable	Inside Connect Cable	Provider
Insight Communications Midwest, LLC	Insight Communications	Provider
Inter Mountain Cable, Inc	Inter Mountain Cable, Inc	Provider
Irvine Community Television, Inc.	Irvine Community Television, Inc.	Provider
Ken-Tenn Wireless, LLC	Ken-Tenn Wireless, LLC	Provider
KRCC	KRCC	Provider
KYWIFI	KYWIFI	Provider
Level 3 Communications, LLC	Level 3 Communications, LLC	Provider
Liberty Communications, Inc.	Liberty Communications, Inc.	Provider
Liberty Communications, Inc.	Liberty Communications, Inc.	Provider
Limestone Cablevision	Standard Tobacco Company, Inc.	Provider
LOGAN TELEPHONE COOPERATIVE, INC.	LOGAN TELEPHONE COOPERATIVE, INC.	Provider
Lycom Communications, Inc	Lycom Communications	Provider
Mediacom	Mediacom Southeast, LLC	Provider
megaWi	megaWi	Provider
MEWS	Mayfield Electric & Water	Provider
Mikrotec CATV, LLC	Mikrotec CATV, LLC	Provider
Mountain Telephone	Mountain Rural Telephone Coop. Corp., Inc.	Provider
Murray Electric Systems	Murray Electric Systems	Provider
Norlight, Inc.	Norlight, Inc.	Provider
North Central Communications	North Central Communications	Provider
NTELOS	West Virginia PCS Alliance, L.C.	Provider
OMU	OMU	Provider
OOL Wireless	Windstream / Norlight Inc	Provider
PRTC	Peoples Rural Telephone Coop. Corp., Inc.	Provider
Skycasters	Skycasters, LLC	Provider
SOUTH CENTRAL RURAL TELEPHONE	SOUTH CENTRAL RURAL TELEPHONE COOPERATIVE, INC.	Provider
SOUTH CENTRAL TELCOM	SOUTH CENTRAL TELCOM, LLC	Provider
Sprint	Sprint Nextel Corporation	Provider
Suddenlink Communications	Cebridge Acquisition, LLC	Provider
Suddenlink Communications	Cequel III Communications II, LLC	Provider
T.V. Service	T.V. Service	Provider
TDS TELECOM	LESLIE COUNTY TELEPHONE COMPANY	Provider
TDS TELECOM	LEWISPORT TELEPHONE COMPANY	Provider
TDS TELECOM	SALEM TELEPHONE COMPANY	Provider
Thacker-Grigsby Telephone	Thacker-Grigsby Telephone	Provider
TIME WARNER CABLE	TIME WARNER CABLE LLC	Provider
T-Mobile	T-Mobile USA, Inc.	Provider
tw telecom of kentucky llc	tw telecom of kentucky llc	Provider
Verizon Wireless	Cellco Partnership and its Affiliated	Provider

	Entities	
Vortex Wireless	Vortex Wireless	Provider
Windstream Kentucky East, LLC	Windstream Kentucky East, LLC	Provider
Windstream Kentucky West, LLC	Windstream Kentucky West, LLC	Provider
WK&T Telecommunications	W Kentucky Rural Telephone	Provider
WWGapTel	WWGapTel	Provider
Your Telecommunications Co.	House Enterprises, Inc.	Provider
SkywayUSA	Skyway	Provider
StarBand Communications Inc.	StarBand Communications Inc.	Provider
WildBlue Communications, Inc.	WildBlue Communications, Inc.	Provider
Broadview Networks, Inc.	Broadview Networks, Inc.	Reseller
EnTelegent Solutions, Inc.	EnTelegent Solutions, Inc.	Reseller
Morehead State University Campus	Morehead State University Campus	Reseller
Ohio County Direct Net	Ohio County Direct Net	Reseller
VCI Internet Services	VCI Internet Services	Reseller
Access Kentucky INC	Access Kentucky INC	Provider
Axon Access	Axon Access	Provider
Chapel Communications Inc.	Chapel Communications Inc.	Provider
KyWiMAX	KyWiMAX	Provider
Blue One Communications, Inc.	Blue One Communications, Inc.	Provider
BluegrassNet	BluegrassNet	Provider
BlueZoom WiFi, Inc.	BlueZoom WiFi, Inc.	Provider
ConnectLink, Inc	ConnectLink, Inc	Provider
EarthLink, Inc.	EarthLink, Inc.	Provider
Henderson Municipal Power & Light Company	Henderson Municipal Power & Light Company	Provider
Open World	Open World	Provider
Princeton Electric Plant Board	Princeton Electric Plant Board	Provider
QX.net	QX.net	Provider
CSI Telecom Group Inc.	CSI Telecom Group Inc.	Provider
IgLou	IgLou	Provider
Kentucky OnLine, Inc. (KYOL)	Kentucky OnLine, Inc. (KYOL)	Provider
Kentucky Telephone Company	Kentucky Telephone Company	Provider
Lightyear Network Solutions, Inc.	Lightyear Network Solutions, Inc.	Provider
MST Wireless	MST Wireless	Provider
Systems Solutions (SSINET)	Systems Solutions (SSINET)	Provider
WiMAX Express	WiMAX Express	Provider
Win.net Internet	Win.net Internet	Provider
Cellular South Licenses, Inc.	Cellular South Licenses, Inc.	Potential
City of Bellefonte	City of Bellefonte	Potential
City of Franklin	City of Franklin	Potential
CNI Wireless, Inc.	CNI Wireless, Inc.	Potential
Crystal Broadband Networks	Crystal Broadband Networks	Potential
Hazard Television Co Inc	Hazard Television Co Inc	Potential
Horizon Telecom	Horizon Telecom	Potential
MediaFLO/Qualcomm	MediaFLO/Qualcomm	Potential
SITCO	SITCO	Potential
Tri-Star Communications, Inc	Tri-Star Communications, Inc	Potential
Alltel Communications, LLC	Alltel Communications, LLC	Other
ALLTEL Newco LLC	ALLTEL Newco LLC	Other

Cellco Partnership	Cellco Partnership	Other
Cincinnati Bell Extended Territories, LLC	Cincinnati Bell Extended Territories, LLC	Other
Cincinnati SMSA Limited Partnership	Cincinnati SMSA Limited Partnership	Other
Comcast - Southern Division	Comcast - Southern Division	Other
DC Kentucky Newco, LLC	DC Kentucky Newco, LLC	Other
GTE Wireless of the Midwest Incorporated	GTE Wireless of the Midwest Incorporated	Other
Kentucky RSA No. 1 Partnership	Kentucky RSA No. 1 Partnership	Other
MCC Telephony of the South, LLC	MCC Telephony of the South, LLC	Other
New Cingular Wireless PCS, LLC	New Cingular Wireless PCS, LLC	Other
New Par	New Par	Other
Powertel Memphis Licenses, Inc.	Powertel Memphis Licenses, Inc.	Other
Sprintcom Inc	Sprintcom Inc	Other
Telecommunications Management, LLC	Telecommunications Management, LLC	Other
Time Warner NY Cable LLC	Time Warner NY Cable LLC	Other
Vista (Mirror 2) PCS License Holding, LLC	Vista (Mirror 2) PCS License Holding, LLC	Other
Vista License Holdings, L.L.C.	Vista License Holdings, L.L.C.	Other
W. Stephen Cannon, Management Trustee	W. Stephen Cannon, Management Trustee	Other
WIN Enterprises	WIN Enterprises	Other
Wirelessco, L.P.	Wirelessco, L.P.	Other
Kentucky Data Link	Kentucky Data Link	Other
Megapath / DSLnet	Megapath / DSLnet	Other
NewWave Communications	NewWave Communications	Other
SouthEast Telephone Inc.	SouthEast Telephone Inc.	Other
US Digital Online	US Digital Online	Other
Zito Media, L.P.	Zito Media, L.P.	Other
SpeedBeam Wireless, Inc.	SpeedBeam Wireless, Inc.	Not a Broadband Provider
360networks	360networks	Not a Broadband Provider
ACN Communication Services, Inc.	ACN Communication Services, Inc.	Not a Broadband Provider
Alltel Communications of Virginia No. 1, LLC	Alltel Communications of Virginia No. 1, LLC	Not a Broadband Provider
Altro TV Company Inc.	Altro TV Company Inc.	Not a Broadband Provider
Banana Communications, LLC	Banana Communications, LLC	Not a Broadband Provider
Bowling Cable TV	Bowling Cable TV	Not a Broadband Provider
BroadLink	BroadLink	Not a Broadband Provider
Buffalo-Lake Erie Wireless Systems Co., L.L.C.	Buffalo-Lake Erie Wireless Systems Co., L.L.C.	Not a Broadband Provider
C & C TV Service	C & C TV Service	Not a Broadband Provider
C & W Cable, Inc.	C & W Cable, Inc.	Not a Broadband Provider
Cainpro Communications	Cainpro Communications	Not a Broadband Provider
CenturyLink (formely Quest Communications)	CenturyLink (formely Quest Communications)	Not a Broadband Provider
Charter Communications	Charter Communications	Not a Broadband Provider
City of Raceland	City of Raceland	Not a Broadband Provider
Community TV Inc	Community TV Inc	Not a Broadband Provider
Cook Inlet/VS GSM VII PCS, LLC	Cook Inlet/VS GSM VII PCS, LLC	Not a Broadband Provider
Crossroads License Holding Sub A Inc.	Crossroads License Holding Sub A Inc.	Not a Broadband Provider

Crossroads Wireless, Inc., Debtor-in-Possession	Crossroads Wireless, Inc., Debtor-in-Possession	Not a Broadband Provider
Derby Divestiture Trust	Derby Divestiture Trust	Not a Broadband Provider
Evarts T.V. Co. Inc.	Evarts T.V. Co. Inc.	Not a Broadband Provider
Franklin Electric Plant Board	Franklin Electric Plant Board	Not a Broadband Provider
Granite Telecommunications, LLC	Granite Telecommunications, LLC	Not a Broadband Provider
iNetworks Group, Inc.	iNetworks Group, Inc.	Not a Broadband Provider
Johnny Wilcop Cable	Johnny Wilcop Cable	Not a Broadband Provider
L & L Communications	L & L Communications	Not a Broadband Provider
MetroFastNet, LLC	MetroFastNet, LLC	Not a Broadband Provider
Netpower, LLC	Netpower, LLC	Not a Broadband Provider
Network Telephone	Network Telephone	Not a Broadband Provider
Northstar Technology, LLC	Northstar Technology, LLC	Not a Broadband Provider
NTCH, Inc.	NTCH, Inc.	Not a Broadband Provider
PAETEC Communications, Inc.	PAETEC Communications, Inc.	Not a Broadband Provider
Pritchtech	Pritchtech	Not a Broadband Provider
Riverside Communications	Riverside Communications	Not a Broadband Provider
SCS Wireless	SCS Wireless	Not a Broadband Provider
SI Spectrum, LLC	SI Spectrum, LLC	Not a Broadband Provider
Sky Blue	Sky Blue	Not a Broadband Provider
South Kentucky RECC (formerly Monticello Plant Board)	South Kentucky RECC (formerly Monticello Plant Board)	Not a Broadband Provider
Tennessee RSA No. 3 Limited Partnership	Tennessee RSA No. 3 Limited Partnership	Not a Broadband Provider
Vanceburg Electric Plant Board	Vanceburg Electric Plant Board	Not a Broadband Provider
Windjammer Communications LLC	Windjammer Communications LLC	Not a Broadband Provider
Wirefree Partners III, LLC	Wirefree Partners III, LLC	Not a Broadband Provider
Bardstown Municipal Utilities	Bardstown Municipal Utilities	Not a Broadband Provider
Cinergy Communications	Cinergy Communications	Not a Broadband Provider
City of Barbourville	City of Barbourville	Not a Broadband Provider
Community Cable Service	Community Cable Service	Not a Broadband Provider
Cricket Licensee I, LLC	Cricket Licensee I, LLC	Not a Broadband Provider
Digital on Demand Danville	Digital on Demand Danville	Not a Broadband Provider

DATA DEVELOPMENT & VALIDATION METHODOLOGIES WHITE PAPER

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

NTIA Data Submittal
April 1, 2012

Baker

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Appendices

Introduction

The following sections of this document provide an overview of the process used for the SBI Broadband Mapping data development for the State of Louisiana. The following narrative is depicted in Appendix A, State of Louisiana SBI Process Workflow, and Appendix B, State Broadband Data Validation Workflow, included at the end of this document.

Broadband Provider Outreach Results

As a result of the outreach to broadband providers and investigating whether an internet service provider (ISP) meets the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

- 139 Total Investigated ISPs
- 64 Total Confirmed Broadband Service Providers (Unique Provider/DBA Combinations)
- 50 Broadband Service Providers who Supplied Data (Unique Provider/DBA Combinations)

Attachment C, Master Outreach List, contains additional provider information.

Broadband Provider Outreach Procedure

The following outreach provides the framework for communicating with Broadband Service Providers (Providers). The primary goals of the outreach approach documented herein are to:

- Promote Provider understanding and acceptance of the Broadband Mapping process, results and benefits
- Clarify NTIA Broadband Mapping requirements
- Facilitate data confidentiality agreements as required
- Minimize the submittal of invalid data
- Enhance provider understanding of the semi-annual update process
- Work with Providers to evaluate submittal options to facilitate data submittals

Data Submission Guidelines

Guidelines for the providers' submission of Broadband Mapping Data are documented in the "Data Submission Guidelines". These Guidelines define technical requirements, submission specifications, and coordination and documentation activities.

Louisiana Broadband Providers Website

A URL was deployed (http://www.broadband.la.gov/lbi_providers.asp) to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letters to providers
- Non-Disclosure Agreement
- Quick Start Guides
- Data Submission Guidelines
- Data Transmittal Letter

- Broadband Data Submittal Templates
- Census TIGER Data
- Data Submittal Assistance Contact Information

Outreach Delivery Vehicles

- A State Broadband Mapping Initiative Call for Data letter from the State Office of Information Technology (OIT) was mailed to all Broadband Service Providers in the State. This initial provider contact letter described the program and the role of Michael baker Jr., Inc. (Baker) acting on behalf of the OIT for Broadband Data Collection and Mapping.
- Baker distributed a follow-up letter to all Providers describing the data submittal requirements and material and help available to aid with the data submittals.
- Submittal assistance was provided to providers that needed help with data submittals.
- Presentations were conducted with various broadband provider associations to present the data submittal requirements and answer questions.
- Email communication and electronic transfer of data was encouraged to facilitate a faster delivery of data and information.
- A URL was deployed and promoted to distribute outreach material and information concerning the Broadband Mapping Project.
- A secure FTP URL was provided for submittal of broadband data by providers.
- A secure Broadband Provider Data Update Webportal was deployed for providers to redline/update their service coverage, rather than supply their updated coverage for the semi-annual data updates.

Secure Broadband Provider Data Update Webportal

A secure web-based application for broadband service providers has been deployed to simplify and automate the semi-annual process for collecting and verifying data. The webportal provides an easy-to-use map redlining tool for updating a provider broadband service area and attributes. It is expected that the simplification and automation of the data collection process will increase participation and improve the timeliness of provider's response, data accuracy and consistency. Providers are being encouraged to utilize this tool but data is still being accepted through other means and formats.

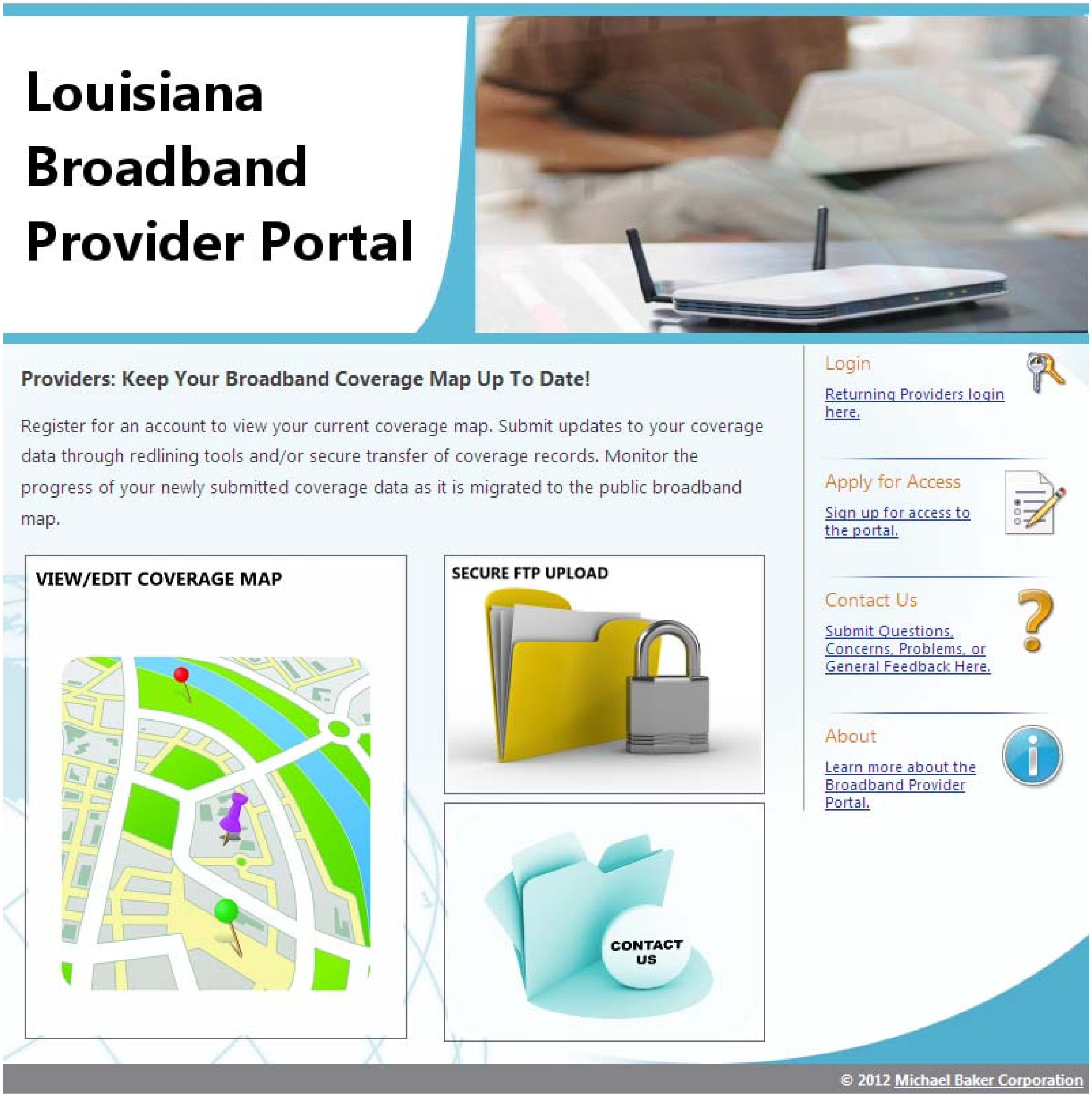


Figure 1 Provider Data Update Webportal Entry Page

The View/Edit Coverage Map functions via secure login/password and secured map services limit broadband providers to see and edit only their own data. Pick lists of valid database attributes eliminates entry errors and create consistency. It also contains a workflow from initial provider input, saving of a provider's work-in-progress, provider formally submitting edits, aggregation into the master geodatabase, soliciting provider approval of aggregated data, and final approval of the edit.

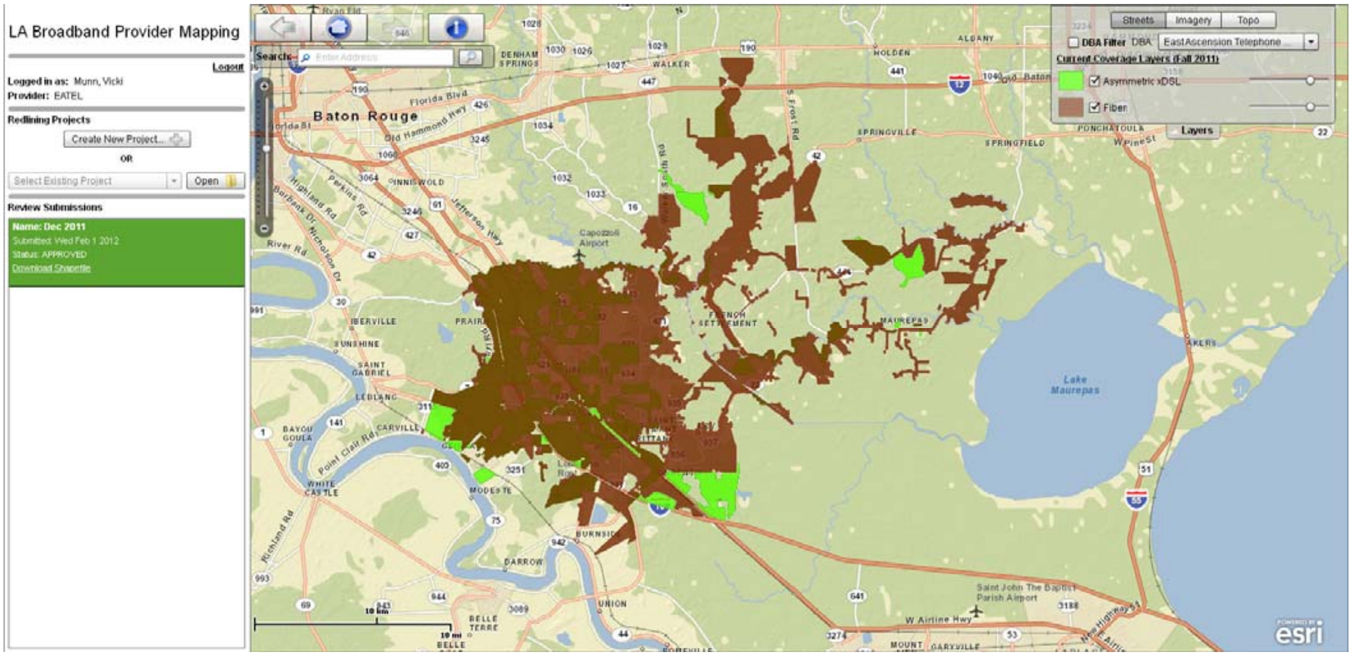
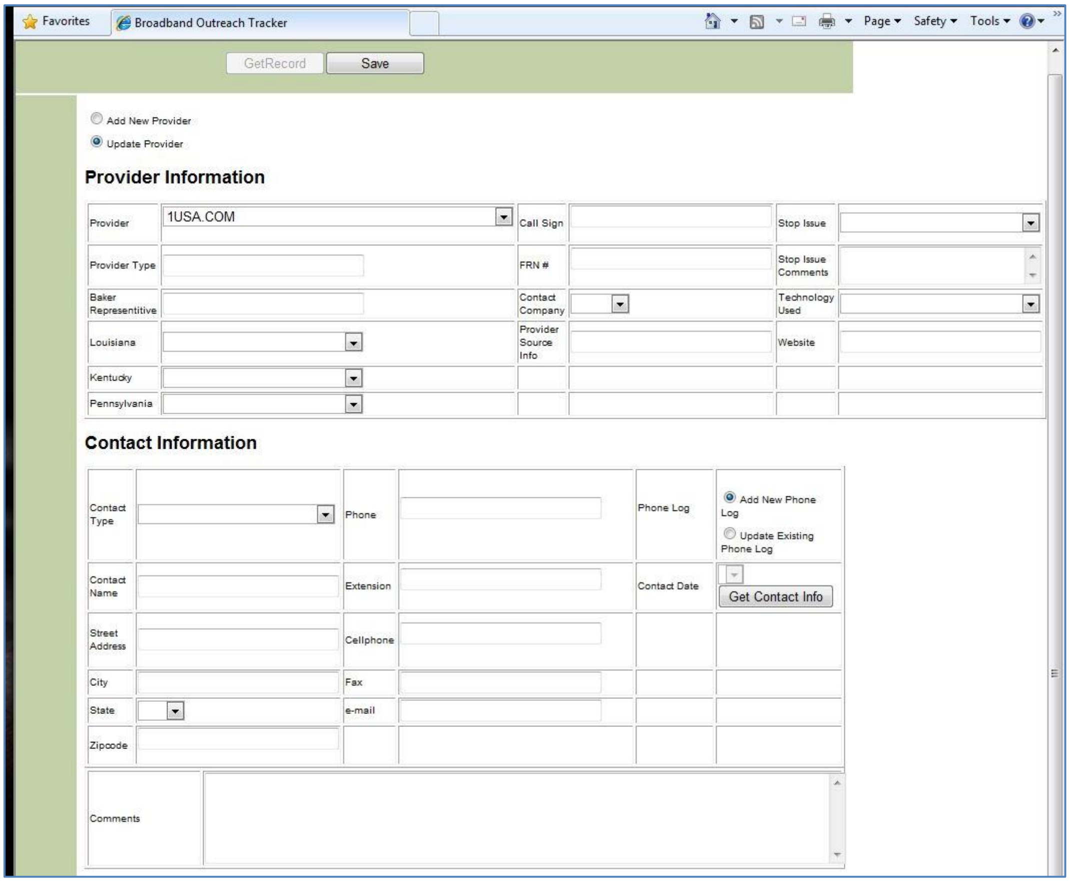


Figure 2 Provider Data Update Webportal – View/Edit Coverage Map Environment

Broadband Outreach Tracker Application

The Tracker application (Figure 3) was utilized to collect all correspondence with Providers and feedback on the effectiveness of the outreach activities by tracking items such as:

- The number and content of incoming e-mails and letters submitted from the Providers
- The number and source of comments, questions, and suggestions made by Providers
- The number and source of comments, questions, and suggestions made by attendees at Provider meetings and conference calls
- Provider contact information and data submittal status.



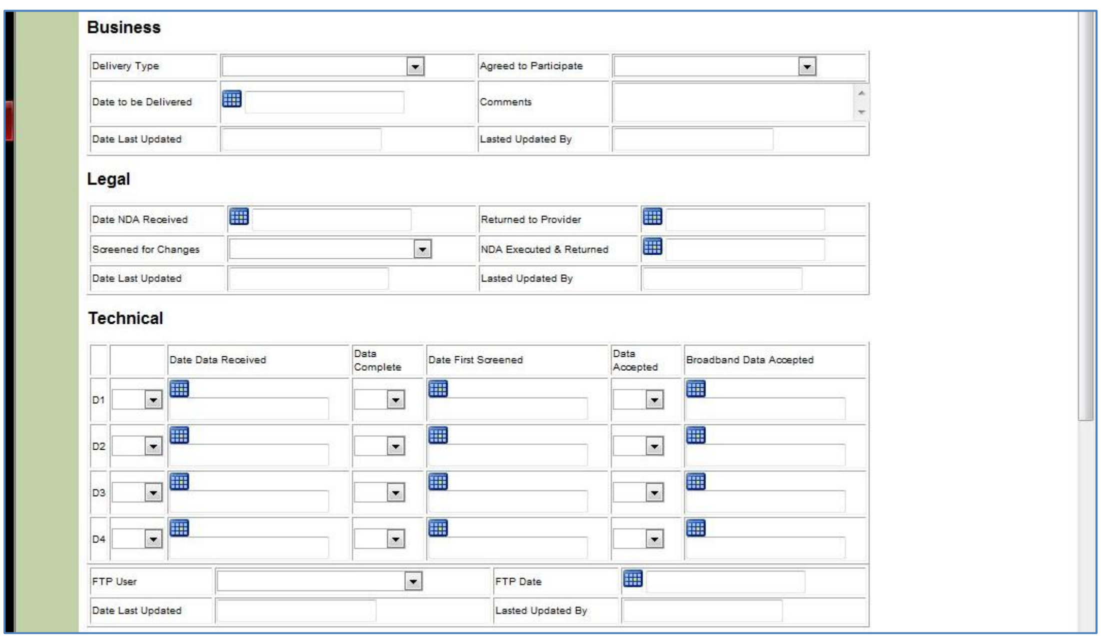


Figure 3 Broadband Outreach Tracker

Provider Submittal Validation

When a data submittal is received from a broadband service provider it is updated in the Broadband Outreach Tracker and run through an initial validation process to assure that it meets the submittal guidelines.

Validation Checklist

The following items are part of this initial data validation process:

- Verify the provider Transmittal Letter is complete and matches submitted data
- Verify the file naming conventions
- Verify each file is machine readable
- Verify data is in the correct GIS or Tabular format/file type
- Verify each field is populated and no empty or NULL values are present for mandatory fields
- Verify all ID (record number points) are unique within the submittal
- Verify all attribute data is formatted according to the submittal guidelines
- Verify topology for all geospatial submissions
- Verify Metadata for all submissions
- Verify the required contact information is included
- Verify adherence to Data Submittal Guidelines (see http://www.broadband.la.gov/lbi_providers.asp to access Data Submittal Guidelines)

  Broadband Service Availability (at least one)
  - Individual Street Addresses (Sec 3.1 & 4.1)
  - Census Blocks < 2 sq mi (3.3 & 4.3)
  - Street Segments for Census Blocks > 2 sq mi (3.2 & 4.2)
  - Service Overview (Sec 3.4 & 4.4)
  - Polygonal Boundary Area(s) (Sec 3.8 & 4.8)

  Middle-mile Points (Sec 3.5 & 4.5)

  Community Anchor Institutions (Sec 3.7 & 4.7)

  Last Mile Connection Points (Sec 3.6 & 4.6)

  WISP Antennas (Sec 4.9)

Data Usability Determination

The validation results are evaluated by the outreach and aggregation persons to determine the usability of the data. If the data meets the submission specifications, it is forwarded on for data aggregation. If it is determined to be unusable, it is returned to the provider for resolution. If the data can be manipulated to get it into a usable format, it is manipulated as required, and then forwarded on for data aggregation.

SBI Data Development

Data from the providers may be submitted in various formats as defined in the Data Submittal Guidelines, or in some cases unspecified formats may be accepted to help facilitate provider participation. Depending on the format of the submitted data, it is processed through one of the following processes to upgrade it to the NTIA SBI data standards.

Spatial Data

After validation and any required manipulation of any spatial data submitted by the providers, it is georeferenced and simply loaded into the appropriate NTIA geodatabase feature class.

Address Data Geocoding

If not already in the standard address point template, the provider tabular address data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. ArcGIS geocoding tools are then utilized geospatially locate the address points for the tabular records. Interactive address rematching is performed against two additional street centerline datasets as needed to increase geocoding matching results. The NTIA deliverable is the geocoded address point geodatabase table. The geocoded address points are also subsequently aggregated to the census block or road segment feature class for public web map display.

Census Block Aggregation

If not already in the standard census block template, the provider tabular census block data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider tabular census block records are then joined to the geodatabase 2010 U.S. Census Block. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination. The NTIA deliverable is the census block geodatabase table.

If the list of census blocks contains blocks > 2 sq. miles then these blocks are used to select all the 2010 U.S. Census TIGER centerlines that intersect those blocks. The Census Block record data is aggregated to each Road Segment within the Census Block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination.

Road Segment Aggregation

If not already in the standard road segment template, the provider road segment data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. If the provider submittal included graphic centerline segments, these are migrated into the delivery geodatabase along with the linked attribute records. If the provider submittal was tabular road segment records only, they are then joined to the geodatabase 2010 U.S. Census TIGER centerline feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

If the provider road segment data lie within census blocks <= 2 sq. miles then the road segment data is aggregated to the census block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

Overview Data Aggregation

Provider Service Availability Areas submitted for entire county areas are loaded into the NTIA geodatabase Overview table. If not already in the standard template, the provider data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The Provider Overview records are then joined to the geodatabase 2010 U.S. Census County feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination.

Polygonal Boundary Aggregation/Integration

Providers submitting polygonal service area data are handled in two ways. Wireline Provider data is aggregated to the census block feature class for areas where census blocks <= 2 sq. mi., or road segment feature class for areas where census blocks > 2 sq. mi. Wireless Provider Service Availability Areas submitted by polygonal area are simply loaded into the NTIA geodatabase Poly_Bndry feature class.

Wireline Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Depending on the area, census blocks < or => 2 sq. mi., a selection set of either census blocks or road segments that intersect the polygon boundary is created. The attributed polygon boundary is then joined with census blocks or road segments table to attribute accordingly. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination. The NTIA deliverable is the census block or road segment geodatabase table.

Wireless Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Multiple Poly_Bndry records are created for multiple Trans Tech values for each Provider. The NTIA deliverable is the polygon boundary geodatabase table.

Middle/Last Mile Data Integration

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. The NTIA deliverable is the middle or last mile geodatabase table.

Community Anchor Institution Integration

Providers supplied some Community Anchor Institution (CAI) data with the data submittals. But the majority of the data was collected from existing GIS Layers from previous studies and commercial data packages.

Provider CAIs

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. Address data is used to geocode locations only when Lat/Long data is not provided.

State CAIs

CAI shapefiles were downloaded from the commercial data packages. The shapefiles were then exported to the NTIA geodatabase CAI feature class. Various sources for obtaining broadband information for the CAIs were utilized including previous broadband studies.

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. In addition, the calculated typical speeds are compared against the Centris average speed verification data to be certain that the calculated typical speeds are within reason. The end result is a more complete data submittal to NTIA.

Propagation Mapping

Because not all fixed wireless broadband providers have participated, may not have a propagation map readily available, or have supplied data of marginal accuracy, the years 3-5 NTIA funding has supplied the means to generate a propagation map for these situations. In addition, the NTIA has also pointed out fixed wireless service coverages with unusual shapes. To generate the propagation mapping, additional information is needed to generate the model to resolve the above mentioned situations and will be resolved over time (ie. beyond the April 2012 deliverable time frame) through coordination and outreach with the Providers.

Data Verification Summary

Louisiana's broadband mapping project employs a multi-prong approach to ensure the provider data is accurate and complete.

In summary, the project employs the following validation methodologies and resources:

- Provider Validation
- Data Validation via Market Intelligence Sources
- Data Validation Using State Supplied Data Points
- Field Validation
- Wireless Coverage Analysis
- Topology Validation
- Automated Validation Processing
- Confidence Level/Statistical Modeling
- SBDD Check Submission
- Stakeholder Validation

The remainder of this verification section describes the various methods in greater detail.

Provider Validation

After data development, service availability maps are generated and submitted to the providers to validate their mapping results. This provides a “sign off” on the interpretation of the submitted data and extends the outreach efforts by providing a visual representation of the data to be delivered to the State and the NTIA.

Types of Provider Maps

Provider maps generally consist of the following types.

Outreach Maps

Often, providers will send data which does not contain all the information needed for a NTIA compliant dataset. In such cases, as an aid to the outreach communication, it may be necessary to produce a map to help the provider locate their service area or verify data they have provided. These maps may take many forms, but generally are of two types:

- General Location Maps – these maps are often produced when the provider does not have a list of address or other standard submittal data and needs help defining their service area. A typical map will show counties, major roads, and towns of the general area the provider has stated as their service area. The intent of the map is to give the provider a way to markup or delineate their service area. If a provider has not provided required attribute information such as Technology of Transmission, Speed Data, etc. then it may be necessary to add a visual clue to this data like an information stamp on the map that they can easily fill out. If the provider sends the map back with a service area boundary, this can then be digitized and sent back to the provider for verification.
- Verification of Provider Supplied Boundaries – these maps are produced when the provider has sent service area boundary information which is confusing or otherwise unclear. Often these are produced when providers send CAD maps, hand drawn maps that need digitization, or lists of zip codes or counties served. A typical map will place the interpreted boundary over a location map so the provider can verify the service area. As with the General Location Map, information stamps or other visual clues may be placed on the map.

Initial Verification Maps

Once the provider data has been processed and the census block and road segment feature classes created, an Initial Verification Map (Figure 4) is produced to give the provider a visual representation of their service area by census block. These maps enable the provider to verify their service area and make changes if necessary. Initial Verification Maps are produced using a set of standards and produced at the highest resolution necessary to convey the map information to the provider. Initial Verification Maps are also produced for Wireless Polygon areas.

Detailed Verification Maps

Providers who have questions about their service areas may request additional information to help clarify issues. In these cases it may be necessary to create a Detailed Verification Map to highlight the areas in question. Detailed Verification Maps provide the same information as Initial Verification Maps only at a higher resolution. Several maps may be needed to accurately portray an area in question.

Revised Maps

Revised maps take two forms:

- Initial or Detailed Verification Maps which have been annotated or marked-up by the provider
- Outreach produced Initial or Detailed Verification Maps incorporating provider changes

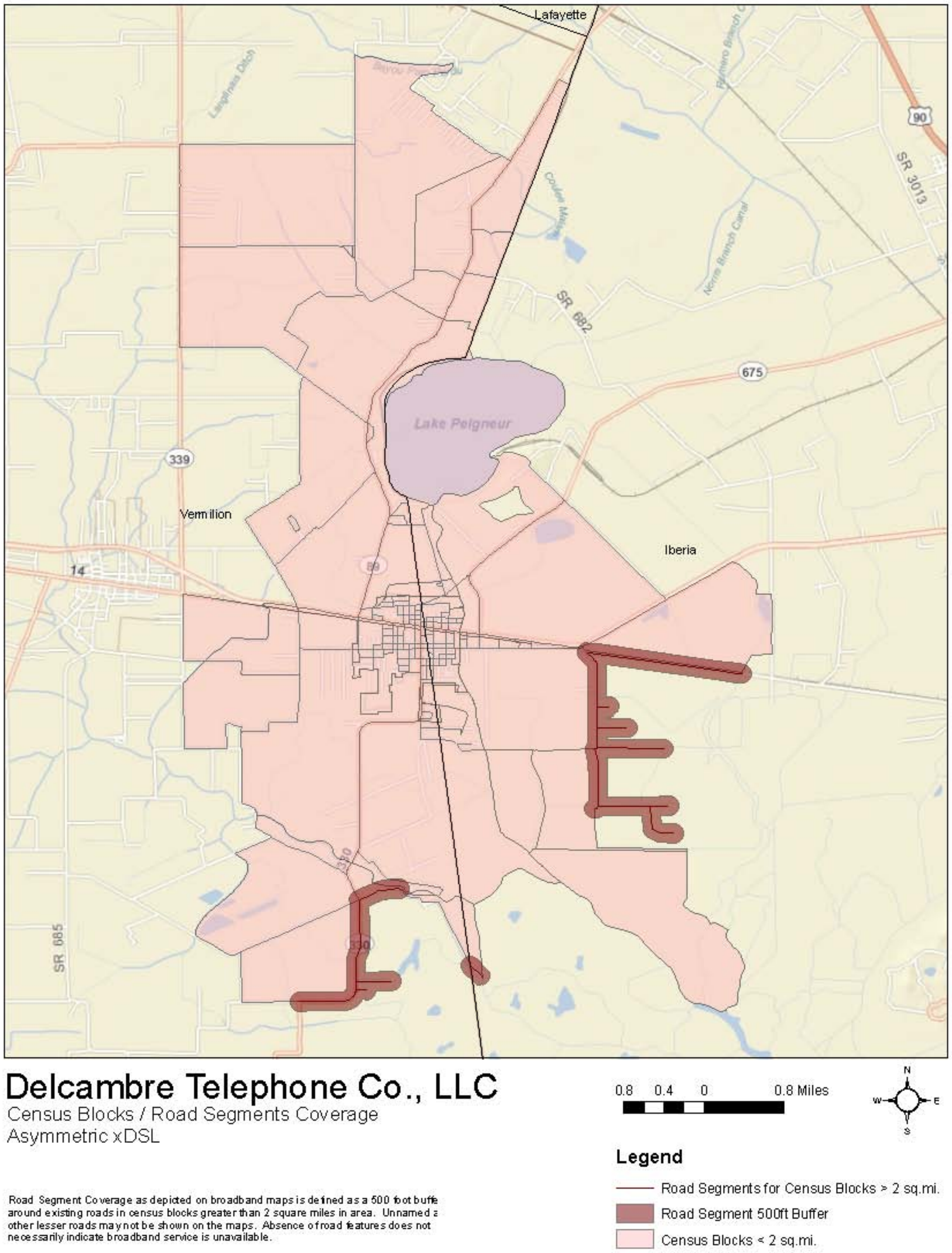


Figure 4 Provider Map

Data Validation

A critical component of the project is the validation of the data submitted by the broadband service providers. Data from various sources, as described in more detail in the following sections, is utilized to develop a level of confidence in the data received from the broadband providers.

Validation Data Set Collection and Development

This validation process employs data sets developed or acquired from different sources as described in the following sections.

Provider Feedback Loop: Maps of completed provider service areas and data are furnished back to the providers for confirmation of the processed/aggregated information. Feedback is integrated into the each Provider's dataset.

Broadband Market Analysis (BMA) Wireline Market Intelligence Data: Data is extracted from internal and commercial databases defining geographic service areas of telephone and cable companies and locations of central office (CO) switches and areas upgraded with fiber. The geographic areas are overlaid with Census demographic data on housing unit counts and density. The areas are then modified based on standard business practices for conducting service build-out and offering broadband service relative to housing density and other variables, such as distance from CO and other infrastructure elements, type of cable franchise (e.g., Census Place vs. Unincorporated County) This represents the first pass conservative estimate of coverage.

The above methods and data sources are supplemented by other data sources and methodologies, including: 1) connectivity data points acquired from InfoUSA that include ISP and type of connection (e.g., DSL, cable modem, dial-up, wireless, fiber) providing Internet service to specific geo-coded (i.e., by Latitude and Longitude) residential addresses; 2) web-based and telephone research, including address-level service-availability queries of web sites operated by service providers and independent entities. This multi-sourced MBA dataset is used as a validation source for provider service area coverage, Technology of Transmission, and Speed.

American Roamer Wireless Market Intelligence Data: Commercially available dataset used as an independent source to verify information submitted by Providers of wireless broadband service. This dataset is used as a validation source for provider service area coverage.

Speed Test: Visitors to the LA Broadband Mapping website are requested to take a speed test that measures downstream and upstream speeds.

Prior Broadband Mapping: Statewide coverage areas for Cable, DSL, and Fixed Wireless providers that were aggregated as part of a previous broadband mapping effort for the State of Louisiana are used to validate against Provider submitted data. In addition to the service areas, the DSL and Fixed Wireless layers contain general speed information that can be compared against Provider submitted data.

FCC Speed Test: The FCC speed test data includes the IP addresses for each specific speed test conducted. This IP address is queried against a web search engine to determine the Provider assigned to that address and is used as a validation source for provider service coverage and typical speeds.

Field Data Acquisition: Broadband technicians visited a sampling of census block locations to gather broadband data to be used for validation. The following criteria were taken into account when developing the census block sampling dataset:

- urban vs. rural census block characteristic
- censes block grouping
- land vs. water census block characteristic

The overarching mission of the Federal broadband stimulus program is to expand Broadband service to areas that are currently unserved and underserved. Also, the market intelligence validation sources typically represent some rural, but more urban areas. Thus, our field data collection efforts were targeted more towards the rural areas; split 90% rural, 10% urban.

Additionally, a study by Penn State University (Glasmeier 2002) notes that a large number of census block groups typically fit within any given cable or telephone company service areas. Therefore, our field sample was also based on selection of one census block per block group. The selected census block also had greater than 50% land area, versus water. There are a total of 3, 512 census block groups statewide. Using a statistical sample size calculator based upon the number of block groups in the state and +/- 4% margin of error at a 95% confidence level, the sample size is 557 census block locations (Figure 5).

For the 557 census blocks that were visited, 3257 individual wired/wireless data elements were recorded and 3410 pictures were taken at those locations. This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

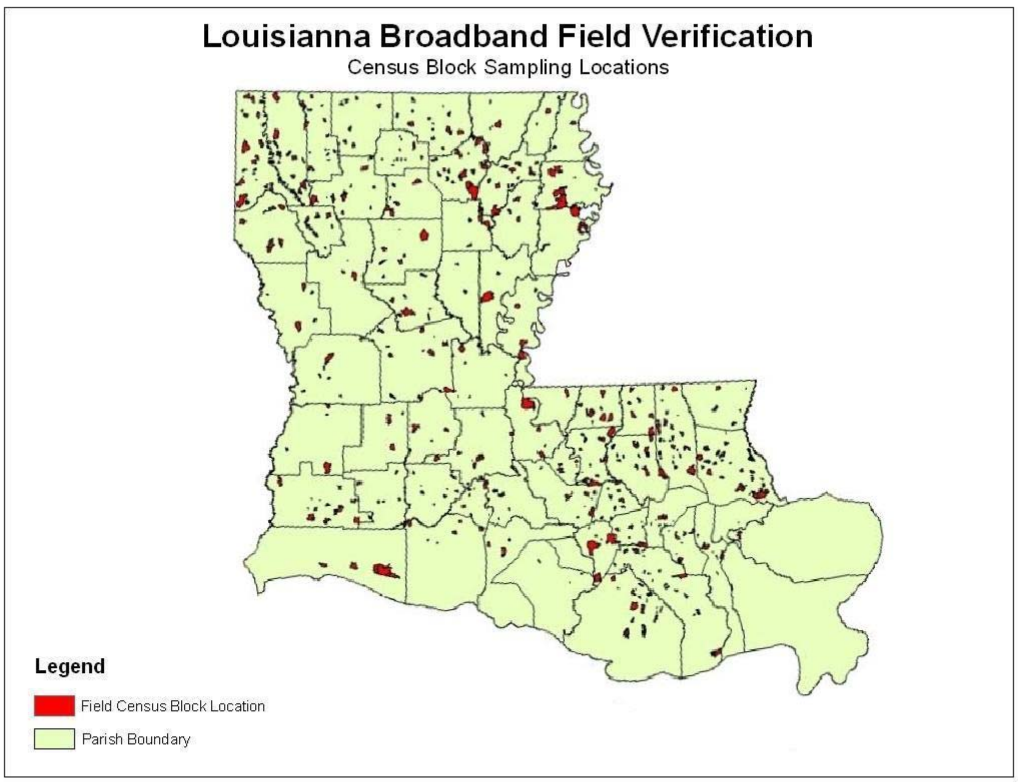


Figure 5 Field Verification Sampling Locations

For each census block in the sample set, broadband technicians collected data using Panasonic Toughbook computers, loaded with MapPoint mapping software, and a customized Microsoft Access data collection form with the ability to automatically import GPS coordinates. The sample census blocks were pre-loaded and directly accessible from MapPoint. Two types of data collection were conducted; infrastructure observation and wireless speed testing; and the results were recorded and linked to the corresponding field location coordinates within the designated sample census block. The information collected by the field broadband technicians includes:

Wireline:

- GPS coordinates
- circuit infrastructure feeding the area (copper, fiber, cable)
- collect site pictures

Wireless:

- GPS coordinates
- internet speed test

This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

Provider Data Validation Process

Provider Feedback Loop: Feedback received from the providers is visually inspected and integrated directly into the mapping GIS database.

Service Area Validation Data: The BMA wireline service area data is tabular and contains a separate record for each provider/technology of transmission combination with an associated census block or TIGER road segment, depending on the whether the size of the census block area (=/< or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer and Prior Mapping service area data is already in and ArcGIS data format. The validation data is then joined to the Provider service area data by census block or TIGER road segment ID. Any database records in the Provider or Validation tables that cannot be joined are output to a separate layer that indicates the areas of discrepancy between the two datasets. The joined tables are then queried to detect any speed discrepancies which are also output to a separate discrepancy layer.

Field Validation Data: The field data are also collected in tabular database format, and represent a specific lat/long spatial location for each record. This data is also exported into an ArcGIS data format, joined to the provider data, queried to validate pertinent attribution. Again, records not joined and or with detected attribution discrepancies are output to separate GIS layers.

Topology: The ArcGIS Validate Topology Tool is used to flag any topology issues in the broadband data. Flagged issues are reviewed to identify false positives and update true errors as required.

SBI Check Submission: The NTIA-provided SBI Check Submission tool is utilized to validate that the deliverable broadband data is consistent with the business logic rules set forth by the NTIA and a passing receipt is provided with the data submittal to NTIA.

Stakeholder Feedback: The state broadband mapping website includes a feedback function. Comments received from stakeholders are reviewed and used to validate provider data submissions.

Validation and Confidence Level Reporting

To facilitate validation and confidence level reporting, Baker deployed a validation application called Statistical Evaluation and Assessment System (SEAS), shown in Figure 6, which automatically compares the multiple independent validation datasets against the broadband service providers' supplied information. The SEAS application uses statistical methodologies to report the confidence level in the spatial and attribute accuracy of the information. Appendix B shows the validation workflow.

The SEAS comparison is a three-part validation process:

1. Comparison of the collected validation source against the aggregated broadband provider data.
2. Match percentage calculation for each provider reported in the DataPackage.xls, "Provider Table" tab, "Comments" column.
3. Confidence score calculation displayed on the state broadband website.

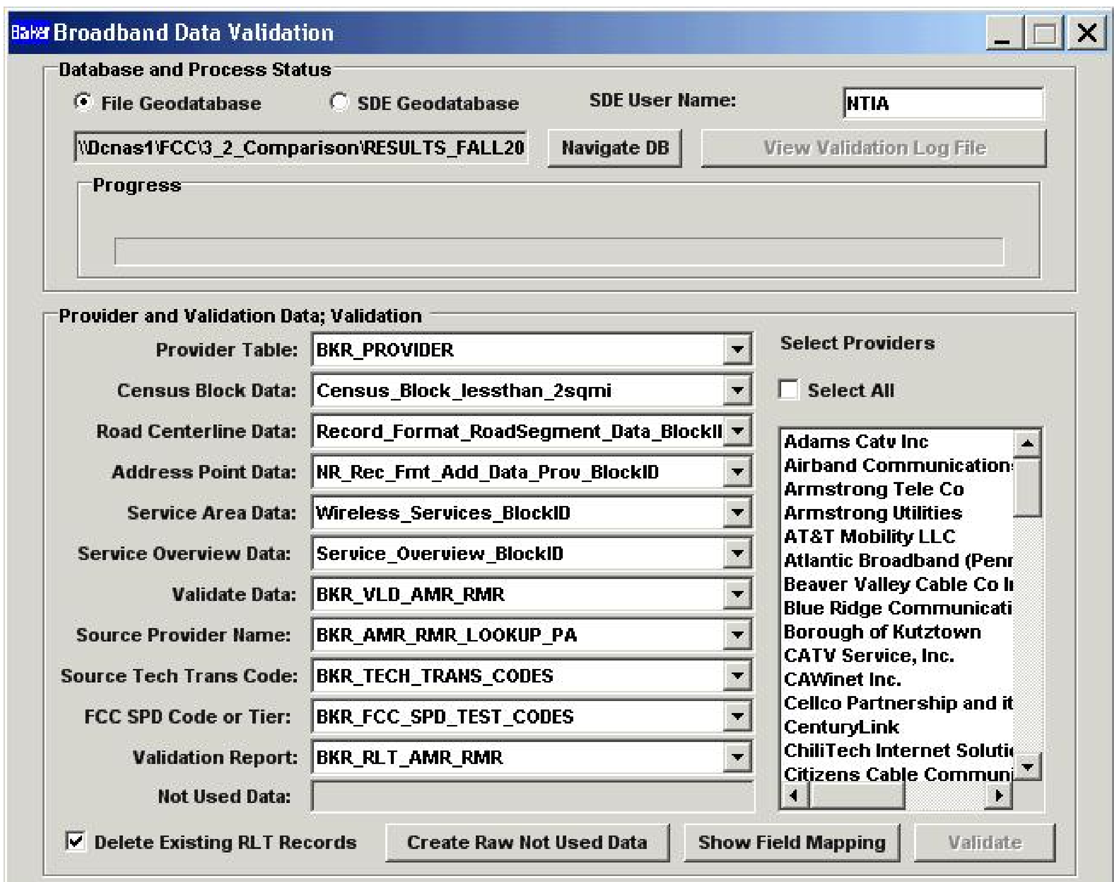


Figure 6 Statistical Evaluation and Assessment System (SEAS)

After completing all validation data source collections, SEAS is used to automatically compare the multiple validation datasets against the aggregated broadband data which came from the providers. Through the SEAS accumulation table, it produces a match percentage per broadband service record based upon the number of matches that record has against each validation source. The matched percentage for each record is the result of the total count of the matched validations for the record divided by the total validation source being compared against the record. A validation confidence rating/score is then assigned on a scale of 1 to 5 based upon the percentage of validation source matches as per the following score results:

- 1 Star = 0% - 19% Match
- 2 Stars = 20% - 39% Match
- 3 Stars = 40% - 59% Match
- 4 Stars = 60% = 79% Match
- 5 Stars = 80% - 100% Match
- “No Analytics” = No validation source available for that provider

The State’s public broadband mapping website (http://www.broadband.la.gov/lbi_providers.asp) is updated with the confidence level results at the record level based upon the queried geographic location and the following is an example of this representation.

Provider Name	Transmission Technology	Max Download Speed	Max Upload Speed	Confidence Score
AT&T Mobility	Mobile Wireless	Greater than or e...	Greater than or e...	
Verizon	Asymmetric xDSL	Greater than or e...	Greater than or e...	NO ANALYTICS
Comcast	Cable Modem – Other	Greater than or e...	Greater than or e...	

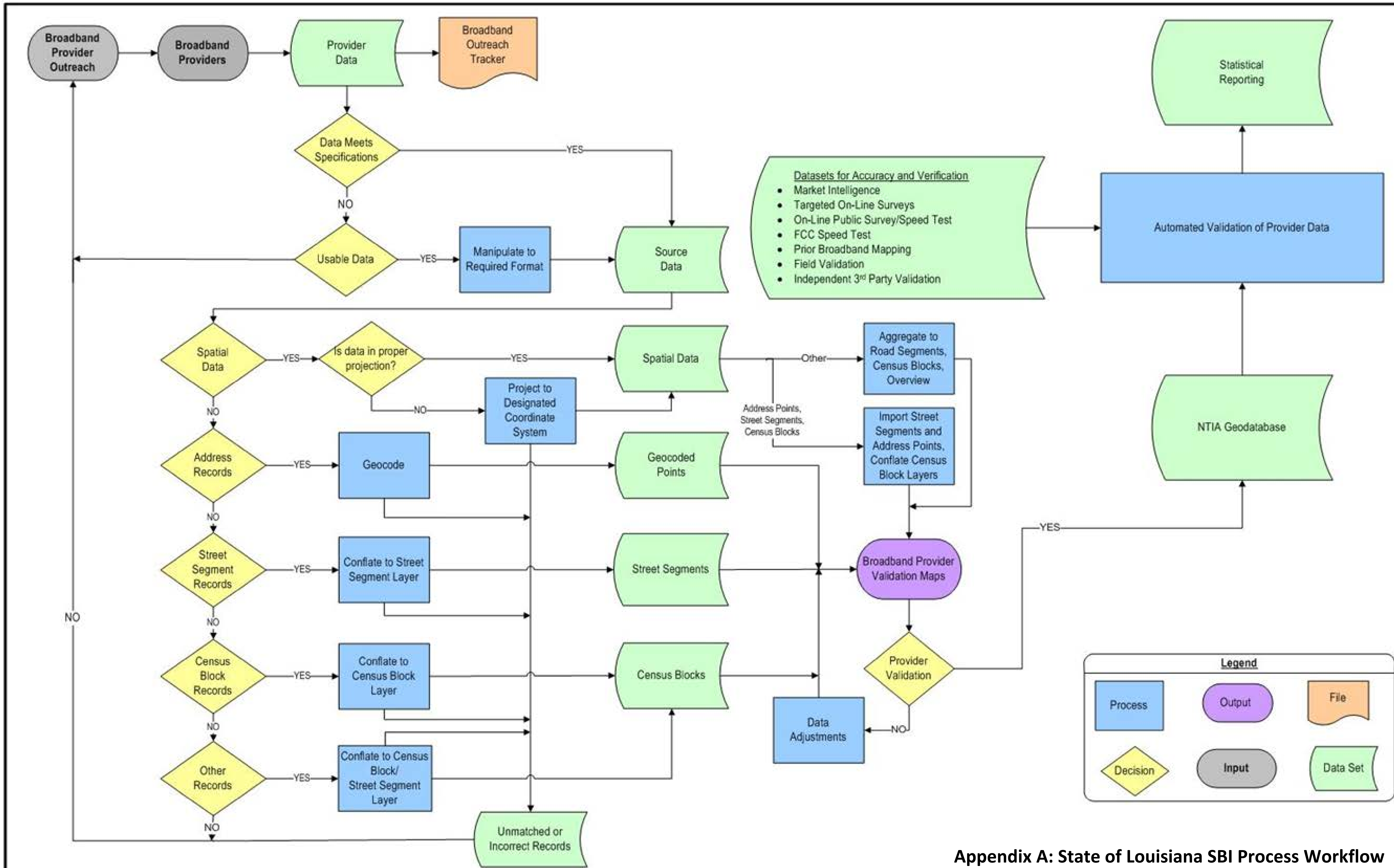
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

Low Confidence Provider Feedback

Provider data which is assigned a low confidence (1 or 2 stars) through the SEAS process is communicated back to the provider through a feedback loop. Generally, the low confidence feedback and reconciliation is a continuous refinement process and will occur between update cycles. The goal is to provide this feedback through the Provider Data Update Webportal via a web connection that is available and rolled out to providers in January 2012.

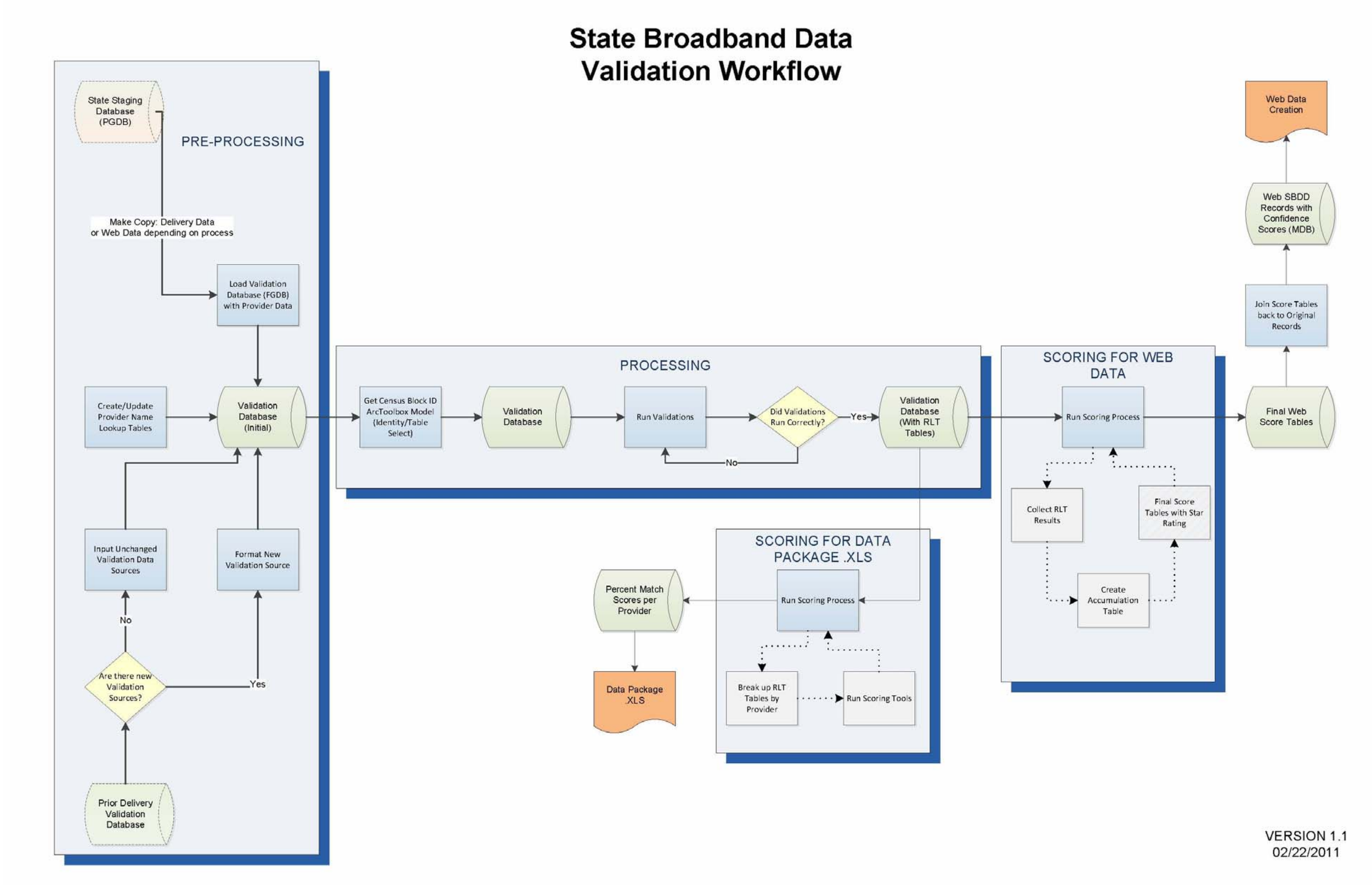
Changes and Corrections Documentation

With each semi-annual NTIA data submittal, changes and corrections documentation is provided. Significant changes in a provider’s status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.



Appendix A: State of Louisiana SBI Process Workflow

October 1, 2010


State Broadband Data
Validation Workflow
PRE-PROCESSING
State Staging Database (PGDB)
Make Copy: Delivery Data or Web Data depending on process
Load Validation Database (FGDB) with Provider Data
Create/Update Provider Name Lookup Tables
Validation Database (Initial)
Input Unchanged Validation Data Sources
Format New Validation Source
No
Are there new Validation Sources?
Yes
Prior Delivery Validation Database
PROCESSING
Get Census Block ID ArcToolbox Model (Identity/Table Select)
Validation Database
Run Validations
Did Validations Run Correctly?
Yes
No
Validation Database (With RLT Tables)
SCORING FOR WEB DATA
Run Scoring Process
Collect RLT Results
Final Score Tables with Star Rating
Create Accumulation Table
Final Web Score Tables
Join Score Tables back to Original Records
Web SBDD Records with Confidence Scores (MDB)
Web Data Creation
SCORING FOR DATA PACKAGE .XLS
Run Scoring Process
Break up RLT Tables by Provider
Run Scoring Tools
Percent Match Scores per Provider
Data Package .XLS
VERSION 1.1
02/22/2011

Appendix C: Master Outreach List

Filing Company DBA	Filing Company Name	Status
360networks		Not a Broadband Provider
BLC Management LLC of Tennessee D/B/A Angles Communication Solutions d/b/a Mexicall Communications		Not a Broadband Provider
BroadPoint, Inc.		Not a Broadband Provider
Catcomm Internet Services, LLC		Not a Broadband Provider
ERF Wireless, Inc.		Not a Broadband Provider
Etex Communications		Not a Broadband Provider
EZNETLA, L.L.C.		Not a Broadband Provider
Galaxy Cable Inc.		Not a Broadband Provider
Global Crossing Telecommunications, Inc.		Not a Broadband Provider
Ground Control Systems, Inc.		Not a Broadband Provider
Gulf Coast Broadband		Not a Broadband Provider
LightEdge Solutions, Inc.		Not a Broadband Provider
LocalUSA		Not a Broadband Provider
McGraw Communications, Inc.		Not a Broadband Provider
Metro PCS		Not a Broadband Provider
Mitel NetSolutions, Inc.		Not a Broadband Provider
Network USA, LLC		Not a Broadband Provider
NextGen Communications, Inc.		Not a Broadband Provider
Petrocom License Corporation		Not a Broadband Provider
Pleasant Vision, Inc.		Not a Broadband Provider
Qualcomm Incorporated		Not a Broadband Provider
Qwest Communications Company, LLC		Not a Broadband Provider
Red River Cable TV Co, Inc.		Not a Broadband Provider
Service One Cable TV		Not a Broadband Provider
Southern Light of Louisiana, LLC		Not a Broadband Provider
Stratos Offshore Service Company		Not a Broadband Provider
TeleConex, Inc.		Not a Broadband Provider
Telepak Networks, Inc.		Not a Broadband Provider
TX-11 Newco LLC		Not a Broadband Provider
US LEC Communications Inc. D/B/A PAETEC		Not a Broadband Provider
Verizon Business Global LLC D/B/A Verizon Business		Not a Broadband Provider
Wave2Wave Communications Inc.		Not a Broadband Provider
Alltel Corporation		Other
Command Conect, LLC		Other
DSLnet Communications, LLC		Other

Filing Company DBA	Filing Company Name	Status
Interlink Communications Partners LLC		Other
Louisiana Unwired, LLC		Other
MediaCom		Other
Plaquemines Cablevision		Other
Wirelessco, L.P.		Other
AccessCom, Inc.		Potential
Alliance Communications Network		Potential
Broadcore, Inc.		Potential
Broadview Networks Holdings, Inc.		Potential
Broadvox, LLC		Potential
Cobridge Communications		Potential
Cypress Communications Operating Company, LLC		Potential
Ernest Communications, Inc.		Potential
First Choice Technology of Louisiana, LLC		Potential
Harbor Communications, LLC		Potential
Matrix Telecom, Inc.		Potential
Public Service Communications, Inc.		Potential
SkyRider Communications, Inc.		Potential
Superior Wireless		Potential
The Bayou Telephone Company, Inc.		Potential
The Other Phone Company, Inc. D/B/A Access One Communications		Potential
Toly Digital Networks, Inc.		Potential
Windstream		Potential
XO Communications Services, Inc.		Potential
Acadania Wireless		Provider
AllensTV	AllensTV	Provider
American Warrior Network	Communication Construction Services	Provider
AT&T Corp, Inc.	AT&T Corp, Inc.	Provider
AT&T Louisiana	BellSouth Telecommunications, Inc.	Provider
AT&T Mobility LLC	AT&T Mobility LLC	Provider
Audubon Cablevision	Bailey Cable TV, Inc.	Provider
Bayou Cable Inc	Bayou Cable Inc.	Provider
Bayou Internet Inc.		Provider
Bluebird Wireless Broadband Services, LLC		Provider
Buford Media Group (FKA: Reach Broadband)		Provider
Cable One	Cable One	Provider
CableSouth Media (formerly known as Media3)		Provider

Filing Company DBA	Filing Company Name	Status
Cameron Communications	Cameron Telephone Company, LLC	Provider
Cameron Communications	Elizabeth Telephone Company, LLC	Provider
Cameron Communications	LBH, LLC	Provider
Cellular South		Provider
CenturyLink	CenturyTel, Inc.	Provider
CHARTER COMMUNICATIONS INC.	CHARTER COMMUNICATIONS INC.	Provider
CMA Communications	Etan Industries, Inc.	Provider
Cogent Communications, Inc.	Cogent Communications, Inc.	Provider
Comcast	Comcast Cable Communications, LLC.	Provider
CommuniComm Services	James Cable	Provider
Computer Sales & Services, Inc.	Computer Sales & Services, Inc.	Provider
Conterra Broadband Services D/B/A DETEL		Provider
Covad Communications Company	DIECA Communications, Inc.	Provider
Cox Communications	CoxCom Inc.	Provider
CP-Tel Network Services	CP-Tel Network Services	Provider
Cricket Communications, Inc.	Leap Wireless International, Inc.	Provider
CS Wireless LLC		Provider
Delcambre Telephone Co., LLC	Delcambre Telephone Co., LLC	Provider
East Ascension Telephone Company LLC	EatelCorp Inc	Provider
Fulair Wireless	Fulair Wireless	Provider
HughesNet	Hughes Communications, Inc.	Provider
Hunt Telecom		Provider
Integrated Data Systems		Provider
Interactive E-Solutions A/K/A Broadband IP		Provider
Kaplan Telephone Co	Kaplan Telephone Co., Inc.	Provider
Kinetix Technologies	Kinetix Broadband, LLC	Provider
Level 3 Communications, LLC	Level 3 Communications, LLC	Provider
LUS Fiber	Lafayette City-Parish Consolidated Government	Provider
Maximum Access, LLC		Provider
Nexus Systems, Inc.		Provider
NORTHEAST LOUISIANA TELEPHONE CO., INC.	NORTHEAST LOUISIANA TELEPHONE CO., INC.	Provider
PC One Cable LLC		Provider
Radio Communications Service	Gonthier, Inc.	Provider
Reserve Telecommunications	Reserve Long Distance Co.	Provider
Skycasters	Skycasters, LLC	Provider
Skycom1		Provider
Spillway Communications Inc.	Spillway Communications Inc.	Provider
Sprint	Sprint Nextel Corporation	Provider

Filing Company DBA	Filing Company Name	Status
Squire Creek Communications, LLC	Squire Creek Communications (SSL)	Provider
Star Communications	Star Telephone Company, Inc.	Provider
StarBand Communications Inc.	StarBand Communications Inc.	Provider
Suddenlink Communications	Cebridge Acquisition, LP	Provider
Suddenlink Communications	Classic Cable of Louisiana, LLC	Provider
T-Mobile	T-Mobile USA, Inc.	Provider
Trust Cable	Trust Cable TV, Inc.	Provider
tw telecom of lousiana llc	tw telecom of lousiana llc	Provider
Verizon Wireless	Cellco Partnership and its Affiliated Entities	Provider
Vision Communications	Vision Communications, LLC	Provider
Vision Communications	SJI, LLC	Provider
WildBlue Communications, Inc.	WildBlue Communications, Inc.	Provider
Xfone USA, Inc.	Xfone USA, Inc.	Provider
Access Point, Inc.		Reseller
Birch Communications, Inc.		Reseller
BullsEye Telecom, Inc.		Reseller
COMTECH 21, LLC		Reseller
DeltaCom, Inc.		Reseller
Meriplex Communications, Ltd.		Reseller
Metropolitan Telecommunications Holding Company		Reseller
Network Telephone Corp. D/B/A Cavalier Business Communications		Reseller
New Edge Network, Inc.		Reseller
NuVox, Inc. (FKA Windstream)		Reseller
Talk America Inc. D/B/A Cavalier Telephone and TV		Reseller
TEC of Jackson, Inc.		Reseller
Telefonica USA, Inc.		Reseller
Tennessee Telephone Service, LLC D/B/A Freedom Communications USA, LLC		Reseller
Wow Technologies, Inc.		Reseller
XPANCE Broadband, Ltd.		Reseller

Methodologies Used to Create and Validate Broadband Datasets For the April 1, 2012 SBDD Submission

EXECUTIVE SUMMARY

Broadband data for Massachusetts was collected, integrated and verified by the Massachusetts Broadband Institute (MBI), a division of the Massachusetts Technology Collaborative (MTC). This data was prepared for the National Telecommunications and Information Administration (NTIA) as part of the State Broadband Data and Development (SBDD) grant program and will be displayed on the National Broadband Map. This data is current as of December 31, 2011 and will continue to be verified and updated to improve the quality and accuracy of the information to support MBI activities including adoption studies and last mile deployment planning.

About the MBI

The MBI is the central broadband entity for the Commonwealth of Massachusetts, created on August 4, 2008 when Governor Deval Patrick signed Chapter 231 of the Acts of 2008, *An Act Establishing and Funding the Massachusetts Broadband Institute* (the "Broadband Act"). The mission of the MBI is to extend affordable, robust high-speed Internet access to all homes, businesses, schools, libraries, medical facilities, government offices and other public places across our state.

The Broadband Act gives the MBI the authority to invest up to $40 million of state bond funds into broadband infrastructure. This bonding authority is structured as an "incentive fund" intended to stimulate private industry investments that will complement the MBI's public investments. The MBI is investing its funds in long-lived infrastructure assets, such as conduit, fiber-optic cable and wireless towers, which will lower the cost of entry for broadband providers and make it economically feasible for such firms to provide broadband access service to currently unserved residential, business and institutional customers. For more information about the MBI and its programs and activities, visit the web site at www.massbroadband.org.

Data Summary

The MBI has collected data for the 31 of 40 companies that meet the SBDD program definition of "broadband service provider" in Massachusetts. The complete list of potential providers also includes resellers and other providers that do not meet the SBDD definition as well as companies that filed FCC Form 477 but do not actually provide broadband service in MA. This list may be found in the "Broadband Providers in Massachusetts" section starting on page 13.

Provider Lists	# Providers
Potential providers in MA (from FCC Form 477 and other sources)	144
Verified as a provider in MA (including resellers and other providers that don't fit the NOFA definition of "provider"	91
Data obtained for or from the provider (included in the April 2012 data submission)	35

Data was acquired from 32 providers of residential and business broadband access in Massachusetts and created from the web sites of 3 additional providers. Data transmission technologies in the datasets include asymmetric and symmetric DSL, other copper wireline, DOCSIS 3.0 and other cable, fiber optic, unlicensed fixed wireless, 3G and 4G mobile wireless and satellite technologies. This information was integrated and submitted to the NTIA in the following four datasets.

Dataset	# Providers	# Records
BB_Service_CensusBlock	18	418,996
BB_Service_RoadSegment	11	11,142
BB_Service_Wireless	15	24
BB_ConnectionPoint_MiddleMile	17	582

Information on broadband services at Community Anchor Institutions (CAIs) were collected by phone, email and web surveys. Approximately 33% of the CAIs participated in the survey, of which 86% subscribe to broadband services.

Dataset	# Institutions	# Records
BB_Service_CAInstitution	4,283	4,595

DATA DEVELOPMENT – GENERAL

Data development was performed using Esri ArcGIS 10.0 software.

Data Integration
Data were received from broadband service providers in varying formats and levels of detail. No two datasets were alike, which required a significant amount of manual review and editing to integrate the information into a common format. Although Excel and Shapefile templates were made available, very few datasets were received in the template formats and attributes were not always provided using the standardized coded values requested. In addition, attribute field names were inconsistent between datasets, contained spaces and special characters or were missing altogether. These differences prevented the use of automated data integration models to format and import data into standardized feature class templates.

All attributes were standardized so that the provider name, doing-business-as name and FCC registration numbers were consistent throughout the datasets and that attributes complied with valid value list (e.g., for technology of transmission, spectrums used, maximum advertised and typical speeds, end user category, etc.).

Geocoding
Unless otherwise specified, address data was geocoded using street addresses and zip codes from NAVTEQ streets data, which was developed though a partnership between NAVTEQ and the

Massachusetts Office of Geographic Information (MassGIS) for increased geocoding accuracy and success rates for the State E911 data.

Data transfer model loading
The final datasets for each provider were appended and loaded into the SBDD transfer schema. Geometry and topology checks were performed a final time and the data were checked for conformance with SBDD database and business rules.

DATA DEVELOPMENT – WIRELINE AVAILABILITY

This section describes the methods used to create the following datasets representing wireline broadband availability (e.g., cable, xDSL, other copper wireline, fiber optic and other unclassified wireline services) by census block and/or road segment:

- BB_Service_CensusBlock and
- BB_Service_RoadSegment

The various wireline broadband availability data formats received include:

1. Non-geographically referenced CAD files containing cable or fiber strands;
2. Geographically referenced Shapefiles containing census block polygons or road segments;
3. Excel spreadsheets or delimited text files containing census block IDs
4. Excel spreadsheets or delimited text files containing individual street addresses;
5. Excel spreadsheets or delimited text files containing street address ranges
6. Written or verbal narratives of service areas; and
7. Excel spreadsheets containing maximum advertised speeds by US Census Bureau core based statistical area (CBSA) and rural statistical area (RSA).

For areas where census blocks are less than or equal to 2 square miles in area, a template containing 2010 census block polygon geography was used. Otherwise, a template was used containing line geography from 2010 TIGER/Line roads that intersect 2010 census blocks greater than 2 square miles in area. Associated attribute information included provider identification, technology of transmission and upload and download speeds.

Data Integration
The integration methods used, and described below, varied according to the source data format.

1. Integrating CAD strands: Cable strands submitted in CAD format were georeferenced to street centerlines and a 200 foot buffer was created from the strands. 2009 census blocks and 2009 TIGER/Line road segments (in census blocks greater than 2 square miles in area) that intersected the 200 foot buffer were classified as served and associated attribute information from tabular datasets or narratives were populated accordingly. These were later converted to 2010 census blocks and roads, as defined in method 4.

2. Integrating census block and road segment polygons: Data provided in Shapefile format required minor formatting of attribute field names and values to match the common schema.

   (a) The census block vintage (2000 or 2010) was determined by reviewing ID values and attributes were imported into the census block template.

   (b) If vector data was provided from a source other than TIGER/Line roads, a spatial intersection with a 200 foot buffer was performed to transfer attributes to the corresponding TIGER/Line road segments.

3. Integrating tabular data containing census block IDs: Tabular information relating to census blocks referenced either 2009 or 2010 census block data and was joined to the corresponding polygon geometry using the 15 or 16 character FIPS IDs. 2009 census block data were summarized and joined to the 2000 census block polygons using the first 15 characters of the FIPS ID while retaining the maximum advertised and typical speeds and other associated validation and data processing attributes. These were then converted to 2010 census blocks, as defined in method 4.

4. Converting to 2010 census blocks: Census blocks and associated attribute information were converted from 2000 to 2010 census blocks by performing a spatial overlay of the adjusted 2000 census blocks and the new 2010 census blocks. Attribute information was summarized by the 15 character GEO ID (i.e., FIPS ID) and statistics were calculated to carry over the appropriate attribute information (e.g. maximum advertised speeds), which were loaded back into a template containing the 2010 census block geometry.

5. Integrating tabular data containing individual street addresses: Tabular data containing individual street addresses, generally representing subscriber addresses, were geocoded using NAVTEQ streets data to generate point locations. 2010 census blocks and 2010 TIGER/Line road segments (in census blocks greater than 2 square miles in area) that intersect a 200 foot buffer of the points were classified as served. Associated attributes were also imported.

6. Integrating tabular data containing street address ranges: (a) If tabular data was based on 2010 TIGER/Line roads and included a TIGER line ID (TLID), the attributes were loaded into a template containing the TIGER/Line geometry by joining the TLIDs.

   (b) If tabular data was not based on TIGER/Line roads or did not have a means for creating a unique ID to link to the TIGER/Line data, the minimum, mean and maximum left and right street addresses were geocoded using NAVTEQ streets data to generate point locations. As with the individual street address methodology above, 2010 census blocks and 2010 TIGER/Line road segments (in census blocks greater than 2 square miles in area) that intersect a 200 foot buffer of the points were classified as served. Associated attributes were also imported.

7. Integrating narrative data: (a) Location information provided in narrative form, such as the names of streets served or unserved, were incorporated by classifying the qualifying road segments as served. A spatial intersection was then performed to classify any census blocks with area less than 2 square miles as served.

(b) Attribute information provided in narrative form generally applied to all records or an easily identifiable subset of records in a dataset and the standardized values were assigned to the appropriate field in batch.

8. Integrating spreadsheets containing speed by CBSA/RSA: The tabular data was joined to corresponding CBSA/RSA polygon geometry using the CBSA/RSA ID. Maximum advertised download and upload speed values were transferred to census block and road segment availability records from the CBSA/RSA polygon they are located within.

Data standardization
All information was imported into to 2010 census blocks and road segments. Records with download speeds below 768 kbps (i.e., that don't qualify as broadband service) were removed from the final dataset.

DATA DEVELOPMENT – WIRELESS AVAILABILITY

This section describes the methods used to create the following dataset representing wireless broadband availability (e.g., fixed and mobile wireless and satellite services) by service area:

- BB_Service_Wireless

The various wireless broadband availability data formats received include:

1. Geographically referenced Shapefiles or MapInfo files containing service area polygons;
2. Geographically referenced KML raster files depicting service areas;
3. Non-geographically referenced PDF and JPG files depicting service area polygons;
4. Hard copy maps with hand-drawn service areas;
5. Excel spreadsheets containing street addresses; and
6. Emails and technical documents containing tower and signal specifications.

Associated attribute information included provider identification, technology of transmission, wireless spectrums used and upload and download speeds. In some cases, attributes were provided in a separate tabular or narrative form or had to be acquired from the provider's web site. If providers offered more than one spectrum, a separate feature was created for each unique provider and spectrum combination.

Data Integration
Data integration methods used, and described below, varied according to the source data format.

1. Integrating service area polygons: Data provided in vector format required minor processing to fix geometry errors and create separate polygons for unique provider and spectrum combinations. Polygons less than 0.125 square miles were removed and the remaining polygons were dissolved to create a single feature for each unique provider and spectrum

combination. Attribute field names and values were created, formatted and/or populated from tabular or narrative form to match the standardized template format.

2. Integrating service area raster images: Propagation model outputs provided as KML raster images were imported into the GIS system; however, the geographic reference information was not able to be preserved. The imported raster images were georeferenced in the GIS by matching the intersections of propagation area boundaries and roads in Google Earth. Once georeferenced, the raster images were converted to polygons, then tagged with and aggregated by the associated tower ID and spectrum information to create service areas polygons for each propagation model. Additional associated attribute values were populated from information provided in narrative form.

3. Integrating static maps: The PDF and JPG maps containing wireless access points and service area buffers were georeferenced using known locations, such as road intersections. Service areas were digitized or recreated from buffered points on the georeferenced maps. Individual service areas were tagged with spectrum information and aggregated into a single service area for the provider and spectrum combination. Additional associated attribute values were populated from information provided in narrative form or from providers' web sites and the resulting service area boundaries received confidence score of 1.

4. Integrating hard copy maps: Hard copy maps containing shaded service areas were reproduced by digitizing boundaries based on known map locations, such as road intersections. Associated attribute values were populated from information provided in narrative form and the resulting service area boundaries received confidence score of 1.

5. Using tabular data containing street addresses: Tabular data containing individual street addresses, representing subscriber addresses or addresses where service was determine not to be available, were geocoded using NAVTEQ streets data to generate point locations. These locations were compared to service areas and propagation models to verify boundaries.

6. Modeling with tower and signal specifications: Wireless tower and signal specifications (e.g., latitude, longitude, cell site height, cell site frequency and effective radiated power) were used as input parameters in SPLAT! radio frequency signal propagation, loss, and terrain analysis software. Service area boundaries were derived from the received power contours in the resulting propagation models. Additional associated attribute values were populated from information provided in narrative form.

7. Integrating online service maps: Wireless service coverage maps downloaded as images from some providers' web sites, georeferenced using roads and other map features and classified by colors into 2 categories (broadband service and all other). The resulting raster representations were converted to polygons representing the providers' wireless service areas.

Data standardization

Service area datasets for each provider were clipped to the state boundary and self-intersecting lines were fixed prior to loading into the SBDD transfer schema.

DATA VERIFICATION – WIRELINE AND WIRELESS AVAILABILITY

This section describes the methods used to verify the following datasets representing wireline broadband availability (e.g., cable, xDSL, other copper wireline, fiber optic and other unclassified wireline services) by census block and/or road segment and wireless broadband availability (e.g., fixed and mobile wireless and satellite services) by service area:

- BB_Service_CensusBlock,
- BB_Service_RoadSegment and
- BB_Service_Wireless

Verification of availability data received from providers is essential to determining the accuracy and completeness of the resulting broadband availability maps and is an ongoing process. Methodologies continue to be developed and implemented for data verification and are incorporated into a confidence ranking process. The data verification and confidence ranking methods are described below.

The data verification process employs the following methods (including ground truthing, modeling, community reviews, crowd sourcing, drive testing and Web research), which supply input for the confidence ranking methodology.

1. Cable service area modeling: Cable strand data for incumbent cable providers were acquired as georeferenced MapInfo files from the MA Department of Telecommunications and Cable (DTC) in 93% of the 305 cable-served towns. The strands were imported and a 200 foot buffer was created to approximate the distance from the cable that a structure can receive service without excessive cost or delay. The 200 foot distance was selected based on observed distances between poles and the acceptable distances of structures from cable as defined in cable license agreements. Census blocks and road segments acquired from providers that intersected the resulting service area buffers for that provider were given an increased confidence score.

2. DSL service area modeling: DSL service areas were modeled from known DSL-equipped central office locations, which were geocoded using NAVTEQ streets data and refined using aerial photography, street views and bird's-eye views from Google Maps and Bing Maps. A linear network was developed, using a comprehensive roads dataset maintained by the MA Department of Transportation (MassDOT), that encompassed all roadways within 17,800 linear feet of the central office location. A 200 foot buffer of the network was created to define a maximum service distance of 18,000 feet from the central office to the service location, based on input from industry experts, with the same 200 foot distance from pole to structure that was used in the cable model. The resulting service area buffers were cropped

at town boundaries except where central offices were known to serve neighboring towns. Census blocks and road segments acquired from providers that intersected the estimated service areas for that provider were given an increased confidence score.

3. Infrastructure field surveys: Targeted field work has been performed to locate broadband infrastructure, such as DSL-equipped remote terminals (RTs). As with the central offices, locations were mapped using address and landmark information acquired in the field by geocoding with NAVTEQ streets data and refining with aerial photography, street views and bird's-eye views from Google Maps and Bing Maps. Although many DSL-equipped RTs have been located in the field, they have not yet been incorporated into the DSL service area model yet due to the difficulty of predicting the directional nature of services provided from those locations. However, the locations are valuable for visual review of DSL coverage areas claimed by providers that fall outside of modeled service areas to evaluate the likelihood of service from a given RT location. These visual reviews are performed by a team consisting of a GIS expert and a DSL technology expert. Confidence scores are modified accordingly.

4. Public surveys: Broadband subscription information is collected through web-based broadband surveys from the public and from community anchor institutions (see www.massbroadband.org/mapping/survey.html). The surveys are publicized through targeted events and publications and MBI email notifications. Information collected includes location, provider name, transmission technology, price, and speed for homes, businesses, and institutions throughout the state. At this time, the survey data is only used to verify availability by provider name and transmission technology. Census blocks and road segments acquired from providers that are within 200 feet of survey locations are given an increased confidence score. As with the service area models, the 200 foot distance represents the distance at which service can be provided without excessive cost or delay. In the future, speed test results will be summarized by census block to verify typical speed information received from providers as well.

   Responses to the public survey are geocoded through Google Maps and visually refined by the user if desired. Responses to the community anchor institution surveys are linked to existing point locations maintained by the Massachusetts Office of Geographic Information (MassGIS) or affiliated agency. Community anchor institutions that have changed addresses or are not already in the MassGIS datasets are geocoded using NAVTEQ streets data and refined using a combination of institution web sites and aerial photography, street views and bird's-eye views from Google Maps and Bing Maps.

   At this time, responses from the FCC's consumer broadband test are not used for data verification, but will be evaluated for inclusion in future data verification phases.

5. Provider web site information: If information acquired by providers – including availability and speed – appeared to be questionable, a search was performed on the provider's web site to confirm it. This type of verification was only performed when uncertainties arose during visual review of the data. In the future, this type of review may be incorporated into a more

structured approach to validate locations that are geographically dispersed throughout a provider's service area.

6. Community cable and DSL feedback: In collaboration with some Regional Planning Agencies (RPAs), availability maps were generated and distributed to carefully selected community representatives, such as local broadband committee members or town officials, with local knowledge of cable and/or DSL services in their town. The community representatives reviewed and marked up hard copy maps to identify services areas that extended too far or not far enough and, in some cases, provided the last known service location or address along a road. This was initially implemented through a pilot project for the member communities of two RPAs and has been rolled out to 3 additional RPAs in other low confidence areas, which include the remainder of western Massachusetts and part of central Massachusetts. Confidence scores are modified based on feedback from the community representatives, and DSL service area boundaries are modified in the areas with the most knowledgeable representatives.

7. Wireless drive studies: In coordination with local colleges, teams of student volunteers were trained to perform wireless drive studies. The students drove pre-defined routes with intermittent stops to collect wireless signal location and quality information using Android phones operating QoS Solutions' QMapper and QPerf software (see www.qos-solutions.com). The drive studies were performed in the same 5 RPA regions in central and western Massachusetts as the community cable and DSL feedback projects. The drive study results will be overlaid on the wireless providers' service areas and submitted for review by the providers. Further verification or service area boundary modifications may be discussed with providers in areas with anomalous results.

Confidence Ranking

As availability data is verified, the verification status is documented in each individual census block or road segment record or subdivision of a wireless service area. The records are also assigned numeric values from 1 to 5 that represent the level of confidence in the likelihood that service is available at that location. When service availability for a given provider and technology is verified by an alternate source, the confidence value for that location is increased by one, up to a maximum score of 5. A value of 1 represents the lowest confidence in provider data and no corroborating information from alternate sources. A value of 5 represents 3 or more corroborating sources or confirmation through field work. Data of all confidence levels are included in the availability datasets; however, locations that are deemed to be inaccurate as a result of the data verification process may have their confidence value reduced and may be tagged as not part of the service area.

General guidelines of the confidence ranking process are as follows:

- Initial rankings: Data records submitted by providers are given an initial confidence ranking of "1" or "2" depending on the level of ambiguity in the submission method. For example, availability information provided by census block ID, street address or spatial object is given a confidence ranking of 2. Whereas, availability information provided as hand-drawn or narrative estimates may be given a confidence ranking of 1.

- Verification from alternate sources: If availability at a given location is corroborated by an alternate dataset (such as the cable or DSL models, broadband survey responses, cable or DSL service area feedback from community representatives, or wireless drive study data interpolation), the verified location receives a 1 point increase in the confidence score for each corroborating dataset, with a minimum score of 3 and a maximum score of 5.

- Field confirmation: If availability at a given location is confirmed by known service locations identified through field work, it is given a confidence score of 5. Confirmed field locations include known infrastructure, such as DSL-equipped remote terminals, or known service availability acquired in wireless drive studies.

Provider Feedback Loop
All providers that submitted data received a written data submission report that described the format and completeness of the datasets they provided. This report included requests for additional information or alternate formats in the next submission and other data clarifications or corrections needed. Additional feedback was provided by phone or email conversations as needed. In addition, PDF maps of estimated services, based on the census blocks and roads or wireless area boundaries, were provided for verification and/or modification. Information on conflicting alternate data sources may also be provided for comment or challenge. In the future, this process will be standardized and formalized through the development of a web-based provider data portal.

DATA DEVELOPMENT – MIDDLE MILE INTERCONNECTION FACILITIES

This section describes the methods used to create the following dataset representing the location, technology and capacity of facilities that connect a service provider's network to another provider's network or the Internet:

- BB_ConnectionPoint_MiddleMile

Tabular data – including provider identification and facility ownership, capacity and type – were received from providers by street address or latitude and longitude. Latitude and longitude values were used to create point geometry when possible. Otherwise, street address data was geocoded using NAVTEQ streets data.

The MBI did not have alternate data sources for the verification of these datasets.

Data standardization
Facility ownership, capacity and type values were standardized to comply with valid value lists. Due to the field type of double used to store latitude and longitude, values with trailing 0's did not meet the 6-digit business rule. However, to preserve the accuracy of the data, these values

were not modified to contain 6 decimal places. Latitude and longitude values received from providers with less than 6 decimal places were also not modified to prevent misrepresenting the data as more accurate than it really was.

DATA DEVELOPMENT – COMMUNITY ANCHOR INSTITUTION SERVICE SUBSCRIPTIONS

This section describes the methods used to create the following dataset representing the location and broadband service subscription of community anchor institutions throughout the state:

- BB_Service_CAInstitutions

The community anchor institution datasets deemed most relevant to broadband issues in Massachusetts were:

- K-12 schools
- Colleges and universities
- Public libraries
- Hospitals
- Community health centers
- Police and sheriffs
- Career centers
- Town halls

Existing spatial datasets containing community anchor institution names and locations were acquired from state and regional agencies. The attributes were standardized and imported into a template dataset. Missing attributes (e.g., zip codes) were acquired through web searches (e.g., on institution web sites or from the US Postal Service).

Initial data requests were made to state and regional agencies and/or associations to acquire any existing compilations of information on broadband service information at affiliated anchor institutions. Complete or almost complete datasets for career centers, state police and county sheriffs were acquired from the MA Executive Office of Labor and Workforce Development (EOLWD) and MA Executive Office of Public Safety and Security (EOPSS).

For the remainder of the anchor institutions, a campaign was implemented to acquire information through phone, email and web-based surveys from individuals associated with individual anchor institutions who were knowledgeable about the institution's broadband services. Requests were also made through targeted outreach at events and in publications targeted at anchor institutions to increase awareness of broadband issues and participation in the broadband survey. Agencies and organizations that assisted in this effort included the MA Department of Secondary and Elementary Education (ESE), MA Board of Library Commissioners (MBLC), MA Chiefs of Police Association (MCOPA), Massachusetts Municipal Association (MMA), MA Department of Revenue (DOR), Mass League of Community Health Centers (MLCHC) and a CIO group for public and community colleges.

Data standardization

Survey questions were developed to request information that were easily understood and acquired by anchor institution staff. As a result, survey results required additional formatting to standardize the information in accordance with SBDD valid values. This information included broadband subscription status, transmission technology and maximum advertised speeds were collected and standardized to comply with valid value lists. In addition, street addresses for new anchor institutions that were not in the original GIS datasets were geocoded using NAVTEQ streets data and refined using visual references such as Google satellite photography and street view imagery.

In some cases, standardized transmission technology attribute values were used by the MBI to track uncertain technology categories. These were converted in the final datasets, as shown below, to comply with SBDD valid values.

MBI Technology Values	SBDD Technology Values
1: Unknown	0: Other
42: Cable - DOCSIS Unknown	41: Cable - DOCSIS Other
72: Fixed Wireless - Unknown	70: Fixed Wireless - Unlicensed

In some cases, transmission technology was corrected to reflect the service known to be offered by the specified provider. For anchor institutions that have more than one broadband connection, only records with the maximum speeds for each transmission technology type were included. For anchor institutions that did not provide broadband information, the broadband service field was set to unknown (BBSERVICE = U).

BROADBAND CHALLENGES IN MASSACHUSETTS

Broadband access differs significantly between the eastern, central and western parts of the state as well as the cape and islands. The majority of "unserved" and "underserved" communities are in western Massachusetts, which represents approximately 1/3 of the land mass in the state. Barriers to broadband access and deployment in this region are primarily due to topography, vegetation and population density. Western Massachusetts, as well as Cape Cod and the islands, currently lacks the middle mile infrastructure needed to encourage private sector development of last mile service or to achieve downstream speeds of 4 Mbps.

Wireline broadband availability in Massachusetts, particularly in western Massachusetts, is overstated in the current broadband datasets. This is due, in part, to generalizations resulting from census block size and population distribution in rural areas. The MBI is also working with communities to incorporate local knowledge of service availability in our feedback to broadband service providers and flagging census blocks and road segments requiring additional verification.

Wireless broadband availability in Massachusetts is also overstated. The reliability of propagation modeling has been identified as a concern in establishing wireless broadband availability. Although topography is factored into propagation models, vegetation is also a significant barrier to wireless in Massachusetts and makes it difficult to determine if service is really available at a location. In addition, at least one fixed wireless provider is not able to accept new customers within its service area due to limited capacity. Responses to the MBI survey also indicate that typical mobile wireless speeds do not always qualify as broadband.

Information provided by the community anchor institutions also requires additional review and modification. Respondents had difficulty selecting the correct transmission technology (e.g., the provider name frequently did not correspond to the technology) and often did not know the advertised speed of their service.

BROADBAND PROVIDERS IN MASSACHUSETTS

The MBI performed web research and/or attempted to contact all of these companies to verify if they were a broadband service provider in Massachusetts. Potential providers were asked the following questions to determine how to classify them on the list and if they should be included on the state and national broadband maps.

1. Do you provide broadband services in MA?
2. What part(s) of MA do you serve?
3. What type of broadband services do you offer?
   - What type of technologies?
   - Do you offer residential services, business services or both?
4. Do you own the infrastructure or are you a reseller?
5. Do you offer separate services under different names or do you have multiple names related to the same service?
6. Can you provide service within 10 days?

Below is the full list of providers potentially offering broadband services in Massachusetts, including companies that filed FCC Form 477 and additional providers identified by the MBI through other sources. Alternate provider names, resulting in duplicate provider entries, were removed from the list.

The list is broken down into three sections.

1. Verified providers with data included in the April 2012 data submission.
2. Verified providers in Massachusetts that were not included in the April 2012 data submission. (Note: This category is made up primarily of resellers and other providers that do not fit the SBDD definition of a broadband service provider, generally because they can’t provide service within 10 days.)
3. Other companies that do not offer broadband service in Massachusetts.

A. Verified providers included in the April 2012 data submission

Number	Filing Company DBA	Provider Type
1	AT&T Corp, Inc.	Meets NOFA Definition
2	AT&T Mobility LLC	Meets NOFA Definition
3	BELD Broadband	Meets NOFA Definition
4	Charter Communications Inc.	Meets NOFA Definition
5	Chappy WISP	Meets NOFA Definition
6	Comcast	Meets NOFA Definition
7	Country Roads Networks, Inc.	Meets NOFA Definition
8	Covad Communications Company	Meets NOFA Definition
9	Cox Communications	Meets NOFA Definition
10	FairPoint Communications	Meets NOFA Definition
11	Fibertech	Other
12	FiberTower Network Services Corp.	Other
13	GAW High-Speed Internet Inc	Meets NOFA Definition
14	HGE.net Fiber Optic Internet	Other
15	HughesNet	Meets NOFA Definition
16	Level 3 Communications, LLC	Other
17	MetroPCS	Meets NOFA Definition
18	Norwood Light Broadband	Meets NOFA Definition
19	OTT Communications	Meets NOFA Definition
20	PMLDnet.com	Meets NOFA Definition
21	RCN	Meets NOFA Definition
22	Richmond Telephone Company	Meets NOFA Definition
23	Russell Municipal Cable T.V.	Meets NOFA Definition
24	Shrewsbury Electric and Cable Operations (SELCO)	Meets NOFA Definition
25	Sidera Networks	Meets NOFA Definition
26	Sprint	Meets NOFA Definition
27	StarBand Communications Inc.	Meets NOFA Definition
28	Time Warner Cable	Meets NOFA Definition
29	T-Mobile	Meets NOFA Definition
30	USAi.net	Meets NOFA Definition
31	Verizon	Meets NOFA Definition
32	Verizon Wireless	Meets NOFA Definition
33	Warwick Broadband Service	Meets NOFA Definition
34	WildBlue Communications, Inc.	Meets NOFA Definition
35	WiSpring	Meets NOFA Definition

B. Verified providers not included in the April 2012 data submission

Number	Filing Company DBA	Provider Type
36	Clearwire Corporation	Meets SBDD Definition
37	DSCI Corporation	Meets SBDD Definition
38	Mega Broadband Inc.	Meets SBDD Definition
39	segTel, Inc.	Meets SBDD Definition
40	Sentinel Tree Telephone Company	Meets SBDD Definition
41	Towerstream	Meets SBDD Definition
42	tw telecom inc.	Meets SBDD Definition
43	Wave2Wave Communications Inc.	Meets SBDD Definition
44	XO Communications Inc.	Meets SBDD Definition
45	Ace Innovative Networks, Inc.	Reseller
46	ACN, Inc.	Reseller
47	ACN, Inc.	Reseller
48	Airespring, Inc.	Reseller
49	American Telephone Company LLC	Reseller
50	Bandwidth.com, Inc.	Reseller
51	Barry Communications, Inc.	Reseller
52	BCN Telecom, Inc.	Reseller
53	Broadcore, Inc.	Reseller
54	Broadview Networks Holdings, Inc.	Reseller
55	BullsEye Telecom, Inc.	Reseller
56	Communication Solutions Partners, Inc.	Reseller
57	Cordia Corporation	Reseller
58	Evolve IP, LLC	Reseller
59	Fidelity Voice Services LLC	Reseller
60	Granite Telecommunications, LLC	Reseller
61	iCore Networks, Inc.	Reseller
62	Internet & Telephone, LLC	Reseller
63	LY Holdings, LLC	Reseller
64	McGraw Communications, Inc.	Reseller
65	Metropolitan Telecommunications Holding Company	Reseller
66	Midwest Marketing Group, Inc.	Reseller
67	Network Billing Systems LLC	Reseller
68	New Edge Holding Company	Reseller
69	nexVortex, Inc.	Reseller
70	One Communications	Reseller
71	Qwest Communications International, Inc.	Reseller
72	Smart Choice Communications, LLC	Reseller

Number	Filing Company DBA	Provider Type
73	Stage 2 Networks, LLC	Reseller
74	TReseller Technologies	Reseller
75	Utel, Inc.	Reseller
76	Velocity Networks Inc.	Reseller
77	Broadvox Go!, LLC	Other
78	Cbeyond Communications, Inc.	Other
79	Cogent Communications Group	Other
80	Cypress Communications, Inc.	Other
81	EarthLink	Other
82	Ernest Communications, Inc.	Other
83	Global Crossing	Other
84	Lightower Fiber Networks	Other
85	M5 Networks, Inc.	Other
86	PaeTec Corporation	Other
87	South Hadley Electric Light Department	Other
88	Telesphere Networks Ltd.	Other
89	Transbeam Inc.	Other
90	Vocal IP Networx Ltd.	Other
91	Westfield Gas and Electric	Other

C. Other companies that do not offer broadband service in Massachusetts

Number	Filing Company DBA	Provider Type
92	5LINX Enterprises, Inc.	No service in MA
93	8x8, Inc.	No service in MA
94	Access One, Inc.	No service in MA
95	Access Point, Inc.	No service in MA
96	Accessline Holdings, Inc.	No service in MA
97	Apptix, Inc.	No service in MA
98	Aptela, Inc.	No service in MA
99	Birch Communications Inc.	No service in MA
100	C3IP Communications LLC	Dissolved/Liquidated
101	Call Catchers, Inc.	No service in MA
102	Cause Based Commerce Inc.	No service in MA
103	Cincinnati Bell Inc.	No service in MA
104	CommPartners Holding Corporation	No service in MA
105	ConnectMe, L.L.C.	No service in MA
106	Cordia Corporation	No service in MA
107	DataNet Communications Group, Inc.	Needs further research

Number	Filing Company DBA	Provider Type
108	Equinox, Inc.	No service in MA
109	First Communications, LLC	No service in MA
110	GlobalPhone Corp.	No service in MA
111	GreatCall, Inc.	No service in MA
112	IDT Corporation	No service in MA
113	InPhonex.com, LLC	No service in MA
114	IP Communications, LLC	No service in MA
115	Jivetel Communications	No service in MA
116	Kosmaz Technologies, LLC	No service in MA
117	LightSquared LP	No service in MA
118	Matrix Telecom, inc.	No service in MA
119	Millicorp	No service in MA
120	Mitel Netsolutions Inc.	No service in MA
121	Mix Networks, Inc.	No service in MA
122	N.W.ComTech, Inc	No service in MA
123	Navigator Telecommunications, LLC	No service in MA
124	NextWave Wireless Inc.	No service in MA
125	NOS Communications, Inc.	No service in MA
126	OnWav, Inc.	No service in MA
127	Openairboston.net	No service in MA
128	Phone.com, LLC	No service in MA
129	PNG Telecommunications, Inc.	No service in MA
130	Proximiti Technologies, Inc.	No service in MA
131	Quality Telephone Inc.	No service in MA
132	Razorline LLC	No service in MA
133	Reign Integrated Network Solutions LLC	No service in MA
134	Semperon Corporation	No service in MA
135	Spectrotel, Inc.	No service in MA
136	Telekenex, Inc.	No service in MA
137	TelLan Network Technologies, Inc.	No service in MA
138	Thinking Phone Networks, LLC	No service in MA
139	Tidal Communications, LLC	No service in MA
140	Trans National Communications International, Inc., TNCII	No service in MA
141	vCom Solutions	No service in MA
142	VoIPStreet, Inc.	No service in MA
143	Vonage Holdings Corp.	No service in MA
144	Zayo Group, LLC	No service in MA

Maryland Broadband Mapping Initiative
Broadband Availability Map Data
Submission Summary for Spring 2012

March 30, 2012

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Submission Summary

The staff of the Eastern Shore Regional GIS Cooperative (ESRGC) at Salisbury University in Salisbury, Maryland, in its role as primary technical lead for the Maryland Broadband Mapping Initiative, originally contacted 120 potential facilities-based broadband service providers (BSPs), receiving data from 41 providers which representing 39 different companies (See Appendix A). In this fifth submission, 50 different companies responded to our data request, an increase of 25.6% since the initiation of this project. An overall summary of the Spring 2012 data submission can be described as:

53 potential facilities-based broadband service providers were contacted
3 BSPs did not respond
6 BSPs responded but did not provide updated data
43 BSPs responded and either provided data or affirmed no change to data
0 BSPs responded and agreed to provide data but have not as of March 30, 2012

Of those that provided broadband availability data,

20 provided addresses
4 provided census block information only
9 provided census blocks and road segments
22 provided wireless coverage areas

In addition, 10 of the 50 responsive BSPs provided middle mile infrastructure points

Since our last submission, we gained two participants namely US Cellular and nTelos, Inc. MegaPath, DSL.net, Inc, and DSLnet Communications LLC have all merged with Covad Communications Company. Unfortunately for this submission, Covad did not include the service areas of these other providers. Therefore, we are using data from last submission for MegaPath, DSL.net, Inc., and DSLnet Communications, LLC. Finally, we received word from One Communications that they will no longer be participating in the Maryland Broadband Mapping Initiative.

Data Processing

For a specific discussion of the data processing steps for any particular BSP, please see the individual dataset report for each BSP below. In general, the data processing used to create the Spring 2012 data submission depended on the type of data provided by the BSP.

Census Blocks

To process the served census blocks, the steps are as follows. First, geocode the provider-submitted address table (if applicable) to the ArcGIS 10 US Streets Geocode Service. Second, spatially join the address points to the Year 2010 census blocks. Third, divide the address points into the different technologies of transmission. Fourth, select those address points that are within the census blocks that are greater than 2 mi^2, exporting them as a separate feature class. Fifth, switch the selected set (thus creating all the address points in blocks that are less than 2 mi^2), and select those blocks. Sixth, import the provider-submitted table of served census blocks and merge with the address-created blocks (if applicable). Finally, export the results. In previous submissions, it was necessary to translate between legacy 2000 census blocks and the current 2010 census block standard. That was no longer necessary for the Spring 2012 submission as no providers submitted 2000 census blocks.

Road Segments

To process the served road segments that are within census blocks that are greater than 2 mi^2, we import the table of road segment address ranges provided by the BSP, unless a Tiger Line ID (TLID) is provided. We then take the TO address values and the FROM address values on both the left and the right side of the segment and concatenate those address numbers with the street name, type, and direction, thus creating a maximum of 4 point addresses per road segment. Those point addresses are then address matched against both the TIGER line file and the Maryland iMap geocoding service. We can then find the street segments in TIGER that are adjacent to the located points. Finally, we select those TIGER lines that intersect the census blocks that are greater than 2 mi^2. If a TLID is provided we join the delivered table to the appropriate year Tiger Lines by the TLID and the joined results are exported. The result can be loaded into the SBDD Transfer data model.

Service Addresses

The process for creating the service addresses is the same as the census blocks (above), except that the addresses that fall within the census blocks that are greater than 2 mi^2 are kept as the key feature class.

Middle Mile Infrastructure

Processing the middle mile infrastructure is relatively trivial, in that the providers submit geographic coordinates with the middle mile attributes. Most of the providers, however, do not submit new middle mile data every six months. Therefore, any middle mile infrastructure collected during previous submission periods have been include in the current submission.

Community Anchor Institutions

The creation and verification of the Community Anchor Institution (CAI) Database is the responsibility of the Center for GIS at Towson University (CGIS). For the April 2012 data submission, the Center for GIS (CGIS) improved the quality of Maryland's Community Anchor Institution (CAI) broadband dataset by focusing on the following action items: 1) for each category, determine primary State of Maryland contacts to help with data collection and maintenance, 2) determine the "universe" of CAIs in Maryland by verifying existing locations and adding additional locations, and 3) determine subcategories and priorities within each major category. Focus broadband data collection on each location with an assigned Priority 1 and/or Priority 2. The following narrative describes the work performed in each area.

Public Schools K-12
The strategy was redirected in 2012 to focus on collecting broadband data for Maryland public schools. The data collection team assigned secondary priority to broadband data collection for Maryland private schools. Contact was made with the Maryland State Department of Education (MSDE), and the results of an annual MSDE technology survey were obtained. The intent was to sustain collection of the broadband data for public schools required by NTIA by obtaining the data from the annual survey. However, MSDE announced that survey will no longer be administered due to lack of funding. The data collection team will therefore continue to search for a reliable, sustainable data source. For the Spring 2012 submission, the dataset contains 1,922 records, an increase of 131 schools, of which 475 schools were categorized as Private and 1,447 were categorized as Public.

Universities
The strategy was redirected to focus on collecting broadband data on Maryland public universities. The data collection team assigned secondary priority to broadband data collection for Maryland private universities, and third priority to regional higher education centers.
The data collection team contacted the Chief Network Technology Officer at the Maryland Research and Educational Network (MDREN), formerly the University System of Maryland Academic Telecommunications System (UMATS), to determine if MDREN could assist with the broadband data collection process. MDREN maintains the broadband data for Maryland public universities and agreed to provide the information along with annual updates. The Fall 2012 data submission will include data obtained from MDREN. Additional outreach was made to community colleges. The dataset submitted for Spring 2012 contains 111 records, an increase of 20 records. Of these, we identified the broadband service for 50 entries.

Medical
The strategy was redirected to focus on collecting broadband data for hospitals and long term care facilities, and removing duplicate records from the dataset. Research was successfully conducted to locate resources in Maryland that could assist with broadband data collection, including the Maryland Health Care Commission and the Department of Health and Mental Hygiene, among others. The dataset submitted in for Spring 2012 contains 25,030 records.

Hospitals and long-term care facilities were determined to be our highest priority for broadband connectivity data collection, followed by ambulatory care facilities and mental health facilities as next highest priority. During this submission period, we were ablue to verify that all 65 hospitals and 28 long-term care facilities in the state of Maryland have broadband service. Because of the volume of the data, a large portion of the medical data was not assigned to a prioritized subcategory prior to the Spring 2012 submission deadline. A total of 13,534 records remain to be assigned.

Public Safety

The strategy was redirected to focus on collecting or verifying shelter locations, campus police departments, and fire departments, as well as determining sustainable relationships and data sources. We identified the Maryland Fireman's Association, the State Fire Marshal, and the Maryland Emergency Management Agency (MEMA) for collaboration and assistance in reaching out to the public safety community for data collection. The dataset submitted for Spring 2012 contains 1,695 records, an increase of 973 records since the last submission. All categories of public safety facilities were identified as a high-priority data collection target, except for volunteer fire departments.

Libraries

The Fall 2011 submission in this category primarily contained public libraries. The strategy was redirected to focus on collecting or verifying all library locations in Maryland by using the *American Library Directory, 64th Edition, 2011-2012 Vol. 1* Finding a cooperative source for broadband information at public libraries continues to be a challenge. The dataset submitted for the Spring 2012 contained 366 records, an increase of 173 records. Public libraries and government and law libraries were given top priority with university/college libraries given secondary priority. The data collection team reviewed state and county library websites and confirmed that at least 114 more public libraries have broadband service and at least 140 more have free public Wi-Fi than were reported in October 2011.

Community Support – Government

Outreach was attempted to the Maryland Deputy State Chief Information Officer at the Department of Information Technology (DoIT), who oversees networkMaryland™, the statewide high-speed network for public sector use. After failed attempts, outreach was successfully made to the Maryland State Geographic Information Officer for assistance in brokering communications. As a secondary strategy, a letter has been drafted to state agency secretaries and department heads, as well as county and municipality leaders, to solicit compliance with the data collection. The dataset submitted for Spring 2012 contains 1,485 records, an increase of 230 entities. Of these, county government offices and state cabinet level departments are our top priority.

Community Support – Non-Government

The strategy was redirected to focus on building relationships with nongovernmental organizations. A relationship with the executive directors of United Way of Central Maryland

(UWCM) was established. Through this communication and a presentation at the January United Way Executive Committee meeting, the data collection team obtained the 2-1-1 database of health and human services, as well as support for the data collection process. The executive directors agreed to disseminate a survey to all nongovernmental organizations funded by UWCM. Additionally, the State GIO held a meeting with UWCM, the Governor's Office, Maryland Department of Planning, the MBBMI team, and the University of Maryland Center for Substance Abuse Research (CESAR) team to discuss work ongoing in Maryland to map nonprofit organizations and services. The dataset submitted for Spring 2012 contains 2,679 records, an net increase of 1,981 locations. The UWCM provided 4,609 records which were processed against all of our existing CAIs to remove duplicates, inappropriate entities, etc. All of the entities in this category were assigned a secondary priority with regard to broadband connectivity information.

In summary, the Maryland broadband CAI database now contains 33,288 records, an increase of 2,709 (8.1%) from the fall 2011 submission. Information regarding the broadband service for 2,843 (8.5%) of those CAIs has been obtained. As the Universe of CAIs has been expanded for this submission, there was not been the same increase in knowledge of broadband service at these locations. This has resulted in a decrease in percent of CAIs with broadband service.

		Fall 2011 Submission			Spring 2012 Submission		
	CAI Category	# CAIs with BBSERVICE	Total CAIs	% of CAIs with BBSERVICE	# CAIs with BBSERVICE	Total CAIs	% of CAIs with BBSERVICE
1	School (K-12)	1,465	1,791	81.8%	1,418	1,922	73.7%
2	Library	139	193	72.0%	252	366	68.9%
3	Medical / Healthcare	22	25,829	0.1%	112	25,030	0.4%
4	Public Safety	406	722	56.2%	993	1,695	58.6%
5	University / College/ Other Post-Secondary	50	91	55.0%	50	111	45.0%
6	Other Community Support - Government	692	1,255	55.1%	716	1,485	48.2%
7	Other Community Support - Non-Government	69	698	9.9%	74	2,679	2.8%
	Total	**2,843**	**30,579**	**9.3%**	**3,615**	**33,288**	**10.9%**

Data Verification

The ESRGC, in partnership with the Center for GIS at Towson University and as a subcontract to the SBDD grantee in Maryland, the Maryland Broadband Cooperative, conducted a number of verification and validation tests on the provider-submitted broadband availability data. In the event that inconsistencies or errors were found, certain changes are made to the provider-submitted data. These changes are either retention but modification to provider-submitted data or the removal of the provider-submitted data, depending on the type and severity of the error. Given our extensive review and testing of broadband availability information in Maryland, we feel confident that the changes we make are improving the accuracy of the provider's submission. We continue to search for new ways to refine the submitted data and present an ever-increasing accurate portrayal of broadband availability in our state.

In the first phase of data validation, the provider-submitted data is processed for inclusion within the NTIA transfer model. During this processing, several data inconsistencies can be found. They include:

1) Submitted download and upload speeds do not match the values expected for a given technology of transmission
2) Service addresses are located hundreds of miles away from the provider's known service areas
3) Served blocks with technologies and speeds that do not meet the working definition of broadband
4) Addresses/road segments/blocks that have no technology of transmission

For each of these, the initial remedy is to contact the provider for clarification/modification. If that communication is not successful for whatever reason, the data team makes a decision to either modify the data to match expected values or removes the errant data.

In the second phase of data validation, a maximum of fourteen data checks are conducted on each of the provider-submitted broadband availability data, listed below. Different versions of data verification tests were conducted on submissions from wireline broadband providers versus wireless providers, because of the differing submission geometry. Each check will be explained in detail below. The result of each of these tests is an error statistic, cataloged in a data verification report. No changes to the data are made based on these tests.

1) Maximum down/upload speeds reported by provider
2) Typical down/upload speeds reported by provider
3) Typical down/upload speed from 2010 speed test
4) Speed tests match reported typical speeds or are within 1 speed tier
5) Speed tests present within blocks not reported as served by provider
6) Census blocks/coverage area reported to project, but no tract reported directly to FCC
7) Tracts reported directly to FCC, but no census blocks/coverage area reported to project
8) Census blocks/coverage areas versus unserved area locations reported
9) Total number of unserved area locations reported per provider
10) Web search verification
11) Census blocks that are outside providers Cable Franchise Boundary
12) Census blocks that are within another providers Cable Franchise Boundary
13) Census blocks that are outside DSL boundary
14) Wireless broadband presence and speed systematic field sampling

15) Comparison of areas reported as served in last submission, to areas served this submission

This last test was adding during this Spring 2012 submission round. It came to our attention as we were examining the broadband availability data for another purpose that some of the blocks that were submitted as "served" by a provider in previous submissions were being submitted as "unserved" in later submissions. While it is certainly possible that a provider decides to stop serving the residents and businesses of a particular block, it is not probable and is more likely explained by an error either in reporting or geocoding.

Finally, the third and final phase of data validation is an in-depth discussion of a provider's data submission and the subsequent data tests with the provider via web conference. During this discussion, a detailed review of the submission takes place including an examination of their resulting availability maps. Several of these web conferences were attempted in preparation for the Spring 2012 submission, with limited results. Most providers were not willing to admit that any portion of their data were inaccurately portrayed. However, we have now conditioned several of the providers to ask for and review the maps, prior to our submission to the NTIA. While no major (or even minor) modifications have been requested prior to submission, that feedback loop has been established.

Maximum down/upload speeds reported by provider

Facilities-based BSPs are required to provide the maximum downstream and upstream speeds by the NTIA and the NoFA of August 2009. These speeds are dependent upon the technology of transmission the BSP uses to deliver broadband service. Speeds are reported in ordinal categories, or tiers, as defined by the NoFA. They are:

Downstream Speed Tier	Upstream Speed Tier	Corresponding Speed
--	1	Less than or equal to 200 kbps
--	2	Greater than 200 kbps and less than 768 kbps
3	3	Greater than or equal to 768 kbps and less than 1.5 mbps
4	4	Greater than or equal to 1.5 mbps and less than 3 mbps
5	5	Greater than or equal to 3 mbps and less than 6 mbps
6	6	Greater than or equal to 6 mbps and less than 10 mbps
7	7	Greater than or equal to 10 mbps and less than 25 mbps
8	8	Greater than or equal to 25 mbps and less than 50 mbps
9	9	Greater than or equal to 50 mbps and less than 100 mbps
10	10	Greater than or equal to 100 mbps and less than 1 gbps
11	11	Greater than or equal to 1 gbps

For this data check, the maximum downstream/upstream speeds reported from each provider are summarized in a table. These speeds are summarized for census blocks, wireless coverage areas, road segments, and service address points.

For the data submission, 49 providers (100%) reported maximum downstream/upstream speeds for census blocks. The lowest maximum downstream speed reported is greater than or equal to 768 kbps and less than 1.5 mbps, reported by 14 providers. The highest maximum downstream speed was greater than or equal to 1 gbps, reported by 6 providers. The most frequent maximum downstream speed was greater than or equal to 10 mbps and less than 25 mbps, reported by 18 providers.

Typical down/upload speeds reported by provider

BSPs are required to provide the typical downstream and upstream speeds by the NTIA and the NoFA of August 2009. Typical speeds are, per the NoFA, intended to be "the data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed can achieve consistently during expected periods of heavy network usage." These speeds are dependent upon the technology of transmission the BSP uses to deliver broadband service. Speeds are reported in ordinal categories, or tiers, as defined by the NoFA (see table above).

For this data check, the typical downstream/upstream speeds reported from each provider are summarized in a table. These speeds are summarized for census blocks, wireless coverage areas, road segments, and service address points

For the data submission, 22 providers (45%) reported typical downstream/upstream speeds. The lowest typical downstream speed was greater than or equal to 768 kbps and less than 1.5 mbps, reported by 8 providers. The highest typical downstream speed was greater than or equal to 1 gbps, reported by 2 providers. The most frequent typical downstream speed of the census blocks was greater than or equal to 768 kbps and less than 1.5 mbps, reported by 8 providers

Typical down/upload speed from 2010 mobile speed test
Typical down/upload speed from 2010 computer-based speed test

Beginning in April 2010, the MBBMI team and the FCC (nearly simultaneously) began collecting speed test information from broadband consumers in the state of Maryland. This speed test information included the downstream and upstream speed in kbps, the signal latency, the street address of the tester, the type of connection location (home, work, etc), the connection technology (cable/DSL, fiber optic, satellite/dial-up, or unknown – MBBMI test only), the IP address of the test machine, and the corresponding BSP. The MBBMI contracted with a company named Ookla to create their test; the FCC used both Ookla and an alternative method developed by a company named MLab.

From mid-April 2010 until June 30, 2011, 12,141 speed tests were collected by MBBMI and 26,537 PC-based speed tests were collected by the FCC (the FCC also collected mobile speed tests, see below). Of these, 5,527 MLab-based FCC speed tests were eliminated (to insure consistent speed test results and 11,354 were removed because they did not include a valid address. The FCC and the MBBMI speed tests were then combined and geocoded using their street address. Just over 12% of the addresses could not be resolved, thus a total of 19,162 of speed tests were used in verification processing. Note that speed tests were collected after June 30, 2011, however, the updated speed test data was not provided by the NTIA in time for use in this submission

The speed tests associated with each reporting BSP were extracted from the geocoded set. The downstream and upstream speeds were classified according to the NTIA's speed tiers (see table above) and the number of tests in each tier were counted. A table of those results in included in each data validation/verification report. For mobile broadband providers, a distinction was made between the results from mobile speed tests (generated by an iOS or Android app) and the results from computer-based speed tests (generated by a web-based speed test) as those results are likely to be different (due to significant hardware/software differences) even though the network being accessed is the same

For the state of Maryland as a whole, the PC-based speed test results are:

Speed Tier	Number of Downstream Tests	% of Downstream Tests	Number of Upstream Tests	% of Upstream Tests
1	483	2.5%	1,461	7.6%
2	1,541	8.0%	4,720	24.6%
3	1,674	8.7%	1,154	6.0%
4	2,077	10.8%	2,580	13.5%
5	1,713	8.9%	5,895	30.8%
6	2,387	12.5%	1,440	7.5%
7	6,803	35.5%	1,754	9.2%
8	1,959	10.2%	144	0.8%
9	469	2.4%	12	0.1%
10	56	0.3%	2	0.0%

Speed tests match reported typical speeds or are within 1 speed tier

For the 22 providers that submitted typical speeds for their data, a comparison was conducted between the mode (the most frequent value) of the typical download speed tier from the provider area and the FCC/Ookla speed tests. In instances where the most frequent download speed tier from the speed tests matched, or was within one tier of, the typical download speed tier from the provider, the response to this statement is affirmative (6 providers). When the response to this statement is negative (9 providers), there is question about the typical download speeds that have been submitted by the provider. The remaining 7 providers provided typical speeds but none of their customers have taken a speed test to verify.

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted)
Number and percentage of mobile speed tests verifying coverage area
Number and percentage of computer-based speed tests verifying coverage area

Using the location of speed tests submitted through the FCC or the MBBMI speed test tools, the team sought to compare the location of broadband availability submitted by BSPs and the location of actual broadband service reported by speed test takers.

For this verification test on wireline provider census block submissions, the number of census blocks served (as determined by the location of a speed test) but were not reported by provider were calculated. That number is then divided by the total number of blocks submitted by the provider, reported as an error percentage.

For the state of Maryland, the maximum number of census blocks shown to be served by speed test data but not reported by a BSP is 349 (for Comcast Cable Communications, LLC , 0.66% of their total reported blocks). The minimum percentage of served census blocks confirmed by speed test was 0% (7 providers). The maximum percentage was 100% (Cogent and Tata Communications (America) Inc.).

For this verification test on wireless provider coverage area submissions, the following statistics are reported:

1) Confirmation of coverage area served
    - The number/percentage of computer-based speed tests that fall within the BSP's reported coverage area(s).
    - The number/percentage of mobile speed tests that fall within the BSP's reported coverage area(s).
2) Area served, not reported by provider
    - The number/percentage of computer-based speed tests that fall outside the BSP's reported coverage area(s).
    - The number/percentage of mobile speed tests that fall outside the BSP's reported coverage area(s).

For the wireless providers in the state of Maryland, 41% (7 of 17) had computer-based speed tests submitted by users. The maximum number of computer-based speed tests shown to fall within the reported coverage area of a BSP is 67 (for Hughes Communications, Inc., 100% of their computer-based speed tests). Other BSPs that has 100% of their computer-based speed tests fall within their reported coverage were ATTWireless and Wildblue Communications, Inc..

The minimum percentage of computer-based speed tests shown to fall within the reported coverage area of a BSP was 10% (Easton Utilities, 10 tests fell inside). On average, 86% of computer-based speed tests fell within the BSP's reported coverage area.

Regarding the number of mobile speed tests that fall within the reported coverage area of a BSP, 53% (9 of 17) of the wireless BSPs had tests and the maximum number came from Verizon Wireless customers, with 9,253 tests within their reported coverage area. Two wireless BSPs had 100% of their mobile speed tests fall within their reported coverage area: Hughes, and Wildblue Communications, Inc.. Easton Utilities and nTelos were the BSPs with the smallest percentage of tests falling within their reported coverage area – 0%. On average, 74.8% of mobile speed tests fell within the BSPs reported coverage areas.

Census blocks/coverage area reported to project, but no census tract reported to FCC
Census tracts reported to FCC, but no census blocks/coverage areas reported to project

Another source of data validation was the FCC's Form 477 data as of December 2009. This dataset is collected semi-annually by the FCC from BSPs, both facility-based and not facility-based. The BSPs report the number of residential and business subscribers to their broadband service per census tract. For comparison, the average census tract in Maryland contains 67 census blocks. While the Form 477 data is much coarser than the SBDD-reported data, it still should align spatially.
Therefore, as another verification check, we test the number of census blocks that are reported by wireline BSPs that have no corresponding reported census tract in the BSP's Form 477 data. Similarly, we test the number of tracts from the wireline BSP's Form 477 data that do not have corresponded census blocks reported in this initiative.

For the state of Maryland, the maximum number of census blocks that were reported as served but had no corresponding Form 477 census tract was 8,353 from Covad Communications Company. On average, 594 census blocks (from 25 providers) had no corresponding census tract. The maximum number of census tracts that had no corresponded reported census blocks was 192 from DSLnet Communications, LLC. On average, 24 census tracts (from 25 providers) had no corresponding census blocks.

For wireless BSPs, we tested the number of census tracts that either intersect or do not intersect each reported coverage area. Because it is not possible to tell what portion of the Form 477 reported census tract may receive the wireless service, a simple intersect between served tracts and coverage areas is the only test available from these data sources. For those wireless BSPs reporting to the FCC on Form 477 (9 of 17), all but one had 100% of their served census tracts intersecting their reported coverage areas. Only Easton Utilities had less, with 60% of their 477 census tracts intersecting their coverage area. We are almost positive this result is due to the mismatched vintage of the Form 477 data and the provider data.

Census blocks/coverage areas versus unserved area locations reported
Total number of unserved area locations reported per provider

At the MBBMI website (www.mdbroadbandmap.org) and at the FCC website (www.broadband.gov), residents and business owners have the opportunity to report unserved areas. These are locations, specifically addresses, at which the potential broadband customer cannot access broadband service. Those unserved area reports are taken in by the MBBMI team, geocoded according to their address, and are examined for their spatial coincidence with BSP availability coverages. For each wireline provider, the number of census blocks reported as served that contain a unserved area report are calculated, as well as the total number of unserved area reports within a BSPs availability area. For each wireless BSP, the number/percentage of unserved area reports from both the FCC and the MBBMI that fall within and outside the reported coverage area are calculated.

It is important to note that, at the present time, these unserved area reports are unverified. It is possible that broadband service may be available either at the address (but the person reporting the unserved area location was unaware of service availability), or not available at the address because of some unique configuration problem at that address specifically. It is also entirely possible that portions of a census block may be served but other portions may not.

For the state of Maryland, the maximum number of a wireline BSP’s available census blocks that contain an unserved area location report is 104 (Verizon Communications, Inc.). This represents 0.14% of Verizon's reported census blocks. The maximum rate of deadzone reports as a percentage of blocks reported is 4.6% (Alantech Online, Inc.). The minimum number is 0 (17 providers). The maximum number of unserved area location reports in a wireline BSP’s available area is 129 (Verizon Communications, Inc.).

For the state of Maryland, the maximum percentage of unserved area locations reported from the FCC within a wireless BSP’s reported coverage area is 100% (each are satellite providers). The maximum percentage of unserved area locations reported from the FCC within a non-satellite wireless BSP’s reported coverage area is AT&T Wireless at 98.3% (233 of 237). The average percentage of unserved area locations (reported from the FCC) that fall within a wireless BSP’s reported coverage area is 41.7% (99 of 237). For those unserved area locations reported by the MBBMI, the maximum percentage of unserved area locations within a wireless BSP’s reported coverage area is 100% (203 of 203), true for each of the satellite wireless providers (HughesNet, StarBand, and Wildblue). The maximum percentage of unserved area locations reported from the MBBMI within a non-satellite wireless BSP’s reported coverage area is AT&T Wireless at 97.5% (198 of 203). The average percentage of unserved area locations (reported from the MBBMI) that fall within a wireless BSP’s reported coverage area is 38.4% (78 of 203).

Web search verification

Some broadband service providers publish service availability query tools on their corporate websites. The MBBMI team took the opportunity to test the broadband availability areas submitted by the BSPs against the BSP's web-based service availability tools. A systematic sampling grid was created for the entire state of Maryland. A sample point was placed every 4000 meters, then the nearest property address (within at most 1000 m) was chosen. This yielded a grid of 1,472 sample points. In Baltimore City, an additional 24 sample points were added (approximately every 2000 meters) in order to have reasonable sampling density within the small area of the City. This brought the total sample points to 1,496.

For each BSP that had a web-based service availability query tool (11 providers), the sample point grid addresses were used to verify the availability of service (or lack thereof) compared to both the reported service area, the area just outside the stated service area, and a random selection of grid points across the state. The following combinations of reported service vs. queried service were tallied:

1) A census block/coverage area was reported as served and the sample was returned as served
2) A census block/coverage area was reported as served but the sample was returned as unserved
3) A census block was not reported as served (or the location was outside the wireless coverage area) and the sample was returned as not served
4) A census block was not reported as served (or the location was outside the wireless coverage area) but the sample was returned as served

The total number of sample points in categories 2 and 4 are reported as error (of commission and of omission, respectively).

For Comcast and Verizon, all 1,496 sample points were used as those two BSPs offer broadband service in all areas of the state.

For the eleven wireline BSPs in the state of Maryland that have a Internet-based availability tool, the maximum omission error rate was 24.1% reported by Armstrong Cable The minimum omission error rate was 0% and was reported by Charter Communications, Comcast and Starpower. The average omission error rate was 11.0%. The maximum commission error rate was 31.2% reported by Verizon Maryland. The minimum commission error rate was 0% and was reported by 4 providers. The average commission error rate was 7.0%. The maximum total error rate was 35.3% reported by Verizon Maryland The minimum total error rate was 0% reported by StarPower. The average total error rate was 18.0%.

Census blocks that are outside provider's own Cable Franchise Boundary
Census blocks that are within a different provider's Cable Franchise Boundary

For those BSPs that provide broadband service via cable modem technology, they are (supposedly) constrained to a service area defined by a local (or several local) cable franchise boundar(ies). The MBBMI team obtained the spatial extent of the cable franchise boundaries within the state of Maryland from the Maryland Broadband Cooperative. With these cable franchise boundary areas, a test can be performed to count both the number of served census blocks that fall outside of a provider's designated cable franchise boundary area and the number of served census blocks the fall within a different provider's cable franchise boundary. The first statistic may or may not be an error. If a cable provider is surrounded by an area that has no competing franchises, some expansion beyond the existing franchise boundary is expected. The second test may also not be an error in that franchise boundaries usually refer to cable television service specifically. A provider may be allowed to expand non-television services like broadband into competing areas. It is also possible that the cable franchise boundaries are not up-to-date.

In Maryland, we can test if any of seven providers report blocks outside of their own boundary. The maximum number of blocks that fall outside the cable franchise boundaries is 6,669 reported by Comcast Cable Communications, LLC. This represents 12.7% of their total number of served blocks. The minimum number of "outside" blocks is 8 reported by Easton Utilities, or 1.5% . The average number of blocks that fall outside the cable franchise boundary is 1,604.

Thirteen broadband providers that deliver service via cable modem have the potential of serving blocks contained within someone else's boundary. The maximum number of blocks that fall into someone else's cable franchise boundaries is 2,773 reported by Broadstripe, LLC. This represents 94% of their total number of served blocks. The minimum number of blocks to fall in someone else's boundary is 1 reported by Hotwire Communications, but that represents 100% of their coverage area. The average number of blocks that fall outside the cable franchise boundary is 675.

Census blocks that are outside DSL boundary

For those BSPs that provide broadband service via digital subscriber line (DSL) technology, the general area of DSL availability is tracked by several industry groups. The MBBMI team obtained the spatial extent of the DSL availability areas within the state of Maryland from the Maryland Broadband Cooperative. With these DSL availability areas, a test can be performed to count the number of census blocks that fall outside of the DSL availability area. This may indicate an error, although it is possible that the DSL availability boundaries are not up-to-date or correct. There was no metadata concerning currentness or quality included in the DSL availability areas.

In Maryland, 12 providers are eligible for this test. The maximum number of blocks that fall outside the DSL availability areas is 20,183 reported by Verizon Maryland Inc. This represents 26.3% of their total number of served blocks. The minimum number of "outside" blocks is 0 reported by Tata. The average number of blocks that fall outside the DSL availability area is 3,223.

Wireless broadband presence and speed systematic field sampling

For the wireless coverage areas, many of the other data checks and tests are not appropriate to use. In the summer of 2011, the MBBMI embarked on the second phase of a wireless coverage area verification project. For each of the 1,496 systematic sampling grid points (increased slightly from 2010 to sample more intensively in Baltimore City), a research team visited the sample address with nine phones, two each for Sprint, Verizon Wireless, AT&T, and T-Mobile, measuring both 3G and 4G network presence and speed, as well as one phone to test the Cricket network. Using the FCC/Ookla speed test app, the broadband availability, downstream and upstream speeds, and the GPS location of the test were collected.

After the field sampling was completed, 1,486 grid points with valid samples were used to conduct this test; 10 of the original sample locations were not collected due to a communication error with the field team. Of those, the following combinations of reported service vs. sampled service were tallied:

1) A sample point was in an area reported by the provider as served and the sample was collected as served
2) A sample point was in an area reported by the provider as served but the sample was collected as unserved
3) A sample point was in an area reported by the provider as not served and the sample was collected as not served
4) A sample point was in an area reported by the provider as not served but the sample was collected as served

The total number of sample points in categories 2 and 4 are reported as error (of commission and of omission, respectively). Verifying the 4G network presence proved more challenging. Because the 4G phones will conduct a mobile broadband test on a 3G network if it all that is available, simply noting the presence of a speed test from a 4G phone is not enough to verify that the phone was actually accessing the 4G network. Therefore, in order to isolate those speed tests that were truly taken on the 4G network, we selected those tests that had an average download speed of 2000 kbps or greater. This number was chosen by examining the typical speed results in the known 4G areas of the state, plus consulting published speed comparison studies on numerous popular technology websites.

For the 3G coverage areas in the state of Maryland, T-Mobile had the maximum number of samples that were reported as omitted (sampled as served but not within the coverage area) was 849 and the error rate was 63.6% (849 of 1,334 samples that had registered service). AT&T Wireless had the minimum number of samples that were reported as omitted (13 or 1.0%). The average omission error rate was 26.3%. Sprint-Nextel had the maximum number of samples that were reported as committed (sampled as not served but within the coverage area) at 263. The commission error rate was 26.9% (977 were tested). Verizon Wireless had the minimum number of samples that were reported as committed (64 or 5.2%). The average commission error rate was 15.5%.

For the 4G coverage areas in the state of Maryland, Verizon Wireless had the maximum number of samples that were reported as omitted (sampled as served but not within the coverage area) was 60 and the error rate was 21.9% (60 of 274 samples that had registered service). AT&T Wireless had the minimum number of samples that were reported as omitted (0). The average omission error rate was 14.0%. AT&T Wireless had the maximum number of samples that were reported as committed (sampled as not served but within the coverage area) at 1,367. The commission error rate was 92% (1,453 were tested). Verizon Wireless had the minimum number of samples that were reported as committed (69 or 24.4%). The average commission error rate was 70.2%. This average rate is so high because most of the tests we took within 4G areas did not return 4G speeds.

Comparison of areas reported as served in last submission, to areas served this submission

It recently became clear as we were examining the broadband availability data that some of the blocks that were submitted as "served" by a provider in previous submissions were being submitted as "unserved" in later submissions. While it is certainly possible that a provider decides to stop serving the residents and businesses of a particular block, it is not probable and is more likely explained by an error either in reporting or geocoding. Therefore, we added a test that simply compares the unique block count from the previous submission to this submission. In addition to this simple test, we are making maps of change for each provider and will be reviewing those maps with the providers.

The range of change from the Fall 2011 submission to Spring 2012 was a loss of 79 blocks (Verizon Communications) to no change (26 providers) to a gain of 3,969 blocks (Comcast Cable). For those registering change (8 providers), the average was a gain of 757 blocks.

Individual Provider Data Summaries

Allied Telecom Group, LLC

DBA: **Allied Telecom Group, LLC**

Data Characteristics

Date of Original Submission:	3/7/2011
Date of Update Submission:	2/28/2012
Currency of Data:	12/31/2011
FRN:	0014531073
Type of data submitted:	Address Table
Census Block Count:	84
Total Matched Address Points Count:	170
Unmatched Address Points:	0
Number of Technology of Transmission Types:	4
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 174
  - Number unmatched: 0
- Spatially join matched address points to 2010 census blocks
- Separate addresses by technology of transmission

Census Block Process:

- Join the spatial join result to the 2010 census blocks based on the GEOID10 field for each technology
  - Export results for each technology
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	29	27%

Max Upload Category	Count	% of Blocks
5	29	27%

4	5	5%
11	29	27%
10	46	42%

4	5	5%
11	29	27%
10	46	42%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
7	29	27%
4	5	5%
11	29	27%
10	46	42%

Typical Upload Category	Count	% of Blocks
5	29	27%
4	5	5%
11	29	27%
10	46	42%

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
4	1	100%

Speed Test Upload Tier	Count	% of Tests
6	1	100%

Speed tests match reported typical speeds or are within 1 speed tier: No

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/84 (1.2%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 15/84 (17.9%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: 2 census block **increase**

Antietam Cable Television, Inc.

DBA Name: Antietam Cable Television, Inc

Data Characteristics

Date of Original Submission:	7/29/2010
Date of Update Submission:	3/7/2012
Currency of Data:	12/31/2011
FRN:	0002154367
Type of data submitted:	Addresses
Census Block Count:	2424
Total Matched Address Points Count:	21847
Unmatched Address Points:	37
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 21021
  - Number unmatched: 863
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 548
  - Number unmatched: 315
- Unmatched addresses are geocoded to Maryland centerline address locator
  - Number matched: 278
  - Number unmatched: 37
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	2424	100%

Max Upload Category	Count	% of Blocks
4	2424	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	1	1%
3	3	2%
4	33	20%
5	119	71%
6	4	2%
7	7	4%

Speed Test Upload Tier	Count	% of Tests
1	1	1%
2	34	20%
3	122	73%
4	8	5%
6	2	1%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 2/2424 (<1%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
1/2424 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org:
2/2424 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 2

Web Search Verification: 41/2424 (2%) of census blocks were confirmed using online search feature of given provider.

Antietam WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	123	8%
Result is yes and census block is in served area	41	33%
Result is yes but not in a census block reported as served	21	17%
Result is no and census block is in served area	5	4%
Result is no and census block not served area	56	46%

Census blocks that are outside providers own Cable Franchise Boundary: 735/2424 (30.3%)

Census blocks that fall within another provider's Cable Franchise Boundary: 58/2424 (2.4%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Armstrong Holdings, Inc.

DBA Name: Armstrong Utilities, Inc.

Data Characteristics

Date of Original Submission:	3/31/2010
Date of Update Submission:	1/23/2012
Currency of Data:	12/31/2011
FRN:	0003765617
Type of data submitted:	Census Block Table & Road Segments
Census Block Count:	2592
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

***See ReadMe.txt**

Data Processing

Census Block Process:

- Join the provided census block table to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Create beginning and ending road segment addresses for all submitted road segments by concatenating the address number, street direction, street name, street type.
- Remove any duplicate addresses and those with no address number.
- Address-match those road segment addresses against the ArcGIS US Streets geocoding service to create beginning/ending road segment points
- Select those TIGER line segments that are within 10 m of a segment point location
- Spatial join the points to the TIGER lines so that the Technology of Transmission and Speed Tiers are attached to the appropriate line segment.
- Select just those line segments that intersect the census blocks that are greater than 2 square miles
  - Export results

- Load exported results into the NTIA data model
  - Result: BB_Service_RoadSegment

Data Verification

Census Blocks

Max Download Category	Count	% of Blocks
9	2592	100%

Max Upload Category	Count	% of Blocks
5	2592	100%

Road Segments

Max Download Category	Count	% of Road Segments
9	198	100%

Max Upload Category	Count	% of Road Segments
5	198	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	8	10%
3	1	1%
4	1	1%
5	15	19%
6	42	54%
7	11	14%

Speed Test Upload Tier	Count	% of Tests
1	2	3%
2	8	10%
3	10	13%
4	57	73%
6	1	1%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/2592 (0%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: 92/2592 (4%)
Number of tracts reported to FCC, but no census blocks reported to project: 1

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 6/2592 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 6

Number or census blocks with dead zones reported via mdbroadbandmap.org: 8/2592 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 9

Web Search Verification: 46/2592 (2%) of census blocks were confirmed using online search feature of given provider

Armstrong WebSearch Verification Table	**Count**	**Percentage**
Total # of sample points	1496	
Number of sample points with results	166	11%
Result is yes and census block is in served area	46	28%
Result is yes but not in a census block reported as served	40	24.1%
Result is no and census block is in served area	0	0%
Result is no and census block not served area	80	48%

Census blocks that are outside providers own Cable Franchise Boundary: 2132/2592 (82%)

Census blocks that fall within another provider's Cable Franchise Boundary: 742/2592 (29%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

AT&T Mobility LLC

DBA Name: **AT&T Mobility LLC**

Data Characteristics

Date of Original Submission:	3/9/2010
Date of Update Submission:	2/10/2012
Currency of Data:	12/31/2011
FRN:	0004979233
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	2	100%

Max Upload Category	Count	% of Area
3	2	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	425	37%
3	331	29%

Speed Test Upload Tier	Count	% of Tests
1	667	58%
2	307	27%

4	331	29%
5	59	5%
6	3	0%
7	6	1%

3	135	12%
4	31	3%
5	7	1%
6	1	0%
7	4	0%
8	3	0%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 1150/1155 (99.5%)
Number of mobile speed tests reported outside coverage area: 5/1155 (0.5%)

Typical down/upload speed from 2010 <u>computer based speed test</u>:

Speed Test Download Tier	Count	% of Tests
0	7	70%
3	2	20%
4	1	10%

Speed Test Upload Tier	Count	% of Tests
1	5	50%
2	2	20%
3	3	30%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of computer based speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 10/10 (100%)
Number of mobile speed tests reported outside coverage area: 0/10 (0%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 342/342 (100.0%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/342 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
233/237 (98.3%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
198/203 (97.5%)

Web Search Verification: N/A

Wireless Verification:

ATT Wireless Verification Table - 3G	**Count**	**Percentage**
Total # of sample points	1486	
Number of sample points within coverage area	1453	
Total number of sample points with results	1293	

Verified served AND within reported coverage area (yes,yes)	1280	
Verified served AND found outside reported coverage area (yes,no)	13	1.0%
Verified unserved AND found within reported coverage area (no,yes)	173	11.6%
Verified unserved AND found outside reported coverage area (no,no)	20	
Total error	186	12.5%

ATT Wireless Verification Table - 4G	**Count**	**Percentage**
Total # of sample points	1486	
Number of sample points with expected 4G results	1453	
Total number of sample points with 4G results	86	
Verified 4G AND within reported coverage area (yes,yes)	86	
Verified 4G AND found outside reported coverage area (yes,no)	0	0.0%
Verified not 4G AND found within reported coverage area (no,yes)	1367	92.0%
Verified not 4G AND found outside reported coverage area (no,no)	33	
Total error	1367	94.1%

*4G service defined as average down speed of > 2000 bps

Atlantech Online, Inc.

DBA: **Atlantech Online, Inc.**

Data Characteristics

Date of Original Submission:	3/7/2011
Date of Update Submission:	3/13/2012
Currency of Data:	12/31/2011
FRN:	0018854935
Type of data submitted:	Address Table
Census Block Count:	22
Total Matched Address Points Count:	39
Unmatched Address Points:	0
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 39
  - Number unmatched: 39
- Spatially join matched address points to 2010 census blocks
- Separate addresses by technology of transmission

Census Block Process:

- Join the spatial join result to the 2010 census blocks based on the GEOID10 field for each technology
  - Export results for each technology
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
11	2	9%

Max Upload Category	Count	% of Blocks
11	2	9%

7	20	91%	7	20	91%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	6	14%
4	1	2%
5	20	47%
6	7	16%
7	3	7%
8	3	7%
9	3	7%

Speed Test Upload Tier	Count	% of Tests
2	1	2%
3	10	23%
4	12	28%
5	10	23%
6	2	5%
7	4	9%
8	2	5%
9	2	5%

Speed tests match reported typical speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 9/22 (41%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0
Number of tracts reported to FCC, but no census blocks reported to project: 84

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/22 (4.5%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Atlantic Broadband (Penn), LLC
DBA Name: Atlantic BroadBand

Data Characteristics

Date of Original Submission:	3/26/2011
Date of Update Submission:	3/13/2012
Currency of Data:	12/31/2011
FRN:	0009596883
Type of data submitted:	Address Table
Census Block Count:	3870
Total Matched Address Points Count:	63765
Unmatched Address Points:	4183
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 59443
  - Number unmatched: 8505
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 3282
  - Number unmatched: 5223
- Unmatched addresses are geocoded to Maryland center line address locator
  - Number matched: 1040
  - Number unmatched: 4183
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- Provider submitted 92 addresses with Category of End User of 3 - Small Business. The SBDD data model does not allow this code for addresses; the 92 addresses were changed to 5 – Other.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	3870	100%

Max Upload Category	Count	% of Blocks
3	3611	93%
4	259	7%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
7	3870	100%

Typical Upload Category	Count	% of Blocks
3	3870	100%

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	31	15%
3	8	4%
4	17	8%
5	104	49%
6	39	18%
7	13	6%
9	1	0%

Speed Test Upload Tier	Count	% of Tests
1	1	0%
2	192	90%
3	17	8%
4	3	1%

Speed tests match reported typical download speeds or are within 1 speed tier: No

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 10/3870 (< 1%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: 128/3870 (3.3%)
Number of tracts reported to FCC, but no census blocks reported to project: 5

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
2/3870 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number or census blocks with dead zones reported via mdbroadbandmap.org: 7/3870 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 9

Web Search Verification: 87/3870 (2.2%) of census blocks were confirmed using online search feature of given provider

Atlantic Broadband WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	1496	100%
Result is yes and census block is in served area	87	6%
Result is yes but not in a census block reported as served	116	8%
Result is no and census block is in served area	2	0%
Result is no and census block not served area	1289	86%

Census blocks that are outside providers own Cable Franchise Boundary: 1255/3870 (32.4%)

Census blocks that fall within another provider's Cable Franchise Boundary: 266/3870 (6.9%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Bay Country Communications, Inc.

DBA Name: Bay Country Communications, Inc.

Data Characteristics

Date of Original Submission:	8/9/2010
Date of Update Submission:	1/17/2012
Currency of Data:	12/31/2011
FRN:	0020136552
Type of data submitted:	Census Block Table
Census Block Count:	1841
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Join the provided census block table to the 2010 census blocks based on the 2000 block name field
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	1841	100%

Max Upload Category	Count	% of Blocks
7	1841	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
4	1841	100%

Typical Upload Category	Count	% of Blocks
2	1841	100%

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	2	100%

Speed Test Upload Tier	Count	% of Tests
2	2	100%

Speed tests match reported typical download speeds or are within 1 speed tier: Yes

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/1841 (0%)

Form 477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
1/1841 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org:
1/1841 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: N/A

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary:
1439/1841 (78.2%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Believe Wireless, LLC.
DBA: Believe Wireless Broadband

Data Characteristics

Date of Original Submission:	3/1/2011
Date of Update Submission:	3/22/2012
Currency of Data:	12/31/2011
FRN:	9999
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Spectrum not provided
  - Spectrum selected by comparing similar providers and choosing the most likely option
- Use raster analysis to extract coverage area from map
- Repair Geometry on coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Simplify Polygon of coverage area
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Speed Domains:

- Maximum Advertized Speeds changed
  - Reported speeds exceed domain – changed from tier 11 to 7

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
6	1	100%

Max Upload Category	Count	% of Area
6	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
6	1	100%

Typical Upload Category	Count	% of Area
6	1	100%

Typical down/upload speed from 2010 mobile speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
15/237(6.2%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
7/203 (3.4%)

Web Search Verification: N/A

Wireless Verification: N/A

Bloosurf

DBA: Bloosurf

Data Characteristics

Date of Original Submission:	2/28/2011
Date of Update Submission:	3/18/2012
Currency of Data:	12/31/2011
FRN:	0019496462
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Digitize coverage area from map
- Repair Geometry on coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
3	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 mobile speed test: N/A

Speed tests match reported typical speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
5/237 (2%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
1/203 (.5%)

Web Search Verification: N/A

Wireless Verification: N/A

Broadstripe, LLC

DBA Name: Broadstripe, LLC

Data Characteristics

Date of Original Submission:	4/14/2010
Date of Update Submission:	1/31/2012
Currency of Data:	12/31/2011
FRN:	0003773843
Type of data submitted:	Address Table
Census Block Count:	2949
Total Matched Address Points Count:	107378
Unmatched Address Points:	100
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 103647
  - Number unmatched: 840
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 636
  - Number unmatched: 204
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 636
  - Number unmatched: 204
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- Removed 2 addresses from data set – address out of provider area
    - Milford, MI
    - Cecil County, MD

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	2949	100%

Max Upload Category	Count	% of Blocks
4	2949	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	3	5%
4	1	2%
5	10	18%
6	17	31%
7	20	36%
8	1	2%
9	2	4%
10	1	2%

Speed Test Upload Tier	Count	% of Tests
1	3	5%
2	4	7%
3	5	9%
4	43	78%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/2949 (0%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 8/2949 (<1%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/2949 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org: 1/2949 (<1%)

Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: 17/2949 (1%) of census blocks were confirmed using online search feature of given provider

Broadstripe WebSearch Verification Table	**Count**	**Percentage**
Total # of sample points	1496	
Number of sample points with results	85	6%
Result is yes and census block is in served area	17	20%
Result is yes but not in a census block reported as served	15	18%
Result is no and census block is in served area	0	0%
Result is no and census block not served area	53	62%

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: 2773/2949 (94%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Broadview Networks Holdings, Inc.

DBA Name: Broadview Networks Holdings, Inc.

Data Characteristics

Date of Original Submission:	2/24/2010
Date of Update Submission:	3/19/2012
Currency of Data:	12/31/2011
FRN:	0010296853
Type of data submitted:	Address Table
Census Block Count:	600
Total Matched Address Points Count:	797
Unmatched Address Points:	10
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
    - Number matched: 786
    - Number unmatched: 23
- Unmatched address are geocoded to Maryland Property View address locator
    - Number matched: 12
    - Number unmatched: 11
- Unmatched address are geocoded to Maryland street centerline address locator
    - Number matched: 1
    - Number unmatched: 10
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
    - Export results for each technology of transmission
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- Dropped 32 blocks reported by provider that do not meet broadband speeds

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	20	3%
4	496	81%
5	84	14%
6	11	2%

Max Upload Category	Count	% of Blocks
2	37	6%
3	33	5%
4	459	75%
5	72	12%
6	10	2%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	1	100%

Speed Test Upload Tier	Count	% of Tests
3	1	100%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 2/600 (<1%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: 45/600 (7.5%)
Number of tracts reported to FCC, but no census blocks reported to project: 54

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/600 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 2/600 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 2

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 111/600 (19%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Brookwood Ventures LLC

DBA Name: Brookwood Ventures LLC

Data Characteristics

Date of Original Submission:	3/12/2010
Date of Update Submission:	3/7/2012
Currency of Data:	12/31/2011
FRN:	0010296853
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Perform Topology on coverage area
    - Rule: Coverage area should not overlap
    - Load coverage area into the NTIA data model
        - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
3	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 mobile speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 2/2 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/2 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov: 1/237 (0.4%)
Number of dead zones reported within coverage area via mdbroadbandmap.org: 0/203 (0%)

Web Search Verification: N/A

Wireless Verification: N/A

Cavalier Telephone Mid-Atlantic, LLC

DBA Name: Cavalier Telephone Mid-Atlantic, LLC

Data Characteristics

Date of Original Submission:	3/10/2010
Date of Update Submission:	N/A
Currency of Data:	6/30/2011
FRN:	0015799133
Type of data submitted:	Census Block Table, Middle Mile
Census Block Count:	6858
Total Matched Address Points Count:	10263
Unmatched Address Points:	34
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 10212
  - Number unmatched: 85
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 42
  - Number unmatched: 43
- Unmatched addresses are geocoded to Maryland center line address locator
  - Number matched: 9
  - Number unmatched: 34
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- 6342 blocks with technology of transmission 10 exceed domain speed
  - changed to MAXADUP speed tier 7
- Provider did not submit elevation for middle mile. Check submission script does not allow a Null elevation or -9999 default value - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
8	7015	100%

Max Upload Category	Count	% of Area
8	7015	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	36	23%
3	23	14%
4	31	19%
5	37	23%
6	22	14%
7	7	4%
8	2	1%
10	1	1%

Speed Test Upload Tier	Count	% of Tests
1	14	9%
2	98	62%
3	38	24%
4	1	1%
5	3	2%
6	2	1%
7	3	2%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 16/6856 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 60/6856 (1%)
Number of tracts reported to FCC, but no census blocks reported to project: 79

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 9/6856 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 13

Number of census blocks with dead zones reported via mdbroadbandmap.org: 4/6856 (< 1%)

Total number of dead zones reported per provider via mdbroadbandmap.org: 4

Web Search Verification: 20/6856 (1%) of census blocks were confirmed using online search feature of given provider

Cavalier WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	432	29%
Result is yes and census block is in served area	20	5%
Result is yes but not in a census block reported as served	47	11%
Result is no and census block is in served area	26	6%
Result is no and census block not served area	339	78%

Census blocks that are outside DSL boundary: 263/6856 (4%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Cellco Partnership and its Affiliated Entities

DBA Name: Verizon Wireless

Data Characteristics

Date of Original Submission:	3/8/2010
Date of Update Submission:	2/14/2012
Currency of Data:	12/31/2011
FRN:	0003290673
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	3	75%
7	1	25%

Max Upload Category	Count	% of Area
2	3	75%
5	1	25%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	3	75%
6	1	25%

Typical Upload Category	Count	% of Area
2	3	75%
5	1	25%

Typical down/upload speed from 2010 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	597	6%
3	553	6%
4	1108	12%
5	1180	13%
6	1599	17%
7	4127	44%
8	162	2%
10	1	0%

Speed Test Upload Tier	Count	% of Tests
1	353	4%
2	1395	15%
3	460	5%
4	1321	14%
5	2768	30%
6	1218	13%
7	1803	19%
8	9	0%

Speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 9253/9327 (99.2%)
Number of mobile speed tests reported outside coverage area: 74/9327 (0.8%)

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	225	57%
3	122	31%
4	45	11%
5	1	0%

Speed Test Upload Tier	Count	% of Tests
1	120	31%
2	270	69%
3	2	1%
4	1	0%

Speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 385/393 (98%)
Number of computer based speed tests reported outside coverage area: 8/393 (2%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
214/237 (90.3%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
189/203 (93.1%)

Web Search Verification: N/A

Wireless Verification:

Verizon Wireless Verification Table - 3G	Count	Percentage
Total # of sample points	1486	
Number of sample points within coverage area	1225	
Total number of sample points with results	1334	
Verified served AND within reported coverage area (yes,yes)	1161	
Verified served AND found outside reported coverage area (yes,no)	173	13.0%
Verified unserved AND found within reported coverage area (no,yes)	64	5.2%
Verified unserved AND found outside reported coverage area (no,no)	88	
Total error	237	15.9%

*for three different spectrums the results were identical

Verizon Wireless Verification Table - 4G	Count	Percentage
Total # of sample points	1486	
Number of sample points with expected 4G results	283	
Total number of sample points with 4G results	274	
Verified 4G AND within reported coverage area (yes,yes)	214	
Verified 4G AND found outside reported coverage area (yes,no)	60	21.9%
Verified not 4G AND found within reported coverage area (no,yes)	69	24.4%
Verified not 4G AND found outside reported coverage area (no,no)	1143	
Total error	129	8.7%

*4G service defined as average down speed of > 2000 bps

CHARTER COMMUNICATIONS INC.

DBA Name: CHARTER COMMUNICATIONS INC.

Data Characteristics

Date of Original Submission:	3/31/2010
Date of Update Submission:	1/17/2012
Currency of Data:	12/31/2011
FRN:	0017179383
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	421
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the provided census block table to the 2010 census blocks based on the 2010 block name field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	421	100%

Max Upload Category	Count	% of Blocks
3	421	100%

Road Segments

Max Download Category	Count	% of Road Segments
7	49	100%

Max Upload Category	Count	% of Road Segments
3	49	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
7	421	100%

Typical Upload Category	Count	% of Blocks
3	421	100%

Road Segments

Typical Download Category	Count	% of Road Segments
7	49	100%

Typical Upload Category	Count	% of Road Segments
3	49	100%

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
4	3	50%
5	2	33%
7	1	17%

Speed Test Upload Tier	Count	% of Tests
2	3	50%
3	3	50%

Speed tests match reported typical download speeds or are within 1 speed tier: No

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/421 (0%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: 2/421 (1%) of census blocks were confirmed using online search feature of given provider

Charter WebSearch Verification Table	**Count**	**Percentage**
Total # of sample points	1496	
Number of sample points with results	55	4%
Result is yes and census block is in served area	2	4%

Result is yes but not in a census block reported as served	0	0%
Result is no and census block is in served area	3	5%
Result is no and census block not served area	50	91%

Census blocks that are outside providers own Cable Franchise Boundary: 208/421 (49%)

Census blocks that fall within another provider's Cable Franchise Boundary: 0/421 (0%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Clearwire Corporation

DBA Name: Clearwire Corporation

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	1/17/2012
Currency of Data:	12/31/2011
FRN:	0017775628
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
1	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
5	1	100%

Typical Upload Category	Count	% of Area
4	1	100%

Typical down/upload speed from 2010 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	36	14%
3	83	31%
4	91	34%
5	48	18%
6	5	2%
7	2	1%

Speed Test Upload Tier	Count	% of Tests
1	15	6%
2	106	40%
3	142	54%
7	2	1%

Speed tests match reported typical download speeds or are within 1 speed tier: Yes

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 209/265 (78.9%)
Number of mobile speed tests reported outside coverage area: 56/265 (21.1%)

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	7	8%
3	11	13%
4	19	23%
5	35	42%
6	10	12%
7	2	2%

Speed Test Upload Tier	Count	% of Tests
1	2	2%
2	22	26%
3	60	71%

Speed tests match reported typical download speeds or are within 1 speed tier: Yes

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 81/84 (96.4%)
Number of computer based speed tests reported outside coverage area: 3/84 (3.6%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
38/237 (16%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
11/203 (5.4%)

Web Search Verification: N/A
Wireless Verification: N/A

Cogent Communications Group

DBA Name: Cogent Communications Group

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	1/26/2012
Currency of Data:	6/30/2011
FRN:	0019066034
Type of data submitted:	Address Table, Middle Mile
Census Block Count:	3
Total Matched Address Points Count:	3
Unmatched Address Points:	3
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US streets address locator
  - Number matched: 3
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modifications:

- Provider did not submit elevation for middle mile. Check submission script does not allow a Null elevation or -9999 default value - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Max Download Category	Count	% of Blocks
11	3	100%

Max Upload Category	Count	% of Blocks
11	3	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	1	8%
3	2	15%
4	1	8%
6	8	62%
8	1	8%

Speed Test Upload Tier	Count	% of Tests
2	1	8%
3	2	15%
6	7	54%
7	3	23%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 8/3 (> 100%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 3
Number of tracts reported to FCC, but no census blocks reported to project: 3

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Comcast Corporation

DBA Name: Comcast Cable Communications, LLC

Data Characteristics

Date of Original Submission:	1/19/2010
Date of Update Submission:	2/21/2012
Currency of Data:	12/31/2011
FRN:	0004441663
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	52689
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Create beginning and ending road segment addresses for all submitted road segments by concatenating the address number, street direction, street name, street type.
- Remove any duplicate addresses and those with no address number.
- Address-match those road segment addresses against the ArcGIS US Streets geocoding service to create beginning/ending road segment points
- Select those TIGER line segments that are within 10 m of a segment point location
- Spatial join the points to the TIGER lines so that the Technology of Transmission and Speed Tiers are attached to the appropriate line segment.
- Select just those line segments that intersect the census blocks that are greater than 2 square miles
  - Export results
  - Load exported results into the NTIA data model

- Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	4	0%
10	52685	100%

Max Upload Category	Count	% of Blocks
7	52689	100%

Road Segments

Max Download Category	Count	% of Blocks
10	1347	100%

Max Upload Category	Count	% of Blocks
7	1347	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	63	1%
3	144	3%
4	117	2%
5	450	8%
6	734	13%
7	3737	66%
8	372	7%
9	41	1%
10	13	0%

Speed Test Upload Tier	Count	% of Tests
1	36	1%
2	183	3%
3	292	5%
4	1101	19%
5	3841	68%
6	192	3%
7	26	0%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 349/52689 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 1108/52689 (2.1%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 83/52689 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 118

Number of census blocks with dead zones reported via mdbroadbandmap.org:
53/52689 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 70

Web Search Verification:
380/52689 (1%) of census blocks were confirmed using online search feature of given provider

Comcast WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	797	53%
Result is yes and census block is in served area	380	48%
Result is yes but not in a census block reported as served	0	0%
Result is no and census block is in served area	206	26%
Result is no and census block not served area	210	26%

Census blocks that are outside providers own Cable Franchise Boundary: 6669/52689 (13%)

Census blocks that fall within another provider's Cable Franchise Boundary: 295/52689 (.6%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: 3969 census block **increase**

DIECA Communications, Inc.

DBA: Covad Communication Company

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	3/6/2012
Currency of Data:	12/31/2011
FRN:	0003753753
Type of data submitted:	Census Block Table, Road Segments, Middle Mile
Census Block Count:	73662
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Incomplete
Provided Max Typical Upload Speed:	Incomplete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Modification:

- Provider submitted 4,383 census blocks with a Maximum Advertised Download Speed at speed tier 7 - check submission script returns WARNING statement. Maryland checked with provider - provider confirms speeds.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	8288	5%
4	23273	14%
5	81225	50%
6	23946	15%
7	22623	14%
8	2013	1%

Max Upload Category	Count	% of Blocks
2	18726	12%
3	36026	22%
4	15256	9%
5	70118	43%
6	989	1%
7	18240	11%
8	2013	1%

Road Segments

Max Download Category	Count	% of Road Segments
3	7	0%
4	195	10%
5	1647	84%
6	98	5%
7	22	1%

Max Upload Category	Count	% of Road Segments
2	88	4%
3	103	5%
4	168	9%
5	1588	81%
7	22	1%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
NULL	7390	5%
3	9947	6%
4	37634	23%
5	79560	49%
6	6000	4%
7	18824	12%
8	2013	1%

Typical Upload Category	Count	% of Blocks
2	48259	30%
3	7525	5%
4	26527	16%
5	57815	36%
6	1942	1%
7	17287	11%
8	2013	1%

Road Segments

Typical Download Category	Count	% of Road Segments
	0	0%
3	27	1%
4	251	13%
5	1662	84%
7	22	1%

Typical Upload Category	Count	% of Road Segments
2	191	10%
4	192	10%
5	1564	79%
7	22	1%

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	9	11%
3	42	51%
4	23	28%
5	4	5%
6	2	2%
7	3	4%

Speed Test Upload Tier	Count	% of Tests
1	22	27%
2	33	40%
3	17	20%
4	8	10%
5	3	4%

Speed tests match reported typical speeds or are within 1 speed tier: No

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/73662 (0%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC:
8353/73662 (11.3%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
60/73662 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 75

Number of census blocks with dead zones reported via mdbroadbandmap.org:
31/73662 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 40

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 17955/73662 (24.4%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: 1706 census block **increase**

DSLnet Communications, LLC

DBA Name: DSLnet Communications, LLC

Data Characteristics

Date of Original Submission:	3/11/2010
Date of Update Submission:	N/A
Currency of Data:	6/30/2011
FRN:	0004324857
Type of data submitted:	Address Table
Census Block Count:	171
Total Matched Address Points Count:	595
Unmatched Address Points:	6
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 592
  - Number unmatched: 9
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 1
  - Number unmatched: 8
- Unmatched address are geocoded to Maryland centerline address locator
  - Number matched: 2
  - Number unmatched: 6
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results for each technology of transmission
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- Removed 301 addresses from provider submission that do not meet broadband speeds
- Removed 1 address from provider submission reported with no technology of transmission

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	104	61%
4	67	39%

Max Upload Category	Count	% of Blocks
3	104	61%
4	67	39%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test: N/A

Speed tests match reported typical speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 6/171 (3.5%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

DSLnet, Inc

DBA: **DSLnet, Inc**

Data Characteristics

Date of Original Submission:	3/11/2010
Date of Update Submission:	N/A
Currency of Data:	6/30/2011
FRN:	0015321136
Type of data submitted:	Addresses
Census Block Count:	30
Total Matched Address Points Count:	63
Unmatched Address Points:	0
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 63
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- Removed 31 addresses from provider submission that do not meet broadband speeds

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	13	42%
4	17	55%
8	1	3%

Max Upload Category	Count	% of Blocks
3	13	42%
4	17	55%
8	1	3%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0
Number of tracts reported to FCC, but no census blocks reported to project: 192

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 11/30 (36.7%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Easton Utilities Commission

DBA Name: **Easton Utilities Commission**

* Easton Utilities Commission provides wireline and wireless service

Data Characteristics

Date of Original Submission:	2/5/2010
Date of Update Submission:	1/27/2012
Currency of Data:	12/31/2011
FRN:	0003793726
Type of data submitted:	Addresses, Coverage Area
Census Block Count:	530
Total Matched Address Points Count:	4687
Unmatched Address Points:	3
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Wireline Data Processing

Address Table Process:

- Geocode address table to ESRI address locator
  - Number matched: 4316
  - Number unmatched: 374
- Unmatched address are geocoded to MDPV address locator
  - Number matched: 367
  - Number unmatched: 7
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 4
  - Number unmatched: 3
- Merge matched addresses
- Spatially join address points to 2000 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:
- Join the switched selection (BB_Service_Address) address points to the 2000 census blocks based on the BLK2000 field
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:
- 258 blocks with Technology of Transmission 41 Maximum Advertised Up speed does not fit domain - changed to speed tier 2. Provider was informed of this issue and approved change.

<u>Wireline Data Verification</u>

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	275	52%
5	255	48%

Max Upload Category	Count	% of Blocks
2	501	95%
3	24	5%
4	5	1%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 <u>computer based</u> speed test:

Speed Test Download Tier	Count	% of Tests
0	4	4%
3	11	11%
4	9	9%
5	57	56%
6	19	19%
7	1	1%

Speed Test Upload Tier	Count	% of Tests
1	12	12%
2	57	56%
3	29	29%
4	2	2%
6	1	1%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/530 (0%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 7/530 (1.3%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside providers own Cable Franchise Boundary: 8/530 (1.5%)

Census blocks that fall within another provider's Cable Franchise Boundary: 3/530 (<1%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

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Wireless Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Wireless Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	1	8%
3	1	8%
4	1	8%
5	5	42%
6	2	17%
7	2	17%

Speed Test Upload Tier	Count	% of Tests
2	8	67%
3	2	17%
5	2	17%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 0/12 (0%)
Number of mobile speed tests reported outside coverage area: 12/12 (100%)

Typical down/upload speed from 2010 computer based speed test:

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of computer based speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 10/101 (10%)
Number of mobile speed tests reported outside coverage area: 91/101 (90%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 3/5 (60%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 2/5 (40%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
0/237 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
2/203 (1%)

Web Search Verification: N/A

Wireless Verification: N/A

FiberLight LLC

DBA Name: FiberLight LLC

Data Characteristics

Date of Original Submission:	3/31/2010
Date of Update Submission:	3/13/2012
Currency of Data:	12/31/2011
FRN:	0014117139
Type of data submitted:	Census Block Table
Census Block Count:	1128
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Join census block table to the 2010 census blocks based on the GEOID10 field
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	1128	100%

Max Upload Category	Count	% of Blocks
10	1128	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Freedom Wireless Broadband, LLC

DBA Name: Freedom Wireless Broadband, LLC

Data Characteristics

Date of Original Submission:	1/28/2010
Date of Update Submission:	2/23/2012
Currency of Data:	12/31/2011
FRN:	0018643155
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	100%

Max Upload Category	Count	% of Area
4	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 mobile speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 13/13 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/13 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
10/237 (4.2%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
5/203 (2.5%)

Web Search Verification: N/A

Wireless Verification: N/A

Gans Communications, LP

DBA: **MetroCast Communications**

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	3/19/2012
Currency of Data:	12/31/2011
FRN:	0016642761
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	2467
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Road segments are 2009 geometry
- Join road segments to TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	2467	100%

Max Upload Category	Count	% of Blocks
4	2467	100%

Road Segments

Max Download Category	Count	% of Segments
7	800	100%

Max Upload Category	Count	% of Segments
4	800	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
6	2467	100%

Typical Upload Category	Count	% of Blocks
2	2467	100%

Road Segments

Typical Download Category	Count	% of Segments
7	800	100%

Typical Upload Category	Count	% of Segments
2	800	100%

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	3	7%
4	9	20%
5	10	22%
6	21	47%
7	2	4%

Speed Test Upload Tier	Count	% of Tests
1	18	40%
2	24	53%
3	2	4%
4	1	2%

Speed tests match reported typical download speeds or are within 1 speed tier: Yes

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/2467 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
6/2467 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 7

Number of census blocks with dead zones reported via mdbroadbandmap.org:
6/2467 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 7

Web Search Verification: 36/2467 (2%) of census blocks were confirmed using online search feature of given provider

MetroCast Web Search Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	107	7%
Result is yes and census block is in served area	36	34%
Result is yes but not in a census block reported as served	20	19%
Result is no and census block is in served area	1	1%
Result is no and census block not served area	50	47%

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: 1094/2467 (44%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

HNS License Sub, LLC

DBA: **Hughes Communications, Inc.**

Data Characteristics

Date of Original Submission:	2/2/2010
Date of Update Submission:	3/7/2012
Currency of Data:	12/31/2011
FRN:	0018483073
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider:

Typical Download Category	Count	% of Area
3	1	100%

Typical Upload Category	Count	% of Area
2	1	100%

Typical down/upload speed from 2010 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	23	70%

Speed Test Upload Tier	Count	% of Tests
1	10	30%

3	8	24%
4	1	3%
5	1	3%

2	10	30%
4	5	15%
5	6	18%
7	2	6%

Speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 33/33 (100%)
Number of computer based speed tests reported outside coverage area: 0/33 (0%)

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	9	13%
3	34	51%
6	8	12%
7	10	15%
8	5	7%
9	1	1%

Speed Test Upload Tier	Count	% of Tests
1	18	27%
2	27	40%
3	2	3%
4	3	4%
5	4	6%
6	8	12%
7	4	6%
8	1	1%

Speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of computer based speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 67/67 (100%)
Number of mobile speed tests reported outside coverage area: 0/67 (0%)

Form477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 295/295 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/295 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
237/237 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
203/203 (100%)

Web Search Verification: N/A

Wireless Verification: N/A

Hotwire Communications, Ltd

DBA Name: Hotwire Communications, Ltd

Data Characteristics

Date of Original Submission:	2/19/2010
Date of Update Submission:	1/17/2012
Currency of Data:	12/31/2011
FRN:	0009846494
Type of data submitted:	Addresses
Census Block Count:	1
Total Matched Address Points Count:	1
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 1
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2000 census blocks based on the GEOID10 field
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
5	1	100%

Max Upload Category	Count	% of Blocks
3	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 1/1 (100%)
Number of tracts reported to FCC, but no census blocks reported to project: 1

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: 1/1 (100%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Leap Wireless International, Inc
DBA: Cricket Communications

Data Characteristics

Date of Original Submission:	3/17/2010
Date of Update Submission:	3/9/2012
Currency of Data:	12/31/2011
FRN:	0002963528
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 mobile speed test: N/A

Speed tests match reported typical speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
105/237 (44.3%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
69/203 (34%)

Web Search Verification: N/A

Wireless Verification:

Cricket Wireless Verification Table - 3G	Count	Percentage
Total # of sample points	1486	
Number of sample points within coverage area	446	
Total number of sample points with results	489	
Verified served AND within reported coverage area (yes,yes)	356	
Verified served AND found outside reported coverage area (yes,no)	133	27.2%
Verified unserved AND found within reported coverage area (no,yes)	90	20.2%
Verified unserved AND found outside reported coverage area (no,no)	907	
Total error	223	15.0%

Level 3 Communications, LLC

DBA Name: Level 3 Communications, LLC

Data Characteristics

Date of Original Submission:	1/18/2010
Date of Update Submission:	3/7/2012
Currency of Data:	12/31/2011
FRN:	0003723822
Type of data submitted:	Address Table
Census Block Count:	170
Total Matched Address Points Count:	210
Unmatched Address Points:	5
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 196
  - Number unmatched: 19
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 9
  - Number unmatched: 10
- Unmatched address are geocoded to Maryland centerline address locator
  - Number matched: 5
  - Number unmatched: 5
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:
- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modifications:
- Provider did not submit elevation for middle mile. SBDD check submission script does not allow a Null elevation or -9999 default value - elevation changed to 0.
- Provider did not submit owned/leased information for middle mile and SBDD check submission script does not allow Null field. Maryland calculated field to "Leased" as default.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
11	170	100%

Max Upload Category	Count	% of Blocks
11	170	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
11	129	100%

Typical Upload Category	Count	% of Blocks
11	129	100%

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	39	37%
3	21	20%
4	7	7%
5	7	7%
6	5	5%
7	10	10%
8	12	11%
9	3	3%
10	1	1%

Speed Test Upload Tier	Count	% of Tests
1	20	19%
2	28	27%
3	20	19%
4	11	10%
5	3	3%
6	13	12%
7	7	7%
8	3	3%

Speed tests match reported typical download speeds or are within 1 speed tier: No

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 56/170 (33%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 79/170 (46.5%)
Number of tracts reported to FCC, but no census blocks reported to project: 48

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/170 (.5%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Mediacom Communications

DBA: Mediacom Maryland LLC

Data Characteristics

Date of Original Submission:	8/4/2011
Date of Update Submission:	2/13/2012
Currency of Data:	12/31/2011
FRN:	0003572633
Type of data submitted:	Addresses
Census Block Count:	551
Total Matched Address Points Count:	11445
Unmatched Address Points:	227
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 11274
  - Number unmatched: 399
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 97
  - Number unmatched: 302
- Unmatched addresses are geocoded to Maryland center line address locator
  - Number matched: 75
  - Number unmatched: 227
- Merge matched addresses
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- Removed 1 address from provider submission – out of service area bounds

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	551	100%

Max Upload Category	Count	% of Blocks
3	551	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
7	551	100%

Typical Upload Category	Count	% of Blocks
3	551	100%

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
4	8	20%
5	4	10%
6	10	25%
7	18	45%

Speed Test Upload Tier	Count	% of Tests
2	4	10%
3	28	70%
4	6	15%
5	2	5%

Speed tests match reported typical download speeds or are within 1 speed tier: Yes

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/551 (0%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 2/551 (<1%)
Number of tracts reported to FCC, but no census blocks reported to project: 1

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/551 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 3

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: 11/551 (1.9%) of census blocks were confirmed using online search feature of given provider

Mediacom WebSearch Verification Table	**Count**	**Percentage**
Total # of sample points	1496	
Number of sample points with results	85	6%
Result is yes and coverage area is in served area	11	13%

Result is yes but not in a coverage area reported as served	17	20%
Result is no and coverage area is in served area	3	4%
Result is no and coverage area is not in served area	54	64%

Census blocks that are outside providers own Cable Franchise Boundary: 224/551 (40.7%)

Census blocks that fall within another provider's Cable Franchise Boundary: 69/551 (12.5%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: 14 census block **increase**

MegaPath, Inc.

DBA Name: MegaPath

Data Characteristics

Date of Original Submission:	3/11/2010
Date of Update Submission:	N/A
Currency of Data:	6/30/2011
FRN:	0018105601
Type of data submitted:	Address Table
Census Block Count:	68
Total Matched Address Points Count:	85
Unmatched Address Points:	1
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
    - Number matched: 82
    - Number unmatched: 2
- Unmatched address are geocoded to Maryland Property View address locator
    - Number matched: 2
    - Number unmatched: 2
- Unmatched addresses are geocoded to Maryland center line address locator
    - Number matched: 1
    - Number unmatched: 1
- Merge matched addresses
- Spatially join address points to 2000 census blocks
- Separate and export the address points according to technology of transmission
- Select by location the address points that are completely within a greater than two square mile census block
    - Export as address points to be loaded into the NTIA data model
        - Result: BB_Service_Address
    - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results for each technology of transmission
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- Removed 12 addresses from provider submission for not having a Maximum Advertised Upload Speed
- 30 census blocks with Technology of Transmission 20 speed changed to tier 3 to fit domain

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	65	94%
4	3	4%
5	1	1%

Max Upload Category	Count	% of Blocks
2	28	41%
3	40	58%
5	1	1%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	5	63%
3	2	25%
10	1	13%

Speed Test Upload Tier	Count	% of Tests
1	2	25%
2	4	50%
3	1	13%
5	1	13%

Speed tests match reported typical speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 6/68 (9%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 1/68 (1%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Mountain Communications, LLC
DBA: ProCom

Data Characteristics

Date of Original Submission:	5/31/2010
Date of Update Submission:	N/A
Currency of Data:	5/31/2010
FRN:	0008039323
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	161
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Road segments are 2009 geometry
- Join road segments to TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	161	100%

Max Upload Category	Count	% of Blocks
10	161	100%

Road Segments

Max Download Category	Count	% of Blocks
10	95	100%

Max Upload Category	Count	% of Blocks
10	161	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Neon Connect, Inc
DBA: Sidera Networks

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	2/14/2012
Currency of Data:	12/31/2011
FRN:	0005052741
Type of data submitted:	Addresses, Middle Mile
Census Block Count:	1
Total Matched Address Points Count:	1
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:
- Geocode address table to ESRI US Streets address locator
  - Number matched: 1
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:
- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modifications:
- Provider did not submit elevation for middle mile. Check submission script does not allow a Null elevation or -9999 default value - elevation changed to 0.

<u>Data Verification</u>

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	1	100%

Max Upload Category	Count	% of Blocks
10	1	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
10	1	100%

Typical Upload Category	Count	% of Blocks
10	1	100%

Typical down/upload speed from 2010 computer based speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

New Edge Holding Company

DBA Name: New Edge Network, Inc

Data Characteristics

Date of Original Submission:	1/22/2010
Date of Update Submission:	N/A
Currency of Data:	6/30/2011
FRN:	0003720471
Type of data submitted:	Address Table
Census Block Count:	275
Total Matched Address Points Count:	371
Unmatched Address Points:	0
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI address locator
  - Number matched: 335
  - Number unmatched: 2
- Unmatched address are geocoded to MDPV address locator
  - Number matched: 1
  - Number unmatched: 1
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 1
  - Number unmatched: 1
- Merge matched addresses
- Spatially join address points to 2100 census blocks
- Separate and export the address points according to technology of transmission Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the BLK2000 field
    - Export results (for each technology of transmission)
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- Provider submitted 3 locations with a technology 40, Cable Modem - DOCSIS 3.0 Down. This technology is regarded as an error as all other locations are served by DSL technologies and were removed from the submission.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	58	20%
4	216	73%
5	20	7%
7	1	0%

Max Upload Category	Count	% of Blocks
2	167	57%
3	80	27%
4	47	16%
7	1	0%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
3	58	20%
4	216	73%
5	20	7%
7	1	0%

Typical Upload Category	Count	% of Blocks
2	167	56%
3	80	28%
4	47	16%
7	1	0%

Typical down/upload speed from 2010 computer based speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 74/275 (27%)
Number of tracts reported to FCC, but no census blocks reported to project: 39

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 45/275 (16%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

NTELOS Inc

DBA Name: NTELOS

Data Characteristics

Date of Original Submission:	2/3/2012
Date of Update Submission:	2/3/2012
Currency of Data:	12/31/2011
FRN:	0005849518
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 mobile speed test:

Speed Test Download Tier	Count	% of Tests
3	1	100%

Speed Test Upload Tier	Count	% of Tests
2	1	100%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 0/1 (0%)
Number of mobile speed tests reported outside coverage area: 1/1 (100%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
2/237 (0.8%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
2/203 (1%)

Web Search Verification: N/A

Wireless Verification: N/A

PAETEC Communications, Inc.

DBA Name: PAETEC Communications, Inc.

Data Characteristics

Date of Original Submission:	2/28/2011
Date of Update Submission:	N/A
Currency of Data:	12/31/2011
FRN:	0011017795
Type of data submitted:	Address Table
Census Block Count:	301
Total Matched Address Points Count:	373
Unmatched Address Points:	4
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 359
  - Number unmatched: 18
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 9
  - Number unmatched: 9
- Unmatched address are geocoded to Maryland centerline address locator
  - Number matched: 5
  - Number unmatched: 4
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- 52 blocks with Technology of Transmission 30 exceed Maximum Advertised Down and Maximum Advertised Up speed domain (delivered as tier 11)
    - Changed to speed tier 8 to fit domain

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
11	315	100%

Max Upload Category	Count	% of Blocks
11	315	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
3	92	29%
4	223	71%

Typical Upload Category	Count	% of Blocks
3	92	29%
4	223	71%

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	3	7%
3	21	49%
4	11	26%
5	5	12%
8	3	7%

Speed Test Upload Tier	Count	% of Tests
2	6	14%
3	20	47%
4	9	21%
5	6	14%
6	1	2%
7	1	2%

Speed tests match reported typical download speeds or are within 1 speed tier: Yes

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 20/301 (7%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 17/301 (5.6%)
Number of tracts reported to FCC, but no census blocks reported to project: 74

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

QCOL, Inc.

DBA Name: QCOL

Data Characteristics

Date of Original Submission:	5/31/2010
Date of Update Submission:	3/7/2012
Currency of Data:	12/31/2011
FRN:	0019663095
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	308
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Road segments are 2009 geometry
- Join road segments to TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	205	55%

Max Upload Category	Count	% of Blocks
10	205	55%

6	167	45%

6	167	45%

Road Segments

Max Download Category	Count	% of Segments
10	27	56%
6	21	44%

Max Upload Category	Count	% of Segments
10	27	56%
6	21	44%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
4	1	25%
5	2	50%
6	1	25%

Speed Test Upload Tier	Count	% of Tests
2	1	25%
3	2	50%
5	1	25%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/308 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 2/308 (0.6%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: 272/308 (88.3%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Shentel Cable Company

DBA: **Shentel Cable Company**

Data Characteristics

Date of Original Submission:	5/31/2010
Date of Update Submission:	3/8/2012
Currency of Data:	12/31/2011
FRN:	0013962170
Type of data submitted:	Census Blocks, Road Segments
Census Block Count:	611
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join the road segment table to the 2010 Tiger Lines based on TLID field
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
9	611	100%

Max Upload Category	Count	% of Blocks
5	611	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
9	611	100%

Typical Upload Category	Count	% of Blocks
5	611	100%

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	1	2%
3	1	2%
4	7	14%
5	13	25%
7	3	6%
8	6	12%
9	9	18%
10	11	22%

Speed Test Upload Tier	Count	% of Tests
1	2	4%
2	9	18%
3	18	35%
4	22	43%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 6/611 (<1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 611
Number of tracts reported to FCC, but no census blocks reported to project: 1

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: 29 census block **increase**

Sprint Nextel Corporation

DBA Name: **Sprint**

Data Characteristics

Date of Original Submission:	2/18/2010
Date of Update Submission:	1/23/2012
Currency of Data:	12/31/2011
FRN:	0003774593
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Modifications:

- Provider did not submit elevation for middle mile. Check submission script does not allow a Null elevation or -9999 default value - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%
5	1	100%

Max Upload Category	Count	% of Area
2	1	100%
3	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	1	100%
5	1	100%

Typical Upload Category	Count	% of Area
2	1	100%
3	1	100%

Typical down/upload speed from 2010 <u>mobile speed test</u>:

Speed Test Download Tier	Count	% of Tests
0	3252	44%
3	1339	18%
4	1332	18%
5	1311	18%
6	145	2%
7	28	0%

Speed Test Upload Tier	Count	% of Tests
1	1863	25%
2	3323	45%
3	2025	27%
4	95	1%
5	48	1%
6	8	0%
7	21	0%
8	24	0%

Speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 7226/7407 (97.6%)
Number of mobile speed tests reported outside coverage area: 181/7407 (2.4%)

Typical down/upload speed from 2010 <u>computer based speed test</u>:

Speed Test Download Tier	Count	% of Tests
0	342	57%
3	229	38%
4	18	3%
5	4	1%
6	2	0%

Speed Test Upload Tier	Count	% of Tests
1	206	35%
2	376	63%
3	9	2%
4	1	0%
5	2	0%
6	1	0%

Speed tests match reported typical download speeds or are within 1 speed tier: Yes

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 581/595 (97.6%)
Number of computer based speed tests reported outside coverage area: 14/595 (2.4%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 71/71 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/71 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
186/237 (78.5%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
149/203 (73.4%)

Web Search Verification: N/A

Wireless Verification:

Sprint Wireless Verification Table - 3G	**Count**	**Percentage**
Total # of sample points	1486	
Number of sample points within coverage area	977	
Total number of sample points with results	975	
Verified served AND within reported coverage area (yes,yes)	714	
Verified served AND found outside reported coverage area (yes,no)	261	26.8%
Verified unserved AND found within reported coverage area (no,yes)	263	26.9%
Verified unserved AND found outside reported coverage area (no,no)	248	
Total error	524	35.3%

Sprint Wireless Verification Table - 4G	**Count**	**Percentage**
Total # of sample points	1486	
Number of sample points with expected 4G results	136	
Total number of sample points with 4G results	16	
Verified 4G AND within reported coverage area (yes,yes)	10	
Verified 4G AND found outside reported coverage area (yes,no)	6	37.5%
Verified not 4G AND found within reported coverage area (no,yes)	126	92.6%
Verified not 4G AND found outside reported coverage area (no,no)	1344	
Total error	132	8.9%

*4G service defined as average down speed of > 2000 bps

StarBand Communications Inc.

DBA Name: StarBand Communications Inc.

Data Characteristics

Date of Original Submission:	1/26/2010
Date of Update Submission:	1/19/2012
Currency of Data:	12/31/2011
FRN:	0005087457
Type of data submitted:	Coverage
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
    - Result: BB_Service_Wireless

Data Modifications: Speed Domains:

- Provider delivered Typical Upstream Speed less than speed tier 2
    - Calculated Typical Upstream speed to 2

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	1	100%

Typical Upload Category	Count	% of Area
2	1	100%

Typical down/upload speed from 2010 mobile speed test: N/A

Speed tests match reported typical speeds or are within 1 speed tier: N/A

# of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 34/34 (100.0%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/34 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
237/237 (100%)
Number of dead zones reported within coverage area via broadband.maryland.gov:
203/203 (100%)

Web Search Verification: N/A

Wireless Verification: N/A

Starpower Communications, LLC
DBA Name: **RCN & RCN Business Solutions**

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	2/24/2012
Currency of Data:	1/31/2012
FRN:	0003735016
Type of data submitted:	Address Table, Middle Mile
Census Block Count:	1764
Total Matched Address Points Count:	48953
Unmatched Address Points:	212
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 48950
  - Number unmatched: 215
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 3
  - Number unmatched: 212
- Unmatched addresses are geocoded to Maryland Centerline address locator
  - Number matched: 0
  - Number unmatched: 212
- Merge matched addresses
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modifications:

- Provider submitted technologies 40 and 41 for the same area with the same speed tier of 9. Maryland submitted the entire service area as technology 40 and speed tier 9.
- Provider did not submit elevation for middle mile. Check submission script does not allow a Null elevation or -9999 default value - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
9	1764	100%

Max Upload Category	Count	% of Blocks
6	1318	75%
7	446	25%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	1	2%
3	1	2%
4	7	14%
5	13	25%
7	3	6%
8	6	12%
9	9	18%
10	11	22%

Speed Test Upload Tier	Count	% of Tests
1	2	4%
2	9	18%
3	18	35%
4	22	43%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Error reported as proportion of total blocks submitted: 7/1764 (< 1%)

Form477 Verification:

Number of census blocks reported to project, but no tract reported to FCC: 7/1764 (<1%)

Number of tracts reported to FCC, but no census blocks reported to project: 4

Dead zones:

Number of census blocks with dead zones reported via broadband.maryland.gov: 0

Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0

Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: 4/1764 (< 1%) of census blocks were confirmed using online search feature of given provider

Starpower WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	55	4%
Result is yes and census block is in served area	4	7%
Result is yes but not in a census block reported as served	0	0%
Result is no and census block is in served area	0	0%
Result is no and census block not served area	51	93%

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: 1761/1764 (99%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: 383 census block **increase**

Tata Communications (America) Inc.

DBA Name: Tata Communications (America) Inc.

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	2/22/2012
Currency of Data:	12/31/2011
FRN:	0009480302
Type of data submitted:	Address Table
Census Block Count:	1
Total Matched Address Points Count:	1
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
    - Number matched: 1
    - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
4	1	100%

Max Upload Category	Count	% of Blocks
4	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	1	100%

Speed Test Upload Tier	Count	% of Tests
2	1	100%

Speed tests match reported typical downloaded speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/1 (100%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 0/1 (0%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

T-Mobile USA, Inc.

DBA Name: T-Mobile

Data Characteristics

Date of Original Submission:	2/25/2010
Date of Update Submission:	2/22/2012
Currency of Data:	12/31/2011
FRN:	0006945950
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	33%
6	1	33%
7	1	33%

Max Upload Category	Count	% of Area
2	1	33%
4	2	67%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	3019	36%
3	1599	19%
4	2034	24%
5	1466	18%
6	156	2%
7	31	0%

Speed Test Upload Tier	Count	% of Tests
1	1229	15%
2	3597	43%
3	2538	31%
4	848	10%
5	51	1%
6	15	0%
7	20	0%
8	7	0%

Speed tests match reported typical speeds or are within 1 speed tier: No

#/% of computer based speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 8152/8305 (98.2%)
Number of mobile speed tests reported outside coverage area: 153/8305 (1.8%)

Form477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
135/237 (57%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
78/203 (38.4%)

Web Search Verification: N/A

Wireless Verification:

TMobile Wireless Verification Table - 3G	**Count**	**Percentage**
Total # of sample points	1486	
Number of sample points within coverage area	560	
Total number of sample points with results	1334	
Verified served AND within reported coverage area (yes,yes)	485	
Verified served AND found outside reported coverage area (yes,no)	849	63.6%
Verified unserved AND found within reported coverage area (no,yes)	75	13.4%
Verified unserved AND found outside reported coverage area (no,no)	77	
Total error	924	62.2%

TMobile Wireless Verification Table - 4G (Speed 6-10)	Count	Percentage
Total # of sample points	1486	
Number of sample points with expected 4G results	402	
Total number of sample points with 4G results	120	
Verified 4G AND within reported coverage area (yes,yes)	116	
Verified 4G AND found outside reported coverage area (yes,no)	4	3.3%
Verified not 4G AND found within reported coverage area (no,yes)	286	71.1%
Verified not 4G AND found outside reported coverage area (no,no)	1080	
Total error	290	19.5%

*4G service defined as average down speed of > 2000 bps

TMobile Wireless Verification Table - 4G (Speed 10-25)	Count	Percentage
Total # of sample points	1486	
Number of sample points with expected 4G results	382	
Total number of sample points with 4G results	120	
Verified 4G AND within reported coverage area (yes,yes)	111	
Verified 4G AND found outside reported coverage area (yes,no)	9	7.5%
Verified not 4G AND found within reported coverage area (no,yes)	271	70.9%
Verified not 4G AND found outside reported coverage area (no,no)	1095	
Total error	280	18.8%

*4G service defined as average down speed of > 2000 bps

tw telecom of maryland llc

DBA Name: tw telecom of maryland llc

Data Characteristics

Date of Original Submission:	1/30/2010
Date of Update Submission:	2/21/2012
Currency of Data:	12/31/2011
FRN:	0017348202
Type of data submitted:	Address table, Middle Mile
Census Block Count:	84
Total Matched Address Points Count:	120
Unmatched Address Points:	0
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 120
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- Removed 26 records from provider data – do not meet broadband speeds
- Provider did not submit elevation for middle mile. Check submission script does not allow a Null elevation or -9999 default value - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	11	13%
4	17	20%
5	10	12%
6	2	2%
7	25	29%
8	7	8%
9	5	6%
10	5	6%
11	3	4%

Max Upload Category	Count	% of Blocks
3	11	13%
4	17	20%
5	10	12%
6	2	2%
7	25	29%
8	7	8%
9	5	6%
10	5	6%
11	3	4%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	6	40%
3	1	7%
4	3	20%
5	3	20%
7	2	13%

Speed Test Upload Tier	Count	% of Tests
1	5	33%
2	1	7%
3	1	7%
4	3	20%
5	5	33%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 6/84 (7.1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 30/84 (36%)
Number of tracts reported to FCC, but no census blocks reported to project: 11

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: 29 census block **increase**

United States Cellular Corporation

DBA Name: US Cellular

Data Characteristics

Date of Original Submission:	2/2/2012
Date of Update Submission:	2/2/2012
Currency of Data:	12/31/2011
FRN:	0004372322
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	100%

Max Upload Category	Count	% of Area
3	1	100%

Typical down/upload speeds reported by provider: N/A

Coverage Area

Typical Download Category	Count	% of Area
4	1	100%

Typical Upload Category	Count	% of Area
3	1	100%

Typical down/upload speed from 2010 mobile speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 13/13 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/13 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
22/237 (9.3%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
14/203 (7%)

Web Search Verification: N/A

Wireless Verification: N/A

Vector Data Systems LLC

DBA Name: **Vector Data Systems LLC**

Data Characteristics

Date of Original Submission:	February 2010
Date of Update Submission:	3/7/2012
Currency of Data:	12/31/2011
FRN:	0017306663
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
5	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
5	1	100%

Typical Upload Category	Count	% of Area
4	1	100%

Typical down/upload speed from 2010 mobile speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 5/5 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/5 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
4/237 (1.7%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
0/110 (0%)

Web Search Verification: N/A

Wireless Verification: N/A

Verizon Communications Inc

DBA: Verizon Maryland Inc

Data Characteristics

Date of Original Submission:	2/15/2010
Date of Update Submission:	3/14/2012
Currency of Data:	12/31/2011
FRN:	0002166825
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	76689
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Join the census block table to 2010 census blocks based on the GEOID10 field
    - Export results for each technology of transmission
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to TigerLine by TLID
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_RoadSegment

Data Modification:

- Provider did not submit elevation for middle mile. Check submission script does not allow a Null elevation or -9999 default value - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
4	11727	12%
5	37120	40%
6	12512	13%
9	32486	35%

Max Upload Category	Count	% of Blocks
2	11727	12%
3	49632	53%
7	32486	35%

Road Segments

Max Download Category	Count	% of Segments
4	1227	31%
5	1566	39%
6	114	3%
9	1077	27%

Max Upload Category	Count	% of Segments
2	1227	31%
3	1680	42%
7	1077	27%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	571	8%
3	526	8%
4	1364	20%
5	391	6%
6	692	10%
7	2199	32%
8	1130	16%
9	37	1%
10	21	0%

Speed Test Upload Tier	Count	% of Tests
1	589	8%
2	2060	30%
3	56	1%
4	882	13%
5	1437	21%
6	624	9%
7	1186	17%
8	96	1%
9	1	0%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 31/76689 (< 1%)

Form 477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 4209/76689 (5.5%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
104/76689 (<1%)

Total number of dead zones reported per provider via broadband.maryland.gov: 129

Number of census blocks with dead zones reported via mdbroadbandmap.org:
85/76689 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 105

Web Search Verification: 459/76689 (<1%) of census blocks were confirmed using online search feature of given provider

VerizonMD WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	1435	96%
Result is yes and census block is in served area	459	32%
Result is yes but not in a census block reported as served	59	4%
Result is no and census block is in served area	448	31%
Result is no and census block not served area	465	32%

Census blocks that are outside DSL boundary: 20183/76689 (26.3%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: 79 census block **decrease**

Wildblue Communications, Inc

DBA Name: Wildblue Communications, Inc

Data Characteristics

Date of Original Submission:	4/21/2010
Date of Update Submission:	2/8/2012
Currency of Data:	12/31/2011
FRN:	0007843766
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Data Modification:

- Provider submitted Typical Downstream Speed as speed tier 2
  - Calculated Typical Downstream Speed to 3
- Provider submitted Typical Upstream Speed as speed tier 1
  - Calculated Typical Upstream Speed to 2

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	1	100%

Typical Upload Category	Count	% of Area
2	1	100%

Typical down/upload speed from 2010 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	4	50%
3	4	50%

Speed Test Upload Tier	Count	% of Tests
1	8	100%

Speed tests match reported typical download speeds or are within 1 speed tier: Yes

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 8/8 (100%)
Number of mobile speed tests reported outside coverage area: 0/8 (0%)

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	31	60%
3	14	27%
4	7	13%

Speed Test Upload Tier	Count	% of Tests
1	52	100%

Speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of computer based speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 52/52 (100%)
Number of mobile speed tests reported outside coverage area: 0/52 (0%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 214/214 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/214 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
237/237 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
203/203 (100%)

Web Search Verification: N/A

Wireless Verification: N/A

XO Holdings, Inc

DBA Name: **XO Communications, LLC**

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	3/8/2012
Currency of Data:	12/31/2011
FRN:	0006275945
Type of data submitted:	Census Blocks
Census Block Count:	322
Total Matched Address Points Count:	354
Unmatched Address Points:	0
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 354
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- 27 addresses do not meet broadband speeds – dropped from submission

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	30	9%
4	193	60%
5	48	15%
6	13	4%
7	29	9%
8	7	2%
10	3	1%

Max Upload Category	Count	% of Blocks
2	7	2%
3	28	9%
4	188	58%
5	48	15%
6	13	4%
7	29	9%
8	7	2%
10	3	1%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	571	8%
3	526	8%
4	1364	20%
5	391	6%
6	692	10%
7	2199	32%
8	1130	16%
9	37	1%
10	21	0%

Speed Test Upload Tier	Count	% of Tests
1	589	8%
2	2060	30%
3	56	1%
4	882	13%
5	1437	21%
6	624	9%
7	1186	17%
8	96	1%
9	1	0%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 36/322 (11.2%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 18/322 (5.6%)
Number of tracts reported to FCC, but no census blocks reported to project: 8

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
3/322 (0.9%)

Total number of dead zones reported per provider via broadband.maryland.gov: 3

Number of census blocks with dead zones reported via mdbroadbandmap.org: 1
Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 59/322 (18.3%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Zayo Bandwidth LLC

DBA Name: Zayo Bandwidth LLC

Data Characteristics

Date of Original Submission:	1/13/2011
Date of Update Submission:	3/8/2012
Currency of Data:	12/31/2011
FRN:	0019133826
Type of data submitted:	Address Table
Census Block Count:	2
Total Matched Address Points Count:	2
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 2
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	1	50%
8	1	50%

Max Upload Category	Count	% of Blocks
7	1	50%
8	1	50%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
7	1	50%
8	1	50%

Typical Upload Category	Count	% of Blocks
7	1	50%
8	1	50%

Typical down/upload speed from 2010 computer based speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 2/2 (100%)
Number of tracts reported to FCC, but no census blocks reported to project: 1

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

Appendix A

	Name	Status
1	Allied Telecom Group, LLC.	Participating
2	Antietam Cable Television, Inc.	Participating
3	Armstrong Holdings, Inc.	Participating
4	Atlantech Online, Inc.	Participating
5	Atlantic Broadband (Delmar), LLC	Participating
6	AT&T Mobility LLC	Participating
7	Bay Country Communications, Inc.	Participating
8	Believe Wireless, LLC.	Participating
9	Bloosurf	Participating
10	Broadstripe, LLC	Participating
11	Broadview Networks Holdings, Inc.	Participating
12	Brookwood Ventures LLC	Participating
13	Cavalier Telephone LLC	Participating
14	Charter Communications Inc	Participating
15	Clearwire Corporation	Participating
16	Cogent Communications Group	Participating
17	Comcast Corporation	Participating
18	DIECA Communications, Inc	Participating
19	DSL.net, Inc.	Participating
20	DSLnet Communications, LLC	Participating
21	Easton Utilities Commission	Participating
22	FiberLight LLC	Participating
23	Freedom Wireless Broadband, LLC	Participating
24	Hotwire Communications, Ltd.	Participating
25	HNS License Sub, LLC	Participating
26	Level 3 Communications, LLC	Participating
27	Mediacom Delaware LLC	Participating
28	MegaPath	Participating
29	Gans Communciations, LP	Participating
30	New Edge Holding Company	Participating
31	NTELOS Inc	Participating
32	Mountain Communications, LLC	Participating
33	QCOL	Participating
34	Neon Optica, Inc	Participating
35	RCN Corporation	Participating
36	Leap Wireless International, Inc.	Participating
37	PAETEC Communications, Inc.	Participating

38	Shenandoah Telecommunications	Participating
39	Sprint Nextel Corporation	Participating
40	StarBand Communications Inc.	Participating
41	Tata Communications (America) Inc.	Participating
42	T-Mobile USA, Inc.	Participating
43	TWTelecom of Maryland, LLC	Participating
44	United States Cellular Corporation	Participating
45	Vector Data Systems LLC	Participating
46	Verizon Communications Inc	Participating
47	Cellco Partnership and its Affiliated Entities	Participating
48	WildBlue Communications, Inc.	Participating
49	XO Holdings, Inc.	Participating
50	Zayo Bandwidth Northeast, LLC	Participating
51	ABOVENET COMMUNICATIONS	Unresponsive
52	ADC Telecommunications	Not a broadband provider
53	airBand Communications	Fixed Wireless provider - Unresponsive
54	Airespring, Inc.	Reseller - Refuses to participate
55	Apogee Telecom	Unresponsive
56	Broadcore, Inc.	Unresponsive
57	BullsEye Telecom, Inc.	Reseller - Refuses to participate
58	Cablespeed - Maryland	Unresponsive
59	Cbeyond Communications, LLC	Unresponsive - Participates with DC
60	CenturyLink	Reseller - Refuses to participate
61	Cequel III Communications II	No longer participating - sold property to Shentel
62	COMBNET	Unresponsive
63	CONXX, Inc.	Refuses to Particpate
64	Coretel America	Unresponsive
65	Cox Communications	Not a broadband provider in Maryland
66	DELMARVA ONLINE	Not a broadband provider
67	Distributed Management Information Systems, Inc.	Unresponsive
68	EarthLink	Unresponsive
69	Eduro Networks, LLC	Unresponsive
70	Enventis Telecom Inc.	Not a broadband provider in Maryland
71	FCB Communications	Not believed to be a broadband provider
72	FDCservers.net	Not believed to be a broadband provider
73	FiberNet of West Virginia	Unresponsive - Is a broadband provider

74	First Communications LLC	Not a broadband provider in Maryland
75	Frontier Communications	Not a broadband provider in Maryland
76	GLOBAL CROSSING TELECOMMUNICATIONS, INC.	Not a facilities based broadband provider in Maryland
77	Global Telecom Brokers/VDL	Refuses to participate
78	GMP CABLE TV	Research returns Metrocast as provider; Metrocast participating
79	iCore	NDA signed - Provider never sent data
80	Intellifiber	Unresponsive
81	InterGlobe Communications	Unresponsive
82	Internap Network Services	Unable to provide service in 7 - 10 days
83	Last Mile, Inc.	Not a broadband provider in Maryland
84	LightEdge Solutions, Inc.	Not a facilities based broadband provider in Maryland
85	Litecast / Balticore	Unresponsive
86	Metropolitan Telecommunications Holding Company	Reseller - Refuses to participate
87	MediaMax Wireless	Unresponsive
88	Motorola	Not a broadband provider
89	NationsLine Inc.	Unresponsive - Participates with DC
90	NEW FRONTIERS INTERNET SERVICES	Unresponsive
91	Northern Neck Wireless Broadband Services, LLC	Not a broadband provider in Maryland
92	NTT America	Unresponsive
93	Nunet	Unresponsive
94	One Communications Corporation	No longer participating
95	Port Networks, LLC	Fixed Wireless provider - Unresponsive
96	Quantum Telecommunications, Inc.	Reseller - Unresponsive
97	Qwest Communications Company, LLC	Unable to provide service in 7 - 10 days
98	Road Runner	Reseller - Unresponsive
99	RapidDSL & Wireless	Reseller - Refuses to participate
100	Reliance Globalcom Services, Inc.	Unresponsive - Participates with DE
101	SAVVIS Communications Corporation	Not a broadband provider
102	SES Americom	Unresponsive
103	SkyWay USA	Unresponsive
104	Southwest Wireless Group, L.L.C.	Not a broadband provider in Maryland
105	SpeakEasy	Unresponsive
106	STSN GENERAL HOLDINGS	Unresponsive
107	Sungard Network Solutions	Unresponsive
108	SWIFT SYSTEMS	Unresponsive
109	Sybase	Not a broadband provider

110	System Source	Unresponsive
111	Telovations, Inc.	Not a broadband provider in Maryland
112	Transbeam Inc.	Refuses to Participate
113	Two-Way Radio Service Inc	Unresponsive
114	United Online	Reseller - Unresponsive
115	VINAKOM COMMUNICATIONS	Not a broadband provider
116	WiTopia	Not a broadband provider
117	Windstream	Not a broadband provider in Maryland
118	Wholesale Carrier Services, Inc.	Unresponsive
119	Xecunet, LLC.	Unresponsive - DSL provider
120	Xspedius Communications Co.	Purchased by twtelecom; twtelecom participating

Maine SBDD Data Submittal to NTIA

Technical Whitepaper

5th Data Delivery

April 1, 2012

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1 Introduction

As an NTIA State Broadband Data and Development (SBDD) grant recipient, the State of Maine is undertaking a statewide project to inventory and map broadband services for inclusion in both national and state broadband maps. The SBDD grantee project team for Maine consists of the ConnectME Authority (ConnectME), the Maine Office of GIS (MeGIS), and the James W. Sewall Company (Sewall). The team is collecting broadband service availability data, including speeds and types of technology, as well as information on Community Anchor Institution (CAI) locations across the entire state. The collected service data undergoes geospatial processing and verification steps before it is loaded into Maine's broadband geodatabase. This geodatabase is used to satisfy NTIA's bi-annual submission requirements as well as support the ConnectME Authority's statewide initiatives and programs.

This whitepaper describes the deliverable datasets, the data collection process and the verification process.

2 Data Description

The Maine team is providing spatial data representing provider coverage in the state as well as information on validation and verification processes. Files provided are as follows:

Filename	Description
ME_SBDD_TRANSFER_2012_04_01.gdb	Folder containing SBDD transfer file geodatabase
ME_DataPackage_2012_04_01.xlsx	Data Package file
ME_2012_04_01.txt	Data Submission Receipt file
ME_Methodology_2012_04_01.pdf	Methodology Paper file
ME_ReadMe_2012_04_01.txt	ReadMe file
ME_2012_04_01_Changes_and_Corrections.doc	Document listing changes and corrections since October 2011 submission to NTIA

3 Provider Participation

Company Response	*Number*	*% of Total Companies*
Provided data	36	61%
Will provide data	3	5%
Will not provide data	6	10%
Non-responsive	13	24%
Total	**58**	**100%**

The Maine team identified 58 individual providers. Companies that provide multiple technologies of service or have multiple subsidiaries are counted only once.

It has been determined that one provider does not provide broadband service and has been removed as a potential provider:

- Broadview Networks Holdings, Inc.

Information on the providers is included on the ‘ProviderTable’ spreadsheet in the file **ME_DataPackage_2012_04_01.xlsx** included as part of the submission to NTIA.

4 Data Collection and Integration

4.1 Provider Outreach and Data Gathering

Mapping broadband footprints across the State begins by identifying potential providers and contacting them to determine service capabilities and level of participation. If a provider offers broadband level Internet service in Maine, the provider will be invited to participate in the project. After executing a non-disclosure agreement (NDA), the provider submits data showing where services are offered, technology of transmission used, and maximum advertised downstream and upstream speeds. The project team has developed a step by step process that has been captured by the high-level workflow shown in ***Figure 1***. Starting with contacting a service provider, the workflow allows a user to determine whether a provider should be included and if so what types of service are offered.

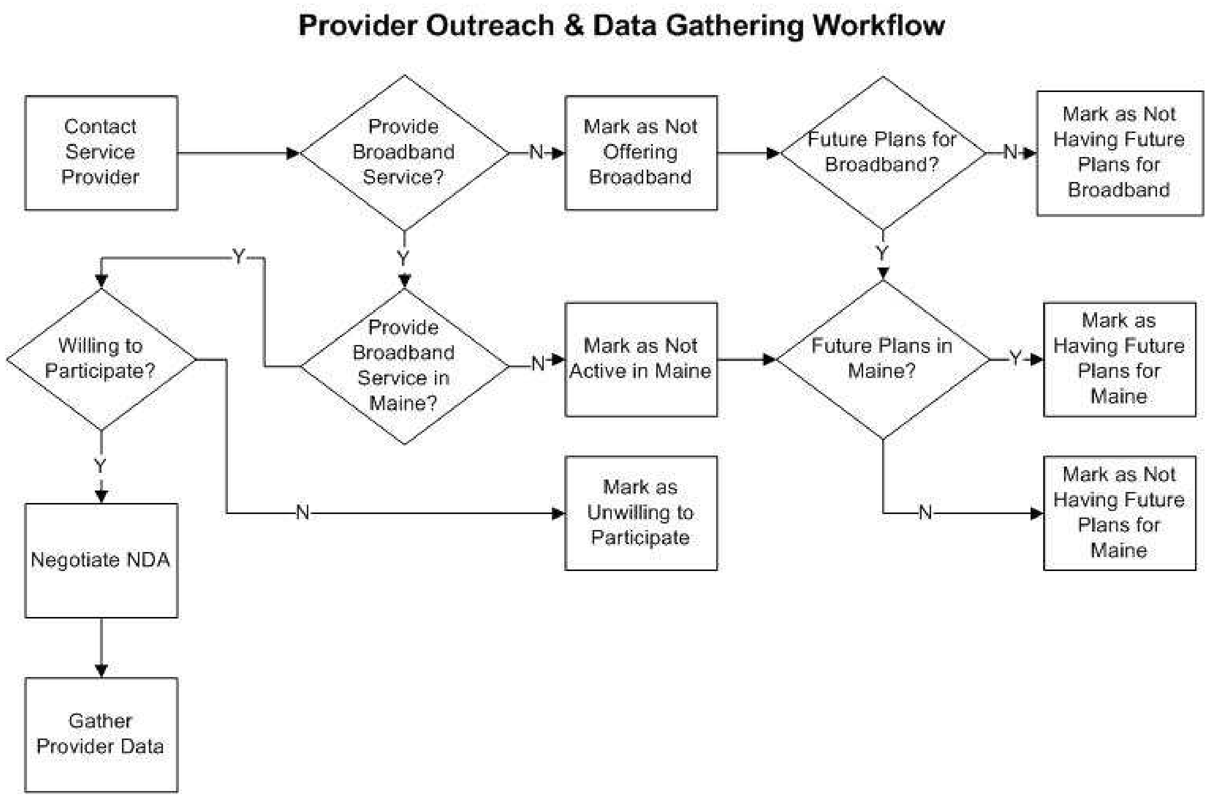


Figure 1 - Provider Outreach and Data Gathering Workflow

The task of reaching out to the provider community and gathering service data has five main tasks: Research Service Providers, Execute NDA, Gather Provider Data, Assess Provider Data, and Categorize Data for Production.

4.1.1 Research Service Providers

The Maine project team has established a service provider contact database, which contains contact information for all of the potential broadband service providers in the state. The initial set of providers was obtained from state and industry lists as well as Internet research. Ongoing management of the list is required because new providers begin offering services that qualify as broadband and changes occur to existing provider companies through mergers or acquisitions.

Sewall initially contacts each provider by phone and introduces the project. One purpose for the initial contact is to identify the individual at the provider company with whom the team should be working. In some instances, especially for larger companies it may take multiple attempts before the appropriate person is reached.

Another purpose is to determine if the company's services meet the requirements for inclusion in the project. If a company offers broadband level service in Maine then the next step is to determine the type(s) of service being offered, whether the service offerings are as an end-user provider or as a middle mile/back haul provider, and whether the company owns facilities or re-sells services using another carrier's network. Data from back haul carriers and resellers are included in the project.

A third purpose behind the initial contact is to confirm that the provider wants to participate in project and is willing to submit data that represents its service offerings and coverages. Provider companies who elect to participate are invited to execute an NDA to protect those data items considered to be confidential or proprietary. If a provider company does not want to participate, Sewall may look for assistance from the ConnectME Authority and the NTIA SBDD project team to encourage participation.

4.1.2 Execute Non-Disclosure Agreement (NDA)

The process of executing an NDA starts with sending a letter of introduction along with an NDA template and a copy of a ConnectME Protective Order. **Appendix A** contains a sample letter. The NDA template was drafted by the Maine law firm, Rudman & Winchell, based on confidentiality guidelines presented by NTIA and can be found in **Appendix B**. A copy of the ConnectME Protective Order signed on 21 December 2009 at the request of many of the service providers is in **Appendix C**.

Changes to the NDA template are negotiated with individual companies as needed. Once finalized, the NDA is signed by the provider company, Sewall, and the ConnectME Authority before the data gathering process begins.

4.1.3 Gather Provider Data

More often than not after an NDA has been executed, a different individual at a provider company is identified as the primary contact for data submittals. Once the contact is confirmed, a data submittal information sheet prepared by the project team is sent to the contact. The data submittal sheet identifies the data items desired and has definitions from the SBDD NOFA. The items requested include:

- FRN or provider FCC Registration Number
- Location and extents of service coverage
- Technology of service
- Speeds of service including maximum advertised downstream & upstream speeds and typical downstream & upstream speeds
- Tower and transmitter locations and transmission attributes (for fixed wireless service)
- Middle mile and back haul connection points
- Customer service locations (for wired and fixed wireless service)
- Failed service locations (for wired and fixed wireless service)
- Service to Community Anchor Institutions

After sending the data submittal information Sewall follows up with the provider contact to review the requested data items and discuss potential formats for submitting data. The team is cognizant of the wide range of environments operated by the provider companies and recognizes the need to accommodate submissions in many different formats including tabular (CSV, Excel, DBF), GIS (ESRI shapefile, ESRI geodatabase, MapInfo, Google KML/KMZ, CAD (AutoCAD, Microstation), and hardcopy. The team also understands that many of the smaller providers in Maine are handicapped by a lack of resources in trying to comply with the project's data submission requirements. Some of the issues facing these providers include small staff sizes, lack of mapping technical expertise, and proprietary digital systems. Sewall lends technical assistance and expertise as needed.

Sewall has deployed a web-based GeoPortal site to accommodate all digital data transfers related to the broadband mapping project. Additional details pertaining to this site can be found in **Section 5.6.1**.

4.1.4 Assess Provider Data

After data has been submitted by a provider, Sewall catalogues it and assesses the data files to see if all of the requested items were provided and what data types were received. Sewall also verifies the locations and spatial definitions for the data items and checks for missing attribute information. Any questions generated are sent to the provider for clarification. It is common for the initial submission to need multiple iterations of data exchanges and feedback before the submission is completed.

Once an initial set of broadband service data is in place, follow-up rounds of data gathering will incorporate modifications to existing service coverages, service types, or service speeds. Later submittals by a provider could consist of an entire set of data records or may only contain updates since the previous submission. Sewall's integration processes are equipped with GIS and database tools to fold newer versions of provider records into the existing baseline. The team anticipates that further development and refinement of these processes and tools will be made as more update submissions are received.

4.1.5 Categorize Data for Production

When data from a provider has been received and assessed, production processes are needed to integrate the data into the project database. **Section 4** of this paper describes the various workflows to turn the submitted data into the SBDD data transfer model features and attributes.

4.2 Community Anchor Outreach and Data Gathering

Community Anchor Institutions (CAI), as defined by NTIA NOFA category codes, consist of the following:

Category 1: School – K through 12
Category 2: Library
Category 3: Medical/Healthcare
Category 4: Public Safety
Category 5: University, College, Other post secondary
Category 6: Other community support – government
Category 7: Other community support – non-governmental

The three primary steps with the CAI are data gathering, data processing and attribution.

4.2.1 Data Gathering

Several data sources were utilized to represent all CAI categories across the state.

State of Maine, Office of Geographic Information Systems (MEGIS)

ARMORIES
CEMA (County Emergency Management Agency)
COLLEGES
FIRE
HOSPITAL
HAS (Hospital Service Areas)
MEAIR (Airports)
POLICE
REDCROSS
RESCUE
SCHLIB (Schools & Libraries)

NAVTEQ-NAVSTREETS (Points of Interest)

NAVTEQ-COMMSVC
NAVTEQ-EDUINSTS
NAVTEQ-HOSPITAL

NAVTEQ-TRANSHUBS

State of Maine, Office of Information Technology – State Facilities

State Facilities File

Maine Department of Health & Human Services (DHHS) – Maine Care Services

Hospitals
Clinics/Rehab/Nursing
Schools
Pharmacies
Home Care
Counseling/Psychologists
Shared Living
Mental Health
School Departments
Health related businesses

Maine School and Library Network (MSLN)

K-12 schools
Public libraries

Maine's Research & Education Network (MaineREN)

Universities and colleges

United States Postal Service (USPS)

Post Office Locations

Service Provider Data

CAI data submitted by provider companies

4.2.2 Data Processing

The data processing task involved an in-depth cleaning and sorting of all CAI source records. Data is initially sorted as spatial (e.g., GIS layer) and non-spatial (e.g., table) data. The spatial data consisted of points and generally needed minimal formatting before loading into a personal geodatabase. The non-spatial data required some initial format revisions to prepare the data for geocoding to generate spatial geometry. The following descriptions associated with ***Figure 2*** below outline the overall workflow and processes involved.

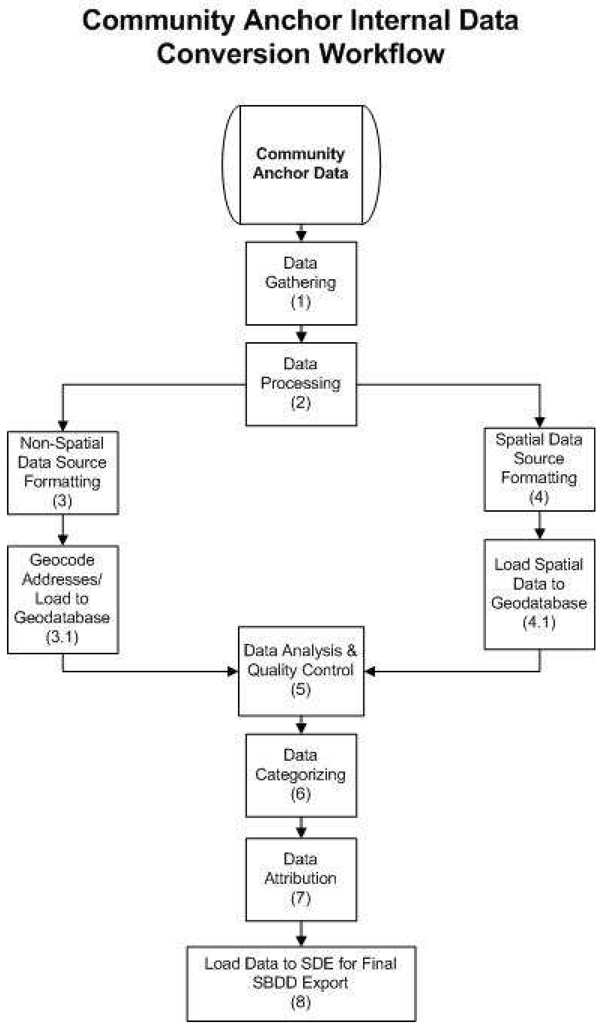


Figure 2 - Community Anchor Internal Workflow

(1) Data Gathering

Data gathering involves acquiring source data involving the seven categories defined by NTIA NOFA. Data may originate from several sources including state, county, town, outreach programs, service providers and more. Records are documented for metadata and given a level of confidence reflecting the data source, spatial accuracy and processing enhancements.

(2) Data Processing

The data processing phase separates the data sources into two types: flat file (non-spatial) and spatial. A flat file refers to data or a table that contains 1 record per line, generally in the format of an .xls spreadsheet or .dbf table. Without spatial coordinate values to translate to points, this type of data must be geocoded in ArcGIS. Spatial data contains pre-defined coordinate values or is already in a format containing spatial geometry with a defined projection and can be imported directly.

(3) Non-Spatial Data Source Formatting

Non-spatial data files are scrubbed to ensure that all necessary fields are present and are formatted to run through the geocoding process.

(3.1) Geocode Addresses/Load to Geodatabase

Using the geocoding tool in ArcGIS, an address locator file must first be setup. The address locator file maps out the ConnectME street centerline fields and is used as a reference for the non-spatial data during the geocoding process. The non-spatial data is saved as a .csv file. Shown below is a typical record formatted to geocode.

Name	Address1	City	State	Zip
Healthworks	10 Bangor	Bangor	ME	04401

In this example, the geocoding process will reference or match this address record to the ConnectME street address locator and place a point at this location in the map layer. All records in the source file are processed at once. Points are generated, based on how matching parameters or set. Points are then loaded into personal geodatabase for final scrubbing and quality acceptance.

Name	Address1	City	State	Latitude	Longitude
Healthworks	10 Bangor St	Bangor	ME	46.1252	-67.8422

(4) Spatial Data Source Formatting

Spatial data sources are received as flat files with spatial coordinate values or reside in a GIS layer as points. Each source type is processed differently.

Flat files with coordinate values:

- Prepare field name formats
- Prepare coordinate values in decimal degrees
- Add X,Y data into ArcGIS, generating the point locations on the fly
- Output to personal geodatabase for final scrubbing and quality acceptance

Point files:

- Export file to shapefile format if necessary
- Project file to state coordinate system (UTM NAD83 Zone19 Meters) for compatibility with other data layers
- Output to personal geodatabase for final scrubbing and quality acceptance

(4.1) Load Spatial Data to Geodatabase

All spatial data types (point files) are loaded into a personal geodatabase for final scrubbing and quality acceptance.

(5) Data Analysis and Quality Control
A final analysis is completed on all points loaded in the personal geodatabase to identify any issues. The table below indicates the primary types of issues, the means to detect them, and the resulting solution.

Issue ⇒	***Identification*** ⇒	***Result***
Duplicate Points	Selection by location/imagery review	Delete incorrect record
Unmatched geocoded records	Google Maps review	Matched record
Inaccurate CAI locations	Imagery review	Modify point location
Unsuitable CAI	-	Delete record

(6) Data Categorizing
Once the CAI records have gone through the data analysis and quality control, the records are given a category value of 1 to 7, as discussed in the introduction.

(7) Data Attribution
CAI attributes are the most difficult to acquire at the data gathering stage and are typically acquired through additional steps, including contacting each CAI. The required attributes are:

- Broadband Service
- Technology of Transmission
- Advertised Downstream and Upstream Speeds

The project team has completed the initial round of contacting each CAI to collect the above information. The task was completed by assembling a call center group assigned to contacting each CAI to establish a primary contact and address verification followed by exercising an on-line survey aimed to provide feedback to the items listed above. Completed surveys were compiled through the use of SurveyMonkey.com and final survey output (.csv) was prepped and values were loaded into the CAI database to populate attributes.

Additional sources and surveys have been utilized to populate the database including MSLN (Maine School and Library Network), NCES (National Center for Education Statistics), the Maine Fiber Company as part of its Three-Ring Binder project, and state agency listings provided by the chief technical officer. The project team will continue to compile CAI data utilizing all the above resources and research additional data sources and methodologies to populate these attributes.

(8) Load Data to SDE for Final SBDD Export
CAI data is loaded from the personal geodatabase to the SDE environment for final export to SBDD format.

4.3 Data Analysis and Conversion

Data is analyzed and converted with different processes, depending on its type and characteristics.

4.3.1 Fixed Wired Transmission

Fixed wired service provider companies in the state of Maine range from small to large businesses and utilize several distinct types of technology to deploy broadband service. In order to accommodate the varied inputs, Sewall has developed a flexible and comprehensive workflow to incorporate provider information into a state broadband map developed by Sewall in conjunction with the ConnectME Authority.

The ConnectME model depicts broadband service provider coverage at the street segment level. The model uses a street centerline as the spatial component of the coverage, and a related table stores provider specific information for street segments. Sewall developed production tools to accommodate the incorporation of service provider data into this ConnectME model and instill quality control into the process.

The steps in the process for analyzing and converting Fixed Wired Transmission data are outlined in ***Figure 3*** and described below.

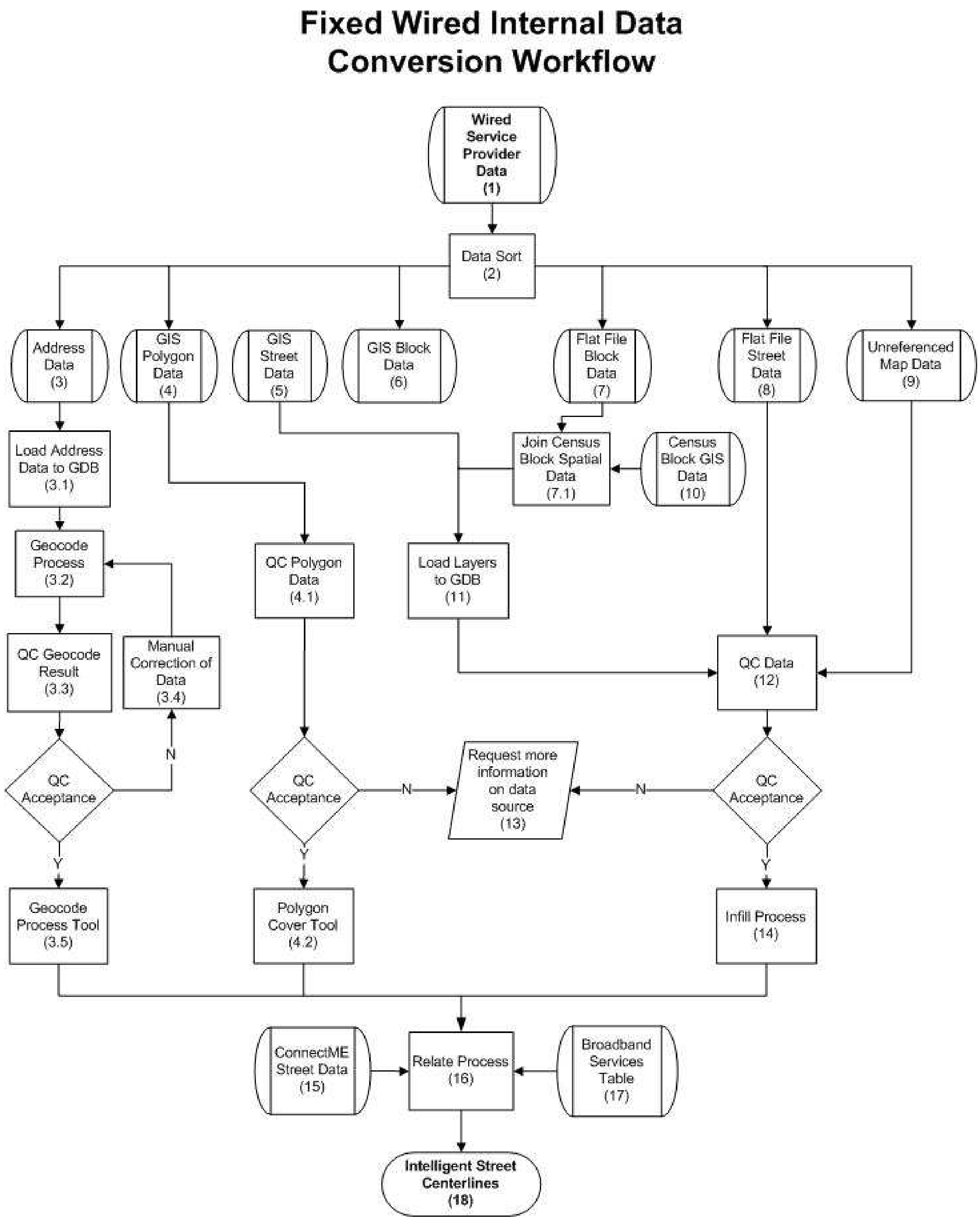


Figure 3 - Data Flow for Fixed Wired Transmission Providers

(1) Wired Service Provider Data

The data bin is the storage location for wired broadband service provider data gathered by Sewall.

(2) Data Sort
The data sort phase immediately follows the data collection process. Analysts sort the wired data by provider and by data characteristics. The wired data can consist of address data, predefined coverage data, flat file coverage data and unreferenced maps. Individual workflows have been developed by Sewall for the various data formats.

(3) Address Data
The address data bin is reserved for service provider data that is at the address level. Examples of address data formats received are spreadsheet and text file format.

(3.1) Load Address Data to Geodatabase
Address data is formatted to meet the ArcGIS geocoder standards and loaded into the geodatabase for processing. The formatting of the address data will include ensuring fields with the full street address and town name are populated in the dataset.

(3.2) Geocode Process
Formatted address data is geocoded using the ConnectME street centerline dataset. The address locator style used in this process is the ArcGIS US Streets with Zone. For this process, the city fields of the ConnectME street dataset are utilized in the zone component of the locator.

(3.3) QC Geocode Result
Analysts review the address data geocode result for the following:

- Overall geocode hit rate
- Town geocode hit rates
- Data anomalies

If address data fails any of these checks the data will not pass QC acceptance.

(3.4) Manual Correction of Data
Address data that has not passed the QC acceptance is evaluated for corrections necessary for the data to pass QC acceptance. Corrections to town names and updates to street names are commonly required to match the naming conventions in the ConnectME roads dataset.

(3.5) Geocode Process Tool
Sewall has developed an ArcGIS tool named Geocode Process Tool that translates the accepted geocoded address data into tabular address range records related to the accompanying ConnectME street centerlines. This tool is shown in ***Figure 4*** below.

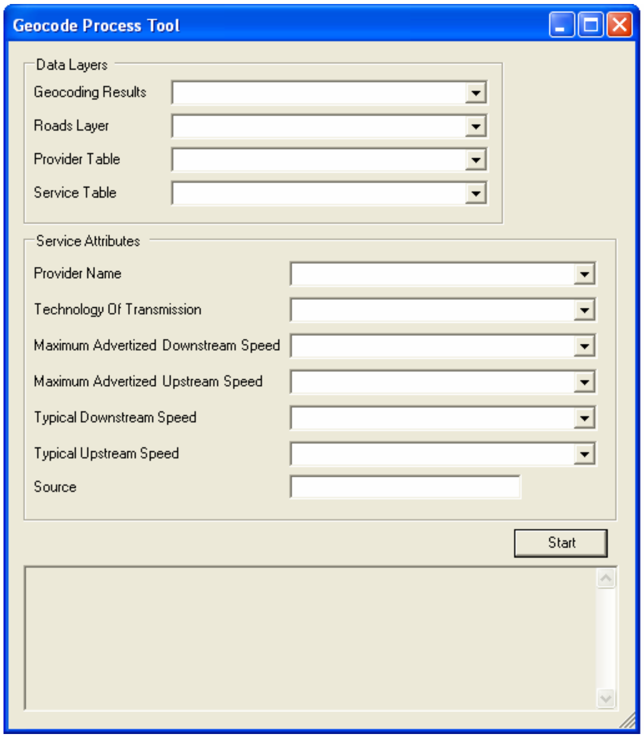


Figure 4 - Geocode Process Tool
Data Layers:(1) Geocoding Results - geocoded layer of address data (2) Roads Layer - ConnectME roads data layer (3) Provider Table - table of provider specific information (4) Service Table - broadband service output table where the service provider street address ranges are stored.
Service Attributes: The first six values are necessary to populate fields in the deliverable. Source is used to designate that the records created are from the Geocode Process Tool.

In ArcMap the user specifies which layers in the map correspond with the data layer inputs for the tool as well as the service provider service attributes that correspond with the geocode address point layer. Once the information is set the user clicks ‘Start’ and the process begins.

Each geocoded address point within the geocode layer has as an attribute the street segment that the address was geocoded to. Using this street link, the tool can locate all of the geocoded address points assigned to a given street segment and build a modified street range of broadband service for the street segment. The tool then creates a record in the Broadband Service table that contains a link to the street segment in the ConnectME street feature class and populates the record with the derived broadband service street segment range and specified service provider information. This process is repeated for each unique street segment listed in the geocoded address point layer.

(4) GIS Polygon Data
The GIS polygon data bin is for service provider data that represents a coverage area of broadband availability and is delivered in a GIS format.

(4.1) QC Polygon Data

Datasets from the GIS polygon data bin are reviewed by an analyst. The QC routine ensures that the data has spatial integrity and includes the necessary attribution for inclusion to the state broadband project.

(4.2) Polygon Cover Tool

Sewall has developed an ArcGIS tool named Polygon Cover that converts service provider coverage area polygons into street segment related tabular records. Each tabular record created by the tool incorporates the service provider broadband specification information as well as modified street ranges representing provider street coverage.

This tool was initially created by Sewall for use on the fixed wireless viewshed datasets but was incorporated into the wired workflow for service providers that provided polygon regions of service coverage.

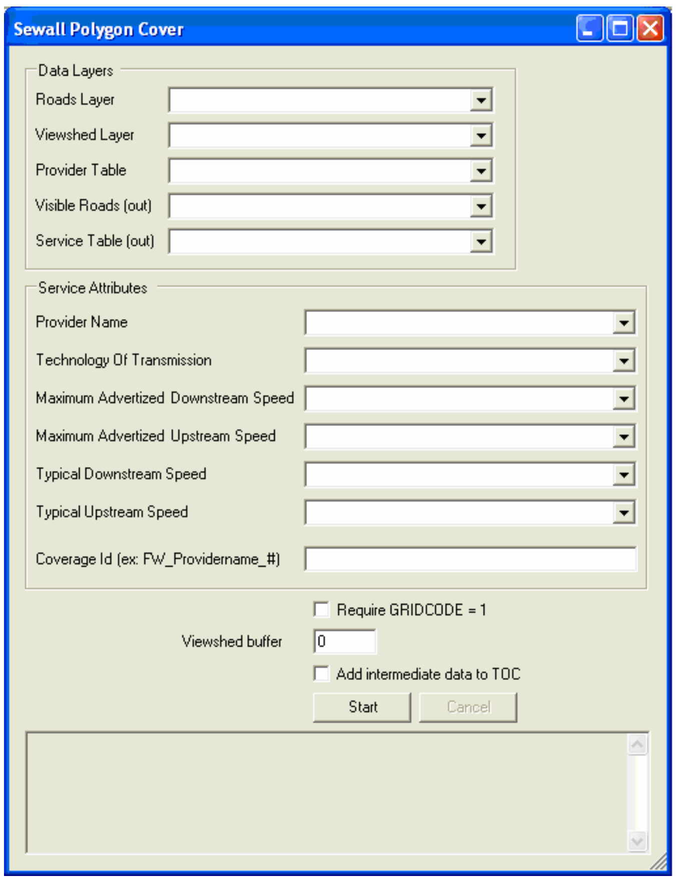


Figure 5 - Polygon Cover Tool

Data Layers: (1) Roads Layer - ConnectME street centerline data layer with address ranges (2) Viewshed Layer - viewshed layer used in delineating visible polygons for clipping road segments. For wired providers this would be the polygon layer that depicts a provider's coverage area. (3) Provider Table - internal processing flag (4) Visible Roads (out) - output feature class that stores the clipped road segment geometry (5) Service Table (out) - output table that the extracted address ranges populate.
Service Attributes: The first seven values are necessary to populate fields in the deliverable.
Require GRIDCODE = 1: Toggle is unchecked when running a wired broadband provider dataset that is represented as a coverage area.

In ArcMap the user specifies which layers in the map correspond with the data layer inputs for the tool as well as setting the service attributes for the service provider polygon layer. While running the Polygon Cover tool for fixed wired service regions analysts ensure the Require GRIDCODE = 1 toggle is unchecked. Since this tool was initially created for use with a viewshed polygon output, the tool will not run on a non-viewshed layer unless this toggle is unchecked. Once the information is set the user clicks 'Start' and the process begins.

The tool selects street segments from the input Roads layer that intersect the input polygon coverage and exports the street segments to a separate working file. These streets are then clipped to the polygon coverage. Next the tool runs a length ratio process that assigns each street segment a fractional value based on the clipped and original lengths. The tool then populates modified street range attributes based on the length ratio of a segment and the original street range of a segment. These modified street range values represent the broadband service street range of the provider. For each street segment the tool also creates a record in the Broadband Service table that contains a link to the original street segment in the ConnectME street feature class and populates the record with the modified broadband service street segment range and specified service provider information.

(5) GIS Street Data
The GIS street data bin is for wired broadband provider data at the street segment level that is delivered in a GIS format.

(6) GIS Block Data
The GIS block data bin is for provider data that is delivered at the census block level in a GIS format.

(7) Flat File Block Data
Census block service data delivered in a flat file format is stored in the flat file block data bin. Examples of flat file data are spreadsheets, text files and database files.

(7.1) Join Census Block Spatial Data
Flat file block provider coverage information is joined to a spatial census block layer using the full census block id value. Blocks with provider information joined are exported creating a spatial representation of the provider's census block broadband coverage.

(8) Flat File Street Data
The flat file street data bin is where provider data is stored when Sewall receives street level information in a format that cannot be associated spatially. Examples of files types delivered in a flat file format are spreadsheet, database and text file.

(9) Unreferenced Map Data
Provider data that cannot be referenced in ArcGIS are stored in the unreferenced map data bin. Examples of this type include paper maps and PDF documents.

(10) Census Block GIS Data
This data is Census 2010 block data in GIS format for the state of Maine that has been downloaded from the US Census website.

(11) Load Layers to GDB
Provider GIS data is loaded into the Sewall SDE geodatabase. A feature class is created for each provider's dataset. Sewall workflow tracking attributes are added to the feature classes.

(12) QC Data
Datasets are sent to a Sewall analyst for QC. The QC routine is to ensure that the data includes the necessary information for inclusion to the state broadband project. Provider data is cross-referenced with information on broadband availability that has been gathered from other sources. The QC of datasets with spatial data includes additional QC routines to ensure spatial integrity.

(13) Request more information on data source
Broadband provider data that does not meet the QC acceptance criteria Sewall initiates a request order to the provider for additional information. This request includes a detailed listing of the deficiencies found in the data as well as inquiries regarding spatial inaccuracies and anomalies discovered in the analysis.

(14) Infill Process
Sewall developed a tool named Infill to interact with the ConnectME street segments and populate related tabular records for fixed wired service provider availability. The Infill Tool allows a user to configure a specific set of service provider parameters, select ConnectME street segments, and then view and edit the related broadband availability information in the Broadband Services table that corresponds with the configured attributes. This tool is used to input fixed wired broadband availability data that Sewall received as census block, street or unreferenced map data. The majority of fixed wired service provider datasets utilize the Infill Tool for processing. A screenshot of the configuration dialog box is shown as Figure 6 below.

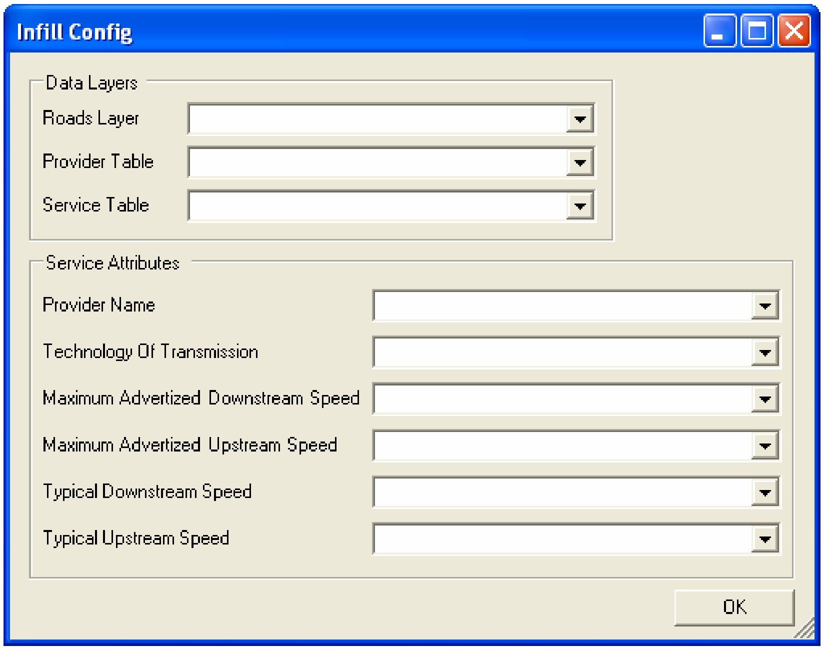


Figure 6 - Infill Tool Configuration
Data Layers: (1) Roads Layer: ConnectME roads data layer (2) Provider Table: Internal processing flag (3) Service Table: Broadband Service output table where the service provider street address ranges are stored. Service Attributes: These fields are necessary to populate fields in the deliverable.

The first time a user uses the Infill tool in an ArcMap session, the ‘Infill Config’ screen appears. The user enters the input data layers and the attributes for the service provider dataset that the tool will utilize during processing.

Once the Infill Config screen has been set a user selects one or more ConnectME road segments. Using the unique primary key values of the selected streets and the specified provider name and technology of transmission the tool searches the Broadband Services table for existing matching tabular records. If matches are found from this search, the tool reports the information in the Infill window. For selected street segments where no match was found in the Broadband Services table, the tool populates the Infill window with street segment road name and street range attributes representing potential broadband service ranges for the provider on the selected streets. These street range attributes can be updated in the Infill window based on provider sources. This Infill tool window is shown as ***Figure 7***.

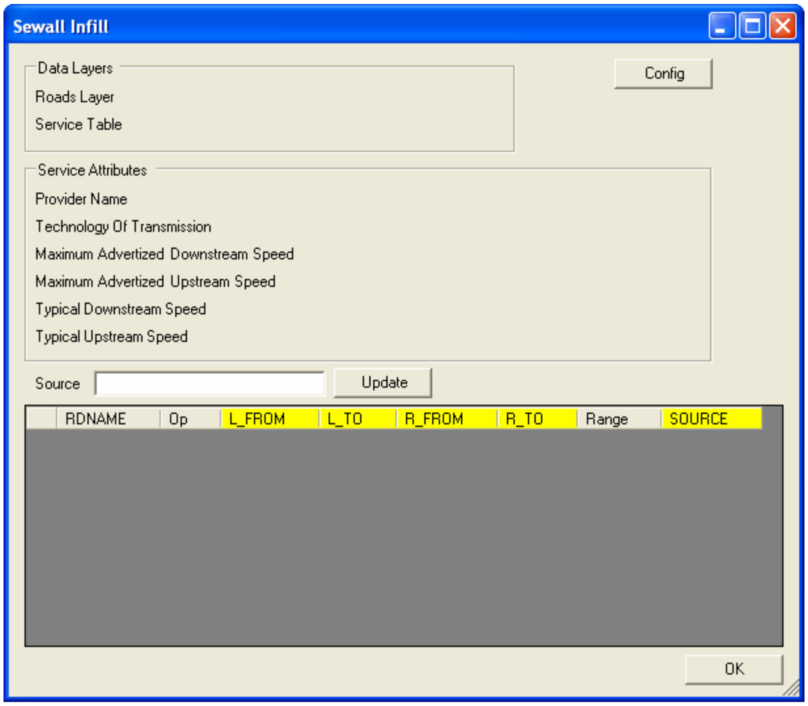


Figure 7 - Infill Tool
Data Layers: (1) Roads Layer: ConnectME roads data layer (2) Service Table: Broadband Service output table where the service provider street address ranges are stored
*Config: Opens the Infill Config window (**Figure 6**)*
Service Attributes: These fields are necessary to populate fields in the deliverable.
Source: Internal flag for source of service availability
Update: Updates selected tabular records SOURCE field to the value entered in the Source field
Tabular Record Attributes: (1) RDNAME: Name of ConnectME road segment (2) Op: Operation being performed {INSERT-new tabular record, UPDATE-update existing tabular record, DELETE-delete tabular record} (3) L_FROM: "Left from" broadband address range of ConnectME road segment (4) L_TO: "Left to" broadband address value of ConnectME road segment (5) R_FROM: "Right from" broadband address value of ConnectME road segment (6) R_TO: "Right to" broadband address value of ConnectME road segment (7) Range: Reports either "full" or "partial" and is a comparison for each tabular record of the broadband provider street range to the accompanying ConnectME street range (8) SOURCE: Internal process flag.

Once the user has reviewed the values, pressing 'OK' will perform the operations listed in the Op field.

(15) ConnectME Street Data

The ConnectME street data bin contains the street centerline dataset used in the geocode and street relate processes. The Maine Office of GIS E-911 street centerline file was used to create the base street segments and gives the project the most accurate street centerline file for the State of Maine. The NAVTEQ street centerline dataset NAVSTREETS was utilized to infill street segments in areas where gaps were assessed in the MEGIS E-911 file.

(16) Relate Process

Through the use of Sewall developed tools the data gathered for fixed wired broadband service providers gets stored in the Broadband Services table as availability street ranges associated with street centerline segments. Each record in the Broadband Services table is associated by a foreign key/primary key relationship with a street segment in the ConnectME street centerline dataset. This relationship allows for clean and easy access to street level availability of service providers.

(17) Broadband Services Table

The Broadband Services geodatabase table was developed by Sewall to store broadband service provider information and street range coverage. NTIA requirements and formats were utilized when creating the fields to ensure the records stored in the Broadband Service table are compatible with the SBDD data model.

(18) Intelligent Street Centerlines

The output from the fixed wired workflow is a comprehensive intelligent street centerline network comprised of street centerlines and related service availability tabular records.

4.3.2 Fixed Wireless Transmission

The initial stage of mapping terrestrial fixed wireless service territories depends on the quality of the data received. To process any service footprint of a particular transmitter, the initial resources acquired during the data collection phase of the project are critical.

Terrestrial Fixed Wireless technology is clouded by many variables that determine the overall performance of each transmitter signal. Inaccurate data pertaining to location, height of a transmitter, horizontal and vertical limitations, signal range and many more factors present potential obstacles to producing an accurate representation of any transmitter's service footprint. Some of these factors have not been considered during the mapping process due to lack of data needed for modeling them. For example, while a 10-meter DEM is used to represent the surface terrain, we have not incorporated obstructions on the surface such as trees and other man-made obstacles that could influence a transmitter's propagation model.

The data collection process and subsequent conversion workflow is designed to accommodate a variety of data sources received from the service providers and production tools have been developed to build efficiencies and quality control into the workflow. When received by the service providers, supplemental data is used throughout the conversion workflow to help verify the mapping results. However, a larger scale verification process is described in **Section 5**.

The data conversion process for fixed wireless transmission is represented by ***Figure 8*** and described below.

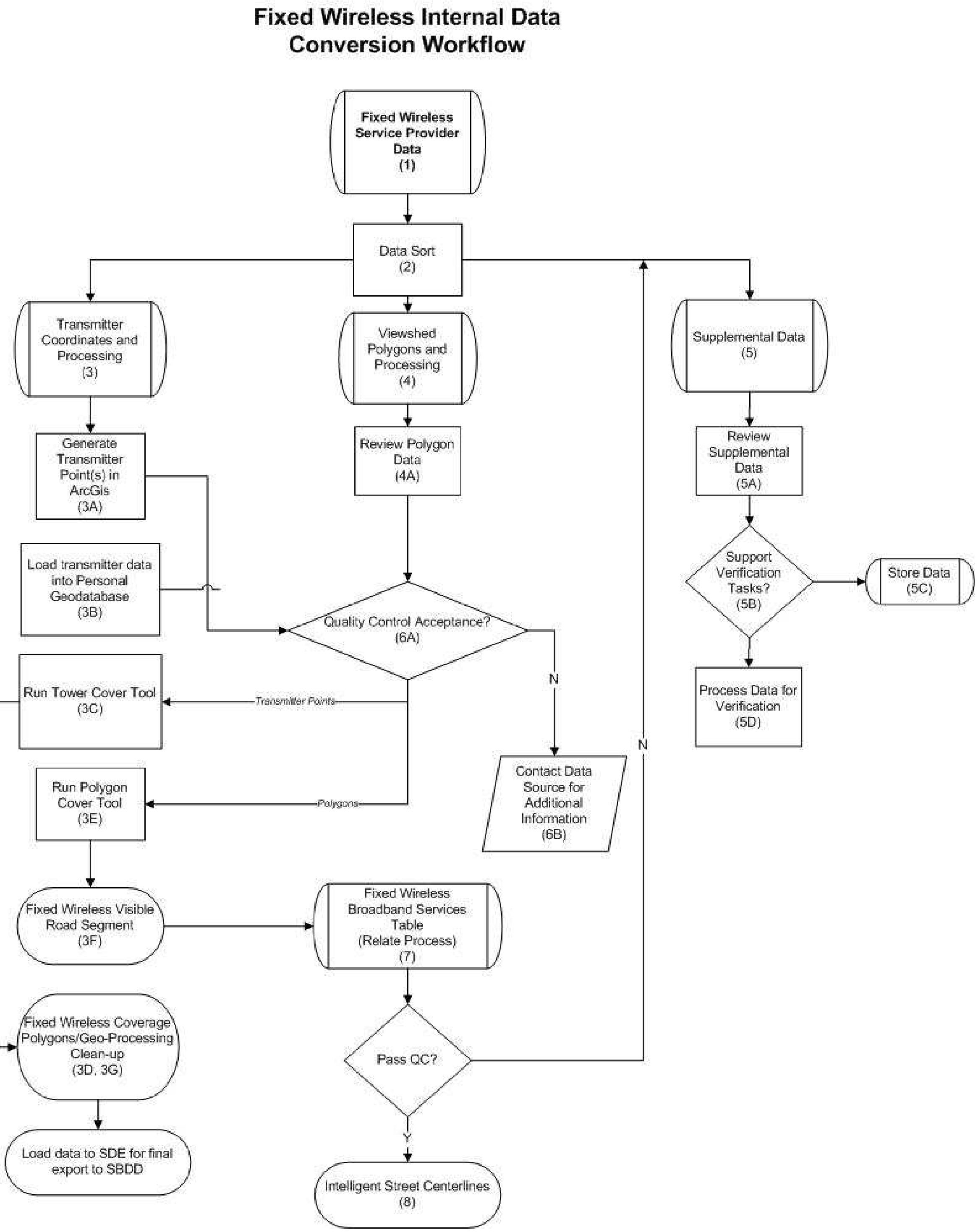


Figure 8 - Fixed Wireless Internal Conversion Workflow

(1) Fixed Wireless Service Provider Data

Service provider data gathered during the data collection phase. Data is cataloged in separate folders by provider and managed according to task and technology of transmission.

(2) Data Sort

The data sort phase of production immediately follows the data collection process. During this task, a thorough review of the service provider data determines the type of data received. Fixed wireless data generally consists of three types: transmitter coordinates and attributes, pre-defined polygons and attributes, and supplemental data. Each type of data follows unique internal processing steps.

(3) Transmitter Coordinates and Processing

Transmitter coordinate data is essentially the raw data necessary to generate a viewshed for each transmitter. In order to be processed, the transmitter source data must have certain required fields such as latitude and longitude, spot (ground elevation), equipment height at the transmitting and receiving ends, horizontal and vertical limitations, and range of transmission. The content of the transmitter data is carefully reviewed for completeness and overall consistency prior to the next step. Once completed, the data is imported into ArcGIS for continued processing and quality control.

(3B) Load Transmitter Data into Personal Geodatabase

Using the newly scrubbed .csv file, transmitter points are created in ArcGIS and the transmitter location points are displayed. A final comparison against supplemental data is performed to ensure the transmitter locations are in the correct locations. Supplemental data includes such layers as imagery, political boundaries, and road centerlines.

(3C) Run Tower Cover Tool

This tool was designed and developed by Sewall to batch process 1 or more transmitter point viewsheds. A screenshot of the tool is shown below as ***Figure 9***.

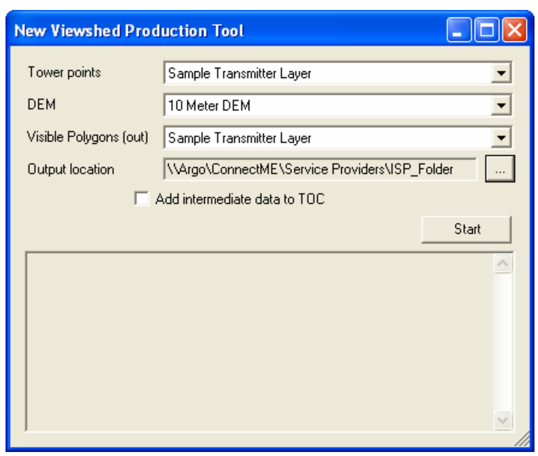


Figure 9 - Tower Cover Tool (Viewshed Production)

Tower Points: The data layer containing records of all transmitters that need a viewshed generated. Originally received from ISP and pre-processed by Sewall for format compatibility.

DEM: 10-meter digital elevation model obtained from MEGIS as the primary surface model for generating the viewshed

Visible Polygons (out): Visible polygons (only) output to an SDE layer

Output location: Location of output to personal geodatabase workspace to be used for additional processing.

(3D) Fixed Wireless Coverage Polygons
The Tower Cover Tool generates raster data sets depicting the visible and non-visible surfaces representing each transmitter. As a final output, the tool extracts the visible components of the raster data and outputs to polygon vector layers stored in the SDE environment as supplemental reference data.

(3E) Run Sewall Polygon Cover Tool
This tool was designed and developed by Sewall to facilitate several production steps.

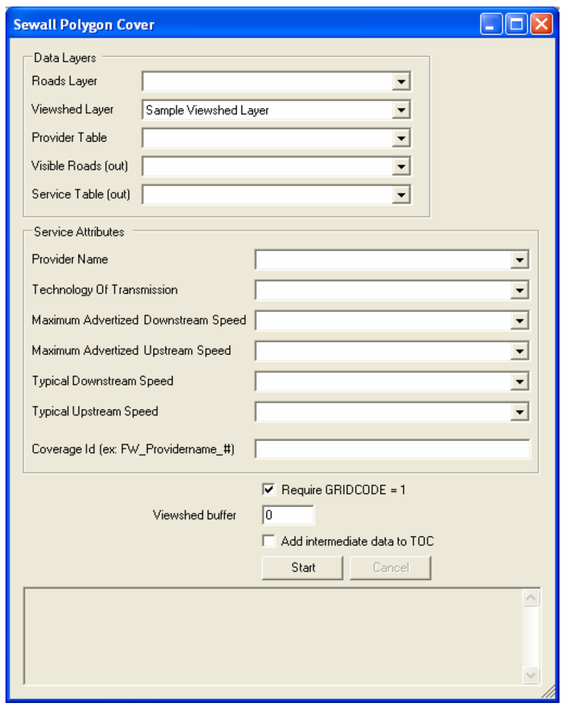


Figure 10 - Polygon Cover Tool
Data Layers: (1) Roads Layer - ConnectME Street data layer with address ranges (2)Viewshed Layer - viewshed layer used toe delineate visible polygons for clipping road segments (3)Provider Table - internal processing flag (4) Visible Roads (out) - output feature class that stores the clipped road segment geometry (5) Service Table (out) - output table that the extracted address ranges populate.
Service Attributes: These fields are populated, if data is available, to meet NTIA NOFA requirements.

(3F) Fixed Wireless Visible Road Segments
The Polygon Cover Tool clips road segments that are within visible polygon viewsheds and writes them out to a polyline vector layer stored in the SDE environment as supplemental reference data.

(3G) Fixed Wireless Geo-Processing Clean-up
The fixed wireless polygons or propagation models generated for each provider step through several geo-processing routines to check for and eliminate the following conditions:

- Single pixels less than 0.125 square miles
- Holes inside the polygons less than 0.125 square miles

In each case, all identified polygons are removed and dissolved to create multipart polygons by provider, technology, speed and spectrum. Each provider's propagation model differs in size and complexity due to the number of transmitters and their individual parameters that determine each view shed. Because the geometries are manipulated through many geo-processing procedures, multiple cycles of validation are run to ensure the geometries are in tact and repair routines are run if necessary. Once all propagation models meet internal quality control standards, the geometry is loaded to SDE and stored for final export to the SBDD deliverable format.

(4) Viewshed Polygons and Processing
Although not as common, another source of data received from the service providers is a polygon dataset that has already been generated to represent visible service territory of transmitters. Service providers or third party vendors will frequently run their own propagation models to be used for broadband mapping. Polygon formats include ESRI shapefiles, MapInfo files, Google .kml files, and raster files. Each format requires a thorough review to determine the subsequent processing steps.

(4A) Review Polygon Data
Although each format listed is unique, the data eventually runs through the Polygon Cover tool so that the address ranges within the polygons can be clipped out. Each format is carefully inspected for content, spatial characteristics and accuracy. The general workflow for each format is as follows:

- Shapefile: Review content > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool
- MapInfo: Review content > Translate to ESRI shapefile > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool
- Google .kml: Review content > Translate to ESRI shapefile > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool
- Raster: Review content > Translate raster to polygon > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool

(5) Supplemental Data
Supplemental data received by service providers is generally used for verification to support internal processing results. It is not used as a data source to generate transmitter locations or viewsheds. Supplementary data includes, but is not limited to, failed service locations, customer service locations, hard copy plots, PDF files, and other digital reference files. In most circumstances, the data can be used for cross-referencing.

(5A) Review Supplemental Data
Each format is unique and so are the processing steps that are necessary to prepare the data for use.

- Failed Service Locations: Provides an excellent source for cross-referencing to viewshed polygons (visible and non-visible) but must have complete address in order to geocode location of address.
- Customer Service Locations: Provides an excellent source for cross-referencing to the viewshed polygons (visible and non-visible) but must have a complete address in order to geocode location of address.
- Hard copy plots: May be used for verification purposes if the content of the material is applicable.
- PDF files: May be used for verification purposes if the data content is applicable.
- Other data sources: All sources are reviewed for potential use.

(5B) Support Verification Tasks
Supplemental data sources are reviewed to determine if they hold any value to the project workflow. Value added data will be stored and utilized as needed to support internal processing.

(5C) Store Data
Data received from service providers that does not have any given value to the project is organized and stored under the service provider folder.

(5D) Process Data for Verification Tasks
Supplemental data sources are scrubbed for compatibility and processed.

(6) Quality Control Acceptance
Quality control procedures are implemented at each of the three production stages depending on the data (transmitter coordinates, viewshed polygons, or supplemental data). Because the service provider data is received in numerous formats, styles, and content, much of the initial QC is completed during the data collection stage. When data is received from a service provider, an initial review is done to determine what is received and what is outstanding. This cycle of communication with the providers continues until all the necessary data is either received or clearly understood that it will not be received. Throughout the data collection process, Sewall keeps an inventory of receivables.

(6A) Contact Data Source for Additional Information
During the data collection phase of the project, questions or clarifications may have been overlooked, or items may present road blocks at some point later during the processing. If an internal quality review does not resolve an issue, the service provider is contacted for additional information or clarification.

(7) Fixed Wireless Broadband Services Table (Relate Process)
The Polygon Cover Tool has two outputs; both generated using the visible polygons created by the Tower Cover Tool: (1) road segments, and (2) calculated address ranges. While the visible road segments are not part of the NTIA deliverable, they are stored as a reference file named CONNECTME.FW_VISIBLE_ROAD_SEGMENTS.

(8) Intelligent Street Centerlines
The output from the fixed wireless workflow is a comprehensive intelligent street centerline network comprised of street centerlines and related service availability tabular records.

4.3.3 Mobile/Satellite Transmission

Wireless broadband technology consists of all facilities-based providers of wireless broadband service that is not address specific. For the State of Maine, this includes terrestrial mobile wireless and satellite broadband service. Mapping mobile wireless and satellite coverage requires less processing than other technologies that are address-based, such as wired and fixed wireless service. Data consists of polygons generated by the providers or third party vendors, representing areas where broadband service is offered. As shown in the workflow below, the data received from providers is sorted, processed and loaded into a geodatabase. Minimal steps are required to process this data, but established internal workflows are taken to ensure that proper protocols and quality assurance are met. The primary steps of the internal workflow are shown in ***Figure 11*** and described below.

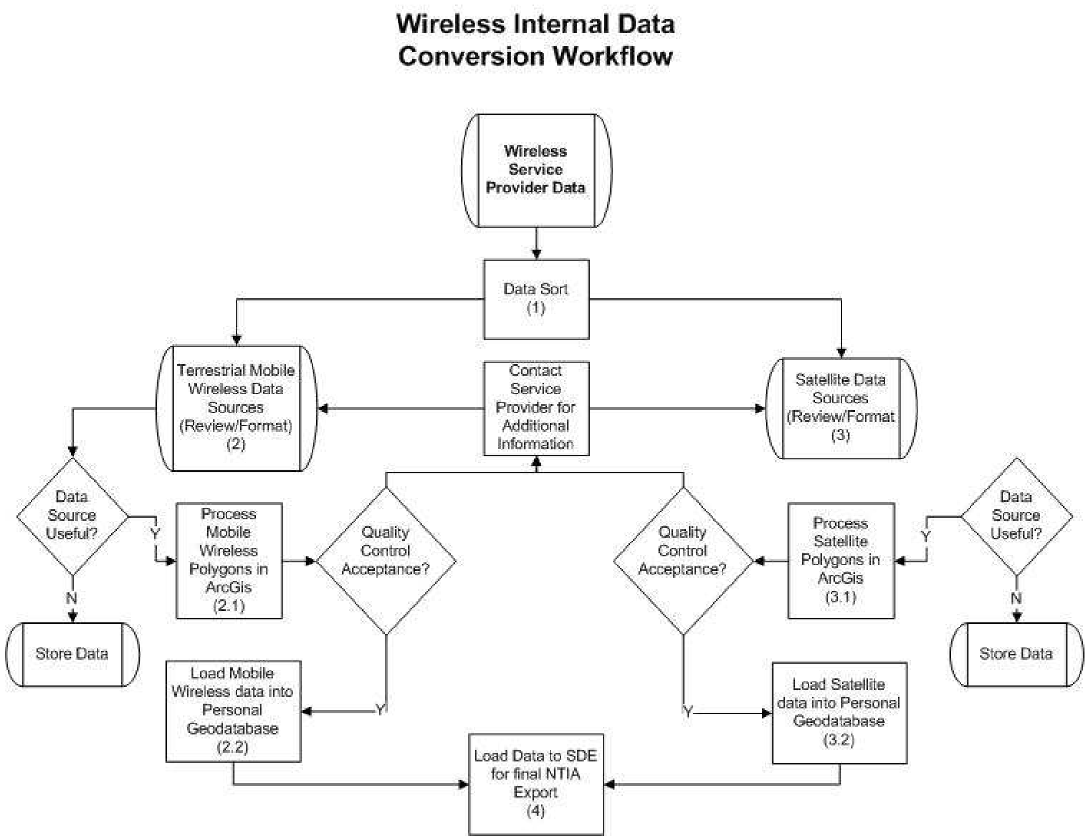


Figure 11 - Wireless Internal Conversion Data Workflow

(1) Data Sort
Upon receiving data from a mobile or satellite service provider, Sewall initially sorts and stores the data by technology - terrestrial or satellite.

(2) Terrestrial Mobile Wireless Data Sources (Review)
After the data is sorted, an initial data analysis is performed to determine if the data received appears to be intact spatially and is accompanied by the proper attribution required for adherence to the SBDD data model. Follow-up with the service provider continues until all necessary information is acquired.

(2.1) Process Mobile Wireless Polygons in ArcGIS
After determining that the data has value, the polygons are projected into the proper coordinate system to complement the internal workflow. Depending on the source data, additional data processing routines may be necessary before loading the data into the geodatabase.

(2.2) Load Mobile Wireless data into Personal Geodatabase
Although the primary quality control procedures are completed during the verification process, initial acceptance testing to ensure the data is spatially valid is performed by cross-referencing to additional data sources such as aerial imagery or information taken from the service provider website. Discrepancies are documented for use in subsequent verification processes. Once quality checks are complete, the data is loaded into a personal geodatabase

(3) Satellite Data Sources (Review)
When all the spatial and attribute information is received, the satellite data follows the same internal workflow as mobile wireless data (Steps 2, 2.1 and 2.2).

(4) Load Data to SDE for final SBDD Export
Mobile wireless and satellite data is loaded to SDE environment for final export to SBDD format.

4.3.4 Middle Mile Locations

Middle Mile and Internet Backhaul Connection Points are defined by NTIA as "interconnection points that typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured." At this stage of the mapping, middle mile data has been the most difficult to obtain from service providers during the data collection process. Service provider networks can include as little as one middle mile location such as a backhaul connection point or as many as dozens, operating as interconnection points within a fixed wireless network reaching out to end users. Furthermore, some service providers may offer middle mile connection points only as a service, such as a splice into a fiber line to support a lateral to a central office or business.

Regardless of the technical framework, all middle mile locations that meet the NTIA definition are captured in a point feature class with additional attribution including the ownership of the facility, serving facility capacity and serving facility type.

The outline of workflow is shown as ***Figure 12***. The description of each step follows.

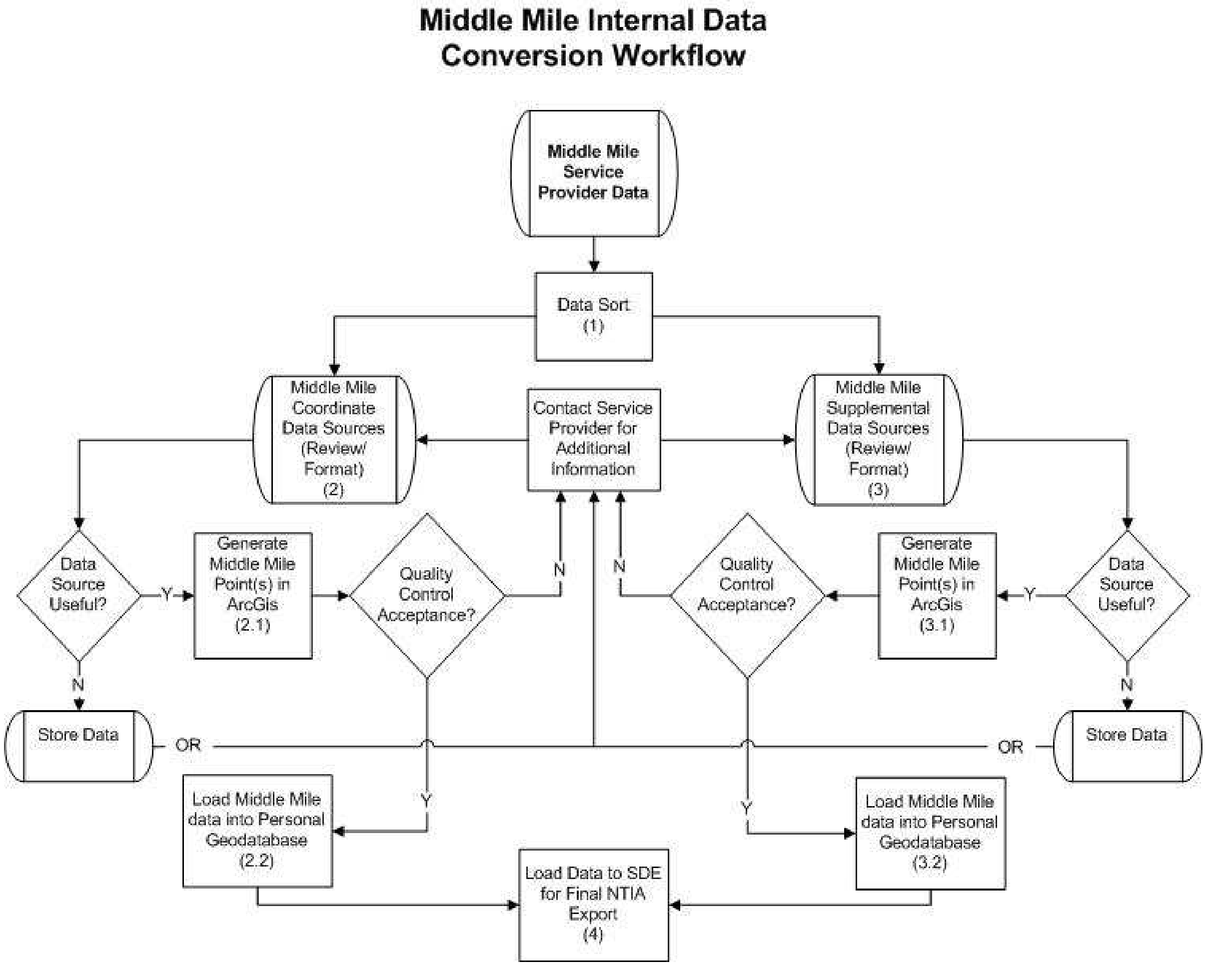


Figure 12 - Middle Mile Internal Data Conversion Workflow

(1) Data Sort

The initial data sort separates the data and distinguishes formats more compatible to the database model, such as middle-mile coordinate values listed in a spreadsheet or ESRI shapefiles. Data received in compatible formats require minimal processing steps. Supplemental data sources generally require additional processing steps. Examples may include the conversion of .kml files to ESRI shapefiles or polyline files that require points to be added at splice or lateral connections.

(2) Middle Mile Coordinate Data Sources Review

Sewall reviews the data to ensure that the information is a valid input. If so, the data is reformatted and loaded into in ArcGIS. Sources deemed as invalid are stored, or the service provider is contacted for additional information if necessary.

(2.1) Generate Middle Mile Points in ArcGIS

Points are loaded into ArcGIS. Sewall analysts run acceptance procedures to verify data translation to ArcGIS and spatial accuracy and completeness using supplemental data sources provided such as addresses, imagery or descriptive information about the point locations. In addition to the point geometry, all attribution carried over in the translation is confirmed.

Conflicts or questions are referred back to the service provider for further clarification if necessary.

(2.2) Load Middle Mile Data into Personal Geodatabase
Middle-Mile data is loaded to a personal geodatabase. Additional data received by the service providers or revisions will cycle through the same process and be stored in the personal geodatabase prior to loading to the SDE environment for final export.

(3) Middle-Mile Supplemental Data Sources (Review)
Supplemental data sources may involve additional processing during this step in order to proceed. Some of the more common supplemental data sources include, but are not limited to, the following:

- Google .kml files
- .jpg images showing middle-mile locations
- AutoCAD point or polyline files
- e-mails with descriptions of locations
- Other miscellaneous information

Once the data has been fully reviewed and normalized, the remaining steps follow the same internal workflow as coordinate data sources (Steps 2.1 and 2.2).

(4) Load Data to SDE for final SBDD Export
Middle mile data is loaded from the personal geodatabase to the SDE environment for final export to SBDD format.

4.3.5 Service Overview

Broadband service providers that participate in the state broadband mapping project have been asked to provide broadband service territory footprints at the address, street, census block or county level. The service overview dataset contains the information that has been delivered at the county level.

The workflow developed by Sewall integrates the gathered data from broadband service providers into a consistent spatial format that is stored in a geodatabase designed to be compatible with the SBDD deliverable.

The service overview workflow is described below and depicted in ***Figure 13***.

Service Overview Workflow

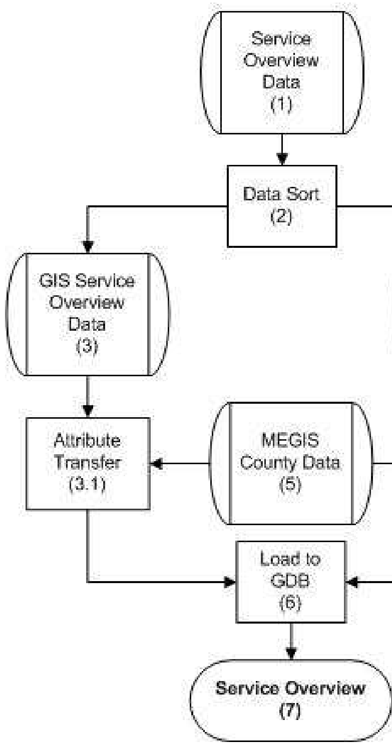


Figure 13 - Service Overview Workflow

(1) Service Overview Data
The Service overview data bin is the storage location for service overview specific broadband service provider data gathered by Sewall. Sewall specifies what information is necessary for this deliverable and what formats are acceptable when contacting each provider during the data gathering phase of the project.

(2) Data Sort
The service overview data is sorted into categories by data type.

(3) GIS Service Overview Data
The GIS data bin is used to store provider data that has been delivered to Sewall with service overview attribution and is in the requested GIS format.

(3.1) Attribute Transfer
Attributes contained in the GIS data are sent through an attribute transfer process that populates county data from the MEGIS County data. This step ensures that there is one consistent spatial dataset utilized as a basemap in the service overview.

(4) Flat File Service Overview Data
The flat file data bin is used to store provider data that has been delivered to Sewall with service overview information in a flat file format.

(4.1) Join
Using county name information provided in the flat files the MEGIS county data is joined to the flat files. The joined dataset is exported and stored in the GIS service Overview data bin.

(5) MEGIS County Data
The shapefile cnty24p.shp was downloaded from the MEGIS website (megis.maine.gov) and utilized for county spatial representation of the service overview dataset during the workflow.

(6) Load to Geodatabase
Once the service overview data has been processed, the data is reviewed for content and accuracy and then loaded to the ConnectME production database.

(7) Service Overview
The output of the service overview workflow is a polygon dataset that is compatible with the SBDD data model.

5 Validation

The validation process is used to ensure that the data delivered is in fact valid and current. Methods used by the Maine team to validate coverage areas include:

- field tests with mobile devices
- responses to surveys sent to residents and businesses
- comparison with third-party datasets both private and governmental
- crowdsourced data (speed test results and feedback forms)

Once the data has been collected, processed and verified, the results are statistically analyzed and plotted atop the original provider data coverages in GIS. Any 'holes' or inconsistencies in the data from the service provider are reported to the provider in a feedback loop to ensure all parties involved are aware of the potential issues with the broadband service in an area.

5.1 Field Tests for Mobile Coverage

Mobile coverage consists of data from providers who offer mobile broadband services to consumers through devices such as smartphones or mobile laptop aircards. Common providers of this type of broadband service in Maine are AT&T, Verizon Wireless, and Sprint.

In order to verify the existence of wired and fixed wireless coverage in an area, direct access to the provider's service is needed. Logistically this would be difficult because transmission receivers, accounts and other equipment would have been required for each of the providers. Instead, the project team opted to gather information through other means, so field tests were only conducted to validate mobile coverage.

Mobile coverage data is received by Sewall from the service providers in the form of GIS polygon files. After these files have been reviewed and properly projected (see **Section 4.3** for details), they can be analyzed in the verification process. The mobile coverage file is compared against the State of Maine boundary file in a GIS application in order to assess the size and location of the coverage area with respect to the State.

5.1.1 Methodology

The methodology developed by the ConnectME Authority to verify mobile coverage in Maine is to select a series of points throughout a provider's coverage and have field crews run tests at these predetermined locations. A minimum of 37 points per coverage area are needed in order for the statistical analysis on the field data to be valid (see Section 5.1.2 for how this was determined).

To select the points for field verification, a 28-square-mile grid was created in GIS and layered with the provider's coverage area, the E911 road layer and the state boundaries. One point was placed per grid block within the provider's coverage network. Each point was placed on a road, usually at road intersections for ease of access by the field crew. Once all the points were placed, the points were divided into groups for distribution to field crew personnel.

The points were assigned attributes of point ID, latitude and longitude. The attribute table was then exported to an Excel file for further editing. The columns: field connect, upload speed, download speed and notes were added to the spreadsheet. The field connect column holds values to describe whether the field crew was able to log on to the provider's network., speeds collected from the state website at that location are stored in the upload speed and download speed columns. The spreadsheet was loaded onto the field laptops for data entry.

Crews utilized Microsoft Streets & Trips to assist in navigating to each of the field points across the state. The software, which was loaded on each of the field laptops, has a GPS component that could track and direct field crews. The spreadsheet used for data entry was also loaded into the software so the points could be plotted based on given coordinates. The field crews could properly identify each of the points based on the Point Name attribute.

The program turned each of the points into a "stop." The start and ending points of the trip were also added, allowing the software to calculate an optimized route to reduce driving time and mileage. After optimization, the software also provided driving directions, which were saved and loaded onto the field laptops.

Mobile broadband aircards from each of the mobile service providers were purchased outright directly from the providers. This eliminated the need for a service contract so that the aircards can be deactivated after the verification process without a contract cancellation fee. Service providers activated the mobile aircards with a month-to-month data package of 5GB.

Aircards from each of the providers were then loaded onto the field crew laptops. The software from the aircards was installed, aircard functionality was checked, and any updates were installed prior to crews leaving the office.

Each time verification tasks are performed, the points are visited by a field crews who are equipped with a field laptop enabled with the mobile broadband aircard of the corresponding service provider and proper navigation information. The field crews drive to each of the points, log onto the service provider's network and navigate via Internet Explorer to an internet speed test website created by the James W. Sewall Company specifically for the ConnectME Broadband Mapping Project.

For each test point, the point number, service provider and date are entered into the internet speed test website (e.g., Test_745_verizon_20100521) and a test is executed. Results are recorded both in the speed test database (automatically) and in the spreadsheet. Once all of the points are completed, crews return to the office and spreadsheets are combined. Data columns are filled in with corresponding broadband upload and download speeds for sites with connectivity.

Data points are then plotted on maps to view where broadband coverage is full strength or where it is lacking. If there are large 'holes' in the coverage areas, the points are revisited to ensure that readings were accurate and not subject to user or equipment error.

5.1.2 Statistical Process Validation

Large data sets are often expressed best in terms of summary statistics. It is often easier to look at commonly defined statistics (stats) to get a quick overview of what the data describes, than to look at all the raw data. A sample set of data points field testing was selected. The following steps were taken to ascertain that the sample set was statistically representative of the actual data.

In analyzing this data, we chose statistics using the following criteria:

- Commonly used and understood
- Fit the data (data type) in question
- Had practical application to the reader in understanding what the data was describing

We believe that the statistics presented can be beneficial in several ways:

- Description/Summary: they consolidate many data observations into a few summary stats that can be quickly compared
- Quantification: they describe which portion of the data falls within or outside of the limits of acceptable criteria
- Reliability/Prediction: in some cases, they attest to the reliability of the data collection

The following statistics were used:

- Number of samples (n): number of data points in the sample
- Average (xbar): arithmetic mean or the mean value of a set of integers, terms, or quantities, expressed as their sum divided by their number.
- Standard Deviation (sd): used as a measure of the dispersion or variation in a distribution, equal to the square root of the arithmetic mean of the squares of the deviations from the arithmetic mean.
- Percentages (%): a proportion or share in relation to a whole; a part; a fraction or ratio with 100 understood as the denominator (e.g., 0.98 equals a percentage of 98).
- Hypothesis testing: statistical process used when trying to determine if it is reasonable to conclude that the entire population possesses a certain characteristic by the analysis of a sample.

Explanation of choices made:

- Quantitative statistics were only applied on sample data that fell within the published service area of the provider in question. This was possible because the area was "bounded" by the geographic area described in the "service area." Outside the service area there is no bound (limit), so these same statistics would not be reliable as used with our methodology.

- Assumed a normal distribution because this is the most common and typical distribution type for this type of data, and we had no evidence to counter this assumption.
- Chose sample statistics because we were not dealing with the whole population (almost unlimited sample points possible).
- Chose hypothesis testing because we wanted to have the most valid predictor of the population parameters given the variability of our sample data.
- Chose student's T-distribution when sample size was equal to or less than 30 (n=<30) and Z-test when populations were above 30 (n>30).
- Used one-tailed tests because we were interested in the area above the curve from a single lower parameter (criteria of minimum speed).

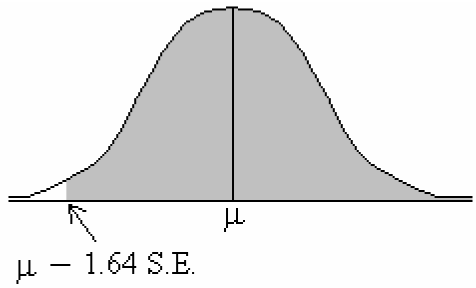
Data was sorted to yield only those sample points that fell within the published service area of the provider in question.

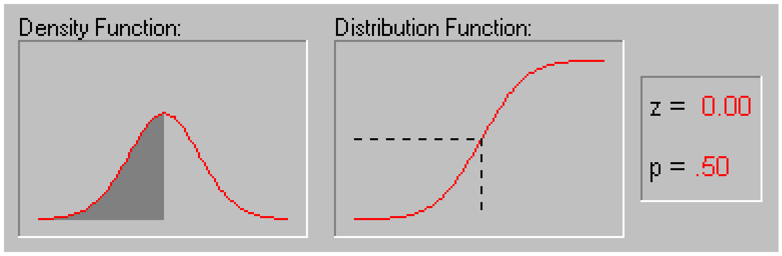
Then the following information was calculated:

- n = number of total sample points
- Degrees of Freedom (df) = n-1
- Selection of t-distribution (df < 30) or standard normal curve (df >= 30)
- Percent of points where connection was established
- Percent of points where both tested upload and download speeds were equal to or greater than (=>) broadband speeds (200 and 768 kb/sec respectively).
- Percent of points where either the upload or download speed was equal to or greater than (=>) broadband speed, but not both.
- Percent of points where neither the tested upload or download speeds was equal to or greater than (=>) broadband speeds.

Using all data points within the designated service provider coverage that registered an upload speed during the test, the following were calculated:

- Average # of points where a connection was made that had an upload speed equal or greater than broadband minimums.
- Average upload speed (xbar/upload)
- Standard deviation of the sample (SD/upload)
- Statistical prediction of percent of points that would meet minimum 3G upload speed in subsequent samplings (using one-tailed t-test or z-score, depending on df) – see schematic below





Using all data points within the designated service provider coverage that registered a download speed during the test, the following were calculated:

- Average # of points where a connection was made that had a download speed equal or greater than broadband minimums.
- Average download speed (xbar/download)
- Standard deviation of the sample (SD/download)
- Statistical prediction of percent of points that would meet minimum 3G upload speed in subsequent samplings (using one-tailed t-test or z-score, depending on df) – see schematic above.

The sampling method was determined to be valid. ConnectME is collecting enough sample points to be a statistically valid representation of the data.

5.2 Surveys

The project team is surveying residents and businesses in Maine utilizing a questionnaire about their current internet connections. The ConnectME Authority has opted begin the verification of residential broadband service with a pilot survey.

5.2.1 Pilot Residential Survey

According to the 2000 Census, there are approximately 518,000 households in Maine, of which 10,000 were included with the pilot survey. Residential addresses were purchased from InfoUSA for the mailing as 2,500 addresses in each of four geographic areas: Maine North, Maine South, Maine East, and Maine West. Addresses were selected at random by InfoUSA from the provided GIS polygons constituting adjacent census blocks in each area containing approximately 5000 households.

The survey questionnaire is comprised of 10 questions and takes about two minutes to complete. A copy is included in **Appendix E**.

The survey identifies the consumer by the physical address, which is geocoded against a street centerline file in GIS to create a point file. The data associated with each address (e.g., transmission type and provider) is analyzed by layering the consumer information with the coverage data provided by the service provider. Sewall can analyze the layers to verify if each service provider does cover the areas represented by the data it submitted. In addition, if an area shown to have no service by a provider appears in the consumer survey, the provider in question can be contacted to confirm and provide updated coverage information.

There is also an online version of the survey that people can access by navigating to a link indicated on the delivered hardcopy of the questionnaire. The electronic version, once completed, directs the person to the ConnectME internet speed test website, which reports the upload and download speeds of the user's internet connection. The speeds are recorded in a database that tracks entered physical address and speed test results for future analysis (see Section 5.4.1 for further details).

5.3 Third Party Data

The Maine team has acquired data from Mosaik Solutions (American Roamer) and from the FCC. These datasets will be used to validate the mapped coverage for each provider through spatial analysis.

5.3.1 Mosaik Solutions data

Maine acquired Mosaik Solutions (American Roamer) data, which includes coverages for Sprint, Verizon Wireless, AT&T and T-Mobile. The data consists of polygon shapefiles, which Sewall could overlay with the coverages received from the providers. For each provider, the area in common and the area covered only by one dataset were determined from geospatial analysis. Differences are used for analysis and refinement of the service territory.

5.3.2 FCC Form 477 aggregate data

The FCC has provided SBDD grantees and their teams access to the FCC Form 477 aggregate data. This data contains information on service providers in Maine at an aggregate or granularity higher than the SBDD data, but is useful for checking the list of providers and their locations at Census Track level.

The project team has recently developed a tool that compares the records in the Form 477 aggregate data to the provider data in the SBDD project database. The tool lists out by Census Track each provider that includes the tract in the Form 477 filing. Each provider that has service data that falls within the tract is considered a match. Using this data, the team has been able to find potential providers that were not previously included in the study, as well using the tract locations as a cross-reference to where each provider has service. The team has plans to further enhance the tool to provide a set of results centric to each provider.

5.3.3 Maine Office of GIS E911 data

The Maine Office of GIS (E911 Services Group) provided the Maine team with a listing of the first and last address of each street in the E911 database, along with a count of households located on each street. This is referenced as the Automatic Location Identification (ALI) database. As a first step in the validation process, the information in this file was cross-referenced to each broadband provider in our broadband mapping database. As a result, potential coverage gaps in broadband service were flagged and prioritized based on the number of household counts for the street. Gaps with potential high household counts were given a higher priority than those with minimal households. The Maine team has completed this initial validation step and is currently developing follow-up procedures to target the gaps with high priority flags.

5.4 Crowdsourced Data

5.4.1 Speed test results

For the SBDD project, the ConnectME Authority has implemented an online speed test tool. The website was developed by Ookla Net Metrics and was brought online on January 13, 2010. To date, over 12,000 tests have been recorded. The speed test stores downstream and upstream speeds as well as the user's address and ISP. The results from the speed test tool are scrubbed and geocoded. The information will be used to help verify service coverages and service speeds for wired, fixed wireless, and satellite providers.

5.4.2 FCC Consumer Broadband Test (CBT) data

The Consumer Broadband Test data provided by the FCC consists of three datasets: Speed Test records, Mobile Broadband Speed Test records, and Broadband Dead Zone Report records. The project team plans to incorporate the FCC speed test records along with those records captured by the ConnectME speed test tool. However, the name of the service provider is not included with data, so a method for mapping the IP address in these records to the appropriate provider must be developed.

The dead zone reports are used to identify locations reported to be without coverage. The addresses from these records are geocoded and then are cross-referenced with service provider coverages in the areas.

5.4.3 Public feedback records

As part of the interactive broadband availability map website, the ConnectME Authority has included a form for public feedback on the results of an address level search on broadband service. Using the form, someone can enter information regarding broadband at his/her location. The feedback records are used to help identify areas where broadband service may be in question and will lead the team to take additional steps to verify service coverage in these areas.

5.5 Service Locations / Failed Service Locations

Service providers are encouraged to submit service locations and/or failed service locations to help validate extents of service coverage. The service addresses and failed service addresses are geocoded and the data is analyzed with the coverage data submitted by the service provider. This validation step will continue throughout the project as the team continues to receive these locations as part of the providers' data submittals.

5.6 Feedback Loop

Once broadband service territories are mapped, Sewall generates maps for each provider company representing the status of data at the time of the mapping. This gives each service provider the opportunity to validate its broadband service footprint and provide feedback to the Sewall project team. ***Figure 14*** below represents a fixed wired validation map where a provider company's broadband service (DSL) foot print is symbolized in red. Depending on the size of a service footprint and map density, additional information, such as road names, may be represented.

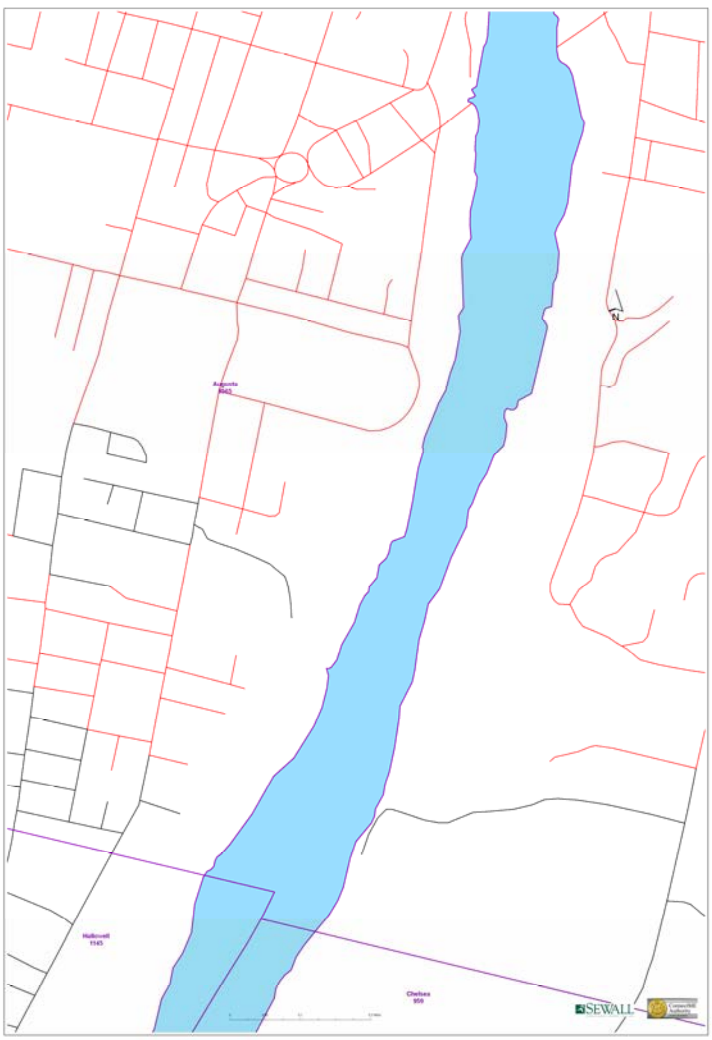


Figure 14 - Fixed Wired Validation Map

Sewall forwards the maps of the service territory, along with any anomalies noted from the third-party and crowd-sourced data analysis to each service provider. Sewall communicates regularly with each provider to ensure that the mapping is as comprehensive and correct as possible.

Sewall also generates maps for mobile service providers showing the coverage and service levels according to FCC and NTIA standards. ***Figure 15*** below represents a sample validation map showing FCC-defined levels of service. Town lines and town names are shown.

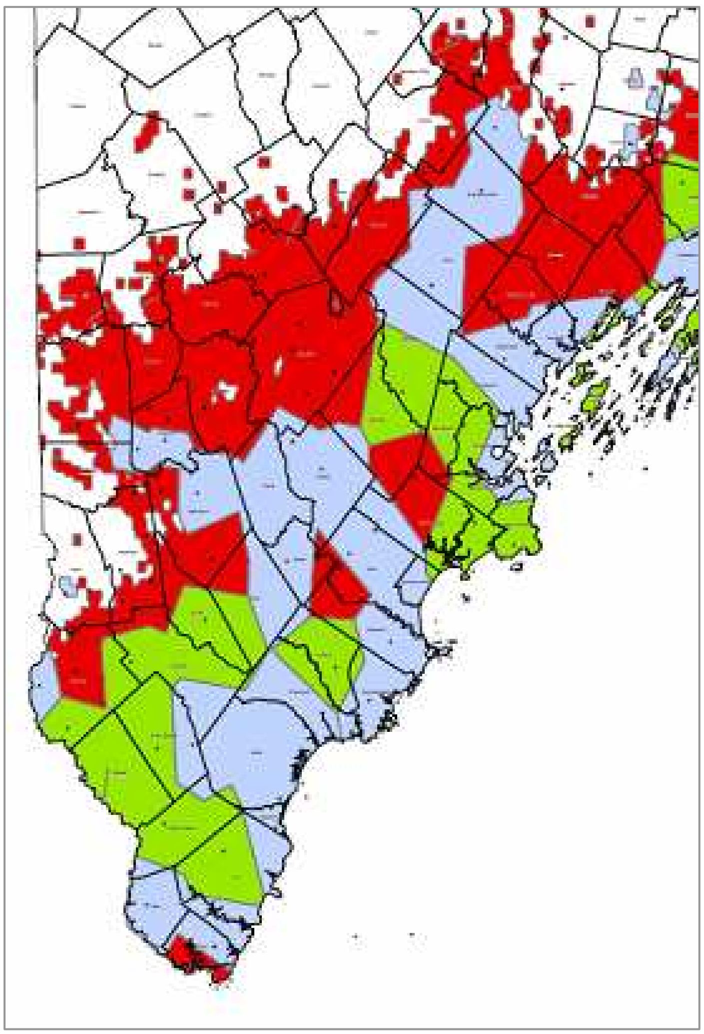


Figure 15 - Mobile Validation Map

5.6.1 GeoPortal Transfer Site

In August 2011 Sewall deployed a web-based GeoPortal site to manage all data transfers related to the ConnectME Authority Broadband Mapping Project, see ***Figure 16***. Each broadband service provider has a secure password-authenticated account set up which allows designated users to upload and download digital data. All users receive an e-mail notification when their account is set up.

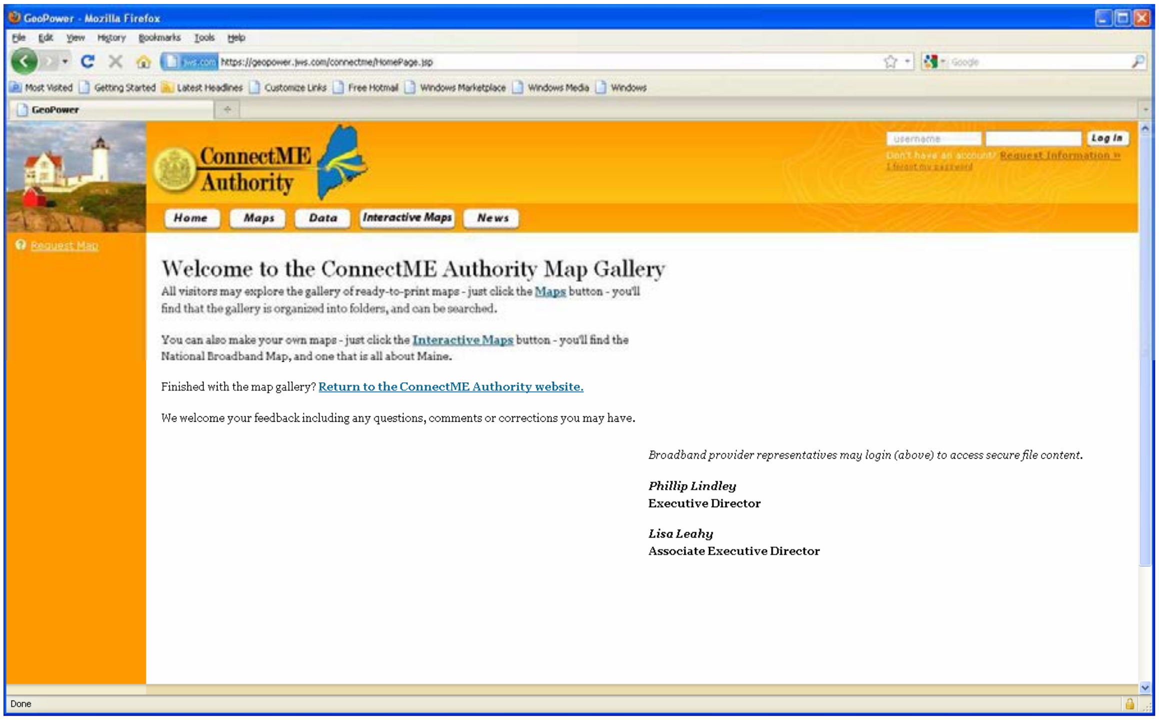


Figure 16 – Screenshot of GeoPortal web site

Data exchanges between Sewall and the service providers will include, but not be limited to, data round submissions, validation maps and other miscellaneous correspondence. In addition to data transfers, the GeoPortal will also be used by the general public for viewing the static maps posted in the map gallery. Currently the map gallery contains statewide maps representing FCC speed tier coverages, broadband service availability for Maine house and senate legislative districts and grant overview maps depicting awarded ConnectME Authority grant applications throughout the state.

6 Data Delivery

Service provider data that has been processed to the Sewall production model needs to be transferred to the SBDD data model for delivery. In order to accomplish this Sewall has developed a process by which the Sewall production datasets are exported to the current SBDD data model structure.

The Sewall production model was designed with the NTIA delivery model in mind and, in as many cases as possible, the production model utilizes the NTIA delivery defined attribute definitions and domain values. Through the use of this design philosophy, Sewall has mitigated the pitfalls for exporting to the SBDD data model.

To facilitate the transfer of data stored in the Sewall production model to the SBDD model for delivery Sewall has developed an ArcCatalog tool named State Broadband Data Export. This tool reads a source geodatabase set of features and writes to a destination geodatabase set of features. A screenshot of the tool dialog box is shown in ***Figure 17***.

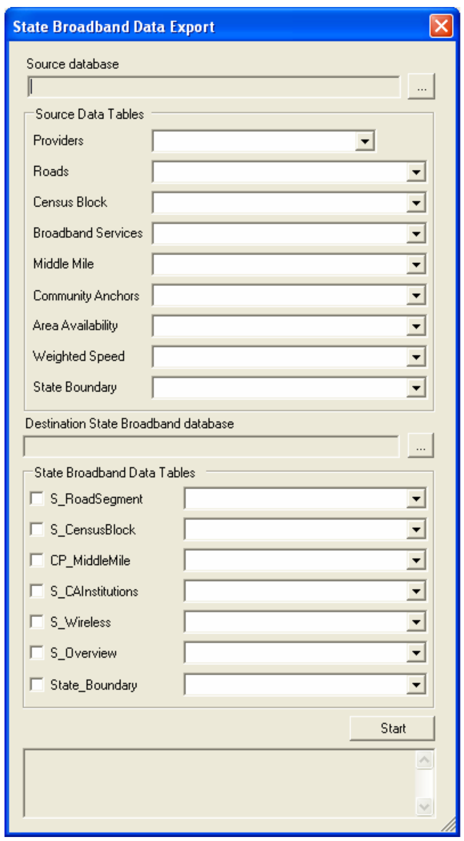


Figure 17 - State Broadband Data Export Tool
Source database: Sewall production geodatabase location.
Source Data Tables: (1) Providers - Geodatabase table with list of provider specific information (2) Roads - ConnectME street centerline feature class (3) Census Block - Census 2010 block geodatabase feature class (4) Broadband Services - Geodatabase table containing broadband provider characteristics and street ranges linked to ConnectME street centerline segments (5) Middle Mile - Geodatabase point feature class containing broadband service provider middle mile locations (6) Community Anchors - Geodatabase point feature class

containing community anchor institution locations (7) Area Availability - Geodatabase polygon feature class containing mobile wireless and satellite broadband provider coverage (8)Weighted Speed - Geodatabase polygon feature class service overview data (9) State Boundary - Geodatabase polygon feature class portraying the Maine state boundary.
Destination State Broadband database: SBDD geodatabase location.
State Broadband Data Tables: These are the required SBDD deliverables.

On launching the ArcCatalog tool, the user selects the source and destination geodatabases for the transfer process. The source geodatabase is the Sewall internal production model, and the destination geodatabase is the empty SBDD model. Next the user matches the items listed in the Source Data Tables section to the production model features. Once complete, the user checks which deliverables the tool will export in the State Broadband Data Tables section. Clicking ‘Start’ will begin the export process.

The road segment and census block exports are performed simultaneously in the State Broadband Data Export Tool with road segments being reported in census blocks greater than 2 square miles and census blocks being reported in areas up to 2 square miles. The tool reads the service provider data stored in the Sewall production geodatabase and performs an analysis through which the deliverables are extracted. The analysis process by which the tool extracts the road segments and census block data is outlined in the whitepaper entitled “Misalignment between Census Blocks & Maine E911 Streets: Technical Whitepaper,” dated 30 September 2011. This paper is included in **Appendix D**. The switch from 2000 Census Blocks to 2010 Census Blocks for the October 1st 2011 delivery caused the team to re-evaluate the export process as the 2010 Census Blocks were reported to be a closer match to the Maine E911 street dataset. The finding of that study revealed that the 2010 Census Blocks still had spatial misalignments with the Maine street dataset and the conclusions of the study in **Appendix D** are still valid.

Once the census block data has been exported it is run through a QC routine. As the census blocks are created from broadband data at the street level and there is a spatial misalignment between the two datasets erroneous data can be created through the export process. The exported census block data is checked against the baseline broadband street dataset for inconsistencies.

Middle mile and community anchor institution data are stored as point features in the Sewall production model and are extracted utilizing a standard export routine. The datasets are reprojected from the production UTM projection to the SBDD WGS84 projection and LAT/LON attributes are populated. Once complete, the points are loaded into the destination feature classes of the SBDD geodatabase.

Wireless, service overview and state boundary data are stored as polygon features in the Sewall production model and a standard export routine extracts these to the SBDD features. The datasets are reprojected from the production UTM projection to the SBDD WGS84 projection as features are loaded.

Address data that has been collected is stored as point features in the Sewall production model and exported to the SBDD geodatabase using standard export routines within ArcGIS.

During the export process features with front-end business rule violations get reported. The report is than reviewed by a Sewall analyst, and necessary corrections are made to the base datasets. This reporting mechanism ensures the data delivered in the SBDD geodatabase is as complete and accurate as the provided data sources allow.

Once the SBDD transfer file geodatabase has been created and its content validated, the geodatabase files are included in the data submittal zip file along with the other submittal files including ‘datapackage.xls,’ schema modifications report, data verification summaries, and this technical whitepaper.

Appendix A - Sample Letter to Service Providers

[date]

Sewall
P.O. Box 433
136 Center St.
Old Town, ME 04468
207-827-4456

[address]
[address]
[address]
[address]

Dear Mr. [name]:

The National Telecommunications and Information Administration (NTIA) of the U. S. Department of Commerce has been charged by Congress under the American Recovery and Reinvestment Act of 2009 and the Broadband Data Improvement Act (BDIA) to develop and maintain a comprehensive, interactive, and searchable nationwide inventory map of existing broadband service capability and availability in the United States that depicts the geographic extent to which broadband service is deployed and available from a commercial or public provider throughout each state (the Program).

The ConnectME Authority (the Authority) is responsible for developing and maintaining these data for the State of Maine and for serving as the conduit for this information to the NTIA. The Authority has contracted with James W. Sewall Company of Old Town, Maine, to undertake the initial mapping and to consult with the Authority on how best to update and maintain these data going forward.

We are writing to insure that you are familiar with this Program and to invite your collaboration in teaming with us in this important, statewide initiative. (See the URL's provided at the end of this letter for further information.) Indeed, your organization's collaboration is essential to the Program's success, and we thank you in advance for your participation.

To comply with the Program, the NTIA requires each state to provide structured data that includes:

- the availability of broadband service at the address level;
- advertised and "expected actual" speeds of broadband service;
- the technology used to deliver broadband service;
- location and capability of critical broadband related infrastructure (this data will not be publicly displayed on the national broadband map);
- the spectrum used by wireless broadband service providers.

We expect that the publicly searchable national broadband map and database will contain:

- geographic areas in which broadband service is available;
- the technologies used to provide broadband service in such areas;
- the speed at which broadband service is available in such areas;
- broadband service availability at public schools, libraries, hospitals, colleges, and all public buildings used by the state or municipalities.
- other economic or demographic data that may enable Federal efforts to provide usable and searchable data on a variety of issues pertinent to the public interest.

We recognize that some of the data we will ask you to provide is proprietary. Consequently, we include a Protective Order authorized by the ConnectME Authority and an accompanying non-disclosure agreement (NDA) for your review and execution. Please note, however, that the NTIA requires that this NDA may not restrict the Authority from providing all data collected to the NTIA or restrict the NTIA's use of such data as contemplated under this Program, including sharing such data with the FCC or other federal agencies. Furthermore, the NTIA prohibits the Authority or Sewall from agreeing to a more restrictive definition of Confidential Information than that adopted by the NTIA. Currently, as required under the BDIA, the NTIA identifies Confidential Information as any information, including trade secrets, or commercial or financial information, submitted under the Program that:

- identifies the location, type and technical specification of infrastructure owned, leased or used by a specific broadband service provider; or
- explicitly identifies a broadband service provider in relation to its specific service area or at a specific service location.

Confidential Information will not be made publicly available pursuant to the limits set forth in the BDIA except as required by applicable law or judicial or administrative action or proceeding, including Freedom of Information Act requirements. From the BDIA (§ 106(h)): "Notwithstanding any provision of Federal or State law to the contrary, an eligible entity shall treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except as otherwise mutually agreed to by the broadband service provider and the eligible entity." Sewall was chosen to lead this task in part because of its long history of handling confidential information for a variety of industries. Finally, should your organization apply for a Broadband Technology Opportunities Program (BTOP) grant to support the deployment of broadband infrastructure in unserved and underserved areas, enhance broadband capacity at public computer centers or to encourage sustainable adoption of broadband service, the NTIA requires that you participate in this mapping Program.

The NTIA has set a very aggressive Program schedule, with many deliverables due by November 2009 and all initial deliverables due in March 2010. Consequently, a representative from the Sewall team will be contacting you soon to discuss any questions you may have and to facilitate completion of the NDA and your participation. If we should be in communication with others in your organization concerning either the NDA or the data transfers, please inform the Sewall representative as soon as possible. Thank you again and we look forward to working with you.

Sincerely,

Phillip W. Lindley, Executive Director
ConnectME Authority

James H. Page, CEO
James W. Sewall Company

URLs for:
www.maine.gov/connectme
www.ntia.doc.gov/press/2009/BTOP_mappingtotals_090909.html

Appendix B - ConnectME Authority Protective Order

STATE OF MAINE December 21, 2009

CONNECTME AUTHORITY PROTECTIVE ORDER
(Proprietary Business Information)

Pursuant to 35-A M.R.S.A. § 9207(1) and Rule Chapter 101, § 4, the ConnectME Authority (Authority) may designate information as confidential to protect the legitimate competitive or proprietary interests of communications service providers and mobile communications service providers. The Authority may designate information as confidential only to the minimum extent necessary to protect such legitimate competitive or proprietary interests. Information designated as confidential is not a public record under 1 M.R.S.A. § 402(3).

The Authority is currently conducting a Broadband Mapping and Inventory Project with the services of a private contractor, James Sewall Company (Sewall). Sewall is required to obtain data from service providers (Provider) by the Authority and the National Telecommunications and Information Administration (NTIA) pursuant to the Broadband Data Improvement Act (BDIA) and the NTIA Notice of Funds Availability (NOFA). The NTIA requires that the Authority agree to comply with confidentiality requirements in section 106(h)(2) of the BDIA.

It is anticipated that providers submitting data to Sewall or the Authority may have a need to provide information considered to be confidential, in that the information provided may involve commercially sensitive and/or proprietary information regarding information that identifies (i) the location, type, and technical specifications of infrastructure owned, leased, or used by providers or (ii) explicitly identifies providers in relation to their specific service area or at a specific service location (collectively, the “Confidential Information”). The Authority has determined that such Confidential Information is generally not disclosed publicly, and that the public disclosure of such Confidential Information without restriction would cause competitive harm to the applicant or provider.

Accordingly, the following terms shall apply unless and until modified by the Authority or a court of competent jurisdiction:

1. Data submitted to Sewall or the Authority falling within the above definition of Confidential Information, as well as any data submitted to Sewall or the Authority pursuant to the Non-Disclosure Agreement set forth in Attachment A , (collectively, “Designated Confidential Information”) shall be deemed to be competitively sensitive and/or proprietary in nature and such Designated Confidential Information shall be and remain exempt from public disclosure pursuant to the terms of this Protective Order and the articles referenced therein.

2. All Designated Confidential Information shall be and remain exempt from public disclosure pursuant to the terms of this Protective Order, unless removed from the coverage of this Protective Order as provided below or otherwise by a court of competent jurisdiction. No persons provided access to any Designated Confidential Information by reason of this Protective Order shall use such information for any purpose other than the purposes designated by the Authority. Every person provided access to Designated Confidential Information shall use his or her best efforts to keep the Designated Confidential Information secure and shall not publicly disclose it or accord public access to it to any person not authorized by the terms of this Protective Order.

3. Any person or the Authority may challenge the designation of any document or other information as Designated Confidential Information. The Authority will provide reasonable prior notice to the applicant or provider and an opportunity for hearing prior to ruling on any such challenge. In considering any such challenge, the usual burdens of proof and production shall apply and no additional presumption shall be given as a result of the prior acceptance by the Authority of material as Designated Confidential Information. In the event the Authority should rule over the objections of the person providing the Designated Confidential Information that any information should no longer be subject to the terms of this Protective Order, such information shall not be publicly disclosed until the later of five (5) business days after the Authority so orders

or, if the person files within such five day period an appeal or request for stay of such order, the date upon which such appeal or request for stay is decided; provided, however, that said periods may be extended in accordance with any stay ordered by the Authority or a reviewing court. Upon the entry of a final unappealed decision by the Authority or a reviewing court granting public disclosure, the terms of this Protective Order shall cease to bind any person with respect to the information that the order granting disclosure shall have expressly and clearly removed from the coverage of this Protective Order.

4. Any person provided access to Designated Confidential Information shall review and be bound by the terms of this Protective Order. Prior to obtaining access to any Designated Confidential Information, such person shall sign an acknowledgment of his or her obligation to abide by the terms of this Protective Order in the Non-Disclosure Agreement (NDA) attached hereto as Attachment A.

5. Unless modified by the Authority or a court of competent jurisdiction, access to Designated Confidential Information shall be limited to Authority Staff, Sewall, any independent consultants or experts retained by the Authority, the National Telecommunications and Information Administration, and those designated persons, who have signed the NDA.

6. No copies of Designated Confidential Information shall be circulated to persons other than those authorized under paragraph 5 of this Protective Order. Persons authorized under paragraph 5 hereof also may take such notes as may be necessary. Such notes shall be treated as Designated Confidential Information.

7. The restrictions upon, and obligations accruing to, persons who become subject to the terms of this Protective Order shall not apply to any Designated Confidential Information submitted in accordance with this Protective Order if the Authority rules, after reasonable notice to the applicant or provider and an opportunity for hearing, that such Designated Confidential Information was publicly known at the time it was furnished or has since become publicly known.

8. Where reference to Designated Confidential Information is required in any Authority document, such reference shall be by citation of title or attachment number only or by some other non-confidential description to the extent possible.

9. Designated Confidential Information furnished to the Authority pursuant to this Protective Order shall remain in the possession of the Authority, under seal, and subject to the terms of this Protective Order, until the Authority or a court of competent jurisdiction shall otherwise order.

10. The terms of this Protective Order may be modified on motion of any person or on the Authority's own motion upon reasonable prior notice to the applicant or provider and an opportunity for hearing.

BY ORDER OF THE CONNECTME AUTHORITY

Phillip Lindley, Executive Director

ATTACHMENT A [Non-Disclosure Agreement]

Appendix C - Template for Non-Disclosure Agreement

NON-DISCLOSURE AGREEMENT

THIS AGREEMENT is made this ________ day of _________________, 20___, by and between ____, a _________________________________ having a principal place of business at ____ ("PROVIDER") and ConnectME Authority, a body corporate and politic and a public instrumentality of the State of Maine established pursuant to 35-A M.R.S.A. § 9203 (the "AUTHORITY") and James W. Sewall Company, a corporation organized under the laws of the State of Maine and having a principal place of business at 136 Center Street, Old Town, Maine 04419 ("SEWALL") (AUTHORITY and SEWALL individually or collectively referred to as "RECIPIENTS") (PROVIDER AND RECIPIENTS collectively referred to as the "Parties").

Recitals

WHEREAS, the National Telecommunications and Information Administration (the "NTIA") of the United States Department of Commerce has been charged by Congress under the America Recovery and Reinvestment Act of 2009 (the "ARRA") and the Broadband Data Improvement Act (the "BDIA") to develop and maintain a comprehensive, interactive, and searchable nationwide inventory map of existing broadband service capability and availability in the United States that depicts the geographic extent to which broadband service is deployed and available from a commercial or public provider throughout each state (the "Data"); and

WHEREAS, the AUTHORITY is responsible for developing and maintaining the Data for the State of Maine and for serving as a conduit for the Data to the NTIA; and

WHEREAS, SEWALL is contracted by the AUTHORITY to undertake the initial mapping and to consult with the AUTHORITY on how best to update and maintain the Data going forward; and

WHEREAS, the PROVIDER has trade secrets and commercial or financial information relating to the location, type, and technical specifications of infrastructure owned, leased, or used by PROVIDER, which is included in the Data (the "PROVIDER Information"); and

WHEREAS, the PROVIDER has agreed to provide PROVIDER Information to SEWALL and/or the AUTHORITY pursuant to the requirements of the ARRA and the BDIA for use by the NTIA.

NOW THEREFORE, for and in consideration of the mutual promises and covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. As requested in writing by PROVIDER, RECIPIENTS agree to hold in absolute and strict confidence and shall not disclose or reveal in any manner or form to any entity other than the NTIA any PROVIDER Information identified as confidential that identifies (i) the location, type, and technical specifications of infrastructure owned, leased, or used by PROVIDER or (ii) explicitly identifies PROVIDER in relation to its specific service area or at a specific service location (collectively, the "Confidential Information"), whether such disclosure was made orally, in writing, or in any other form, without prior written permission from PROVIDER.

Notwithstanding the foregoing, Confidential Information shall not include the following:

(a) information that now is or hereinafter becomes publicly known or available otherwise than through unauthorized disclosure by RECIPIENTS;
(b) information that was in RECIPIENTS' possession at the time of disclosure and was not acquired, directly or indirectly, from PROVIDER;
(c) information that RECIPIENTS received in good faith from a third party who is not under a similar restriction of confidentiality and having a right to disclose the Confidential Information; or
(d) information that is required to be disclosed pursuant to applicable law or judicial or administrative action or proceeding, including the Freedom of Information Act requirements.

2. RECIPIENTS agree not to use for any purpose the Confidential Information except as provided for under the ARRA and the BDIA, without prior written permission from PROVIDER.

3. This Agreement shall be governed by the laws of the State of Maine and applicable federal law, except for the State of Maine's conflict-of-laws provisions, as applicable. The Parties to this Agreement each specifically consent to jurisdiction in Maine in connection with any dispute between the Parties arising out of this Agreement or pertaining to the subject matter hereof, with venue being in a court of competent jurisdiction located in Penobscot or Kennebec County, Maine, United States of America.

4. This Agreement shall inure to the benefit of and be binding on the Parties and their respective successors and assigns.

5. This Agreement constitutes the complete and exclusive agreement of the Parties hereto with respect to the matters set forth herein. The terms of this Agreement may not be modified or amended except by an instrument in writing signed by each of the Parties hereto.

6. This Agreement shall be construed without regard to any presumption or other rule requiring construction against the drafting Party.

7. This Agreement may be executed in counterparts and each Party hereto may execute each such counterpart, each of which when executed and delivered shall be deemed to be an original and both of which counterparts taken together shall constitute but one and

the same instrument. This Agreement shall become binding when all counterparts taken together shall have been executed and delivered by all Parties. Execution and delivery of this Agreement may be made by facsimile transmission, and each Party agrees that the delivery of the Agreement by facsimile shall have the same force and effect as delivery of original signatures and that each Party may use such facsimile signatures as evidence of the execution and delivery of the Agreement by all Parties to the same extent that an original signature could be used.

IN WITNESS WHEREOF, the Parties have executed this Agreement the day and year first above written.

WITNESSED BY:	PROVIDER
______________________________	By: ______________________________
	Title: ______________________________
	ConnectME Authority
______________________________	By: ______________________________
	Title: ______________________________
	James W. Sewall Company
______________________________	By: ______________________________
	Title: ______________________________

Appendix D - White Paper: Maine-SBDD Census Block-Street Segment Misalignment

Misalignment between Census Blocks & Maine E911 Streets

Technical Whitepaper

30 September 2011

Introduction

Importing broadband service provider data into the State Broadband Data Development (SBDD) Map Data Transfer Model at the census block versus street segment level has created challenges for the grantees. For the State of Maine one of the challenges involves the spatial misalignment between the Census Block polygon geometries and Maine's street centerline dataset.

In order to better understand the challenge that Maine is encountering it is necessary to review how the State is collecting and maintaining broadband service provider data.

As a result of Maine's geographic population distribution, mapping broadband service at a census block level does not satisfy the State's requirements for statewide broadband tracking and development. Instead of utilizing the hybrid census block-street centerline model outlined in the SBDD NOFA, the State is collecting service provider coverages at a street level for wired and fixed wired technologies. The State has developed a relational model to best represent the one-to-many relationship between a street segment and its broadband service provider coverages.

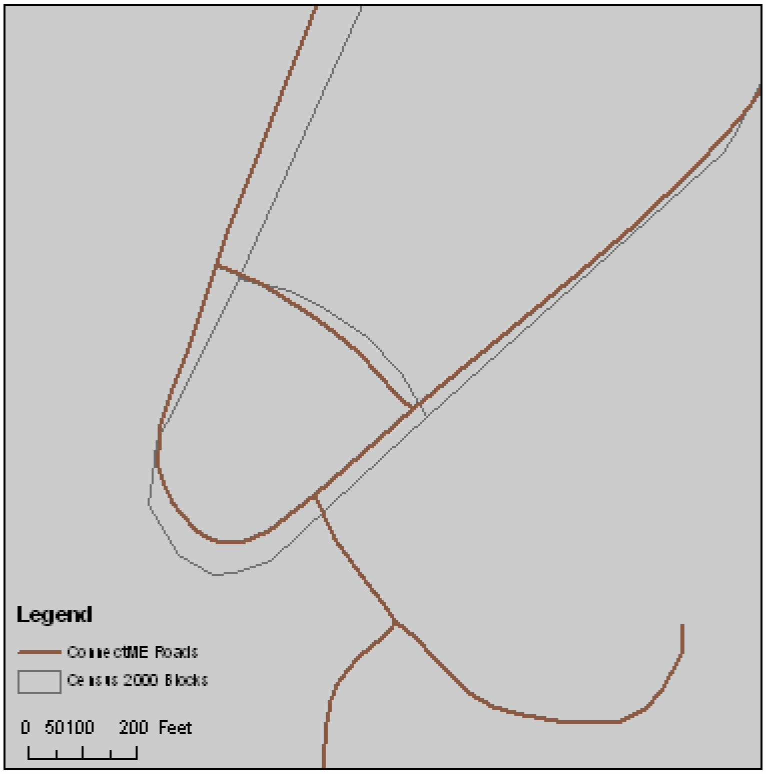
The street segment data that the State is utilizing is based primarily on the State's E911 street centerline GIS layer with additional street coverage added from a 3rd party dataset for those towns not yet participating in the E911 project. For information on the broadband service providers, a database table was developed based on the required attribution descriptions outlined in the NOFA.

With the data structure in place the challenge of importing this data into the transfer model can be discussed along with the State's proposed solution to minimize its impact of the misalignment on the broadband data processing.

The Challenge

Census Block geometry is spatially misaligned with the Maine's street centerlines.

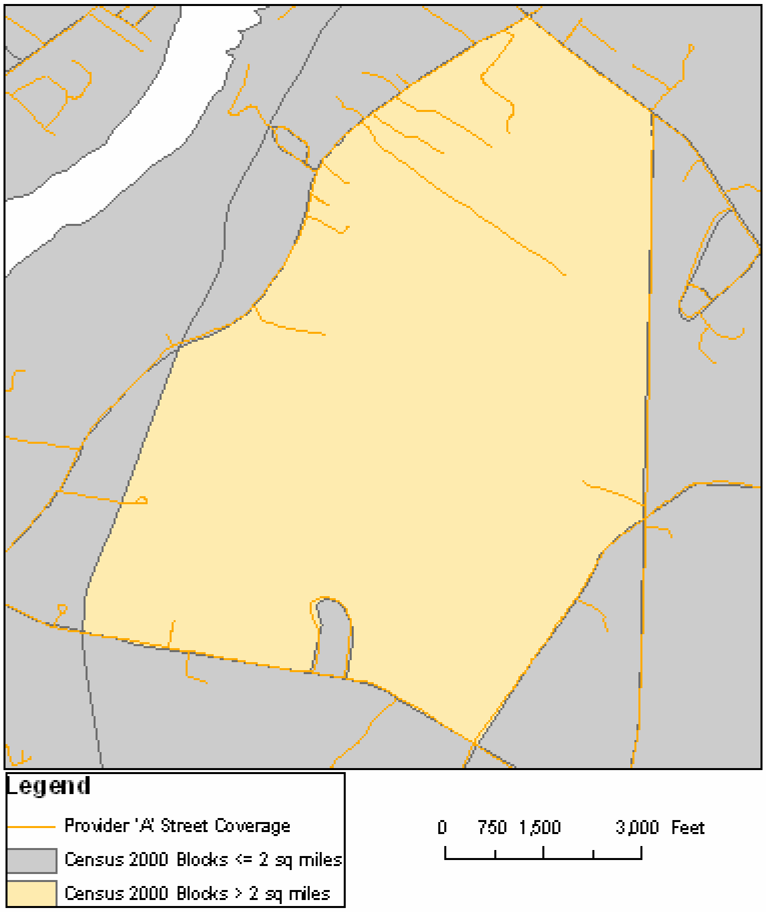
Examples described herein reference 2000 Census Block data and reflect examples found in both 2000 and 2010 Census Block datasets.



As shown in the above screen capture the typical misalignment between these two datasets is between 50 and 100 feet.

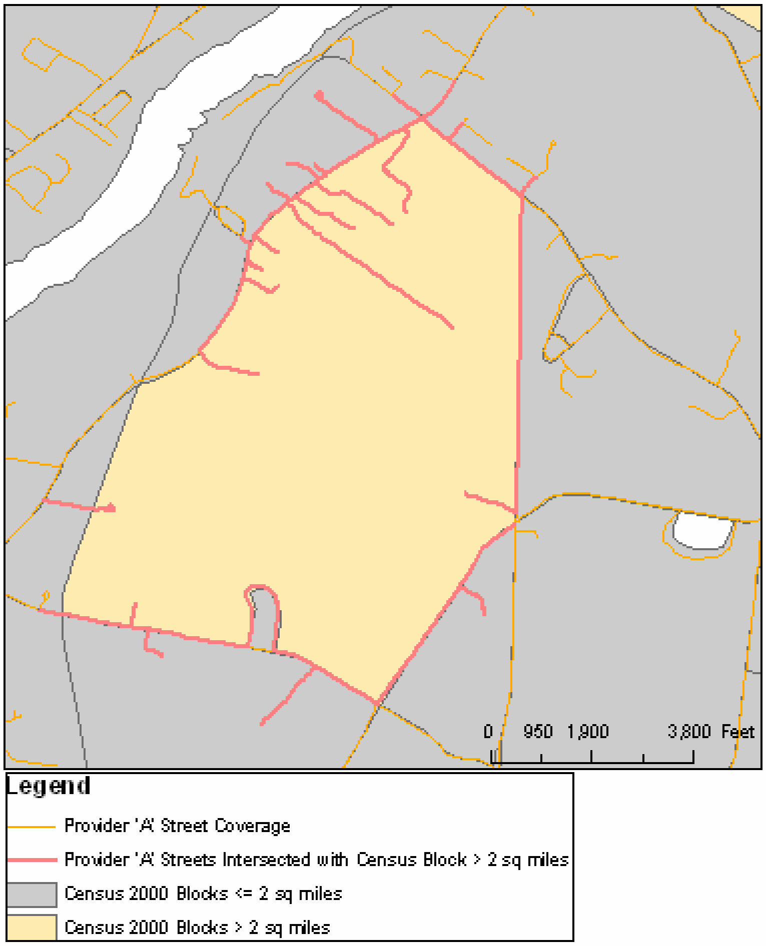
Since Maine is storing all broadband service providers' information as records associated with street centerlines this misalignment causes considerable challenges when trying to accurately export this information into the new SBDD data transfer model. The misalignment is great enough that utilizing basic intersect methodology is not enough to provide NTIA with a highly accurate representation of broadband coverage in Maine.

Example: Basic Intersect



The above screen capture shows an example of a 2000 Census Block that is greater than 2 square miles and Provider 'A' street coverage data that is to be reported.

Performing an intersect between the greater than 2 square mile census block and the street network for Provider 'A' results in the highlighted streets being reported.

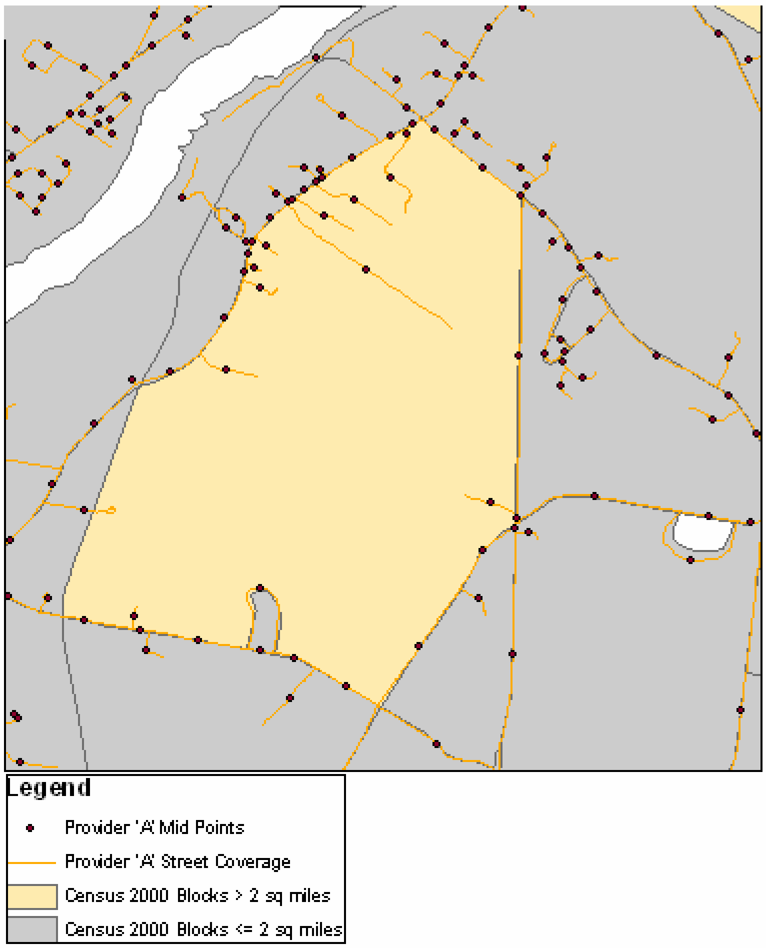


It is clear from the screen capture that several extra streets where selected and a few streets were missed by using the intersection method.

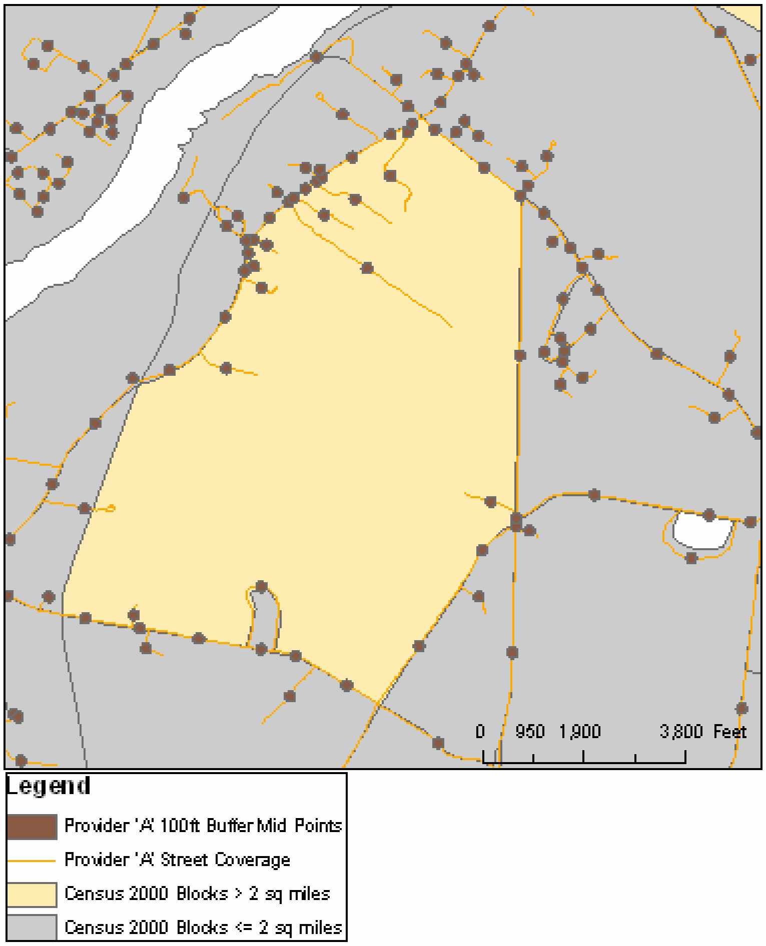
Proposed Technical Solution

The solution to this challenge is a multi-step process that needs to be run on each street segment with intelligent analysis employed to minimize errant representation of broadband service in census blocks greater that 2 square miles.

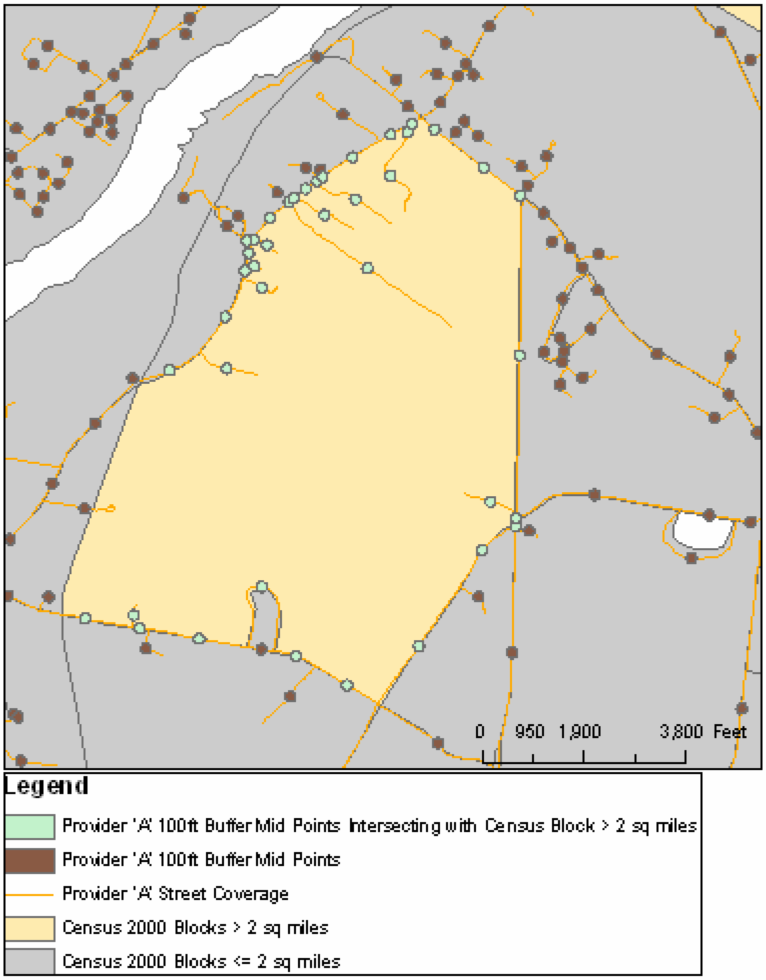
The first step is to create mid points of the street centerlines for Provider 'A'.



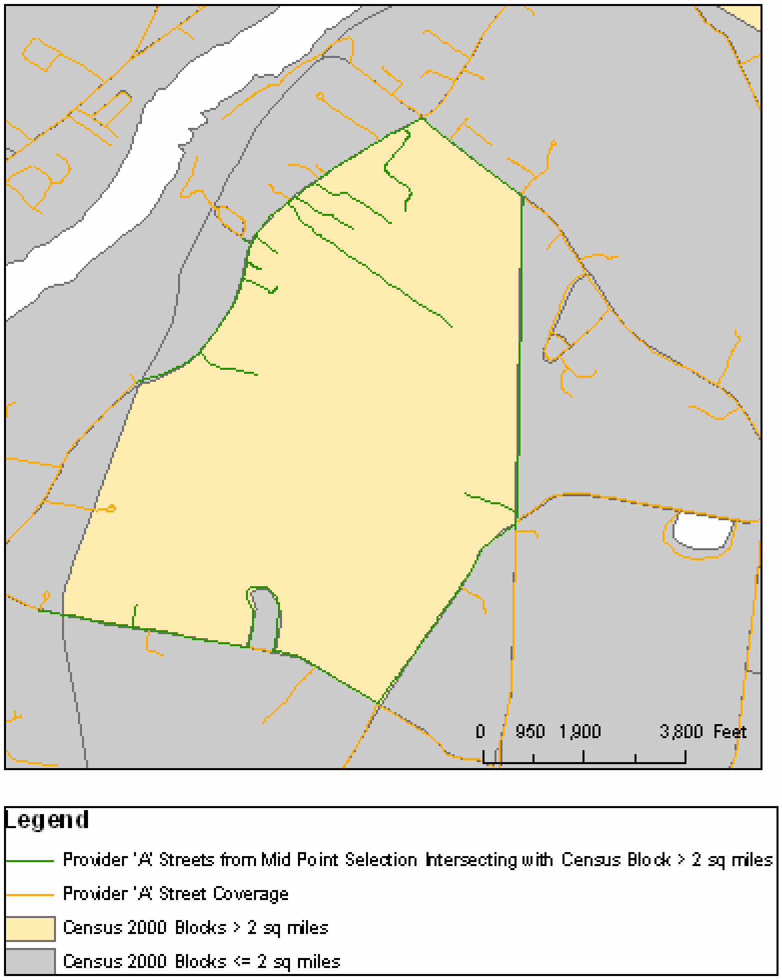
The next step is to create a buffer around the mid points using a distance to compensate for the misalignment in the census blocks. The distance found to have the best return for this process was determined to be 100 feet.



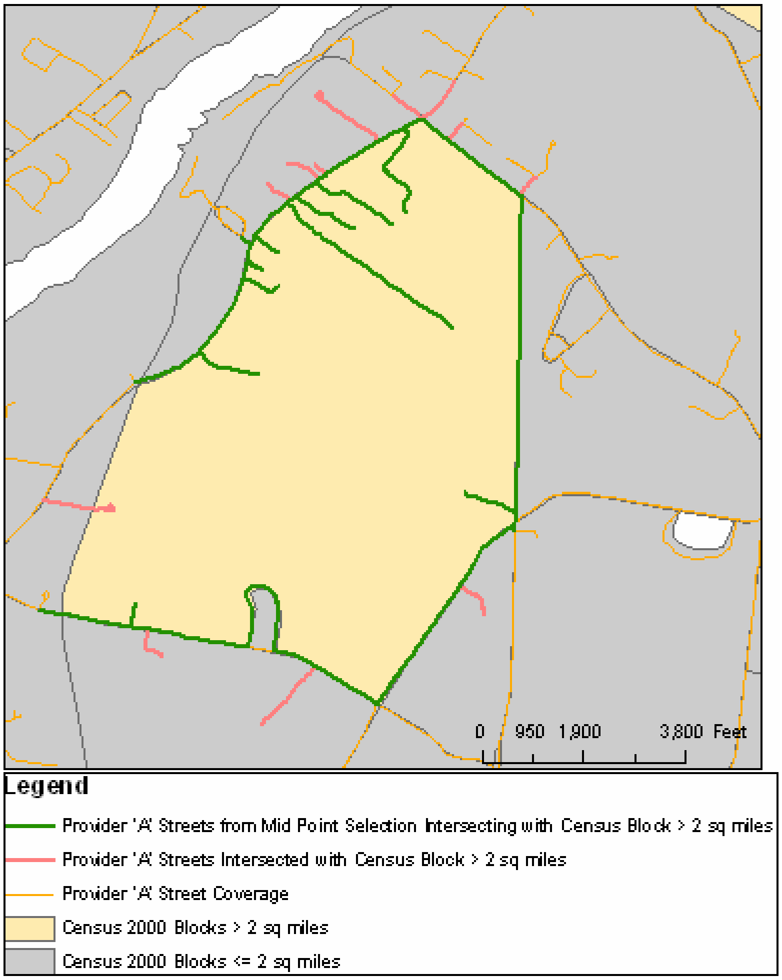
Selecting the buffered mid points that intersect the greater than 2 square miles census block returns the following results:



The selected buffered mid points relate back to the following street selection:

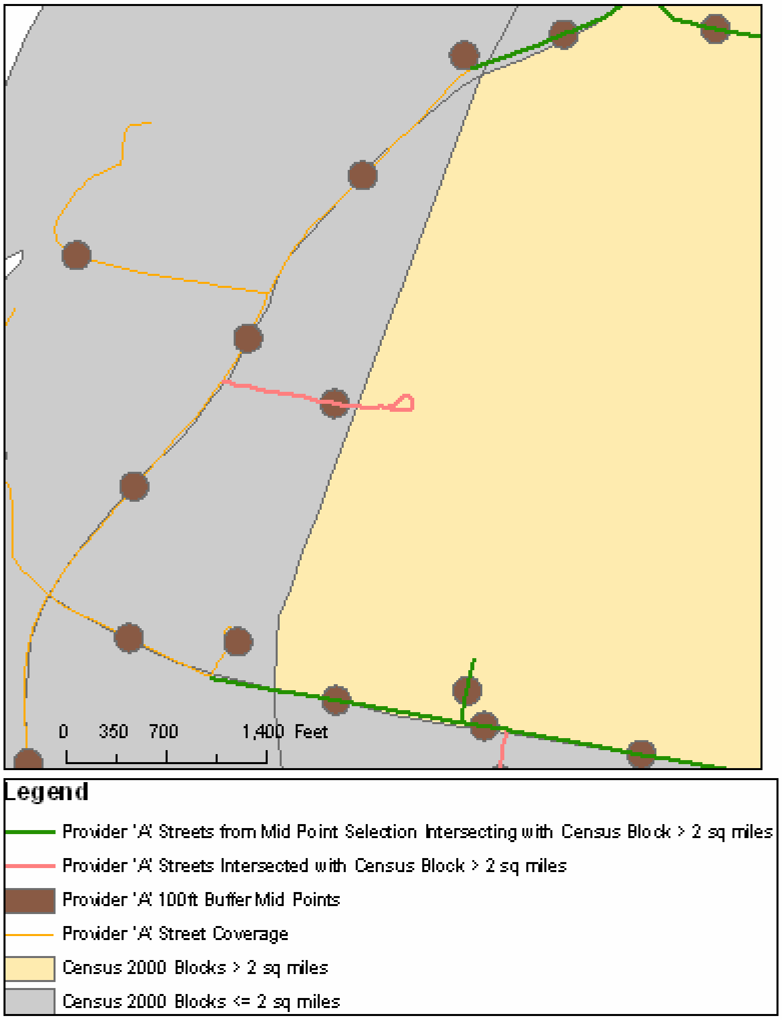


Compare this selection to the original intersection process selection:



The result of the mid point buffering process is a much better representation of streets contained within the greater than 2 square miles census block. A large number of the erroneous streets initially marked as included in the census block have been dropped providing a much improved report.

Taking a look at the left hand side of the map there is a street that intersects the census block but is not reported in the mid point buffering process. A closer look reveals why.

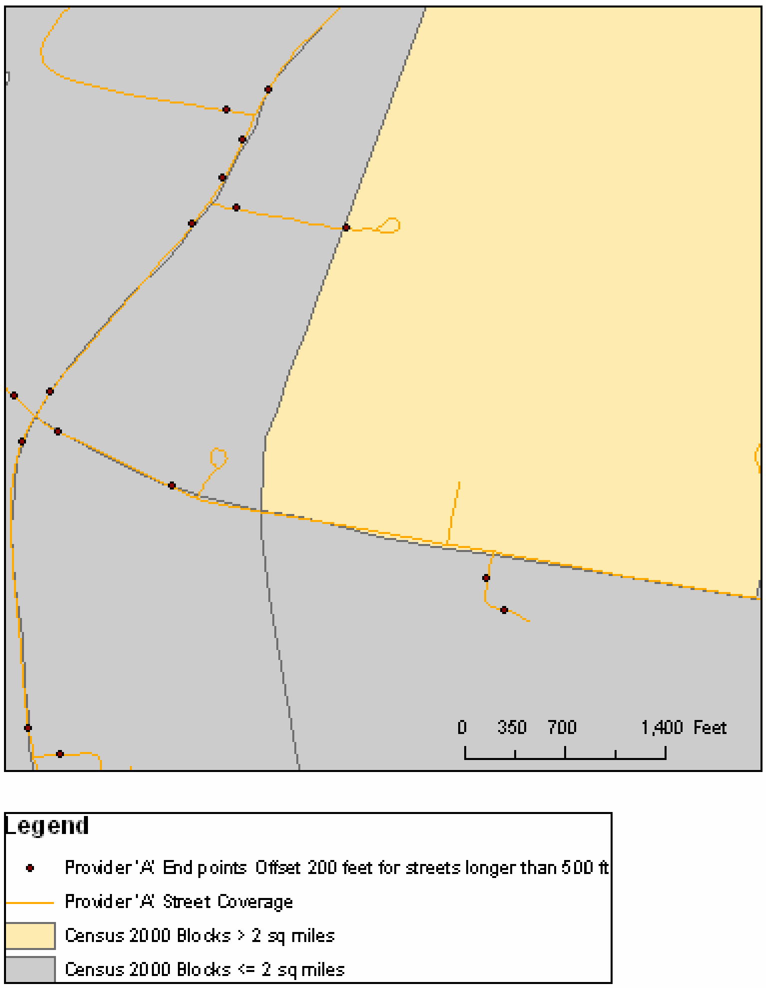


The street in question is relatively long in length and has a midpoint that is located outside of the greater than 2 square miles census block resulting in it not being reported.

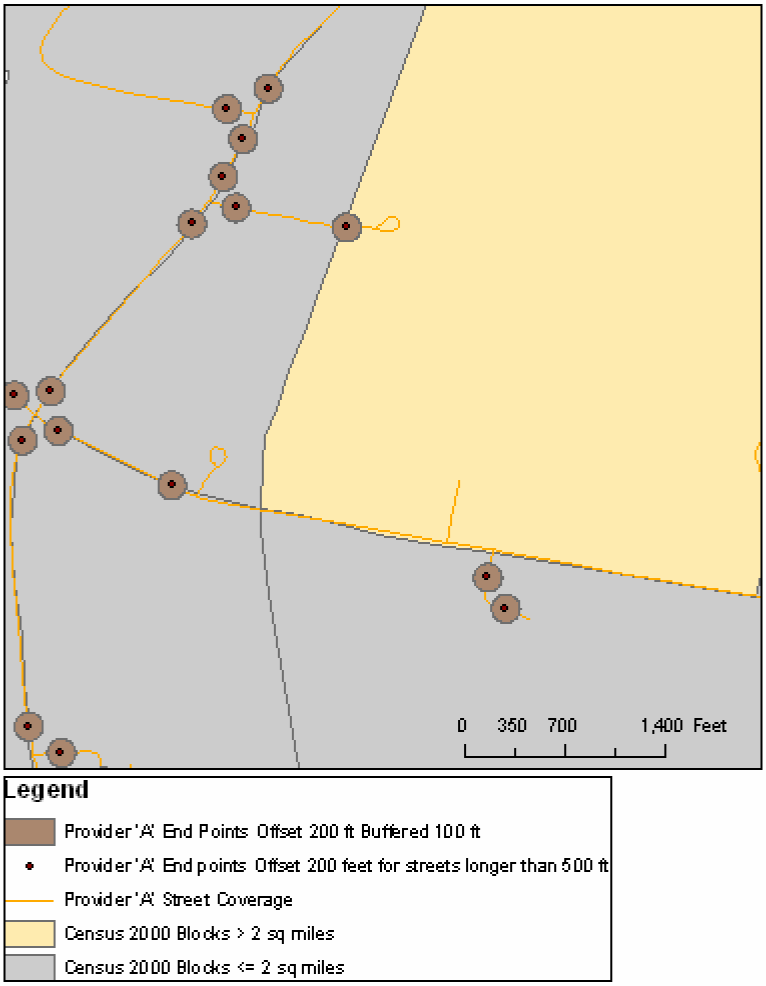
Building onto what has been performed already an additional automation check can locate and incorporate these long streets into the dataset.

The Proposed Solution: Additional Intelligence

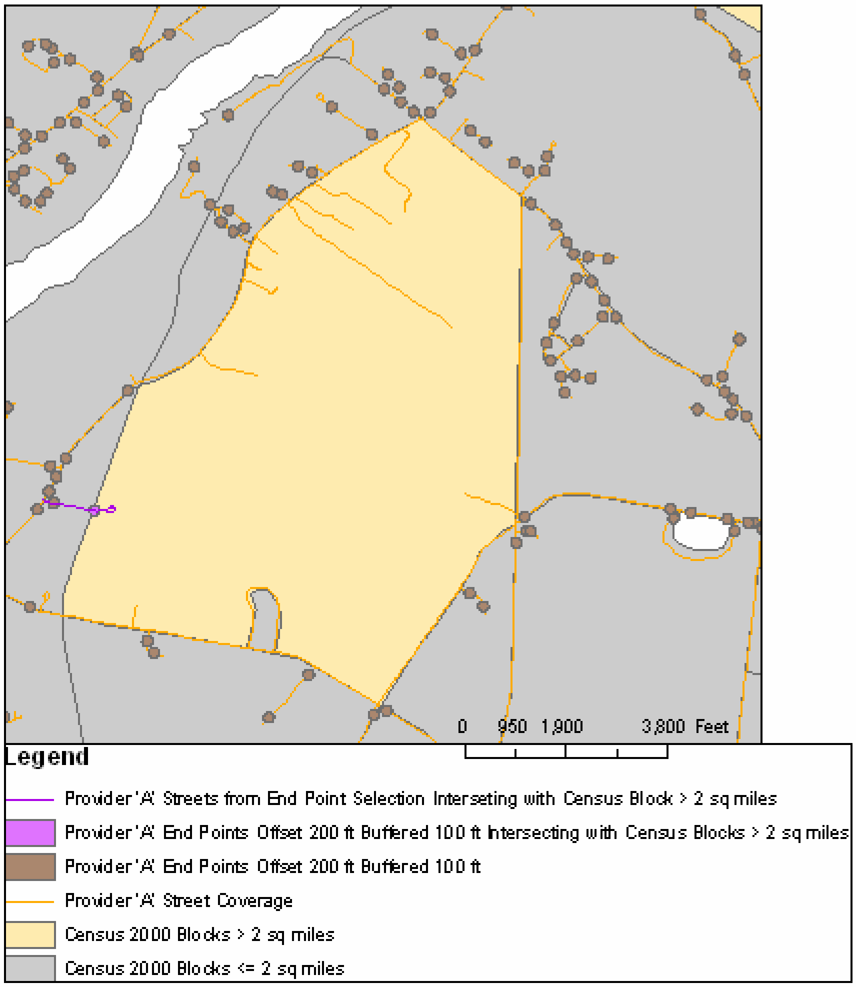
The first step in this additional iteration is to select streets that have not been flagged as being contained within a census block greater than 2 square miles and are longer than 500 feet. Then create points that are offset 200 feet from each end of the selected streets.



Next these 200 feet offset points are buffered 100 feet:

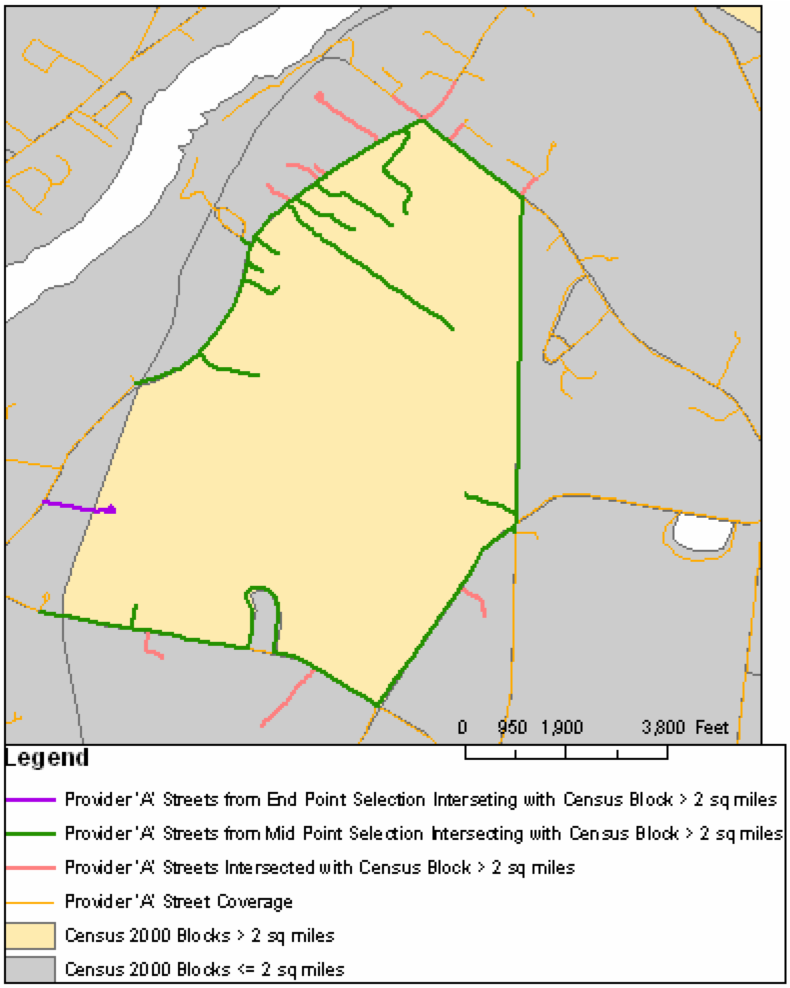


Then by selecting the buffers that intersect the greater than 2 square miles census block and selecting the associated streets, the process results in the following:



The Results

The screen capture below shows the streets reported using the two step process in comparison to the basic intersect method of reporting street segments.



The following table shows the results of the processes for Provider 'A' for this particular census block:

Method	Missed Streets	Extra Streets	%Error
Basic Intersect Process	2	11	35.14
MID Point Process	1	2	8.11
MID and END Point Process	0	2	5.41

The proposed solution gives a much better representation of the data set and minimizes the errors induced by using a basic intersection process.

Summary

The SBDD data submission requirements involving census blocks and street segments have created a challenge for the grantees to accurately represent broadband service provider information. In particular the State of Maine has a significant offset between the 2010 Census Block geometries and the corresponding street centerlines that the State is utilizing to map broadband availability data. A basic spatial intersect method has proven to be highly inaccurate in identifying street centerline data in census blocks greater than 2 square miles.

Through analysis the State has found that using a two step process using mid-point and offset end point buffering provides improved results for street centerlines in the greater than 2 square mile census blocks. The State expects this methodology to improve the accuracy of street segment determination by approximately 50% for these regions. Unless instructed otherwise by the NTIA project team, the State intends to utilize this two step process to develop the SBDD deliverables for street centerlines in census blocks greater than 2 square miles.

Appendix E – Residential Survey Letter

ConnectME Authority

State of Maine Internet Service Questionnaire

This survey is PREPAID to return to the State of Maine! It is only 10 questions long and will take less than 2 minutes to complete. The information is confidential. The data will only be used for the purpose of verifying where high speed internet is and is not offered across the State of Maine. More information about this initiative is provided at the end of the survey.

Thank you in advance for you participation.

If you have access to the internet and wish to complete this survey electronically, you may do so at:
http://www.surveymonkey.com/s/JBLNRHX

1. Please enter your physical home address if it is different than your mailing address:
   Street Address ______________________________
   City ____________________ State ________ Zip Code __________
2. Do you currently subscribe to internet service? Yes No
   If No, please proceed to Question 7, otherwise continue to question 3.
3. What form of internet service do you purchase?
   a. Dialup Service b. DSL or Higher Wired Service c. High Speed Cable
   d. Satellite e. Fixed Antennae Wireless
   f. Mobile Wireless (Mobile Laptop Card, Smartphone, or similar device)
4. Who is your internet service provider? ______________________________
5. Does this provider meet the level of advertised internet speed for the plan you subscribe?
   Yes No I Don't Know
6. Have you ever purchased internet service from a different provider at this address? Yes No
   If YES, please list the name of the previous provider(s)? ______________________________
7. If you do not currently have internet service, have you attempted, in the past, to acquire service at this address but were unable to locate a providing company? Yes No N/A
8. In the past, has an internet provider tested access to the internet at this address? Yes No I Don't Know
   If YES, please list the name of the service provider? ______________________________
9. Was the internet connection test successful? Yes No I Don't Know N/A
10. If you do not subscribe to high speed internet, but it IS available, what is the reason you do not subscribe?
    a. No interest b. Price of service c. Limitations of the service
    d. Need a different option to fit my internet hardware needs e. N/A
    f. Other ______________________

Thank you for taking the time to help shape the future development of broadband service in Maine!

Please fold the survey so the prepaid return label is on the outside and drop it into the nearest mailbox.

More Information about this initiative…
In 2007, the Maine State Legislature created the ConnectME Authority with the mission to promote the development of high speed internet communications systems in the un-served and underserved regions of the state. To fulfill this mission we are seeking your assistance in providing valuable information about the availability and use of high speed internet, otherwise known as broadband, at your location.

The ConnectME Authority has established a website where you can perform a test of internet speed for your location. If you are interested in running a test of your internet speed, please visit http://connectmespeedtest.maine.gov and follow the instructions provided. Access to this site does require a device capable of running flash applications such as a laptop or desktop computer. The test tool is not currently supported by smart phone devices.

To learn more about this project please visit our websites:
http://www.maine.gov/connectme/mapping/BroadbandMappingProject.htm
http://www.sewall.com/projects/project_connectme.php

Appendix F – Mobile Provider Feedback Letter

Welcome Mobile Providers!

Thank you for your participation in the State of Maine's Broadband Mapping Project. As part of our contract/delivery to the National Telecommunications and Information Administration (NTIA) and to the State of Maine we are initiating mobile coverage verification feedback. In your geoportal account you will find two maps of your company's coverage area in Maine.

How did we come up with these maps?

Each time we receive a coverage shapefile from a mobile provider we first overlay the current coverage with the previous round's coverage to find changes in the service area. When an area has a change of service we place a point at a road intersection, based on the E911 roads layer, within the new coverage. Field crews visit each of the points and perform an internet speed test using a mobile aircard from that specific carrier. All point data is analyzed back at the office to determine whether the test point qualifies as having reached broadband speeds. These points are then projected on to maps and the data is extrapolated based on a Thiessen Model to show the internet speed coverages. Two different National Standards are presented: FCC Standards and NTIA Standards.

FCC Standards

FCC Standards break internet speeds into categories called "Tiers"

First Generation

First Generation speed is defined as between 200kbps to 768kbps, symmetrical. This means both upload and download need to be between 200 and 768 to qualify. Any speed (upload or download) less than 200kbps qualifies as "Less than First Generation" regardless of the reciprocating speed (e.g., if you have an upload speed of 120kbps and a download speed of 706kbps the category is still "Less than First Generation" because both speeds were not equal to or greater than 200kbps.

Tier 1

Tier 1 speed is defined as between 768.1kbps to 1.5Mbps, symmetrical. This means both upload and download need to be between 768.1kbps and 1.5Mbps to qualify. Any speed (upload or download) less than 768.1kbps qualifies as "First Generation" regardless of the reciprocating speed (e.g., if you have an upload speed of 767kbps and a download speed of 1.3Mbps the category is still "First Generation" because both speeds were not equal to or greater than 768.1kbps.

Tier 2

Tier 2 speed is defined as between 1.51Mbps to 3Mbps, symmetrical. This means both upload and download need to be between 1.51kbps and 3Mbps to qualify. Any speed (upload or download) less than 1.51kbps qualifies as "Tier 1" regardless of the reciprocating speed (e.g., if you have an upload speed of 1.4Mbps and a download speed of 2.78Mbps the category is still "Tier 1" because both speeds were not equal to or greater than 1.51Mbps.

NTIA Standards

ConnectME Authority

Broadband service is defined as a minimum of 200kbps upload and 768kbps download. Both speeds, upload and download, have to reach 200kbps and 768kbps respectively or they do not qualify as broadband. (e.g.,if you have an upload speed of 240kbps and a download of 766kbps, the speed test does not qualify as broadband). If a speed test reached broadband speed in only the upload or the download, but not both, then the speed test was deemed as "Inconsistent Broadband". If neither upload nor download reached broadband speeds the speed test was deemed "No Broadband". If the speed test could not be performed because of a lack of internet service completely then the test was deemed "No Connect".

In the future we will be working with individual mobile providers regarding discrepancies in coverage based on our verification findings. We welcome any questions or feedback you may have regarding this project. Thank you again for your participation and look forward to working with you in the future.

Sincerely,

Sewall Broadband Mapping Team

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

CONNECT Michigan®

April 1, 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:

As the State Broadband Designated Entity, in partnership with the Michigan Public Service Commission, please accept this submission from Connected Nation on behalf of the state of Michigan's State Broadband Initiative (SBI) Grant Program, known as Connect Michigan.

It is with highest regard that the collective stakeholders of Connect Michigan 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, Federal Communications Commission (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 Michigan has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit not just Michiganders, 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 Michigan: 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 (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2011 SBI data submission for the Connect Michigan program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 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.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of a new section pertaining to industry mergers and acquisitions – specifically this section will detail any and all mergers or acquisitions that have taken place in Michigan since the October 2011 submission. The intent of this new section is to provide a better understanding of how the broadband provider landscape has changed over time.

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 87.86 percent of the Michigan provider community, or 123 of 140 total providers. There are 120 participating providers and 3 additional non-participating providers whose estimated coverage areas have been submitted. Of the 120 participating providers, 46 supplied an update to their network or coverage area(s), while 48 have reported no change. The remaining 26 represent providers who previously supplied data but were 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. Of the 17 providers that are not represented in the attached datasets, 9 have refused to participate in the voluntary program or were non-responsive to multiple contact attempts, and 8 providers 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 Michigan principals that all commercially reasonable efforts were made to account for 100 percent of the known Michigan broadband provider community pursuant to this semi-annual data update submission.

Connect Michigan has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Michigan conducts field validation efforts. To date, 79 (56.43 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Michigan website, (www.connectmi.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative. The Connect Michigan website was redesigned and improved to, among other things, better serve Michigan stakeholders and to achieve goals as established by the State Broadband Initiative Grant Program.

As an indicator of stakeholder penetration, the Connect Michigan website encountered 7,266 unique visits during this reporting period (29,397 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 191 broadband inquiries over this same reporting period (1,376 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 Michigan website and the Connect Michigan 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 Michigan mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Michigan to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Michigan 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 Michigan Public Service Commission, outreach was conducted during this data update reporting period by Connect Michigan to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Michigan website. Connect Michigan focused mostly on capturing CAI data from the education sector including Michigan Association of Computer Users in Learning, REMC of Michigan Association, and the Michigan Department of Education. Connect Michigan will continue to build upon these relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

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

The Connect Michigan program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Michigan, as well as the United States 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.

Data Acquisition: Michigan Community Anchor Institutions Methodology

In this fifth reporting period of the SBI, Connect Michigan, working in close coordination with the state of Michigan, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. During this reporting period Connect Michigan has continued to focus efforts on conducting outreach and raising awareness of this important project.

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

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

The survey can be accessed at this link: http://www.surveymonkey.com/s/RTWDM66.

Connect Michigan conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Michigan continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Michigan works with the Michigan Public Service Commission to identify existing relationships that can support CAI outreach.

Connect Michigan has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. Connect Michigan also works closely with Michigan Collaborative Broadband Committee to provide continuing education about the National Broadband Map as well as efforts to expand broadband. Connect Michigan worked closely with the Michigan Department of Education as well as other education agencies and associations to educate K-12 schools about their role and impact as a CAI. Moreover, the Library of Michigan continues to be a strong partner, offering regular updates regarding public libraries across the state.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Michigan project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Michigan will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. The Michigan Public Service Commission will regularly be briefed on the current CAI data and provided information so they can assist with outreach and promotion within the state. The Michigan Public Service Commission is an essential resource when researching and identifying agencies and organizations in CAI sectors with minimal responses regarding their connectivity.

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	4616	4616	4612	357	328	329
Libraries	2286	2286	2285	892	897	36
Healthcare	264	264	264	4	4	4
Public Safety	958	958	957	18	17	17
Higher Ed Institutions	146	146	146	35	34	34
Other Government	90	90	90	26	23	23
Other Non-Government	512	512	510	8	7	7
Total	8872	8872	8864	1340	1310	450

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

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 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 state of Michigan.

Inventory of Deliverables, Connect Michigan: 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.

The provider data collected by CN on behalf of the state of Michigan have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

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

Mergers and Acquisitions

Throughout the course of the SBI program, CN has maintained a repository of electronic records related to its provider outreach activities. Recently, due to the high volume of mergers and acquisitions (M&A) within the provider community, CN elected to create a listing of M&A activities for this mapping cycle as a way of supplementing the Provider Changes and Corrections section of this document. M&A activities for this state are listed below with a brief description and date as obtained through public records or provider disclosure.

- **Level 3 Acquired Global Crossing**
  The Global Crossing website confirmed that Level 3 and Global Crossing joined forces under the brand name Level 3 on October 4, 2011.

- **SMR Communications Inc. Acquired Portions of Parish Communications**
  Excerpted from Michiana website, Michiana Supernet, the data services division of SMR Communications, Inc.: *Recently, we have acquired the Cable TV/Internet plant for Bainbridge and Pipestone Township. We welcome Parish Communications longtime customers into our local South West Michigan internet family and will continue to provide television programming consistent with an ever competitive market as well as bring VoIP and triple play options to the area.*

- **Windstream Acquired PAETEC**
  The News section of the Windstream website dated December 1, 2011, announced that it had completed the acquisition of PAETEC Holding Corp. in a transaction valued at approximately $2.3 billion.

Michigan Field Validation Methodology

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

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets 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.

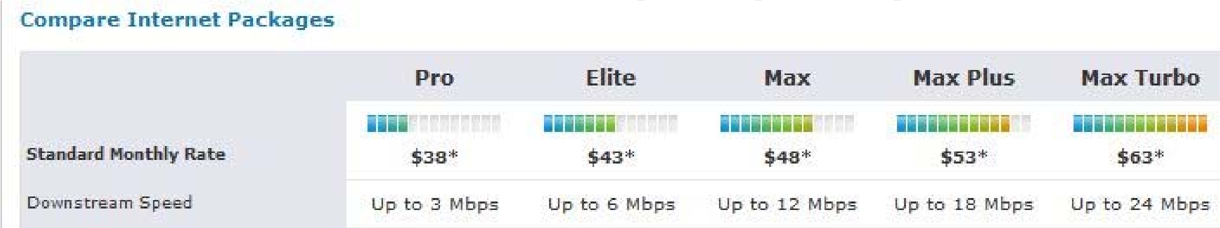
Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public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

To date, Connected Nation's staff conducted on-site validation tests in Michigan on the following providers: 2020 Communications LLC (also d.b.a. 123Net); 2125 Cable Company LLC (d.b.a. Sunrise Communications); Ace Telephone Company of Michigan, Inc. (also d.b.a. Peninsula Telephone Company); Agri-Valley Communications, Inc. (also d.b.a. Pigeon Telephone Company); AIRGRANT; Allendale Telephone Company; AT&T, Inc.; Azulstar, Inc.; Baraga Telephone; Barry County Telephone; Bitwise Wireless, LLC; Bloomingdale Communications, Inc.; Boardman River Communications LLC; Broadstripe; Cable America Michigan LLC; Camp Communications Services, Inc.; Carr Communications; Crystal Automation Systems, Inc.; CenturyLink; Charter Communications; Cherry Capital Connections LLC; Clearwire Corporation; CMS Internet, LLC; COLI, Inc.; Comcast Cable Communications LLC; Custom Software, Inc.; D & P Communications, Inc.; DMCI Broadband LLC; Drenthe Telephone Company; FreedomNet Solutions; Fourway Computer Products, Inc.; Frontier Communications Corporation; Hiawatha Telephone (d.b.a. Jamadots, Chippewa County Telephone); Hidden Lake Wireless; I-2000, Inc.; Interlink Computers Technology, Inc.; Iron Bay Computer and Design; ISP Management; KEPS Technologies, Inc. (also d.b.a. ACD.Net); Leap Wireless International, Inc.; Lighthouse Computers; Merit Network; MetaLINK Technologies, Inc.; Michigan Cable Partners; Michwave Technologies, Inc.; Microtech Services, Inc.; Mutual Data Services; NCATS; Nodin Communications; Ogden Communications, Inc.; PAETEC Communications, Inc. (also d.b.a. Talk America), Parish Communications; Pasty.Net, Inc.; Peninsula Fiber Network LLC; Reliable Internet; Sister Lakes Cable TV; Small Business Solutions Group (d.b.a. RuralReach.Com); SMR Communications, Inc.; SpeedNet LLC; Springcom, Inc.; Sprint Nextel Corporation; T2 Communications LLC; TC3Net; TDS Telecommunications Corporation; The ISERV Company; T-Mobile; Town & Country CATV; Tri-County Wireless, Inc.; Tucker Communications; Upper Peninsula Telephone (d.b.a. LIPC, Alphacomm.net); Verizon North, Inc.; Vision Quest Technology Solutions; Waldron Telephone Company; West Michigan Broadband; Winn Telephone Company; Wireless Technology Solutions; Wyandotte Municipal Services; Xyotek; and Zing Networks, Inc.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 79 companies (out of a universe of 140 viable providers) totaling 56.43 percent within the state of Michigan. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters. 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.

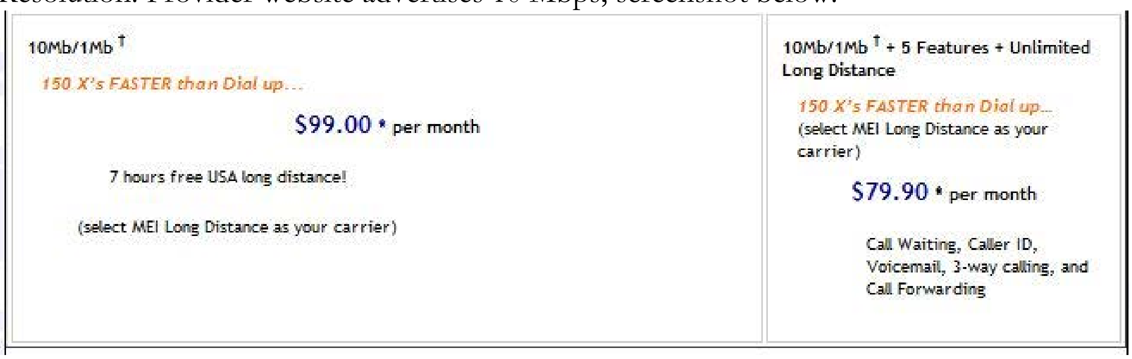
AT&T Inc.
Issue: DSL platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises download speed of up to 24 Mbps; screenshot below.



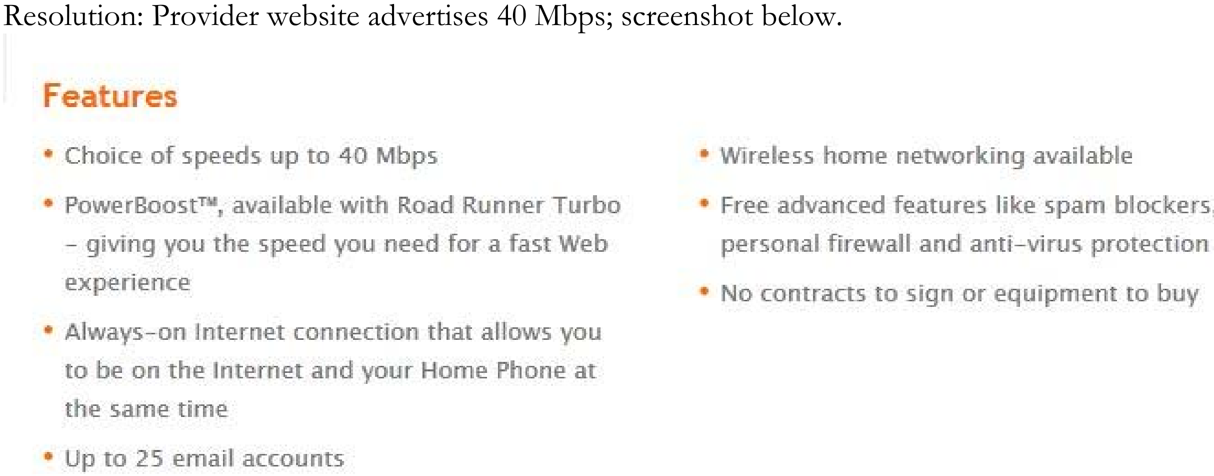
Compare Internet Packages

	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

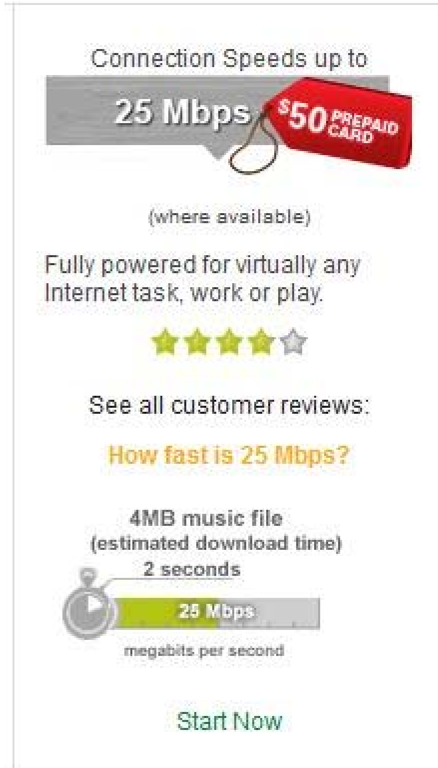
Barry County Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises 10 Mbps; screenshot below.



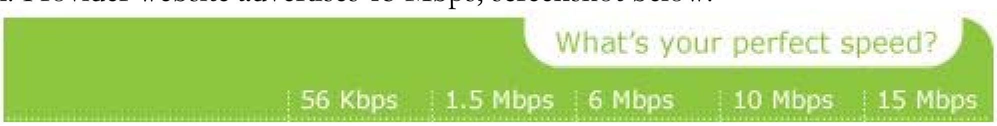
Bright House Networks, LLC
Issue: Cable platform with maximum advertised download speed in tier 8.
Resolution: Provider website advertises 40 Mbps; screenshot below.



CenturyLink
Issue: DSL platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises 25 Mbps; screenshot below.



Hiawatha Communications, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises 15 Mbps; screenshot below.



KEPS Technologies, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises 20 Mbps; screenshot below.

ACD.net 20Mbps ADSL2+ Broadband **$59.95**

1st 3 Months @ $39.95*

Benefits:
- Up to 20Mbps download and 1.5Mbps upload speeds
- Email Virus Scanning
- Email Spam Filters - User Configurable
- Online Web Interface Email
- Free Dialup Account
- CustomerAccount access for online billing & support
- **Phone Service Not Required!**

Scott Cook, Inc.
Issue: Fixed wireless platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises 10 Mbps; screenshot below.

Bandwidth from 128 Kilobits/sec to 10 Megabit/sec, or much faster if needed

SpeedNet, LLC
Issue: Fixed wireless platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises 10 Mbps; screenshot below.

Saginaw, MI – SpeedConnect, a premium wireless broadband provider offering services designed to support high usage demands, announced today it will launch a 4G network, providing up to 10Mbps x 2Mbps connections, throughout Michigan. The new network, deployed by Huawei using the company's SingleRAN solution, will offer comprehensive and secure fixed and mobile broadband solutions for homes and businesses in the Thumb of Michigan.

TDS Telecommunications Corporation
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8.
Resolution: Provider website advertises 15 and 25 Mbps; screenshot below.

25Mbps High-Speed Internet

Check availability to see pricing information!

This speed makes it easy to handle simultaneous connections from multiple devices in the home. You can stream video, download large files, play online games, etc. all at the same time.

Check Availability

15Mbps High-Speed Internet

Check availability to see pricing information!

Serious Internet speed for serious Web surfers. Great for video watchers, gamers, and those who work from home but don't care for the new meaning of whoosh.

Check Availability

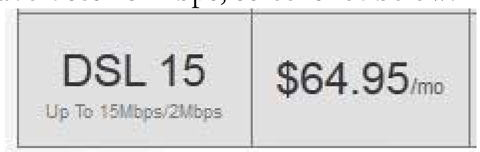
5Mbps High-Speed Internet

Check availability to see pricing information!

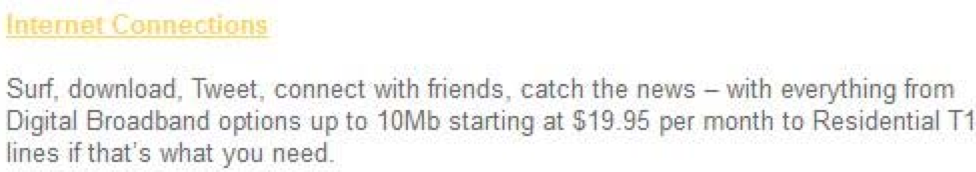
5Mbps Broadband Internet makes everything you do online faster and easier. Enjoy a fast high-speed connection, and quicker uploads and downloads.

Check Availability

The Computer Care Company
Issue: DSL platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises 15 Mbps; screenshot below.

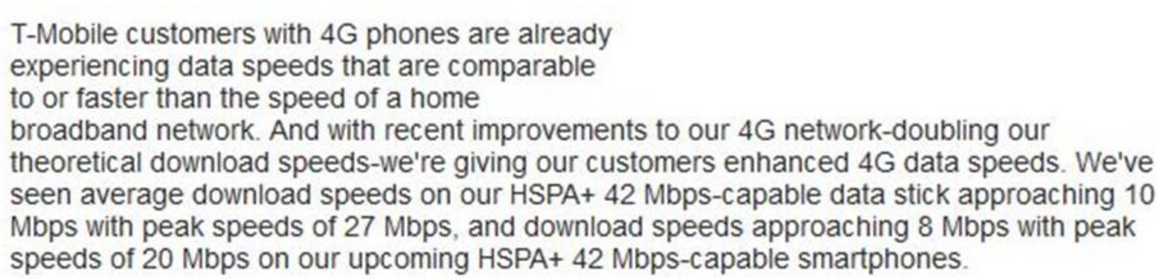


The Iserv Company, LLC
Issue: DSL platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises 10 Mbps; screenshot below.

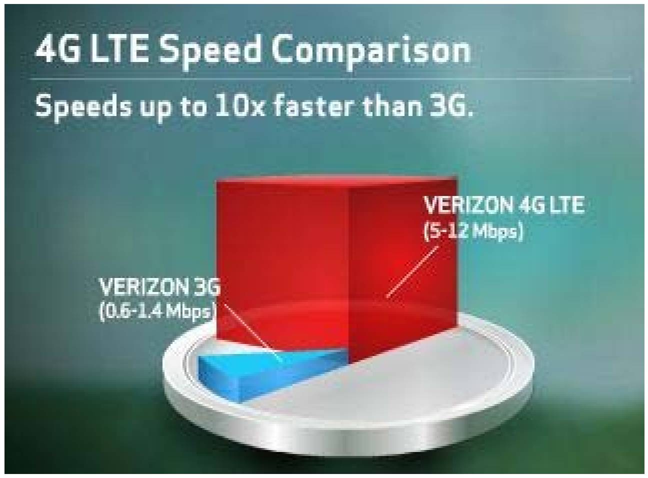


Time Warner Cable LLC
Issue: Cable platform with maximum advertised download speed in tier 8.
Resolution: Provider website advertises 30 Mbps; screenshot below.

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises download speeds greater than tier 6; screenshot below.



Verizon North Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7.
Resolution: Provider website advertises 12 Mbps; screenshot below.



Data Submission and Coverage Estimation of Non-Participating Provider

Bitwise Wireless, LLC

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 State Broadband Initiative (SBI) program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Bitwise Wireless, LLC, a wireless Internet service provider (WISP), located in Davison, Michigan, with a service area around Genesee and Lapeer counties. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background
CN staff members have continued trying to obtain the participation of the provider with 18 instances of communication via telephone and e-mail sessions since May 24, 2011, through February 21, 2012. Telephone discussions were held with a company representative June 13, 2011, and January 3, 2012, with a response of wanting to participate, but too busy to collect the data necessary to develop propagation maps on its own. Additionally, a CN staff member visited the business office of Bitwise Wireless, LLC on January 25, 2012, to discuss the broadband mapping project in

person with Bitwise Wireless staff. A company representative provided certain transmit site locations and broadcast frequencies.

The Issue

CN staff e-mailed technical data and propagation maps to Bitwise Wireless, LLC, though its lack of responsiveness since January 25, 2012, has predicated its inability to participate in the Connect Michigan broadband mapping initiative simply because of a lack of resources.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.bitwisewireless.com) to determine the residential service plans **(Exhibit A)** and the service areas **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded an FRN of 0019402494 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded license WQLJ361 **(Exhibit D)**, Radio Service: NN - 3650-3700 MHz with 0 active locations.

Exhibit A: Service Plans

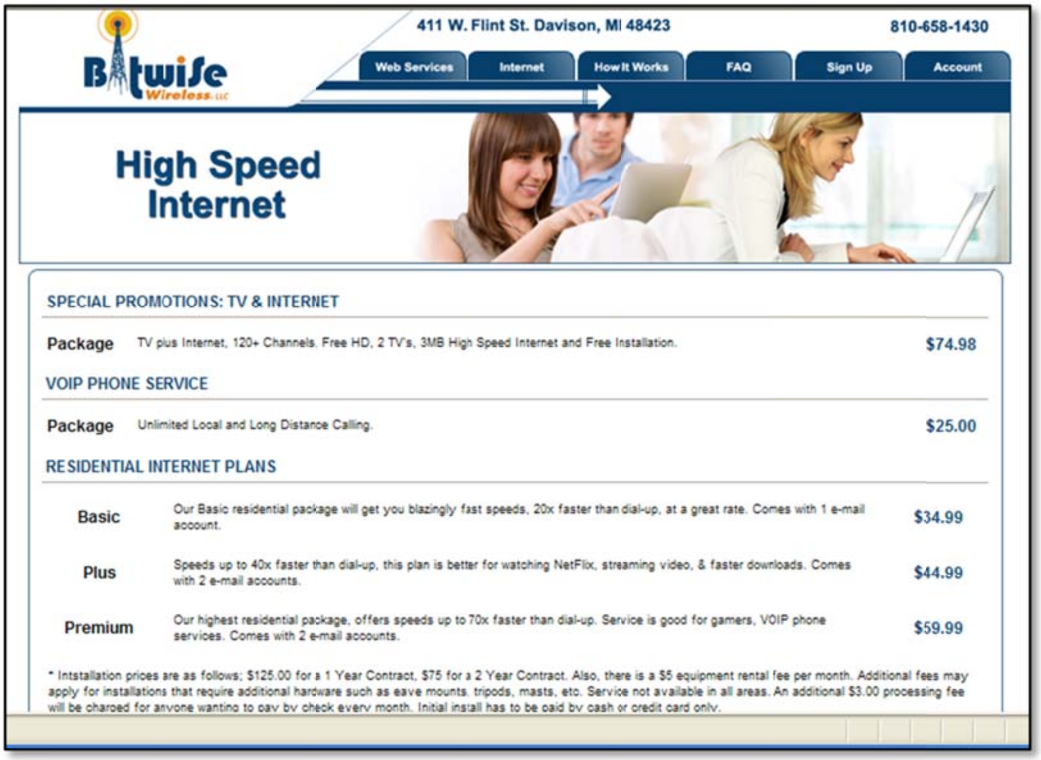


Exhibit B: Service Area

Call for a free consultation. We will evaluate your current services for internet and phone lines. If your business is outside our local area we can still offer a cost saving solution for internet and local toll service. T1, DS3 and PRI lines available with free installation on a 3 year contract.

FREE consultation visit for all new customers.

Current speeds up to 6MB down and up to 3MB up

Service is provided via a wireless point to multi-point connection from our main office in Davison, MI. secured through PPPOE.

Additional services include:

- VOIP
- Static IP Address
- Web Design
- Off-Site Backups (Through a Hi-Speed connection your data will securely be sent back to our office on our servers whit your own dedicated space.) **Enquire at office for plans and pricing on backups.
- Business web filtering (limit and monitor user access to internet)

If you are signing up for new service please read our terms and conditions at the following link: Wireless Internet Service Agreement

To request services, click the link to the right. Request

We Currently Service the Following Areas:

Davison Columbiaville Lapeer Otter Lake Otisville

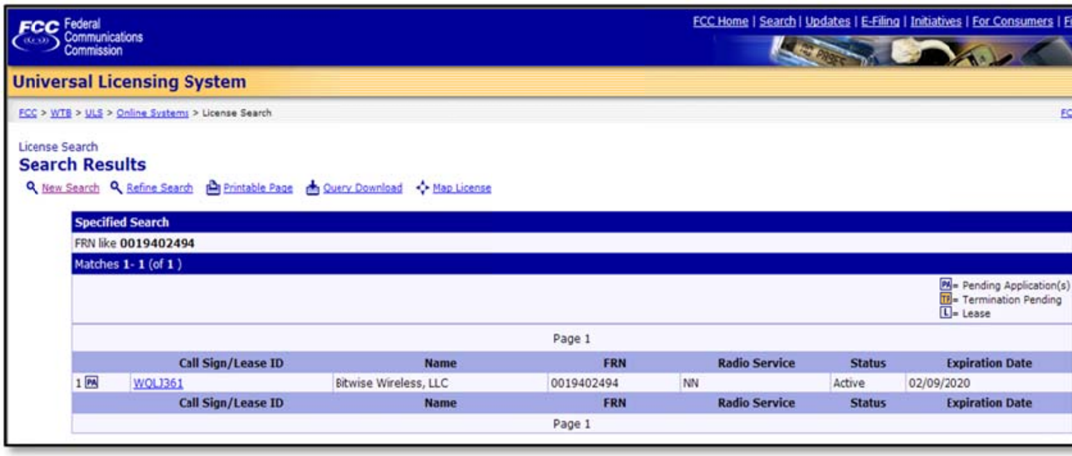
Home | How It Works | FAQ | Sign Up
Michigan Hi-Speed Internet: Bitwise Wireless, LLC

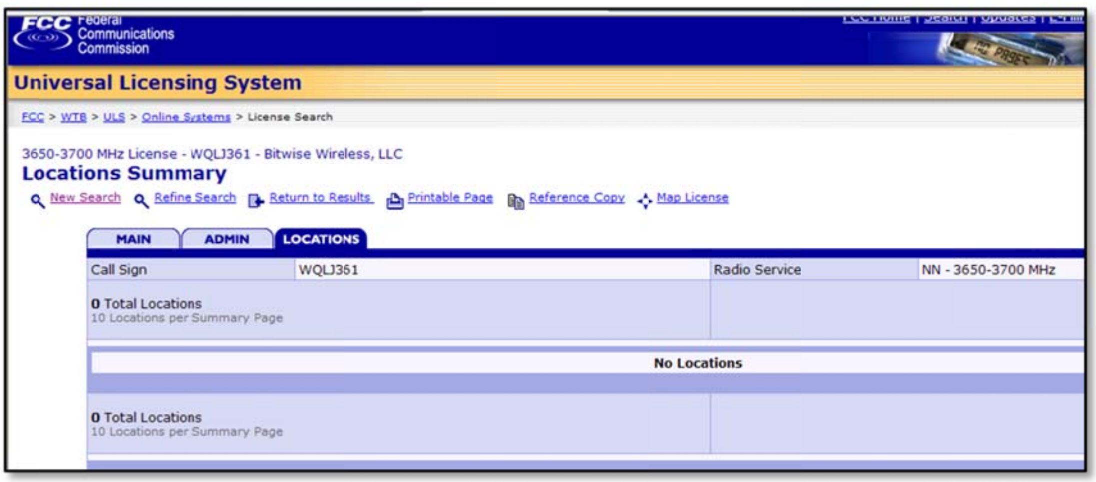
Login
Admin Login | Tech Login

Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0019402494
Registration Date:	12/13/2009 09:27:00 PM
Last Updated:	04/10/2010 10:27:59 AM
Business Name:	Bitwise Connection, LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	Bitwise Connection, LLC
Contact Position:	Owner
Contact Name:	Mr Brian Wills
Contact Address:	410 West Flint Street Davison, MI 48423 United States
Contact Email:	bwills@bitwiseconnection.com
ContactPhone:	(810) 658-6476 22
ContactFax:	

Exhibit D: WQLJ361 License Reference





<u>Preliminary Identification of Provider's Coverage Area</u>

The CN engineer, using the information provided by Bitwise Wireless, drove to the four disclosed transmit locations and confirmed coordinates and the existence of fixed wireless equipment. The website service area was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The provider's service area depiction is represented by tower symbols as shown in **Exhibit E**. The four referenced locations were identified in Google Earth and examined utilizing the zoom option of the aerial imagery. All four location structures were identified as matching the descriptions provided by company representative as can be seen in the Google Earth screen shot of the water tower in Columbiaville, Michigan **(Exhibit F)**, identified as a transmit site. This provided a means of establishing coordinates for the all wireless access point locations and these coordinates were then entered into Microsoft *Streets & Trips* mapping application **(Exhibit G)** to develop a route for the validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

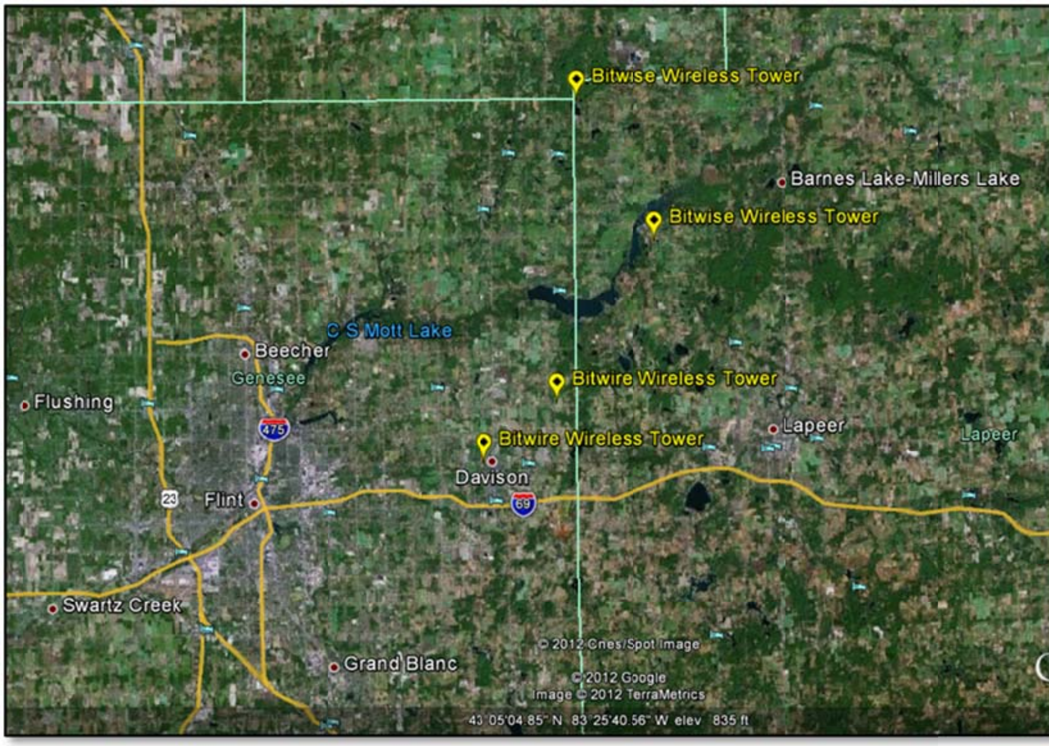
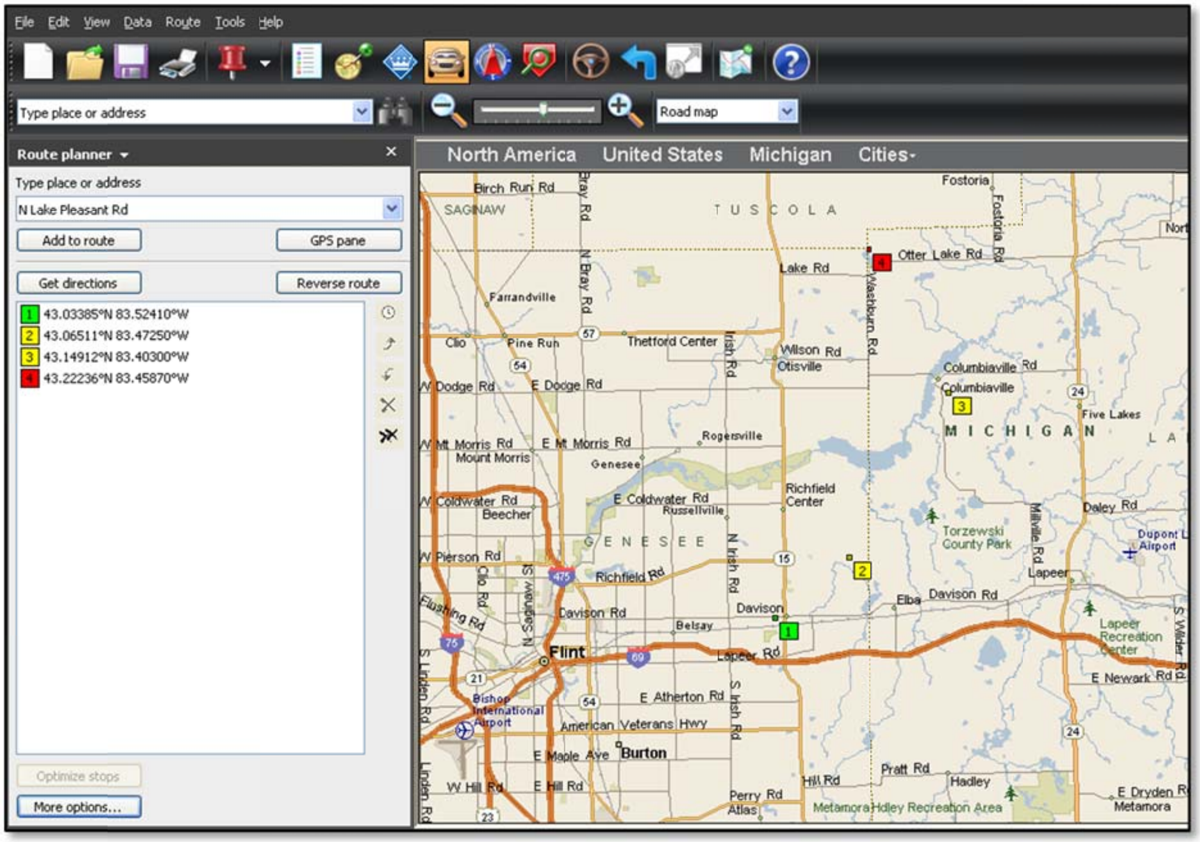


Exhibit F: Google Earth Screenshot of Columbiaville, MI Water Tower

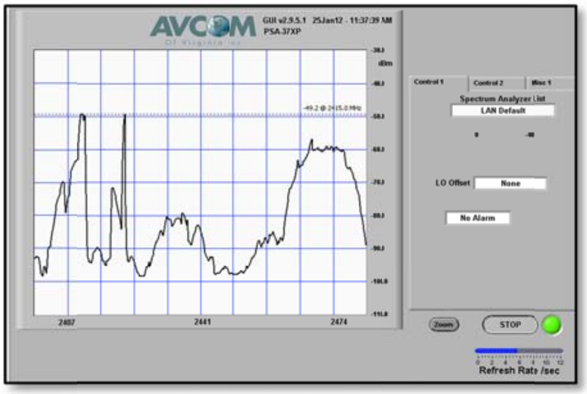
Exhibit G: Validation Points for AP Structures

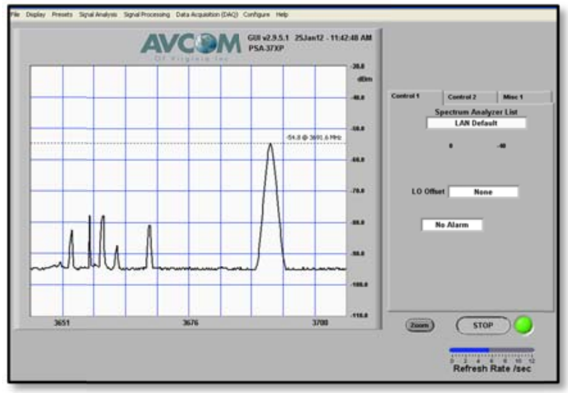


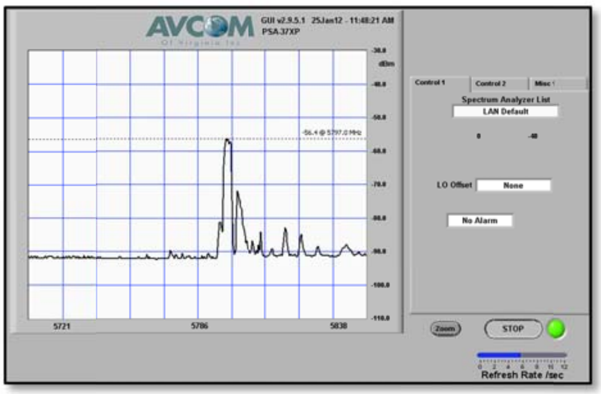
Testing Techniques

Connected Nation staff developed a data collection and site validation route based on data provided by Bitwise Wireless representative, derived from the Google Earth image overlay and the sites selected in *Streets and Trips*. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands as can be seen from the screen shots taken at the Davison tower site **(Exhibit H)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored), and photographs were taken of the access points.

Exhibit H: Field Data for Bitwise Wireless Davison Tower Location







<u>Results and Submission for April 2012</u>

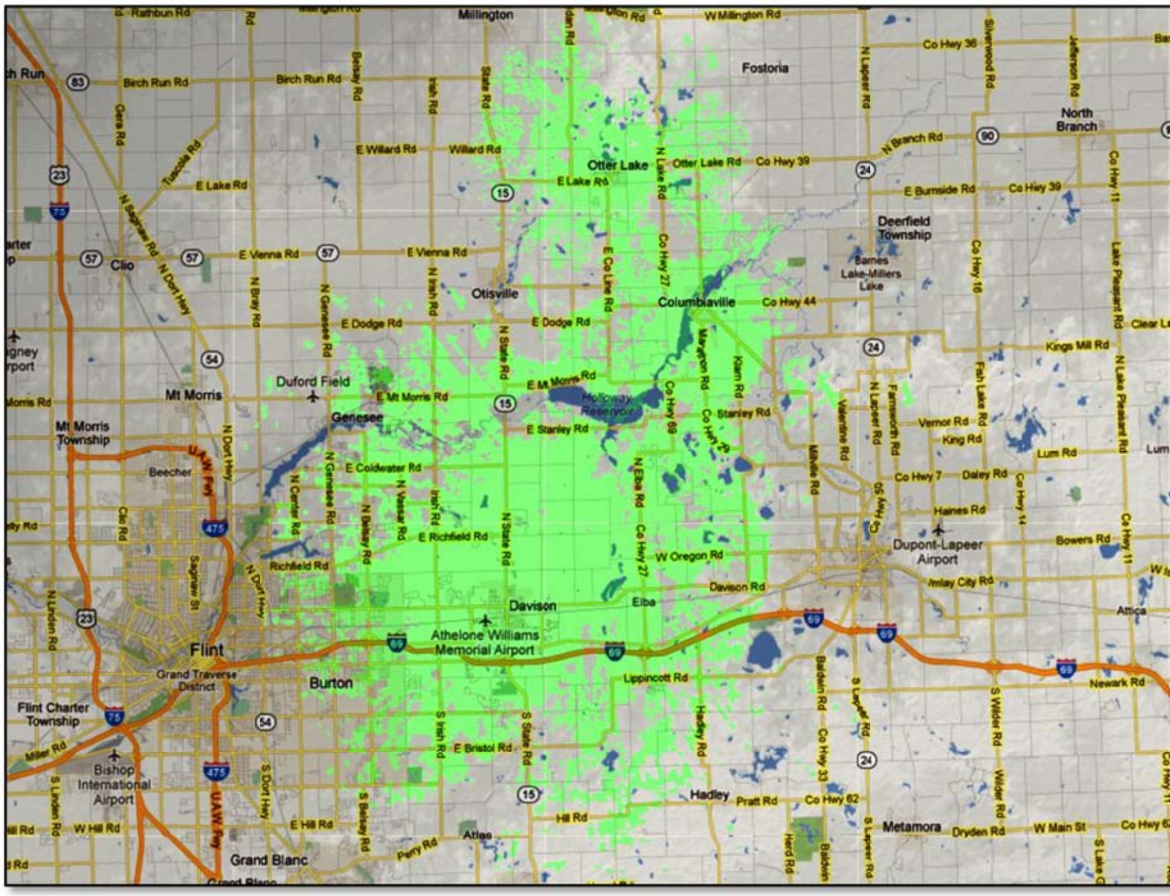
Of the 4 locations visited during the validation point route, 10 access points were identified and relative information was logged into the Bitwise Wireless field validation notes file **(Exhibit I)**. The field and the publicly available data were transferred to the CN Provider Information file. A composite propagation study was completed based on the field data **(Exhibit J)**. Both documents were forwarded to Bitwise Wireless as courtesy copies and the provider was advised that the estimated coverage information would be submitted to Connect Michigan and to the NTIA unless the provider notified CN, within 48 hours, of discrepancies of the estimated coverage. The provider did not respond to CN and, as of this date, CN believes the information to be an accurate estimation of the service area of Bitwise Wireless, LLC.

Exhibit I: Field Validation Notes

					Platform Type		Test Data		Speed Test Data							Visual Confirmation		Signal Verification/Spectrum Analyzer				
Site #	Date	Provider	(N) Lat Decimal	(-)(W) Long Decimal	Type	Presence Confirmed	Type	Pass or Fail?	Utility	Time	Ping Time (ms)	Upload Speed (kbps)	Download Speed (kbps)	Min Speed Met?	Images	Type	Images	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Time	Imag
1	1/25/12	Bitwise Wir	43.0339	-83.5241	Fixed Wir	Yes	Signal Ver	Pass								Wireless C	Yes	2415	-49.2	Avcom PS	11:37 AM	Yes
2	1/25/12	Bitwise Wir	43.0339	-83.5241	Fixed Wir	Yes	Signal Ver	Pass								Wireless (	Yes	3691.6	-54.8	Avcom PS	11:42 AM	Yes
3	1/25/12	Bitwise Wir	43.0339	-83.5241	Fixed Wir	Yes	Signal Ver	Pass								Wireless (	Yes	5797	-54.4	Avcom PS	11:48 AM	Yes
4	1/25/12	Bitwise Wir	43.0651	-83.4725	Fixed Wir	Yes	Signal Ver	Pass								Wireless (	Yes	912.1	-66.8	Avcom PS	1:07 PM	Yes
5	1/25/12	Bitwise Wir	43.0651	-83.4725	Fixed Wir	Yes	Signal Ver	Pass								Wireless (	Yes	2408.1	-62.4	Avcom PS	1:05 PM	Yes
6	1/25/12	Bitwise Wir	43.0651	-83.4725	Fixed Wir	Yes	Signal Ver	Pass								Wireless (	Yes	5761.1	-58.8	Avcom PS	1:10 PM	Yes
7	1/25/12	Bitwise Wir	43.1491	-83.403	Fixed Wir	Yes	Signal Ver	Pass								Wireless (	Yes	2432.8	-48	Avcom PS	1:39 PM	Yes
8	1/25/12	Bitwise Wir	43.1491	-83.403	Fixed Wir	Yes	Signal Ver	Pass								Wireless (	Yes	5842.3	-73.2	Avcom PS	1:36 PM	Yes
9	1/25/12	Bitwise Wir	43.2224	-83.4587	Fixed Wir	Yes	Signal Ver	Pass								Wireless (	Yes	2413.7	-47.6	Avcom PS	2:02 PM	Yes
10	1/25/12	Bitwise Wir	43.2224	-83.4587			Signal Ver	Pass								Wireless (	Yes	5749.8	-63.6	Avcom PS	2:09 PM	Yes
11			0	0																		
12			0	0																		
13			0	0																		
14			0	0																		
15			0	0																		
16			0	0																		
17			0	0																		
18			0	0																		
19			0	0																		
20			0	0																		

Master_Data_Sheet / Final Map / Site 1 / Site 2 / Site 3 / Site 4 / Site 5 / Site 6 / Site 7 / Site 8 / Site 9 / Site 10

Exhibit J: Bitwise Composite Coverage



Tri-County Wireless, Inc.

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 State Broadband Initiative (SBI) program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Tri-County Wireless, Inc., a wireless Internet service provider (WISP), located in Fenton, Michigan, with a service area around Genesee, Oakland and Livingston counties. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 26 instances of communication via telephone and e-mail sessions between December 31, 2009, and November 1, 2011. Only 4 communication replies have been received from a company representative: 1) on February 23, 2010, with a response indicating they would determine the technical difficulty of providing data; 2) on February 25, 2010, when company representative left a voice message requesting type of information being sought; 3) on February 14, 2011, when an e-mail was received from company representative requesting requirements for data submission; and 4) on November 1, 2011, when a company representative e-mailed that they decline to participate.

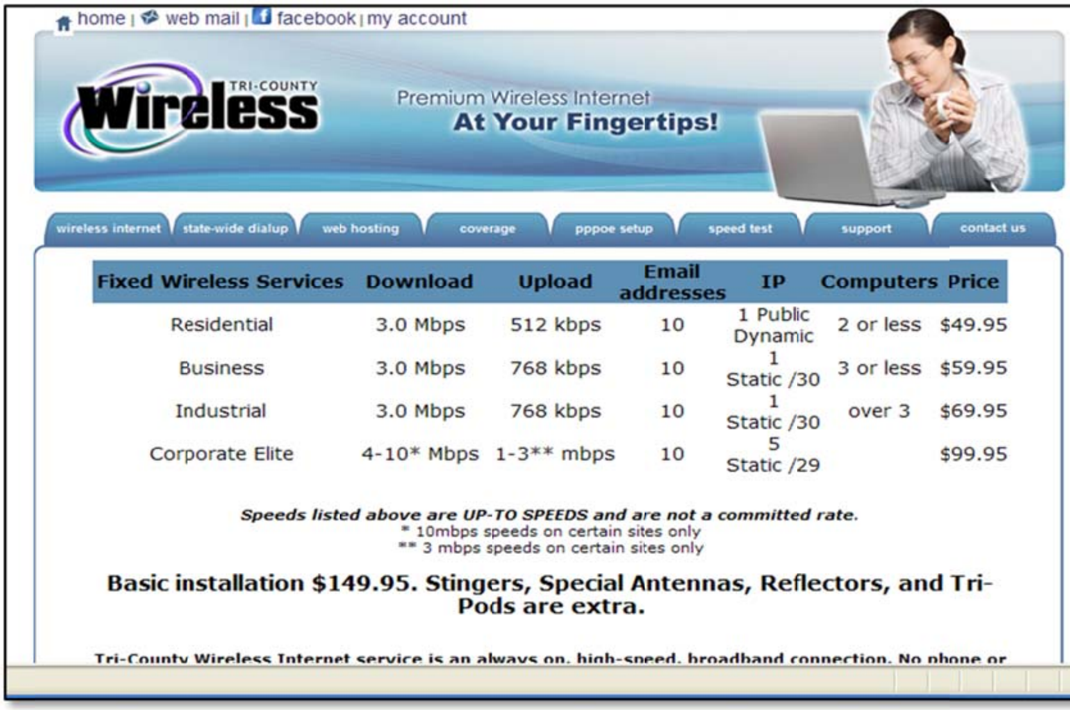
The Issue

Tri-County Wireless, by its response on November 1, 2011, declines to participate in the Michigan broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.tcwireless.us) to determine the residential service plans **(Exhibit A)** and the service areas **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded an FRN of 0018468553 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded license WQKE949 **(Exhibit D)**, Radio Service: NN with 3 pending locations.

Exhibit A: Service Plans



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TRI-COUNTY Wireless

Premium Wireless Internet
At Your Fingertips!

wireless internet | state-wide dialup | web hosting | coverage | pppoe setup | speed test | support | contact us

Fixed Wireless Services	Download	Upload	Email addresses	IP	Computers	Price
Residential	3.0 Mbps	512 kbps	10	1 Public Dynamic	2 or less	$49.95
Business	3.0 Mbps	768 kbps	10	1 Static /30	3 or less	$59.95
Industrial	3.0 Mbps	768 kbps	10	1 Static /30	over 3	$69.95
Corporate Elite	4-10* Mbps	1-3** mbps	10	5 Static /29		$99.95

Speeds listed above are UP-TO SPEEDS and are not a committed rate.
* 10mbps speeds on certain sites only
** 3 mbps speeds on certain sites only

Basic installation $149.95. Stingers, Special Antennas, Reflectors, and Tri-Pods are extra.

Tri-County Wireless Internet service is an always on, high-speed, broadband connection. No phone or

Exhibit B: Service Area

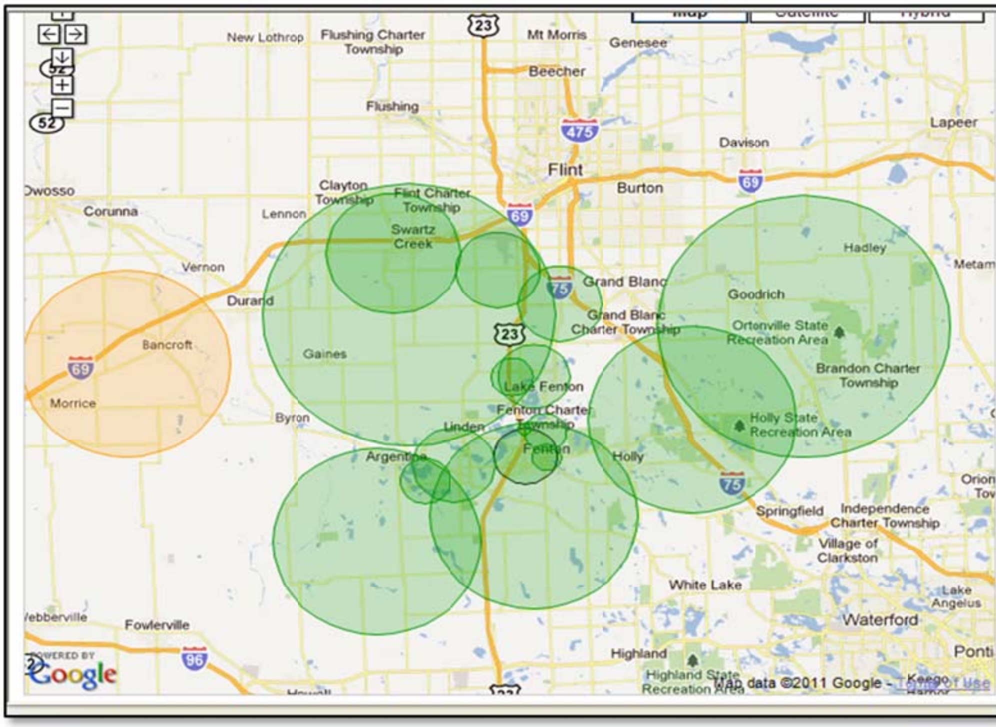


Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0018468553
Registration Date:	01/30/2009 09:24:00 AM
Last Updated:	12/23/2009 11:56:26 AM
Business Name:	Tri-County Times Wireless INC
Business Type:	Private Sector , Corporation
Contact Organization:	Tri-County Times Wireless INC
Contact Position:	CTO
Contact Name:	Mr Fredric S Moses
Contact Address:	256 N. Fenway Drive Fenton, MI 48430 United States
Contact Email:	fred.moses@tcwireless.us
ContactPhone:	(810) 433-6800 6767
ContactFax:	(810) 373-7520

Exhibit D: WQKE949 License Reference

REFERENCE COPY

This is not an official FCC license. It is a record of public information contained in the FCC's licensing database on the date that this reference copy was generated. In cases where FCC rules require the presentation, posting, or display of an FCC license, this document may not be used in place of an official FCC license.

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: Tri-County Times Wireless INC

ATTN: FREDRIC MOSES
TRI-COUNTY TIMES WIRELESS INC
256 N. FENWAY DRIVE
FENTON, MI 48430

Call Sign	File Number
WQKE949	0004878639
Radio Service: NN - 3650-3700 MHz	
Regulatory Status: Private	

FCC Registration Number (FRN): 0018468553

Grant Date	Effective Date	Expiration Date	Print Date
04-24-2009	09-20-2011	04-24-2019	09-20-2011

Market Name: Nationwide

Channel Block: 003650.00000000 - 003700.00000000 MHz

Waivers/Conditions:

This nationwide, non-exclusive license qualifies the licensee to register individual fixed and base stations for wireless operations in the 3650-3700 MHz band. This license does not authorize any operation of a fixed or base station that is not posted by the FCC as a registered fixed or base station on ULS and mobile and portable stations are authorized to operate only if they can positively receive and decode an enabling signal transmitted by a registered base station. To register individual fixed and base stations the licensee must file FCC Form 601 and Schedule M with the FCC. See Public Notice DA 07-4605 (rel November 15, 2007)

Reference

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

3650-3700 MHz License - WQKE949 - Tri-County Times Wireless INC

Administration

New Search | Refine Search | Return to Results | Printable Page | Reference Copy | Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQKE949	Radio Service	NN - 3650-3700 MHz

Applications

Receipt Date	File Number and Type	Status
09/19/2011	0004878766 RL - Register Link/Location	Pending
09/19/2011	0004878762 RL - Register Link/Location	Pending
09/19/2011	0004878726 RL - Register Link/Location	Pending

All Applications (8)

Preliminary Identification of Provider's Coverage Area

CN extracted the Tri-County Wireless service area map directly from the provider's website. Information from that website was used to identify transmit sites such as water towers, grain elevators, and tower structures. The website service area was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The provider's service area depiction is represented by polygons as shown in **Exhibit B**. The thirteen licensed locations' coordinates were inputted into Google Earth and examined utilizing the zoom option of the aerial imagery. All thirteen locations structures were identified. This provided a means of establishing coordinates for all access point locations. All 13 locations were entered into the Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

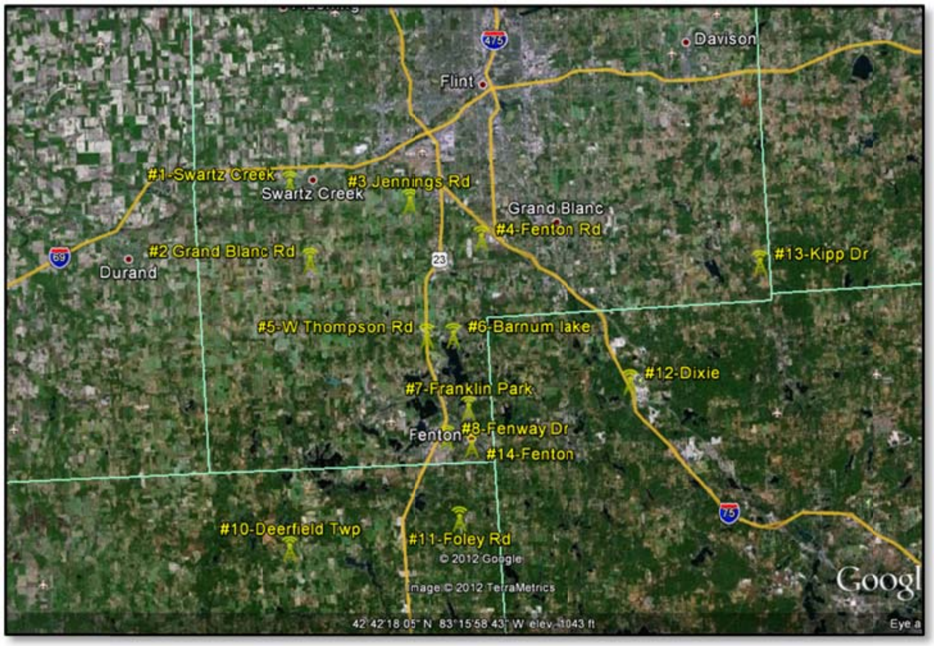
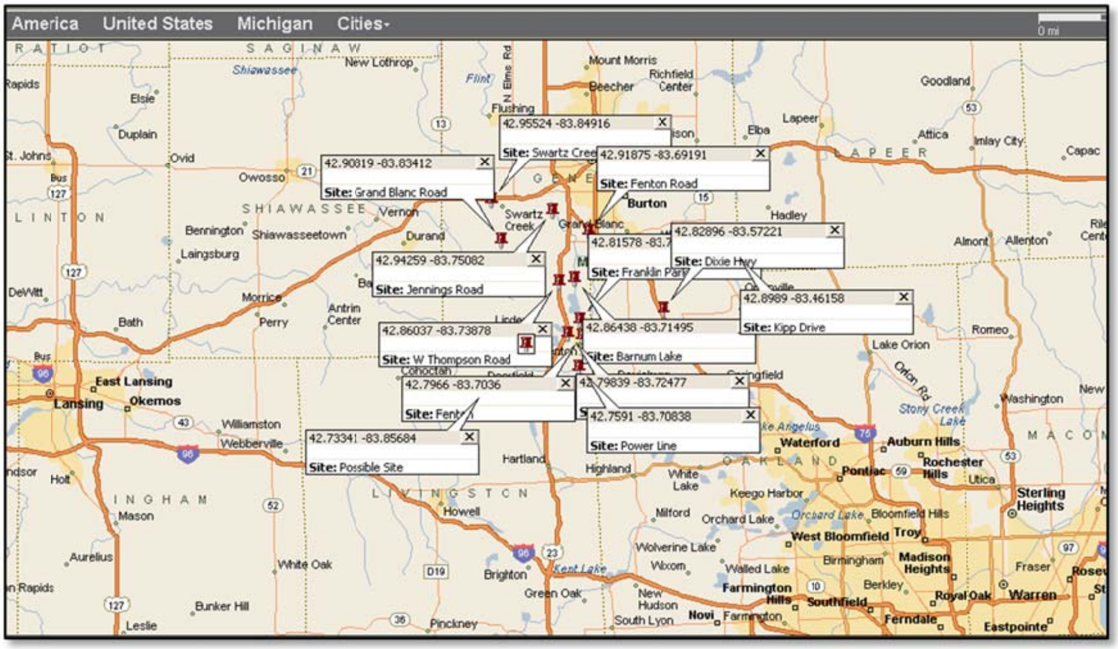


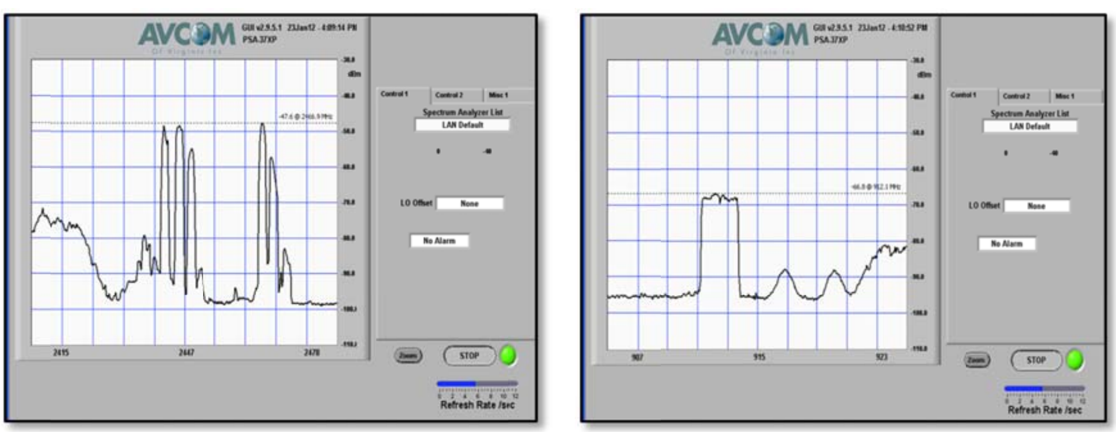
Exhibit F: Validation Points for AP Structures

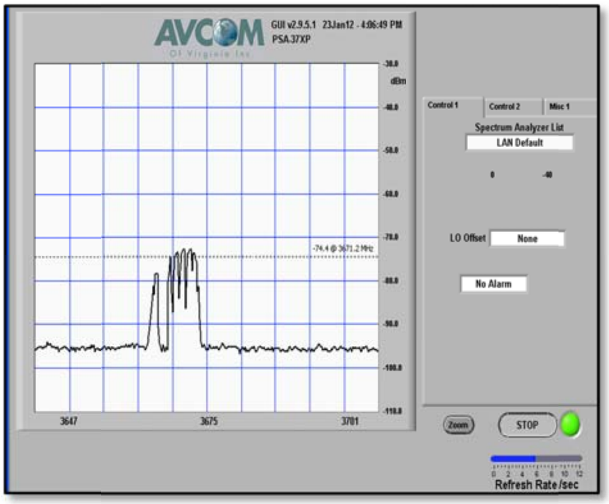


Testing Techniques

CN staff developed a data collection and site validation route based on information derived from the Google Earth image overlay of Tri-County's publicly available coverage on its website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored), and photographs were taken of the access points.

Exhibit G: Field Data for Tri-County Wireless Office/Hub Location





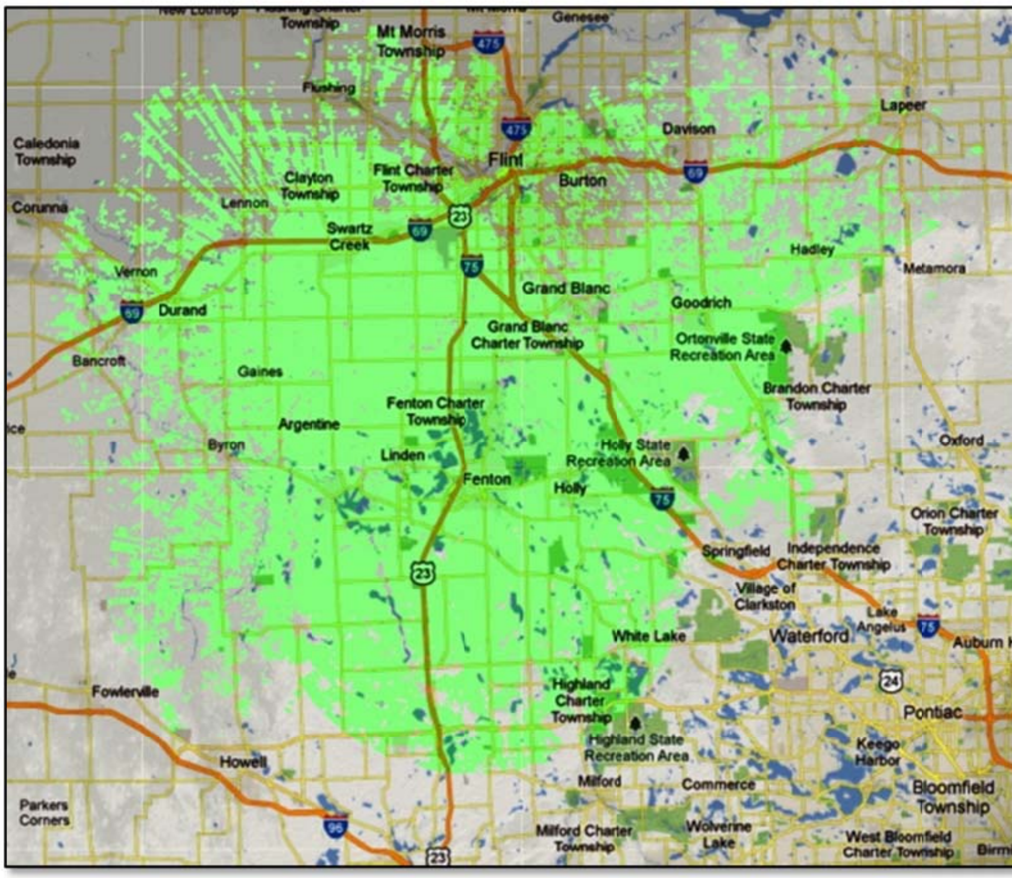
Results and Submission for April 2012

Of the 13 locations visited during the coverage estimation and validation point route, multiple access points were identified and relative information was logged into the Tri-County Wireless field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the CN Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to Tri-County Wireless as courtesy copies and the provider was advised that the estimated coverage information would be submitted to Connect Michigan and to the NTIA unless the provider notified CN, within 48 hours, of discrepancies of the estimated coverage. The provider did not respond to CN and, as of this date, CN believes the information to be an accurate estimation of the service area of Tri-County Wireless.

Exhibit H: Field Validation Notes

1					Coordinates NAD 83 REQUIRED								Platform Type		Test Data		Visual Confirmation		Signal Verification/Spectrum Analyzer				
2	Site #	Date	Provider	Location Description	Lat Deg	Lat Min	Lat Sec	(-) Long Deg	Long Min	Long Sec	(N) Lat Decimal	(-)(W) Long Decimal	Type	Presence Confirmed	Type	Pass or Fail?	Type	Images	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Time	Images
3	1	1/24/12	Tri-County	Water Tower	42	57	18.86	-83	50	56.96	42.9552	-83.8492	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	915.5	-57.6	Avcom PS	12:26 PM	Yes
4	2	1/24/12	Tri-County	AM Radio Tower Field	42	54	29.49	-83	50	2.82	42.9082	-83.8341	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	2441	-46.4	Avcom PS	12:50 PM	Yes
5	3	1/24/12	Tri-County	Grain Elevator	42	56	33.33	-83	45	2.96	42.9426	-83.7508	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	2416.4	-46.8	Avcom PS	7:39 AM	Yes
6	4	1/24/12	Tri-County	Self-supporting tower	42	55	7.5	-83	41	30.88	42.9188	-83.6919	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	2446.2	-46	Avcom PS	11:42 AM	Yes
7	5	1/24/12	Tri-County	Freeway Sports Center	42	51	37.33	-83	44	19.61	42.8604	-83.7388	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	2417	-46.8	Avcom PS	11:21 AM	Yes
8	6	1/24/12	Tri-County	Manufacturing plan:	42	51	36.55	-83	43	1.59	42.8602	-83.7171	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	5812.6	-68.8	Avcom PS	10:55 AM	Yes
9	7	1/24/12	Tri-County	Commercial area	42	48	56.82	-83	42	22.79	42.8158	-83.7063	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	2423.6	-52.8	Avcom PS	10:34 AM	Yes
10	8	1/23/12	Tri-County	Tri-County Wireless Office	42	47	54.28	-83	43	29.18	42.7984	-83.7248	Fixed Wi	Yes	Signal Veri	Pass	Sales Offi	Yes	2466.9	-47.6	Avcom PS	4:56 PM	Yes
11	9	1/24/12	Tri-County	Self-supporting tower	42	44	0.29	-83	51	24.63	42.7334	-83.8568	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	2461.4	-59.2	Avcom PS	9:23 AM	Yes
12	10	1/24/12	Tri-County	Guyed Tower	42	44	55.01	-83	42	58.9	42.7486	-83.7164	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	906	42	Avcom PS	8:50 AM	Yes
13	11	1/25/12	Tri-County	Self-supporting tower	42	49	44.25	-83	34	19.96	42.829	-83.5722	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	2426.2	-48	Avcom PS	9:46 AM	Yes
14	12	1/25/12	Tri-County	Guyed Tower	42	53	56.1	-83	27	40.8	42.8989	-83.4613	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	2404	-61.6	Avcom PS	10:23 AM	Yes
15	13	1/24/12	Tri-County	Fenton Police Station	42	47	37.22	-83	42	16.62	42.7937	-83.7046	Fixed Wi	Yes	Signal Veri	Pass	Wireless	Yes	913.1	-62.8	Avcom PS	9:55 AM	Yes
16	14										0	0											
17	15										0	0											
18	16										0	0											
19	17										0	0											
20	18										0	0											
21	19										0	0											
22	20										0	0											

Exhibit I: Tri-County Wireless, Inc. Estimated Composite Coverage



VQ Wireless

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 State Broadband Initiative (SBI) program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to VQ Wireless, a wireless Internet service provider (WISP) located in Davison, Michigan, with a service area in and around Davison. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

A CN staff member discovered this provider while conducting field research on another provider and stopped in its business office on January 25, 2012. During the ensuing discussions, a representative for VQ Wireless stated it had launched its wireless broadband service in December 2011 from the single tower site next to the office. The company representative provided broadcast frequencies and transmit antenna height on the tower. While on site, the CN staff member captured coordinates of the tower and conducted signal analysis to confirm frequencies being broadcast at that location. CN staff members have continued trying to obtain the participation of the provider with 5 instances of communication via telephone and e-mail sessions since January 25, 2012, through February 20, 2012.

The Issue

VQ Wireless, by its lack of responsiveness since January 25, 2012, has predicated its unwillingness to participate in the Connect Michigan broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.vqwireless.com/) **(Exhibit A)** to determine the residential service plans and the service area of the provider's wireless network; neither of which can be found on the provider's website. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded an FRN of 0021227970 **(Exhibit B)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded a "No Matches Found" response **(Exhibit C).**

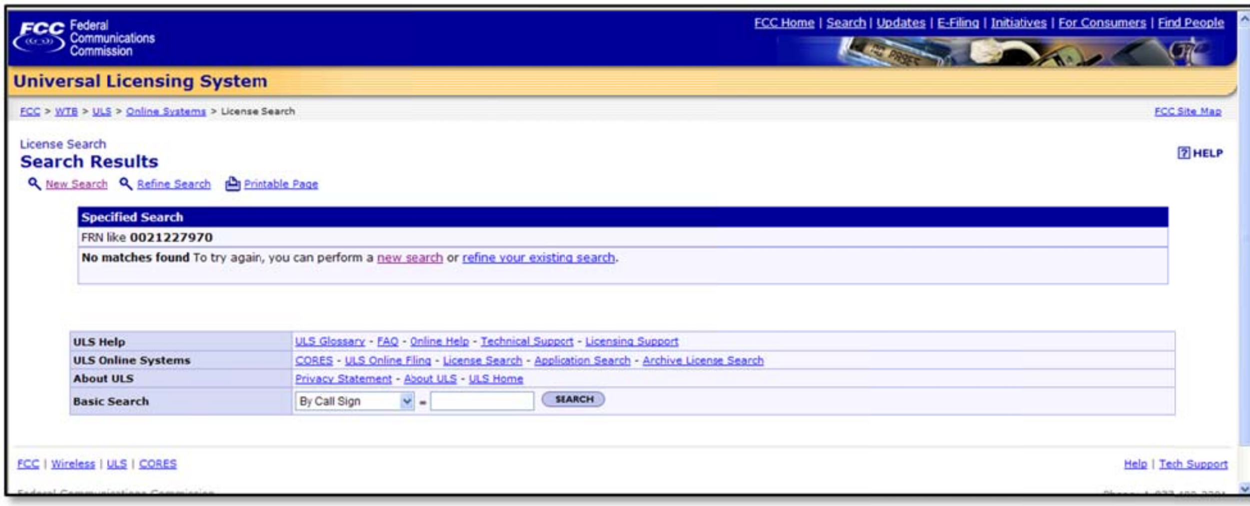
Exhibit A: Service Plans

Exhibit B: Federal Registration Number

Close Window

Registration Detail	
FRN:	0021227970
Registration Date:	10/18/2011 03:59:00 PM
Last Updated:	
Business Name:	VQ Wireless
Business Type:	Private Sector , Sole Proprietor
Contact Organization:	
Contact Position:	Vice President
Contact Name:	Mr Christopher L Sampson
Contact Address:	1312 N Irish Rd Davison, MI 48423 United States
Contact Email:	chris.sampson@vqwireless.com
ContactPhone:	(810) 412-4500
ContactFax:	

Exhibit C: "No Matches Found"



Preliminary Identification of Provider's Coverage Area

CN created the VQ Wireless service area map from the information provided by the company representative and from signal analysis conducted at the tower site to further identify the frequencies being used by this provider. This data was utilized to create a Google Earth image overlay **(Exhibit D).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The provider's service area depiction is represented by tower symbols as shown in **Exhibit D**. The single transmit tower location was entered into the Microsoft *Streets & Trips* mapping application **(Exhibit E)** to develop a route for the validation process.

Exhibit D: Google Earth: Provider's Tower Site Image Overlay

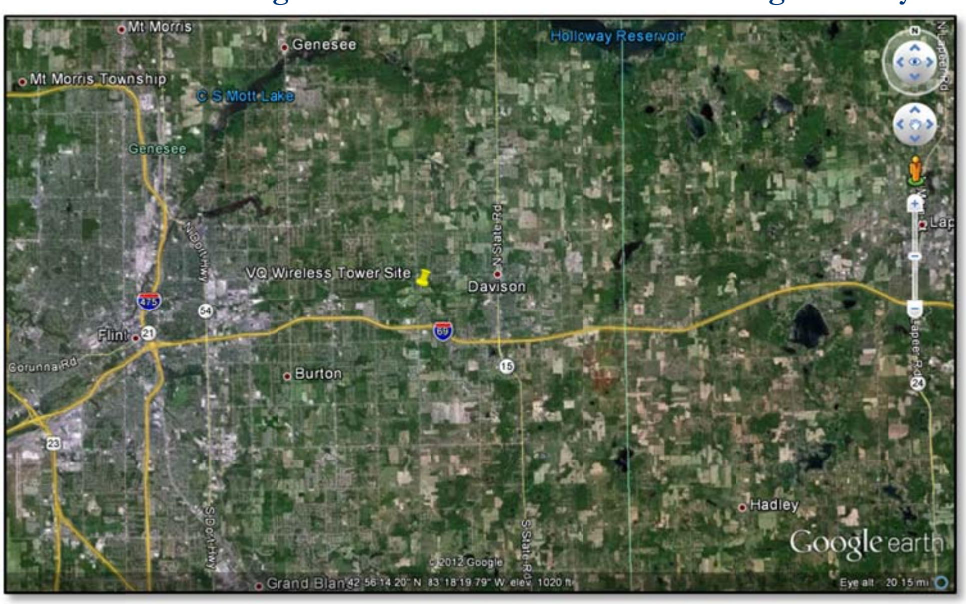
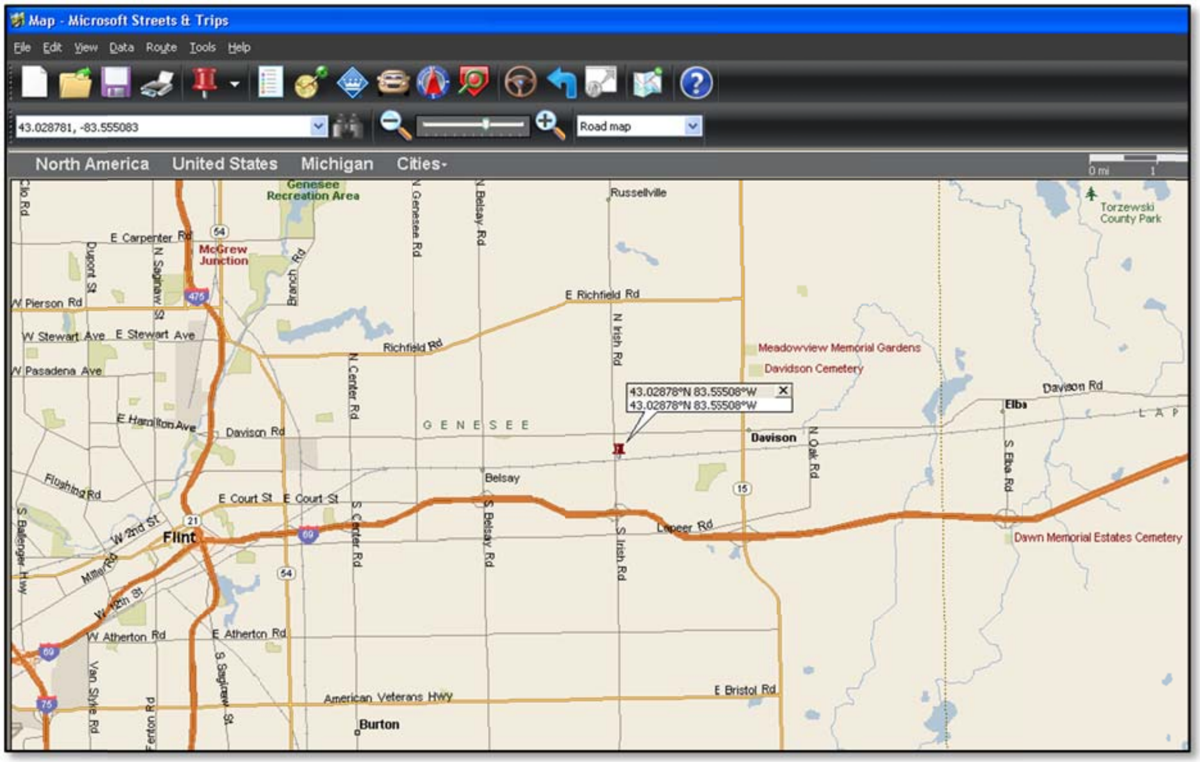


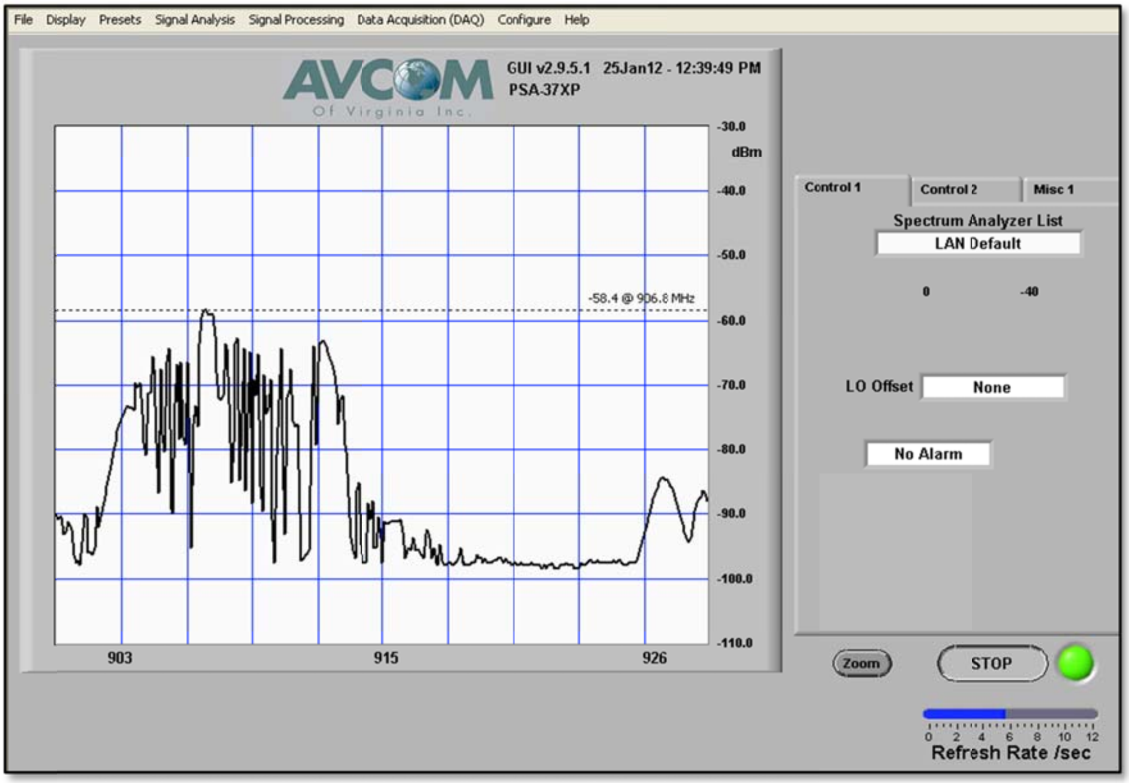
Exhibit E: Validation Point for AP Structure

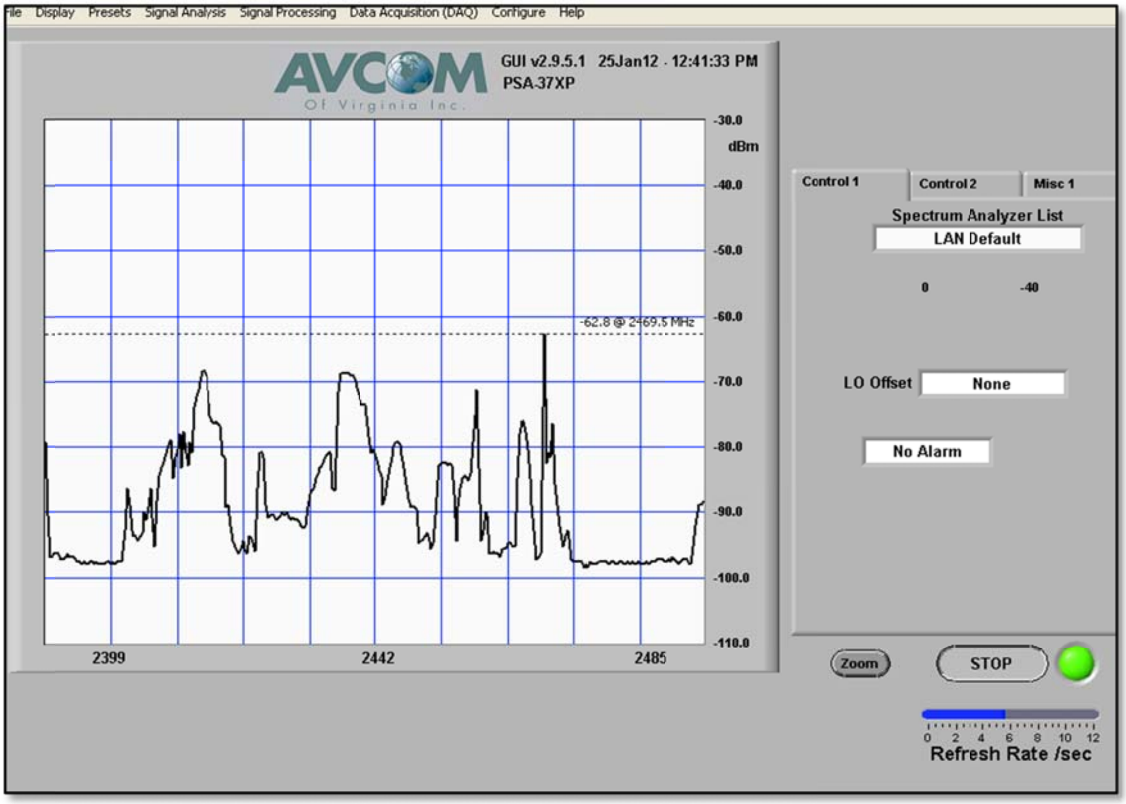


Testing Techniques

The CN engineer then developed a data collection and site validation route based on information derived from the Google Earth image overlay and publicly available data obtained while at the principal offices of VQ Wireless. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit F)**. The single validation point was scrutinized for frequency of operation to confirm the data as provided by the provider representative. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored), and photographs were taken of the access points.

Exhibit F: Field Data for VQ Wireless Office/Hub Location

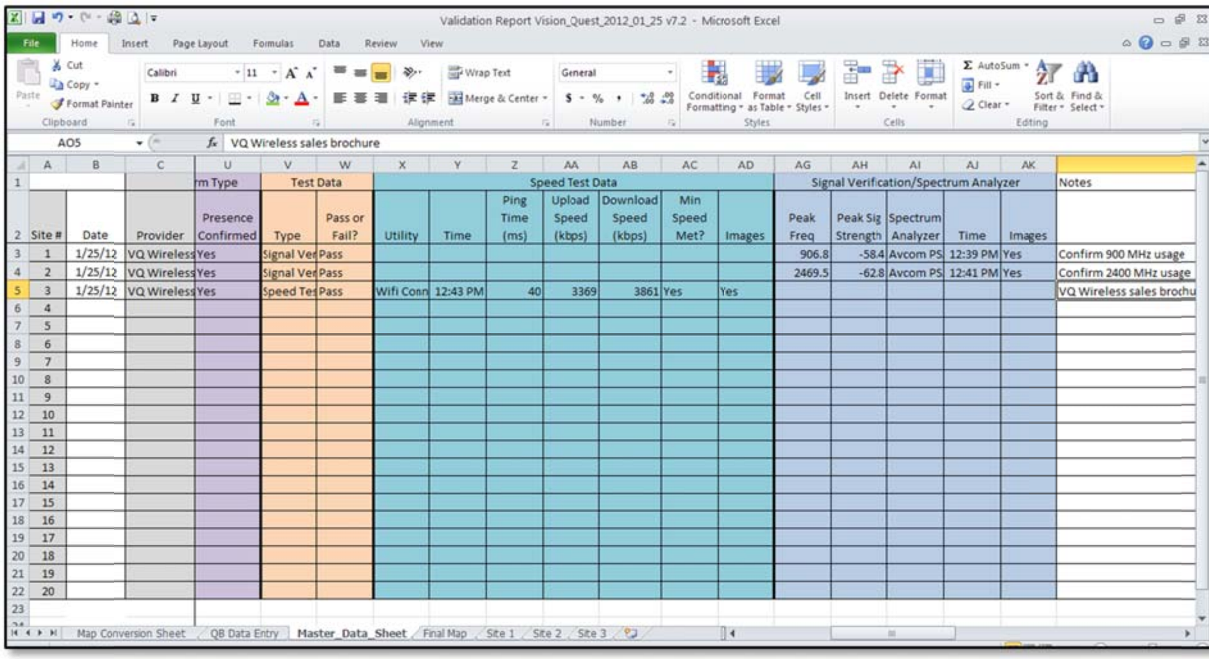




<u>Results and Submission for April 2012</u>

Of the single location visited during the validation point route, two access points were identified, and relative information was logged into the VQ Wireless field validation notes file **(Exhibit G)**. The field and the publicly available data were transferred to the CN Provider Information file. A propagation study was completed based on the field data **(Exhibit H)**. Both documents were forwarded to VQ Wireless as courtesy copies, and the provider was advised the estimated coverage information would be submitted to Connect Michigan and to the NTIA unless the provider notified CN, within 48 hours, of discrepancies of the estimated coverage. The provider did not respond to CN and, as of this date, CN believes the information to be an accurate estimation of the service area of VQ Wireless.

Exhibit G: Field Validation Notes



			m Type	Test Data		Speed Test Data							Signal Verification/Spectrum Analyzer					Notes
Site #	Date	Provider	Presence Confirmed	Type	Pass or Fail?	Utility	Time	Ping Time (ms)	Upload Speed (kbps)	Download Speed (kbps)	Min Speed Met?	Images	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Time	Images	
1	1/25/12	VQ Wireless	Yes	Signal Ver	Pass								906.8	-58.4	Avcom PS	12:39 PM	Yes	Confirm 900 MHz usage
2	1/25/12	VQ Wireless	Yes	Signal Ver	Pass								2469.5	-62.8	Avcom PS	12:41 PM	Yes	Confirm 2400 MHz usage
3	1/25/12	VQ Wireless	Yes	Speed Tes	Pass	Wifi Conn	12:43 PM	40	3369	3861	Yes	Yes						VQ Wireless sales brochu
4																		
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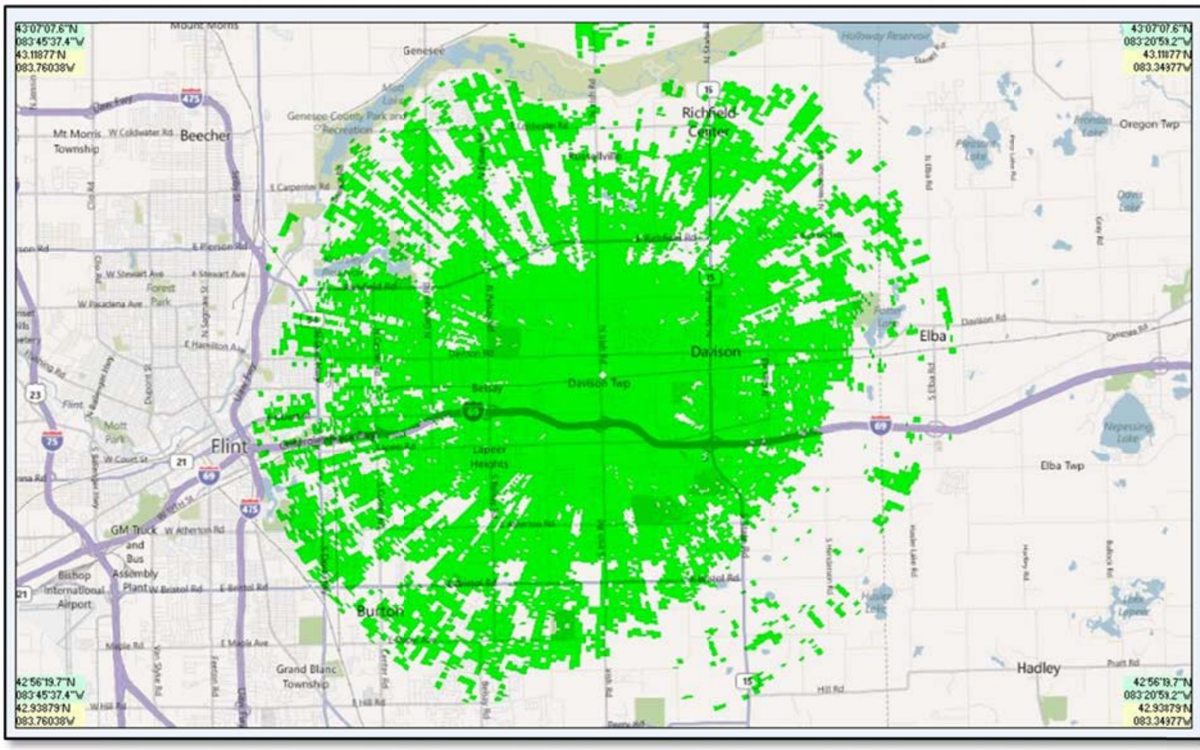
Exhibit H: VQ Wireless Coverage



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 1.79 percent of Michigan households do not have terrestrial fixed broadband service available, and approximately 0.17 percent[1]of Michigan households have neither mobile nor fixed broadband service available.[2]

Within rural areas of the state, results derived from provider-validated data indicate that approximately 3.01 percent of rural Michigan households do not have terrestrial fixed broadband service available, and approximately 0.28 percent[3] of rural Michigan households have neither mobile nor fixed broadband service available.[4] Please note that the availability estimates presented are based on Census 2010 household information.

[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 state.

[3] See footnote 1.

[4] See footnote 2.

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

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information 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 Michigan project has received a total of 191 inquiries (1,376 grant inception to date). As more inquiries are submitted to Connect Michigan, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

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 Michigan project launched BroadbandStat on May 20, 2010, and has received a total of 8,344 visits to date, of which 1,883 occurred this reporting period.

Speed Test Methodology

The 2,883 speed tests that are represented in the Connect Michigan Speed Test Report during this reporting period (11,584 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 Michigan speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Michigan project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Michigan 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 state of Michigan.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 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	20/20 Communications, LLC	n/a	Company has been sold to another area WISP
2	21Globe, Inc.	n/a	Company is no longer in business
3	650Net	http://www.650net.net/	This company provides dial-up only in Michigan
4	A 007 Access	n/a	Acquired by another company
5	Aaccess Network Communications	n/a	Not a broadband provider
6	Access123.net	http://www.access123.net/	Not a broadband provider
7	ACERX.NET	n/a	Not a broadband provider
8	Airbaud, Inc	http://www.airbaud.net/	No longer a fixed wireless provider in Michigan
9	Airespring, Inc.	http://www.airespring.com	Nonfacilities-based reseller
10	Airewaves Broadband, LLC	n/a	Company is no longer in business
11	Airmail247.com	n/a	Company is no longer in business
12	All-In-One Wireless, Inc.	n/a	No longer in business; acquired by another company
13	Antioch Wireless Broadband	www.antiochwirelessbroadband.com/	Not a broadband provider
14	Arrowheadnet.com	http://www.arrowheadnet.com/	Not a broadband provider

15	bargainisp.net	http://www.bargainisp.net/	Not a broadband provider
16	Bayville Wireless	n/a	Company is no longer in business
17	Beanstalk Internet	n/a	Company is no longer in business
18	Beaver Island Broadband, Inc.	n/a	Not a broadband provider
19	Big Bay Broadband	n/a	Company is no longer in business
20	BlazeConnect, Inc.	n/a	Company is no longer in business
21	Blue Communications, LLC	http://www.bluecommunicationsllc.com	Not a broadband provider
22	Broadband National	http://www.broadbandnational.com	Nonfacilities-based reseller
23	Broadview Networks Holdings, Inc.	http://www.broadviewnet.com	Not a Michigan provider
24	BullsEye Telecom, Inc.	http://bullseyetelecom.com	Nonfacilities-based reseller
25	Cable Vision, Inc.	n/a	Company is no longer in business
26	Cablemax Communications	n/a	Company is no longer in business
27	CAC MediaNet, Inc.	n/a	Not a broadband provider
28	Camino-Net Internet Services	http://www.camino-net.com	This company provides dial-up only in Michigan
29	Caspian Community TV Corporation	n/a	Not a broadband provider
30	Cbeyond Communications, LLC	n/a	Company has refused to participate
31	CCIS.net	http://www.ccis.net	Not a Michigan provider
32	Celito Communications	http://www.celito.net/	Nonfacilities-based reseller
33	CIMCO Communications, Inc.	n/a	This company is not a broadband provider
34	City of Crystal Falls	http://www.crystalfalls.org/ Electric%20Department.htm	This company is not a broadband provider
35	City of Negaunee	http://cityofnegaunee.com/ Cable.html	This company is not a broadband provider
36	Clear Rate Communications, Inc.	http://clearrate.com/	This company provides dial-up only in Michigan
37	Cleartouch.Com	n/a	Company is no longer in business
38	CMC Telecom, Inc.	http://cmctelecom.net	Nonfacilities-based reseller

39	Crystal Cable TV	n/a	They do offer broadband, but not over the cable lines; it is provided though satellite link.
40	Deltaforce	http://www.deltaforce.net	Nonfacilities-based reseller
41	deluxehost.com	http://deluxe-host.com	This company is not a broadband provider
42	DGUI	n/a	Company is no longer in business
43	Dial National	n/a	Company is no longer in business
44	Dialer.net	http://www.dialer.net	Nonfacilities-based reseller of mobile 3G services
45	DIECA Communications, Inc.	http://www.covad.com/	Company has been acquired by another company
46	DSL@interlync	www.interlync.com	Company has been non -responsive
47	DSTech	http://www.dstech.us/	They only provide wireless hotspots for the City of Escanaba and are not a fixed wireless provider
48	DTS-NET.COM	http://www.dts-net.com/	Nonfacilities-based reseller
49	Dundee Internet Services, Inc.	n/a	Company is no longer in business
50	Eagles Internet Services	n/a	Company is no longer in business
51	Enventis Telecom Inc.	http://www.enventis.com	Company does not provide broadband services in Michigan
52	ETI - Connecting Your World	http://www.cyberenet.net/	Nonfacilities-based reseller
53	Fast Dependable Access	n/a	Company is no longer in business
54	First Communications, LLC	www.firstcomm.com	Company has been non-responsive
55	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com/	Acquired by another company
56	Grid4 Communications, Inc.	http://www.grid4.com	Nonfacilities-based reseller; company has refused to participate
57	Holland Board of Public Works	http://www.hollandbpw.com	This company is not a broadband provider
58	Hubwest Protected Networks LLC	http://www.hubwest.com	Company does not provide broadband services in Michigan
59	Imbris, Inc.	http://www.imbris.com	Company does not provide broadband services in Michigan
60	IMGISP.NET	http://www.imgisp.net/	This company is not a broadband provider

61	Incredible Networks	n/a	Company is no longer in business
62	Industrial Grade Broadband, LLC	n/a	This company is not a broadband provider
63	Inercom Communications Inc.	http://www.inercom.com	Company is no longer in business
64	Interactiveinfo.com Inc	http://www.rocketbroadband.com	Company does not provide broadband services in Michigan
65	International Broadband Electric Communications, Inc.	http://ibec.net	This company is not a broadband provider
66	Intouch Internet Services, Inc.	http://www.intouchmi.com	Nonfacilities-based reseller
67	iRadical	n/a	Company is no longer in business
68	ISG	http://www.leapfrogbroadband.com	This company is not a broadband provider
69	ISPartner.net	n/a	Company is no longer in business
70	ITWifi, Inc.	http://www.fnw.us/	Company has been sold to another area WISP
71	Jackpine Internet	http://www.jackpine.com	Nonfacilities-based reseller
72	Jenco Speed Web	http://www.jencospeed.net	Company does not provide broadband services in Michigan
73	LARIAT.NET	http://www.lariat.net/	Company does not provide broadband services in Michigan
74	LCSisp.com	http://www.lcsisp.com/index.cfm	This company provides dial-up only in Michigan
75	Lightyear Network Solutions, LLC	http://lightyear.net	Nonfacilities-based reseller
76	LinkAmerica.Net	n/a	Company is no longer in business
77	Local Exchange Networks of Michigan, Inc.	n/a	Company is no longer in business
78	M55 WiFi Wireless Internet Service	http://www.m55wifi.net/	No longer in business
79	MainBoard, LLC	http://www.mainboard.cc/internet.htm	Company does not provide broadband services in Michigan
80	Maine Cable and Wireless	n/a	Company is no longer in business
81	Maple River Networks, LLC	n/a	Company is no longer in business
82	Marcin Company	n/a	Company is no longer in business
83	MediaNet	n/a	Company is no longer in business

84	Metropolitan Telecommunications Holding Company	http://www.mettel.net	Non-facilities based reseller
85	Mich1 Internet, Inc.	http://www.mich1.net	Nonfacilities-based reseller
86	Michiana Wireless, Inc.	http://www.michianawireless.com	Company does not provide broadband services in Michigan
87	Michigan Department of Information Technology	http://www.michigan.gov/dit/	This company is not a broadband provider
88	Microwave Communications, Inc.	n/a	This company is not a broadband provider
89	Midwest Communications Services, Inc.	http://mwcomm.com	This company is not a broadband provider
90	Midwest Energy Cooperative	http://teammidwest.com/	No longer in business
91	Millenicom Inc.	http://www.millenicom.com	Oregon-based reseller of mobile broadband plans
92	MIMesh	http://www.mimesh.com	This company is not a broadband provider
93	Nanomega.Com	n/a	Company is no longer in business
94	NetAccess, Inc.	http://www.nas.net/	This company is not a broadband provider
95	NetSpeed Online	n/a	Company is no longer in business
96	New Edge Network, Inc.	www.newedgenetworks.com	Nonfacilities-based reseller of backhaul services
97	Nextlink Wireless, Inc.	n/a	Company does not provide broadband services in Michigan
98	Northern Michigan Online	http://www.nmo.net	This company is not a broadband provider
99	Northwest ISP	www.northwestisp.com/	Company is no longer in business
100	NSIGHTTEL WIRELESS, LLC	www.nsighttel.com	Company does not provide broadband services in Michigan
101	Overarch Broadband	www.overarch.com	Company does not provide broadband services in Michigan
102	Pacific Internet Exchange	n/a	Company does not provide broadband services in Michigan
103	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company
104	Paknet Limited	n/a	This company is not a broadband provider

105	Planet Online	www.planetonline.net/	This company is not a broadband provider
106	PremoWeb	n/a	This company is not a broadband provider
107	Raser, Inc.	http://www.wmis.net/	Company has been non-responsive
108	Renaissance Networks	www.renaissancenetworks.com/	This company is not a broadband provider
109	Rural Communications, Inc.	http://www.ruralcommunications.net/	No longer in business
110	Saturn Telecommunication Services, Inc.	n/a	Acquired by another company
111	Seneca Communications	www.senecacommunications.com	This company is not a broadband provider
112	Simply Dialup A Metrogeek Company	www.simplydialup.com/	This company is not a broadband provider
113	Sling Broadband	www.slingbroadband.com/	Company does not provide broadband services in Michigan
114	Star Video	n/a	Company is no longer in business
115	State of Michigan	n/a	Not a broadband provider
116	StoneBridge Wireless Broadband	n/a	Acquired by another company
117	Surferz.Net	www.surferz.net/	This company is not a broadband provider
118	T1 Shopper	www.t1shopper.com	Non-facilities based reseller
119	Talk America Inc.	n/a	Acquired by another company
120	Telefonica USA, Inc.	www.telefonica.com/	Company does not provide broadband services in Michigan
121	TelNet Worldwide, Inc.	www.telnetww.com	Company has been non-responsive
122	Telovations, Inc.	www.telovations.com	Company does not provide broadband services in Michigan
123	Thumbnet	n/a	Acquired by another company
124	Total Access Networks, Inc	n/a	Not a broadband provider
125	TRANSWORLD NETWORK, CORP	n/a	Not a broadband provider
126	True Connections, LLC	n/a	Company is no longer in business
127	TSISP.NET	n/a	Company is no longer in business
128	TVC Inc.	www.tvcinc.com	Not a broadband provider
129	University Corporation for Advanced Internet Development	n/a	Not a broadband provider

130	UNUM Telecommunications, Inc.	n/a	Company does not provide broadband services in Michigan
131	WilTel Communications, LLC.	n/a	Acquired by another company
132	WingsComm Communications	n/a	Company is no longer in business
133	Wireless First LLC	n/a	Acquired by another company
134	Wireless Roanoke, Inc.	n/a	Company is no longer in business
135	Wireless Ypsi	www.wireless.ypsi.com	Company provides free hotspots in Ypsilanti area
136	wisbin	www.wisbin.com/	Company does not provide broadband services in Michigan
137	www.AmericanAngel.us	www.AmericanAngel.us	Company is no longer in business
138	YEYZOO.NET	www.yeyzoo.net/	Not a broadband provider
139	YLISP (Your Local ISP)	www.itsyournet.com	Not a broadband provider
140	YourT1Wifi.com	www.yourt1wifi.com/	Company does not provide broadband services in Michigan
141	Z-Comm, LLC	n/a	Company is no longer in business
142	ZOOM Internet Services, LLC	n/a	Acquired by another company

Connect Michigan

Broadband Provider Log

Complete	174
Non-Responsive/Refused	9
In Progress	10
Count of Datasets by Status	**193**
Total Unique Providers Represented	**140**

Provider Name	**Platform**	**Status**	**NDA Execution Date**	**Notes**
Ace Telephone Company of Michigan Inc.	DSL	Data Added to Statewide Inventory	1/12/2010	[JAN-30-12 Brian Dudek] Change: Provider slightly expanded DSL territory near Mesick and increased upload speed to tier 4 in Old Mission area.
Air Advantage, LLC	Fixed Wireless	Data Added to Statewide Inventory	3/15/2010	[FEB-29-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[FEB-29-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-28-12 Brian Dudek] Change: Provider expanded mobile territory.
Barry County Telephone Company	Fixed Wireless	Data Added to Statewide Inventory		[FEB-29-12 Sarah Finne] Change: New fixed wireless towers in operation.
Block Communications, Inc.	Cable	Data Added to Statewide Inventory	4/12/2010	[JAN-17-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer speed tier 10 download speeds, with TechTrans 40 (DOCSIS 3.0).
Bloomingdale Telephone Company, Inc.	Fiber	Data Added to Statewide Inventory	1/25/2010	[JAN-20-11 Brian Dudek] Change and Correction: Provider expanded fiber territory northwest and east of Paw Paw. Provider upload speeds were reported at tier 5 when they should be tier 4.
Broadstripe LLC	Cable	Data Added to Statewide Inventory	3/5/2010	[JAN-17-12 Sarah Finne] Correction: Small area of coverage removed due to consumer broadband inquiry (approved by provider).
Camp Communication Services, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[FEB-29-12 Sarah Finne] Change: New fixed wireless towers in operation, and provider decommissioned 3 tower sites (and upgraded infrastructure on a few sites to offer speed tier 4 and 5 download speeds).
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-23-12 Brian Dudek] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[JAN-30-12 Brian Dudek] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission. Increased maximum advertised download speed to tier 10.
Cherry Capital Connection, LLC	Fixed Wireless	Data Added to Statewide Inventory	12/28/2009	[FEB-29-12 Sarah Finne] Change: New fixed wireless towers in operation.
Climax Telephone Company	Fiber	Data Added to Statewide Inventory	1/14/2010	[FEB-29-12 Sarah Finne] Change: Provider upgraded DSL area to FTTH.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-09-12 Brian Dudek] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Crystal Automation Systems, Inc	Fixed Wireless	Data Added to Statewide Inventory	6/25/2010	[FEB-29-12 Sarah Finne] Change: New fixed wireless towers in operation.
CSInet Internet Access Corp.	Fixed Wireless	Data Added to Statewide Inventory	3/31/2010	[FEB-29-12 Sarah Finne] Change: New fixed wireless towers in operation.
Custom Software Inc.	Fixed Wireless	Data Added to Statewide Inventory	2/3/2010	[FEB-29-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer speed tier 3 download speeds, thus qualifying their fixed wireless platform as broadband.
D&P Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/8/2011	[FEB-21-12 Brian Dudek] Change: New fixed wireless towers in operation.
FNW, LLC	Fixed Wireless	Data Added to Statewide Inventory	2/12/2010	[FEB-29-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-28-12 Brian Dudek] Change and Correction: Service expansion and corrections to previous dataset; entirely new dataset provided for April 2012 submission in Midstates and North provider areas.
Great Lakes High Speed, LLC	Fixed Wireless	Data Added to Statewide Inventory		[FEB-29-12 Sarah Finne] Change: New fixed wireless tower in operation, and one existing tower site was decommissioned.
Great Lakes Internet, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/11/2010	[JAN-17-12 Brian Dudek] Change: Provider expanded fixed wireless territory.
Internet 123, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[FEB-22-12 Brian Dudek] Correction: New provider for April 2012 submission that was previously unresponsive.
Iron River Cooperative TV Antenna Corp	Cable	Data Added to Statewide Inventory	7/27/2010	[JAN-17-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer speed tier 6 download speeds and speed tier 4 upload speeds.
ISP Management, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/22/2010	[FEB-29-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
LakeNet LLC	Fixed Wireless	Data Added to Statewide Inventory	12/27/2011	[FEB-13-12 Brian Dudek] Change: New fixed wireless provider in the market.

Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/5/2010	[FEB-23-12 Brian Dudek] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Lennon Telephone Company	Cable	Data Added to Statewide Inventory	1/25/2010	[FEB-10-12 Brian Dudek] Change: Provider slightly increased cable territory. Increased maximum advertised download speed to tier 6.
MetroPCS Wireless, Inc.	Mobile Wireless	Data Added to Statewide Inventory	2/10/2012	[FEB-29-12 Sarah Finne] Change: New mobile wireless provider identified.
Parish Communications	Cable	Data Added to Statewide Inventory	7/1/2010	[JAN-25-12 Brian Dudek] Change: Provider reduced coverage by selling cable system in Berrien County (Bainbridge/Pipestone Twps) to SMR Communications.
RACC Enterprises, LLC	Fixed Wireless	Data Added to Statewide Inventory		[FEB-17-12 Brian Dudek] Change: New provider in service for April 2012 submission.
Scott Cook, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[FEB-29-12 Sarah Finne] Change: New fixed wireless provider identified.
SMR Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[MAR-01-12 Sarah Finne] Correction:Michiana Supernet was previously non-responsive, but they provided data this round.
SMR Communications, Inc.	Cable	Data Added to Statewide Inventory		[JAN-25-12 Brian Dudek] Change: New cable provider in the market after purchase of cable system from Parish Communications.
SpeedNet, LLC	Fixed Wireless	Data Added to Statewide Inventory	1/7/2010	[FEB-29-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JAN-30-12 Brian Dudek] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-20-12 Brian Dudek] Change: Provider expanded mobile territory in UMTS and HSPA areas.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[FEB-28-12 Brian Dudek] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
The Computer Care Company, Inc.	DSL	Data Added to Statewide Inventory	3/8/2011	[JAN-17-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer speed tier 7 download speeds.
The Computer Care Company, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/8/2011	[JAN-20-12 Brian Dudek] Change: New fixed wireless towers in operation.
Time Warner Cable LLC	Cable	Data Added to Statewide Inventory	12/21/2009	[FEB-21-12 Brian Dudek] Change: Provider increased download and upload speeds in their southern MI territory.
Tucker Communications, Inc	Fixed Wireless	Data Added to Statewide Inventory	2/17/2011	[FEB-29-12 Sarah Finne] Change: New fixed wireless towers in operation.
Upper Peninsula Telephone Company	DSL	Data Added to Statewide Inventory	1/11/2010	[FEB-10-12 Brian Dudek] Change: Provider increased maximum advertised download speed to tier 4 and upload to tier 3 in multiple areas.
Verizon North Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-20-12 Brian Dudek] Change and Correction: Provider corrected their speed tiers and increased coverage areas in EVDO and LTE areas.
Waldron Communication Company	Fixed Wireless	Data Added to Statewide Inventory	1/12/2010	[JAN-19-12 Brian Dudek] Change: Provider added 3650 wireless spectrum to existing tower location and increased wireless speed infrastructure on 900 mhz spectrum to match 3650.
Winn Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	6/28/2010	[FEB-29-12 Sarah Finne] Change: New fixed wireless towers in operation.
Zing Networks, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[FEB-29-12 Sarah Finne] Correction: Zing Networks, Inc. was previously non-responsive, but they provided data this round.
Charter Communications, Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/15/2009	
Conterra Ultra Broadband, LLC	Backhaul	Backhaul Provider Only Processing Complete		
Internet 123, Inc.	Backhaul	Backhaul Provider Only Processing Complete		
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	
TDS Telecommunications Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/27/2010	
Zayo Bandwidth, LLC	Backhaul	Backhaul Provider Only Processing Complete		
Bitwise Wireless, LLC	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-07-12 Sarah Finne] Correction: Estimated coverage created and submitted for non-responsive provider.
Tri-County Wireless, Inc.	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-07-12 Sarah Finne] Correction: Estimated coverage created and submitted for non-responsive provider.
Vision Quest Technology Solutions	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-07-12 Sarah Finne] Correction: Estimated coverage created and submitted for non-responsive provider.
2125 Cable Company, LLC	Cable	No Update to Provide	3/22/2010	
Agri-Valley Communications, Inc.	Fixed Wireless	No Update to Provide	1/22/2010	
Agri-Valley Communications, Inc.	DSL	No Update to Provide	1/22/2010	
Agri-Valley Communications, Inc.	Backhaul	No Update to Provide	1/22/2010	
Agri-Valley Communications, Inc.	Mobile Wireless	No Update to Provide	1/22/2010	
AIRGRANT.COM, INC.	Fixed Wireless	No Update to Provide		
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Azulstar, Inc.	Fixed Wireless	No Update to Provide	1/27/2010	[MAR-13-12 Sarah Finne] Correction: Provider MAD speed decreased from tier 6 to tier 5, per website information.
Baraga Telephone Company	DSL	No Update to Provide	1/14/2010	
Baraga Telephone Company	Fiber	No Update to Provide	1/14/2010	
Barry County Telephone Company	DSL	No Update to Provide		
Barry County Telephone Company	Fiber	No Update to Provide		
BigTube Wireless, LLC	Fixed Wireless	No Update to Provide	6/17/2010	
Blanchard Telephone Association, Inc.	DSL	No Update to Provide	6/17/2010	
Blanchard Telephone Association, Inc.	Backhaul	No Update to Provide	6/17/2010	
Bloomingdale Telephone Company, Inc.	DSL	No Update to Provide	1/25/2010	
Bloomingdale Telephone Company, Inc.	Fixed Wireless	No Update to Provide	1/25/2010	
Cable America Michigan, LLC	Cable	No Update to Provide	3/9/2011	

Carr Communications, Inc.	DSL	No Update to Provide	1/15/2010	
CCI Systems, Inc.	Cable	No Update to Provide	6/29/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
City of Norway	Cable	No Update to Provide	3/14/2011	
Clearwire Corporation	Mobile Wireless	No Update to Provide	3/17/2011	[MAR-12-12 Terry Holmes] Provider supplied additional information on coverage for substantial service sites in October 2011, however requested that CN not submit or publish this coverage since they do not market to these areas.
Climax Telephone Company	Backhaul	No Update to Provide	1/14/2010	
Climax Telephone Company	DSL	No Update to Provide	1/14/2010	
Coldwater Board of Public Utilities	Cable	No Update to Provide	3/1/2010	
Crystal Automation Systems, Inc	Backhaul	No Update to Provide	6/25/2010	
Custom Software Inc.	DSL	No Update to Provide	2/3/2010	
D&P Communications, Inc.	Cable	No Update to Provide	3/8/2011	
D&P Communications, Inc.	Fiber	No Update to Provide	3/8/2011	
Daystarr Communications, LLC	Backhaul	No Update to Provide		
Daystarr Communications, LLC	DSL	No Update to Provide		
Daystarr Communications, LLC	Fiber	No Update to Provide		
DISH Network Corporation	Satellite	No Update to Provide	1/27/2010	
Farmers Mutual Telephone Company of Chapin, Inc.	DSL	No Update to Provide	10/26/2010	
Fast-Air Internet, Inc.	Fixed Wireless	No Update to Provide		
Frontier Communications Corporation	Backhaul	No Update to Provide	1/22/2010	
Great Lakes Comnet, Inc.	Backhaul	No Update to Provide		
Hiawatha Communications, Inc.	DSL	No Update to Provide	2/2/2010	
Hiawatha Communications, Inc.	Fiber	No Update to Provide	2/2/2010	
Hiawatha Communications, Inc.	DSL	No Update to Provide	2/2/2010	
Hiawatha Communications, Inc.	DSL	No Update to Provide	2/2/2010	
Hiawatha Communications, Inc.	DSL	No Update to Provide	2/2/2010	
Hidden Lake Wireless, Inc.	Fixed Wireless	No Update to Provide	3/12/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
I-2000, Inc.	Fixed Wireless	No Update to Provide	3/7/2011	
Interlink Computers Technology, Inc.	Fixed Wireless	No Update to Provide	3/12/2010	
Iron Bay Computer & Design	Fixed Wireless	No Update to Provide	1/14/2010	
Kaltelco, LLC	DSL	No Update to Provide	3/5/2010	
Lennon Telephone Company	DSL	No Update to Provide	1/25/2010	
Ligonier Telephone Company, Inc.	Fixed Wireless	No Update to Provide	3/31/2010	
MegaPath Inc.	Backhaul	No Update to Provide	2/15/2010	
Mercury Network Corporation	Fixed Wireless	No Update to Provide	3/9/2011	
Mercury Network Corporation	Backhaul	No Update to Provide	3/9/2011	
Merit Network, Inc.	Backhaul	No Update to Provide	6/21/2010	
MetaLINK Technologies, Inc.	Fixed Wireless	No Update to Provide	3/22/2010	
Newaygo County Advanced Technology Services	Fixed Wireless	No Update to Provide		
Niagara Telephone Company	DSL	No Update to Provide	1/22/2010	
Niagara Telephone Company	Backhaul	No Update to Provide	1/22/2010	
Northside TV Corporation	Cable	No Update to Provide		
Ogden Communications, Inc.	DSL	No Update to Provide	1/19/2010	
Ogden Communications, Inc.	Fixed Wireless	No Update to Provide	1/19/2010	
Pasty.Net, Inc.	Fixed Wireless	No Update to Provide	1/6/2010	
Peninsula Fiber Network, LLC	Backhaul	No Update to Provide	1/14/2010	
Sand Creek Communications Company	DSL	No Update to Provide	3/2/2010	
Sand Creek Communications Company	Backhaul	No Update to Provide	3/2/2010	
Sister Lakes Cable TV	Cable	No Update to Provide		
Small Business Solutions Group L.L.C.	Fixed Wireless	No Update to Provide	7/20/2010	
SonicNet, Inc	Fixed Wireless	No Update to Provide	8/4/2011	
SpeedNet, LLC	Backhaul	No Update to Provide	1/7/2010	
Springcom, Inc.	Cable	No Update to Provide	2/25/2010	
Springcom, Inc.	DSL	No Update to Provide	2/25/2010	
The Computer Care Company, Inc.	Backhaul	No Update to Provide	3/8/2011	
The Iserv Company, LLC	DSL	No Update to Provide	6/21/2010	
The Iserv Company, LLC	Fiber	No Update to Provide	6/21/2010	
The Iserv Company, LLC	Backhaul	No Update to Provide	6/21/2010	
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
US Signal Company, LLC	Backhaul	No Update to Provide	2/25/2010	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	[MAR-06-12 Brian Dudek] Change: ViaSat has acquired Wildblue and coverage will be represented as ViaSat, Inc. starting with the April 2012 submission.
Waldron Communication Company	DSL	No Update to Provide	1/12/2010	
WideOpenWest Michigan, LLC	Cable	No Update to Provide		
Windstream Communications	Backhaul	No Update to Provide		
Windstream Communications	Backhaul	No Update to Provide		[MAR-08-12 Brian Dudek] Change: Windstream acquired Intellifiber Networks, Inc. (Talk America) and it is being submitted under the Windstream name.
Windstream Communications	DSL	No Update to Provide		[MAR-07-12 Sarah Finne] Change: Windstream acquired Talk America d/b/a Cavalier Telephone and the former Cavalier Telephone data is being submitted under the Windstream name.
Winn Telephone Company	Fiber	No Update to Provide	6/28/2010	
Winn Telephone Company	DSL	No Update to Provide	6/28/2010	[MAR-13-12 Sarah Finne] Correction: Provider download speed corrected to tier 6 in previously reported tier 7 areas, per website information.
Wyandotte Municipal Services	Cable	No Update to Provide	3/23/2010	
Allband Communications Cooperative	Fiber	No Update Provided - Use Last Submission Data	2/2/2010	
Allendale Telephone Company	DSL	No Update Provided - Use Last Submission Data	2/4/2010	
Allendale Telephone Company	Fiber	No Update Provided - Use Last Submission Data	2/4/2010	
Boardman River Communications, LLC	Cable	No Update Provided - Use Last Submission Data	2/10/2010	
Bright House Networks, LLC	Cable	No Update Provided - Use Last Submission Data	4/26/2010	
CMS Internet LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	3/11/2010	
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		

COLI, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
DMCI Broadband, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	2/3/2010	
Drenthe Telephone Company	DSL	No Update Provided - Use Last Submission Data	2/4/2010	
Endless Journey, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Fourway Computer Products, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Ideal Wireless, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Invisalink Wireless Enterprises LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	4/13/2010	
KEPS Technologies, Inc.	DSL	No Update Provided - Use Last Submission Data		[MAR-13-12 Sarah Finne] Correction: Provider download speed changed to tier 7 and upload speed changed to tier 4, per advertised website information.
KEPS Technologies, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Lighthouse Computers, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	2/17/2011	
Michigan Cable Partners Inc.	Cable	No Update Provided - Use Last Submission Data	6/18/2010	
Michwave Technologies, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/12/2010	
Nodin Communications, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	4/22/2010	
Summit Digital Holdings, Inc.	Cable	No Update Provided - Use Last Submission Data		
Summit Digital Holdings, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
T2 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	3/10/2010	
Town & Country Cable and Telecommunications, LLC	Cable	No Update Provided - Use Last Submission Data	6/18/2010	
Verizon North Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
West Michigan Broadband, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		
Westphalia Telephone Company	DSL	No Update Provided - Use Last Submission Data	1/20/2010	
XO Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	2/12/2010	
Xyotek, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		
Boardman River Communications, LLC	Fixed Wireless	Solicited Initial Data	2/10/2010	
Martell Cable Services, Inc.	Cable	Solicited Initial Data		
Microtech Services, Inc.	Fixed Wireless	Solicited Initial Data		
Network Computers, LLC	Fixed Wireless	Solicited Initial Data		
Niagara Wireless, LLC	Fixed Wireless	Solicited Initial Data		

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

CONNECT Minnesota®

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:

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

It is with highest regard that the collective stakeholders of Connect Minnesota 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 Minnesota has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit not just Minnesotans, 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 Minnesota: 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 (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2011 SBI data submission for the Connect Minnesota program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 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.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of a new section pertaining to industry mergers and acquisitions – specifically this section will detail any and all mergers or acquisitions that have taken place in Minnesota, since the October 2011 submission. The intent of this new section is to provide a better understanding of how the broadband provider landscape has changed over time.

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 96.67 percent of the Minnesota provider community, or 116 of 120 total providers. There are 112 participating providers and 4 additional non-participating providers whose estimated coverage areas have been submitted. Of the 112 participating providers, 55 supplied an update to their network or coverage area(s), while 53 have reported no change. The remaining 4 represent providers who previously supplied data but were 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 4 providers that are not represented in the attached datasets were non-responsive to multiple contact attempts.

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

Connect Minnesota has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Minnesota conducts field validation efforts. To date, 75 (61.98 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

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

As an indicator of stakeholder penetration, the Connect Minnesota website encountered 4,691 unique visits during this reporting period (18,762 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 36 broadband inquiries over this same reporting period (151 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 Minnesota website and the Connect Minnesota 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 Minnesota mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Minnesota to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Minnesota 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 Minnesota Department of Commerce, outreach was conducted during this data update reporting period by Connect Minnesota to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Minnesota website. Connect Minnesota and the Department of Commerce solicited support of the CAI data collection from Minnesota Department of Public Safety, Minnesota Department of Education, University of Minnesota, Minnesota Library Association, Minnesota League of Cities, Minnesota Township Association, and Minnesota Association of Counties. Connect Minnesota continues to promote the importance of broadband connectivity at anchor institutions and encourage participation in this data collection process. Connect Minnesota will continue to build upon these relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

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

The Connect Minnesota program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Minnesota, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead.

Respectfully submitted,

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

DATA ACQUISITION: MINNESOTA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this fifth reporting period of the SBI, Connect Minnesota, working in close coordination with the state of Minnesota, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. During this reporting period Connect Minnesota has continued to focus efforts on conducting outreach and raising awareness of this important project.

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

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

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

Connect Minnesota conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Minnesota continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Minnesota works with the Minnesota Department of Commerce to identify existing relationships that can support CAI outreach.

Connect Minnesota has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. During this reporting period, Connect Minnesota and the Department of Commerce solicited the support of the CAI data collection including the Minnesota Department of Public Safety, the Minnesota Department of Education, the University of Minnesota, the Minnesota Library Association, the Minnesota League of Cities, the Minnesota Township Association, and the Minnesota Association of Counties.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Minnesota project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Minnesota will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the

Minnesota Department of Commerce will continue to be briefed on the current CAI data and provided information so they can assist with outreach and promotion within the state.

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

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	3732	3732	3730	703	616	171
Libraries	1014	1014	1014	18	16	11
Healthcare	206	206	206	57	56	56
Public Safety	1544	1544	1539	25	21	21
Higher Ed Institutions	183	183	181	3	1	3
Other Government	132	132	125	28	26	26
Other Non-Government	112	112	110	8	7	7
Total	**6923**	**6923**	**6905**	**842**	**743**	**295**

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

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 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 state of Minnesota.

Inventory of Deliverables, Connect Minnesota: 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.

The provider data collected by CN on behalf of the state of Minnesota have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

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

Mergers and Acquisitions

Throughout the course of the SBI program, CN has maintained a repository of electronic records related to its provider outreach activities. Recently, due to the high volume of mergers and acquisitions (M&A) within the provider community, CN elected to create a listing of M&A activities for this mapping cycle as a way of supplementing the Provider Changes and Corrections section of this document. M&A activities for this state are listed below with a brief description and date as obtained through public records or provider disclosure.

- **CenturyLink Merged with Qwest**
  On April 1, 2011, CenturyLink, Inc. (NYSE: CTL) and Qwest Communications completed their merger, creating the nation's third largest telecommunications company. The combined companies will deliver a broader range of communications services to consumers and small businesses throughout its 37-state service area and to business, wholesale, and government customers nationwide via its 190,000 route mile fiber network.

- **HickoryTech Corp. Acquired IdeaOne Telecom Group LLC**
  On March 2, 2012, HickoryTech Corporation (NASDAQ: HTCO - News) announced the completion of its acquisition of IdeaOne Telecom Group, LLC, a fiber-based CLEC serving the greater Fargo, North Dakota area, in a transaction valued at $28 million.

- **Level 3 Acquired Global Crossing**
  The Global Crossing website confirmed that Level 3 and Global Crossing joined forces under the brand name Level 3 on October 4, 2011.

- **Midcontinent Communications Acquired US Cable**
  Independent reports posted by dslreports.com and forestlaketimes.com confirm that MidContinent Communications picked up roughly 33,000 customers through its acquisition of U.S. Cable in Minnesota and Wisconsin. This transaction became effective on October 1, 2011.

- **Savage Communications Acquired Portions of Jaguar Communications**
  There was no public announcement of the acquisition of properties in Bovey and Coleraine from Jaguar Communications.

- **Windstream Acquired PAETEC**
  The News section of the Windstream website dated December 1, 2011, announced that it had completed the acquisition of PAETEC Holding Corp. in a transaction valued at approximately $2.3 billion.

- **Zayo Acquired 360networks**
  On December 2, 2011, the Zayo website announced that it had completed its transaction to purchase 360networks. The resulting company is one of the largest bandwidth infrastructure

companies in North America with an estimated annualized pro forma revenue of $393 million.

- **Zayo Acquired American Fiber Systems**
  On October 1, 2011, Zayo Group, a provider of telecom and Internet infrastructure services, announced that it had closed its previously announced transaction to purchase American Fiber Systems (AFS), a leading provider of metropolitan fiber network and telecom services. The acquisition adds approximately 1,000 route miles of metropolitan fiber footprint and over 600 incremental buildings. AFS operated in nine markets, six of which are new markets for Zayo Group and three of which bolster Zayo's network in existing markets.

MINNESOTA FIELD VALIDATION METHODOLOGY

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

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets 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 Minnesota on the following providers: A Better Wireless, NISP, LLC; Ace Telephone Association; Albany Mutual Telephone Association; Alliance Communications; Arvig Communications Systems; AT&T, Inc.; Barnesville Municipal Telephone; Benton Cooperative Telephone Company; Blue Earth Valley Telephone

Company; Bradco-WISP, Inc.; Broadband Corp.; CenturyLink (also formerly Qwest); Charter Communications; Chaska.net; Christensen Communications Company; CitiScape Communications; City of Detroit Lakes; City of Windom; Clear Choice; Clearwire Corporation; Cloudnet, Inc.; Comcast Cable Communications LLC; CTC Telecom; diversiCOM; Enterpoint; Evertek Enterprises LLC; Farmers Mutual Telephone; Fibernet Monticello; Frontier Communications Corporation; FTTH Communications; Garden Valley Telephone Company; Gardonville Cooperative Telephone Association; Genesis Wireless; Granada Telephone Company; Halsted Telephone; Harmony Telephone Company; Hickory Tech Corporation; Info Link Wireless, Inc.; Interstate Telecommunications Cooperative, Inc.; Invisimax; Jaguar Communications; Kasson & Mantorville Telephone Company; KeyOn Communications, Inc.; Knology of the Plains, Inc.; Lonsdale Telephone; Loterel Systems, Inc.; Mable Cooperative Telephone Company; Manchester Heartland Telephone Company; Midcontinent Communications (also d.b.a. US Cable Corporation); Minnesota Valley Telephone Company; Minnesota Valley TV Improvement Corporation; New Ulm Telecom, Inc.; Nextera Communications; NorthfieldWireless; Park Region Mutual Telephone Company (also d.b.a. Otter Tail Telecom); Polar Telcom, Inc.; Red River Rural Telephone Association; River Valley Telecommunications Cooperative; SCI Cable; Scott Rice Telephone; Sioux Valley Wireless; Sleepy Eye Telephone Company; SMBS; Southern Cablevision, Inc.; Spring Grove Cooperative Telephone Company; Sprint Nextel Corporation; Starpoint Communications, Inc.; TDS Telecommunications Corporation; tothehome.com, LLC; T-Mobile USA, Inc.; U.S. Internet (d.b.a. USI Wireless); Upsala Cooperative Telephone Company; VAL-ED Joint Venture; Verizon Communications, Inc.; Western Telephone Company; Windstream (also d.b.a. Lakedale LINK) and Winnebago Cooperative Telephone Association.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 75 companies (out of a universe of 121 viable providers) totaling 61.98 percent within the state of Minnesota. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters. 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.

Ace Telephone Association
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

If you have Ace Digital TV–Expanded package:	
Ace High-speed – up to 8Mbps	**$34.95 per month**
If you have Ace High-speed by itself:	
Ace High-speed (basic) – up to 1Mbps	**$39.95 per month**
Ace High-speed – up to 15Mbps	**$49.95 per month**

Arvig Communication Systems
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: provider website advertises 20 Mbps service; screenshot below.

Lightning, up to 20Mb/512Kb

with Arvig Phone and Digital TV	$79.95
with Arvig Phone or Digital TV	$85.95
without Arvig Phone or Digital TV	$154.95

Blue Earth Valley Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Surf the Internet at speeds from 1Mb to 15Mb/second. All plans allow for multiple users at the same location, business or residential. Stop wasting time waiting for web sites and files to download and see the benefits of BEVCOMM High Speed Internet today!

Broadband Corp
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: The equipment being used for the 3650 MHz spectrum allows for 14 Mbps speeds.

Century Link
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 25 and 40 Mbps service; screenshot below.

Christensen Communications Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

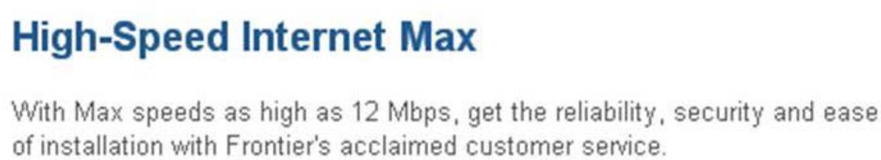
CitEscape, LLC
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: The documentation on the equipment being used indicates that 16.5 Mbps is achievable speed depending on the settings.

Clara City Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Confirmed with provider that 12 Mbps service is available, but speeds are not advertised on their website.

Crosslake Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative indicated that tier 7 speeds are indeed available to all customers.

Crosslake Telephone Company
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Provider representative indicated that DOCSIS 3.0 has been installed, but speeds across their service area have not been bumped up yet. That will occur after the connectivity to fiber backbone is complete and middle-mile bandwidth is increased.

Frontier Communications of Minnesota, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



Garden Valley Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative indicated that tier 7 speeds are indeed available to all customers.

Granada Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Plan	Speed	Monthly Fee
Basic	1 Mb	$74.95
Silver	5 Mb	$94.95
Gold	15 Mb	$114.95

Hiawatha Broadband Communications, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.

Digital Value: $114.84/month

TV –
Expanded Plus Lineup
Music Choice
VOD (Where Available)

Internet –
25 Mbps
6 E-mails
100 MB Server Space
SpamCu s

Phone –
Local Service
60 min. Long Distance
2 Features

Hickory Tech Corporation
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

Plans:	Lite	Prime	Pro	Premium
Download Speeds:	1 Mbps*	6 Mbps*	9 Mbps*	20 Mbps*
Emails:	5	5	5	5
Web Space:	20 MB	30 MB	40 MB	50 MB

InvisiMax, Inc.
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: The equipment being used allows for 14 Mbps speeds.

Jaguar Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed that 10 Mbps service is available.

Knology of the Plains, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.

Midcontinent Communications
Issue: Technology of transmission 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.

Speed things up!

MidcoNet Xstream® Wideband 1.0

Remember the files that normally took minutes to download over a typical dial-up or DSL connection? With MidcoNet Xstream® Wideband 1.0, you've got them in just seconds! MidcoNet Xstream® Wideband 1.0 packs your computer with download speeds up to 30 Mbps and uploads up to 5 Mbps.* It's amazing speed at a very affordable price – and backed by our friendly, 24/7 customer service.

New Ulm Telecom, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps; screenshot below.

Internet Pricing

Download speeds up to 1 mbps	$29.95
Download speeds up to 15 mbps	$44.95
Download speeds up to 25 mbps	$64.95

New Ulm Telecom, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

10 Mbps	$59.95
10 MBps + NU-Basic TV	$71.90
10 Mbps + NU-Entertainment TV	$104.90
10 Mbps + NU-Variety TV	$109.90

NorthfieldWiFi LLC
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed that higher speeds are available on its fixed wireless network.

Paul Bunyan Rural Telephone Cooperative
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.

Broadband Service Plans	Fee
Up to 10 Mb	$44.95/mo.
Up to 15 Mb	$54.95/mo.
Up to 20 Mb	$64.95/mo.
Up to 25 Mb	$74.95/mo.

Pine Island Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

High Speed Internet - Residential

Plan	Speed	E-Mail Boxes	Monthly Fee
Silver DSL*	1 Mb	5	$49.95
Platinum DSL*	5 Mb	5	$59.95
Platinum Plus*	15 Mb	5	$64.95

Polar Telcom, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative indicated that tier 7 speeds are indeed available to all customers.

Sacred Heart Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Confirmed with provider that 12 Mbps service is available, but speeds are not advertised on their website.

Scott Rice Telephone Co.
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider representative confirmed that 10 Mbps service is available in some areas and 30 Mbps service is also available in some areas.

Sjoberg's Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider representative confirmed that 40 Mbps service is available to all customers, using DOCSIS 3.0.

Sleepy Eye Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Residential Rates
Various options for Internet speeds are available.

- 256k DSL $39.95
- 2Mbps DSL $44.95
- 5Mbps DSL $59.95
- 10Mbps DSL $79.95

Southern Cablevision, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Provider representative confirmed that service area is DOCSIS 3.0, but lower speeds are still advertised and in use while customers move modems up to DOCSIS 3.0.

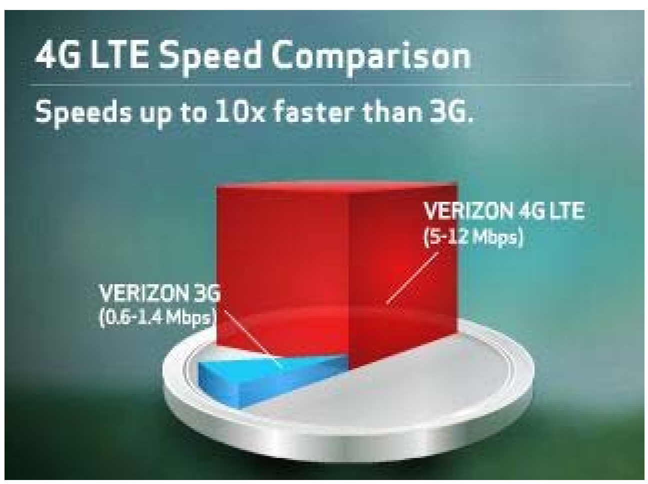
TDS Telecommunications Corporation
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website confirms that service greater than speed tier 6 is 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.

VAL-ED Joint Venture, LLP
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: The equipment being used allows for 14 Mbps speeds.

Verizon Communications, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



Western Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

10 Mbps	$59.95
10 MBps + NU-Basic TV	$71.90
10 Mbps + NU-Entertainment TV	$104.90
10 Mbps + NU-Variety TV	$109.90

Wikstrom Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Could not confirm the tier 7 service with the provider prior to submission and could not find any speeds advertised on its website to provide as confirmation; will continue outreach to this provider for next submission.

Windstream Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

See which of our speeds matches your online activities. Choose the right Internet speed (WATCH VIDEO)	3 Mbps (Basic Use)	6 Mbps (Most Popular)	12 Mbps (Fastest Option)
E-mail friends	x	x	x
Browse the Internet	x	x	x
Bank online	x	x	x
Shop for deals	x	x	x
Download music	x	x	x
Connect with friends on Facebook and Twitter	x	x	x
Use wireless home networking	x	x	x
Download large files		x	x
Stream video		x	x
Watch TV shows online			x
Play online games			x

Wolverton Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative indicated that tier 7 speeds are indeed available to all customers.

As requested of SBI grantees through e-mail correspondence on February 22, 2012, CN has also reviewed the fixed wireless coverage of providers in Minnesota that NTIA has recognized as "having an unusual shape" that does not appear to be propagated service. Descriptions on the data collection and methodology used for each provider are supplied below.

City of Chaska
Background: This is a non-participating provider whose coverage has been estimated for submission. The coverage resembles buffered WiFi hotspots; additional information is available in the non-participating provider section of the methodology paper.
Resolution: No resolution at this time as more complete information on the equipment is necessary to produce the propagations.

Federated Telephone Cooperative
Background: Coverage for this provider had what appeared to be arbitrary boundaries.
Resolution: Portion of provider's licensed wireless is now a real-world propagation unlike prior submissions.

Halstad Telephone Company
Background: Coverage for this provider had what appeared to be arbitrary boundaries.
Resolution: Portion of provider's licensed wireless is now a real-world propagation unlike prior submissions.

US Internet of Minnetoka
Background: According to provider representative, service area is derived from a real-world wireless propagation and is cut to the allowed service boundary. It is a city funded project and the provider is required to only provide within this service boundary.
Resolution: No change to the coverage being submitted based on explanation provided by provider.

Windstream
Background: This coverage is the former Lakedale fixed wireless service area; it appeared that the DSL service area was removed from the fixed wireless service area and clipped to the exchange boundaries.
Resolution: Provider's licensed wireless is now a real-world propagation unlike prior submissions. It has also been clipped to its serviceable exchange boundary, as the provider does not offer service to locations outside the exchange boundary that may still be able to obtain a proper signal.

Data Submission and Coverage Estimation of Non-Participating Provider

A Better Wireless

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 provides detail regarding the recent data collection activities related to A Better Wireless, a wireless Internet service provider (WISP), located in Henning, MN, with a service area around Henning, Deer Creek, and Leaf Lakes. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 24 instances of communication via telephone and e-mail sessions since January 26, 2010, through August 15, 2011. Communication replies were received from a company representative on July 19, 2011, with the response of electing not to participate. Additionally, a CN staff member visited the A Better Wireless office on September 21, 2011, to discuss the broadband mapping project in person with A Better Wireless staff, but staff was not available.

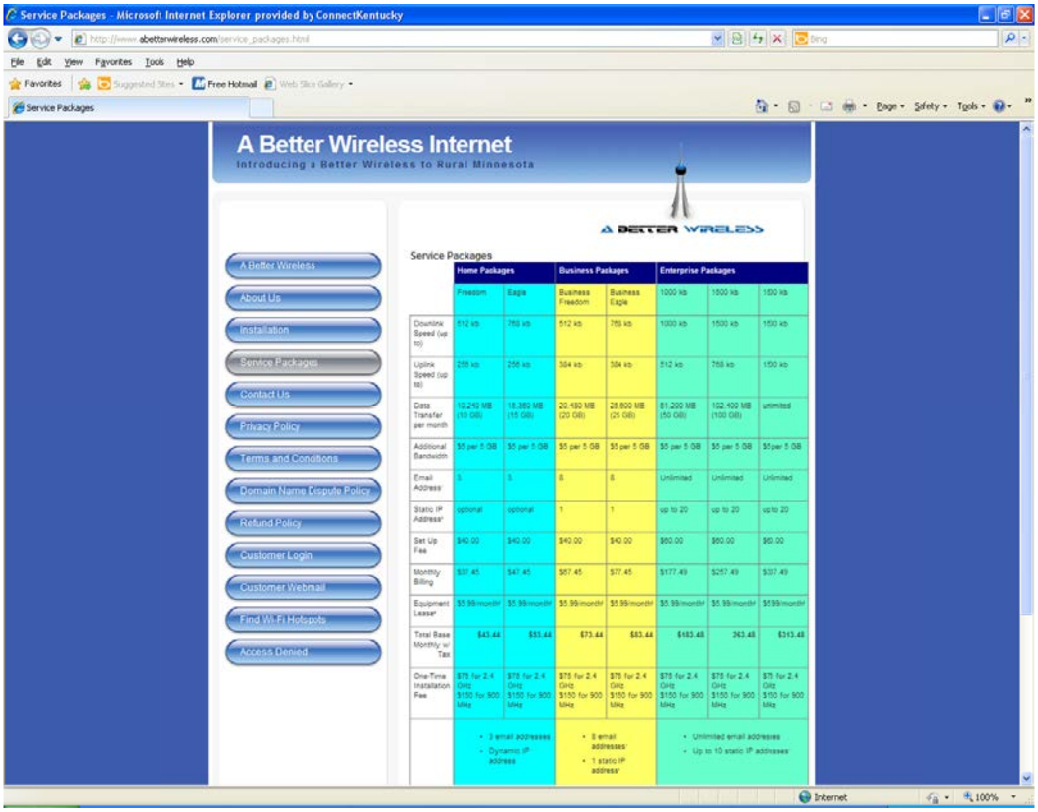
The Issue

A Better Wireless, by its lack of responsiveness since January 26, 2010, has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.abetterwireless.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0015093073 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded license WQKB862 **(Exhibit D)**, Radio Service: WQKB862 with 0 unique locations.

Exhibit A: Service Plans



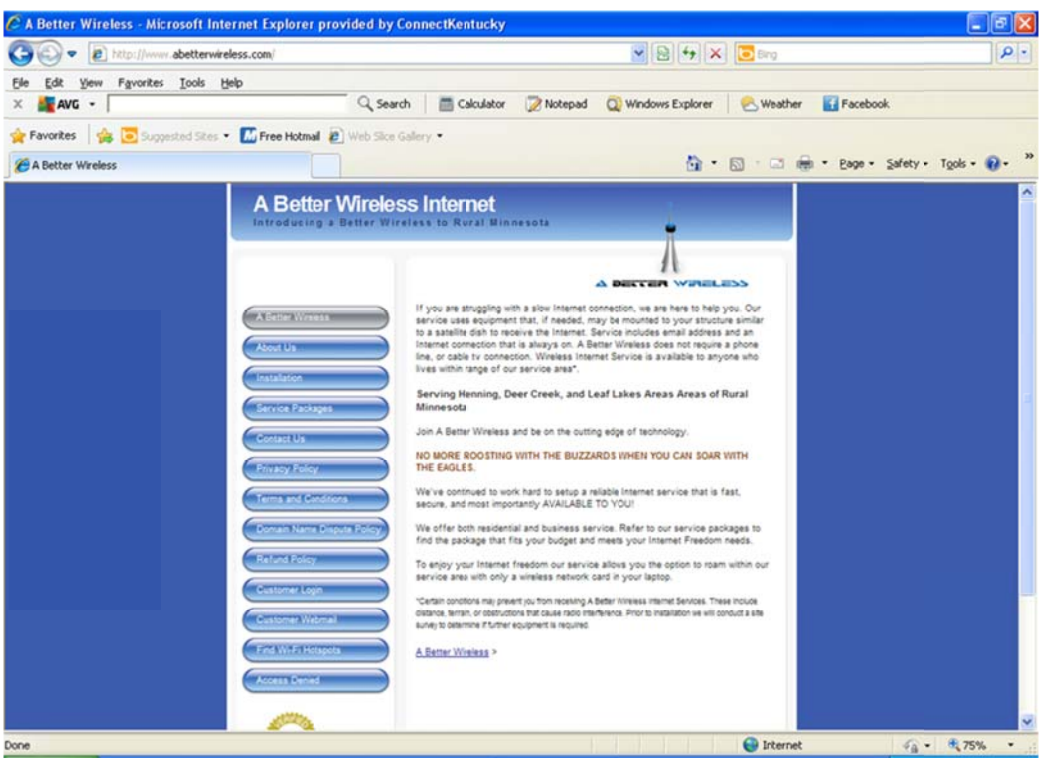
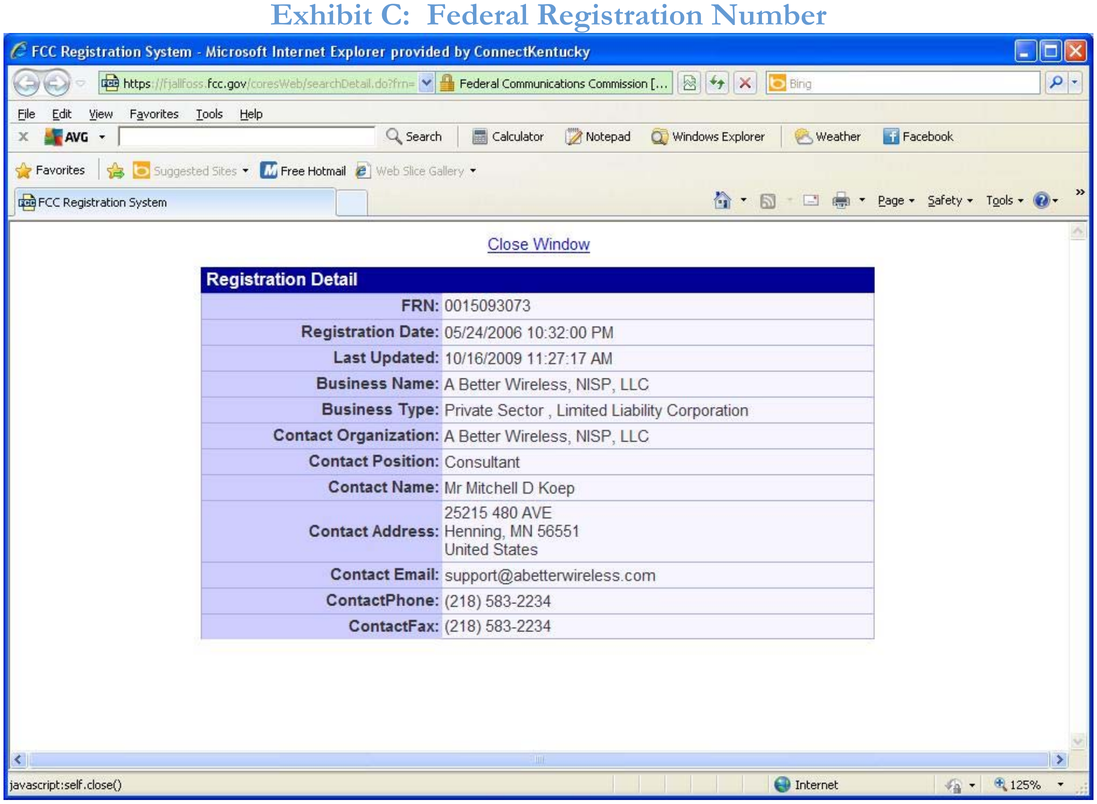


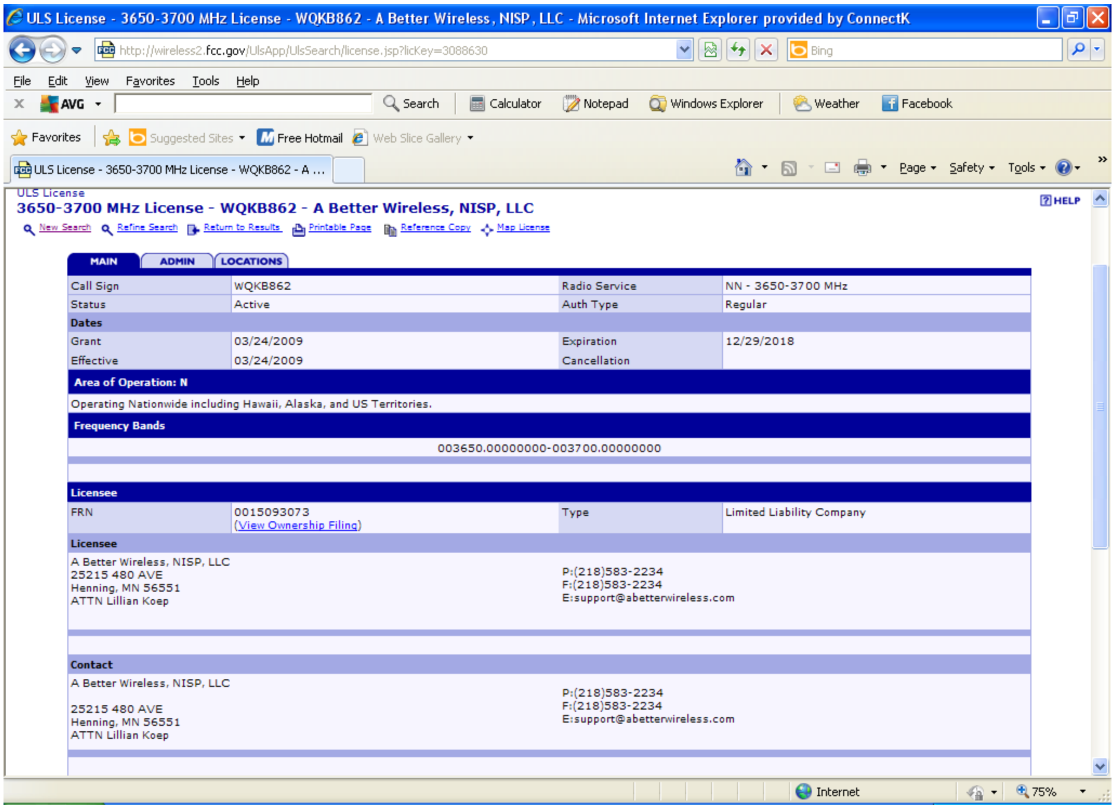
Exhibit B: Service Area

Exhibit C: Federal Registration Number



Registration Detail	
FRN:	0015093073
Registration Date:	05/24/2006 10:32:00 PM
Last Updated:	10/16/2009 11:27:17 AM
Business Name:	A Better Wireless, NISP, LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	A Better Wireless, NISP, LLC
Contact Position:	Consultant
Contact Name:	Mr Mitchell D Koep
Contact Address:	25215 480 AVE Henning, MN 56551 United States
Contact Email:	support@abetterwireless.com
ContactPhone:	(218) 583-2234
ContactFax:	(218) 583-2234

Exhibit D: WQKB862 License Reference


ULS License - 3650-3700 MHz License - WQKB862 - A Better Wireless, NISP, LLC - Microsoft Internet Explorer provided by ConnectK

http://wireless2.fcc.gov/UlsApp/UlsSearch/license.jsp?licKey=3088630

ULS License

3650-3700 MHz License - WQKB862 - A Better Wireless, NISP, LLC

New Search | Refine Search | Return to Results | Printable Page | Reference Copy | Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQKB862	Radio Service	NN - 3650-3700 MHz
Status	Active	Auth Type	Regular
Dates			
Grant	03/24/2009	Expiration	12/29/2018
Effective	03/24/2009	Cancellation	

Area of Operation: N

Operating Nationwide including Hawaii, Alaska, and US Territories.

Frequency Bands

003650.00000000-003700.00000000

Licensee

FRN	0015093073 (View Ownership Filing)	Type	Limited Liability Company

Licensee

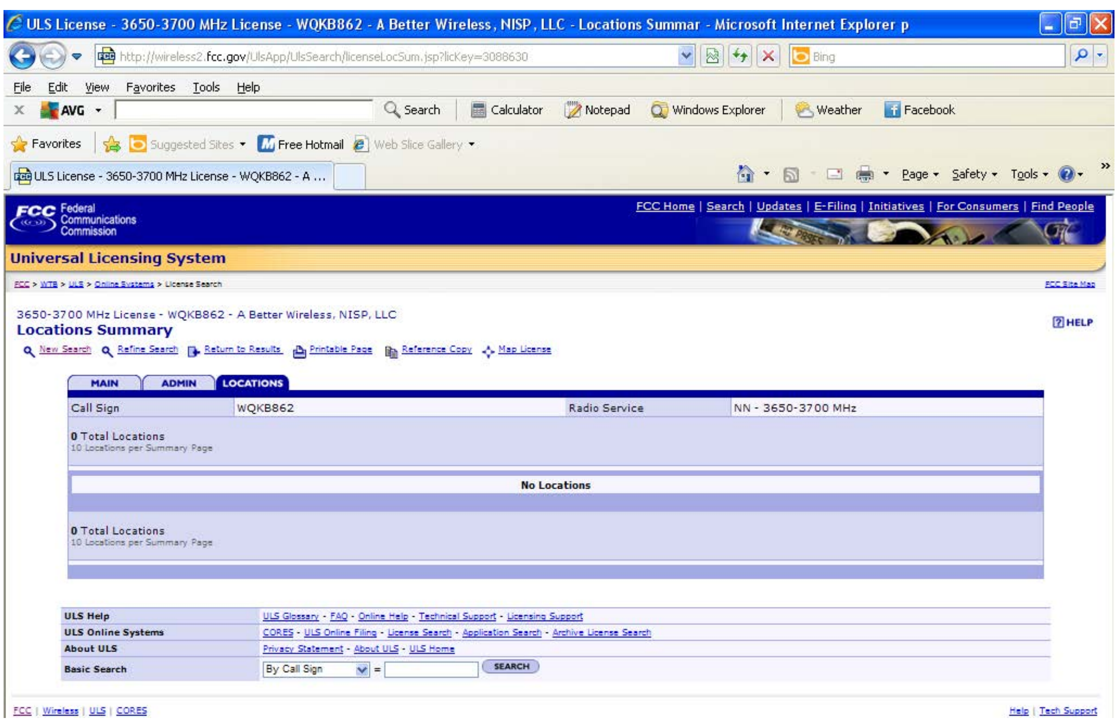
A Better Wireless, NISP, LLC
25215 480 AVE
Henning, MN 56551
ATTN Lillian Koep

P:(218)583-2234
F:(218)583-2234
E:support@abetterwireless.com

Contact

A Better Wireless, NISP, LLC
25215 480 AVE
Henning, MN 56551
ATTN Lillian Koep

P:(218)583-2234
F:(218)583-2234
E:support@abetterwireless.com


ULS License - 3650-3700 MHz License - WQKB862 - A Better Wireless, NISP, LLC - Locations Summary - Microsoft Internet Explorer p

http://wireless2.fcc.gov/UlsApp/UlsSearch/licenseLocSum.jsp?licKey=3088630

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Consumers | Find People

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

3650-3700 MHz License - WQKB862 - A Better Wireless, NISP, LLC

Locations Summary

New Search | Refine Search | Return to Results | Printable Page | Reference Copy | Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQKB862	Radio Service	NN - 3650-3700 MHz

0 Total Locations
10 Locations per Summary Page

No Locations

0 Total Locations
10 Locations per Summary Page

ULS Help	ULS Glossary - FAQ - Online Help - Technical Support - Licensing Support
ULS Online Systems	CORES - ULS Online Filing - License Search - Application Search - Archive License Search
About ULS	Privacy Statement - About ULS - ULS Home
Basic Search	By Call Sign = SEARCH

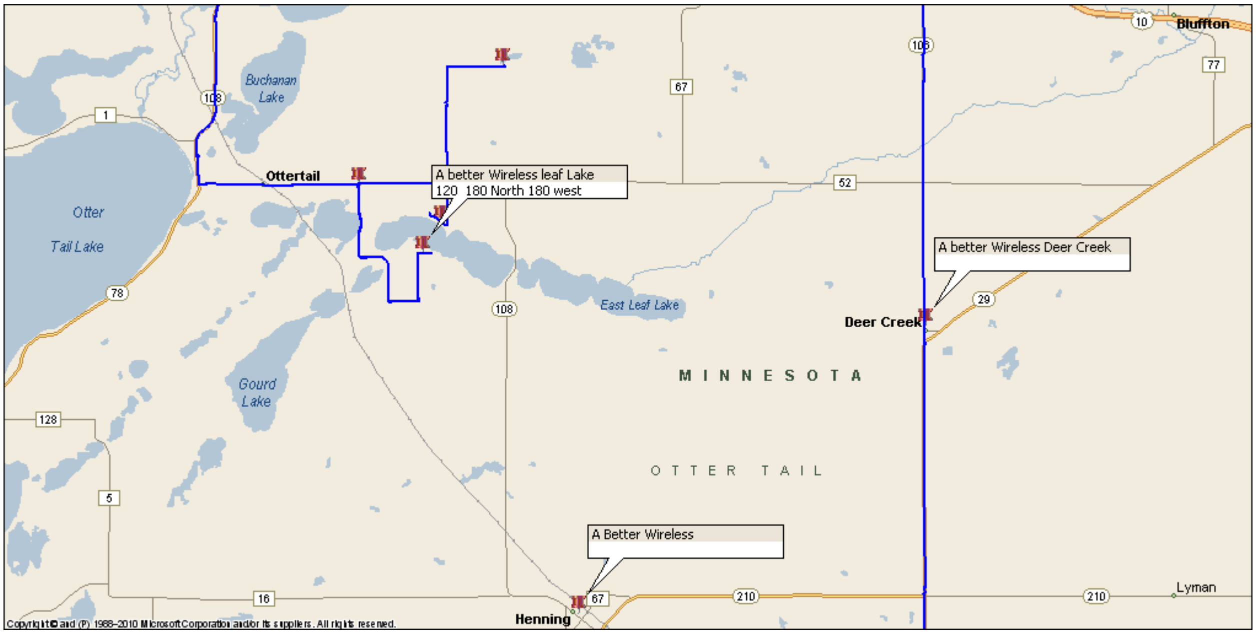
FCC | Wireless | ULS | CORES   Help | Tech Support

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the A Better Wireless service area locations from its website and the information through the FCC ULS database in reference to license WQKB862. The website service area locations were utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than 1 mile (5280 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by tower symbols as shown in **Exhibit B**. Using the coordinates determined to be center coordinates, search rings were created with the image overlay to determine the feasibility of locating the Structures to identify coordinates of the locations. The location's center coordinates were inputted into Google Earth and examined utilizing the zoom option of the aerial imagery. A portion of the Transmitting locations structures were identified. This resulted in the means of establishing coordinates for the access point locations. A site validation trip was also planned and executed to the area. All 3 locations were entered into the *Streets and Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

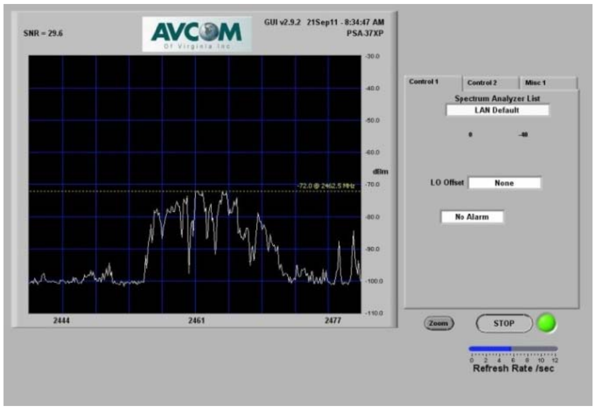
Exhibit F: Validation Points for AP Structures

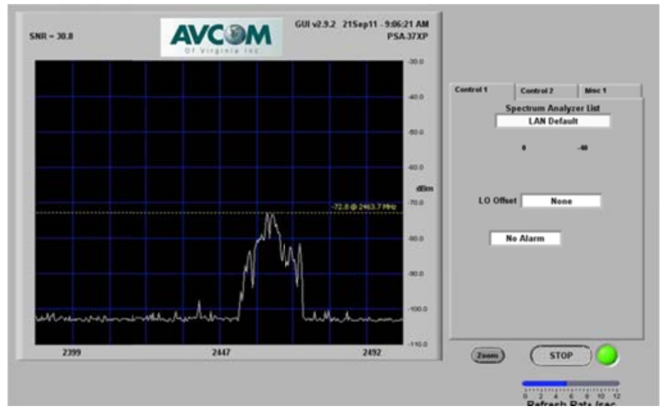


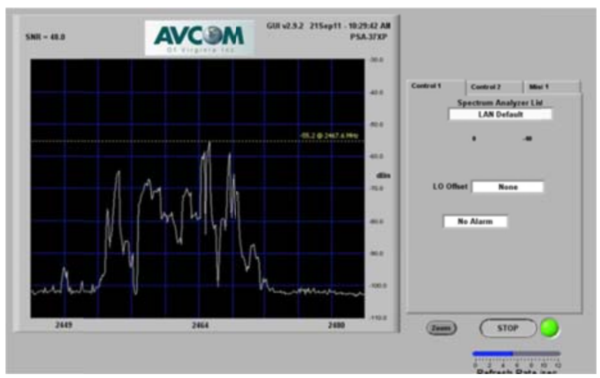
Testing Techniques

Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay and publicly available data through the FCC ULS database for A Better Wireless WQKB862 radio service. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored), and photographs were taken of the access points. See Exhibit G on the following page.

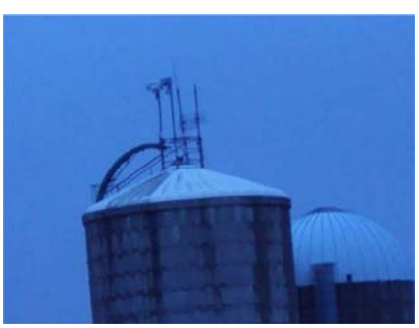
Exhibit G: Field Data for A Better Wireless Hub Location

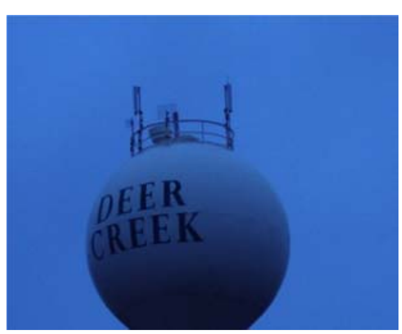


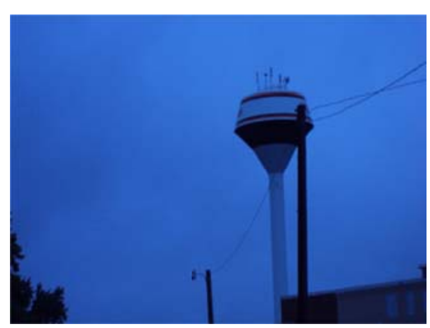




Provider	Area Covered	Structure type	Longitude	Latitude	Frequency Band	TX Ant Height	Notes
A Better Wireless	Henning	Water Tower	46.31916667	-95.44777778	2400 Mhz	120 feet	Ant Ht 120' Omni
A Better Wireless	Deer Creek	Water Tower	46.39138889	-95.32666667	2400 Mhz	120 feet	Ant Ht 120' Omni
A Better Wireless	Leaf Lake Area	Grain Silo's	46.41001000	-95.50138889	2400 Mhz	120 feet	120' 180 North 180 west Farm 2 silos







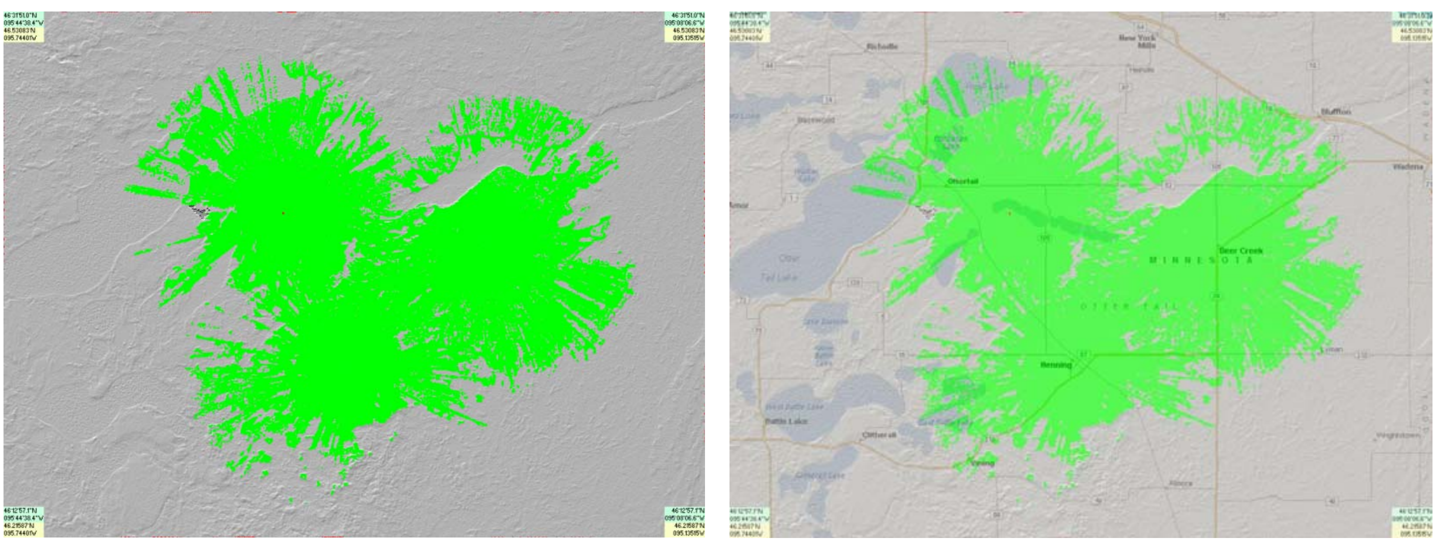
Results and Submission for April 2012

Of the 3 locations visited during the validation point route, 3 access points were identified and relative information was logged into the A Better Wireless field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to A Better Wireless and advised the information will be submitted to Connect Minnesota and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit H: Field Validation Notes

Provider		Test Site Info		Coordinates NAD 83		Platform Type		Test Data	
Provider	FRN Validation	Test City	Location Description	Lat Decimal	Long Decimal	Type	Presence Confirmed	Type	Pass or Fail?
A Better Wireless	Yes	Henning	South edge town	46.319167	-95.447778	Fixed Wireless	Yes	Signal Verification	Pass
A Better Wireless	Yes	Deer Creek	West Part of Town	46.391389	-95.326667	Fixed Wireless	Yes	Signal Verification	Pass
A Better Wireless	Yes	Leaf Lake	Leaf Lake area	46.410000	-95.501389	Fixed Wireless	Yes	Signal Verification	Pass

Exhibit I: A Better Wireless Composite Coverage



Chaska.net

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection activities related to Chaska.net, a wireless Internet service provider (WISP), located in Chaska, Minnesota. Owned by the City of Chaska, the network is actually an unlicensed, metro-mesh network that provides service to the residents and businesses of Chaska, as well as some surrounding areas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

April 2012 Submission Commentary

Connected Nation created this coverage estimation document during the October 2011 submission period as a result of the ongoing non-participatory status of the provider. In addition to the 6 instances of e-mail and/or telephone communication during the October 2011 submission period (as previously reported), CN made 4 additional attempts to contact the provider during this mapping cycle.

CN closely monitored the provider's website to identify any changes in the coverage area or maximum advertised speeds but did not locate evidence of any recent changes. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data.

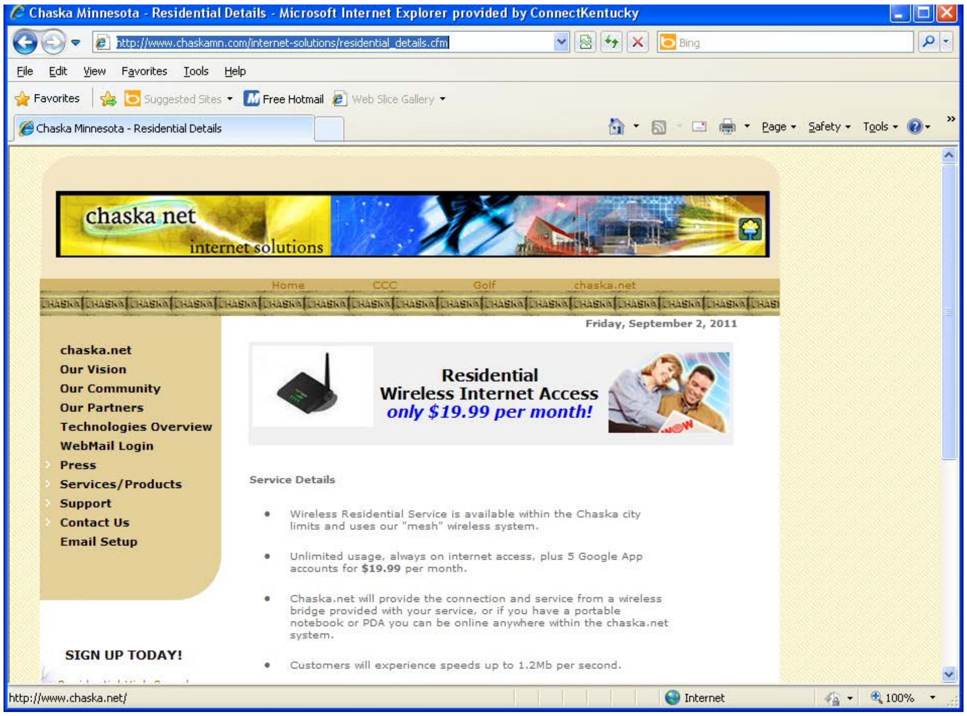
The Issue

By its lack of data submission since August 4, 2010, Chaska.net has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.chaskamn.com/internet-solutions/) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded an FRN of 0002606630 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded one active License: KRX-344 **(Exhibit D)**, Radio Service: Public Safety License with Mobile applications. It is licensed to the City of Chaska and not affiliated with the Chaska.net business venture.

Exhibit A: Service Plans



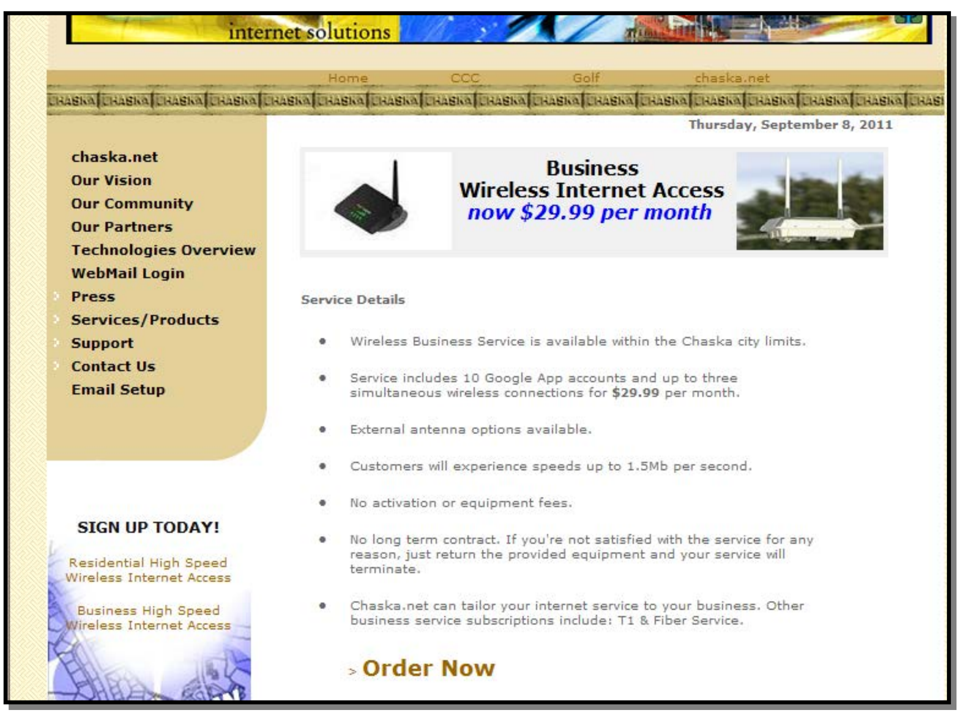


Exhibit B: Service Area

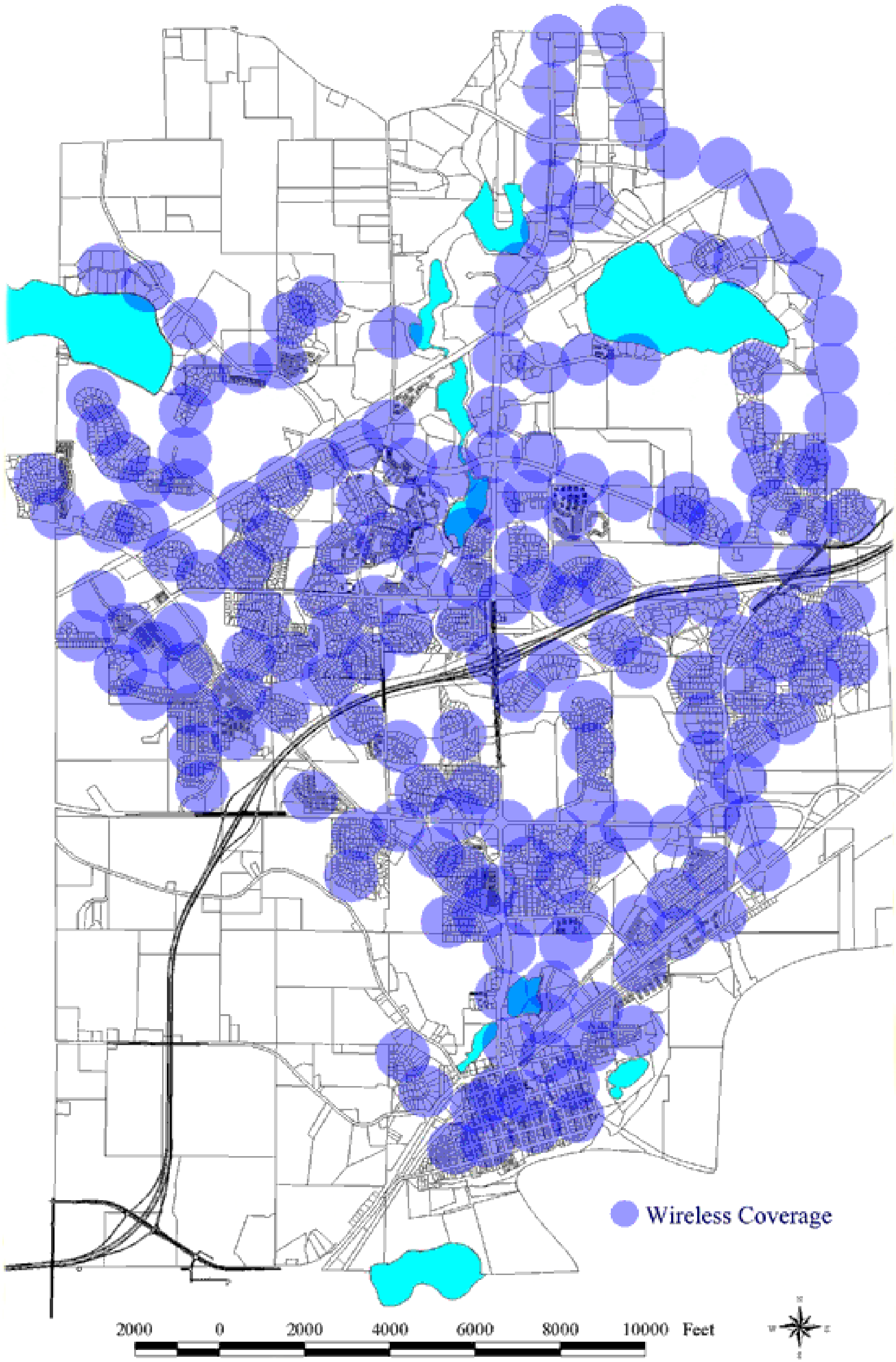
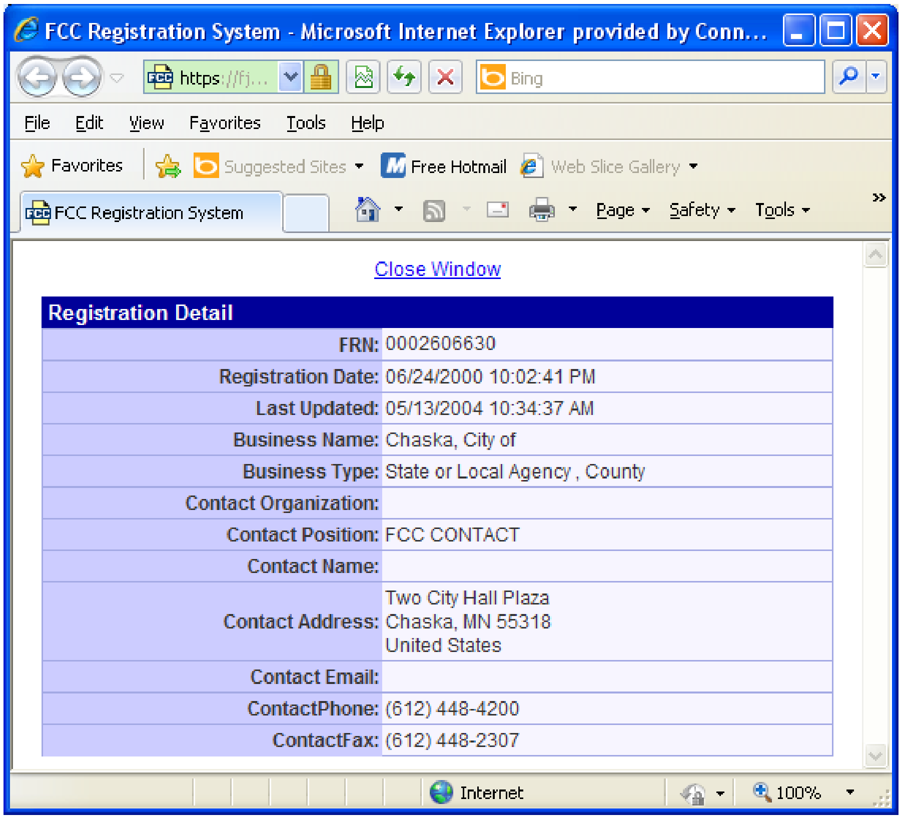
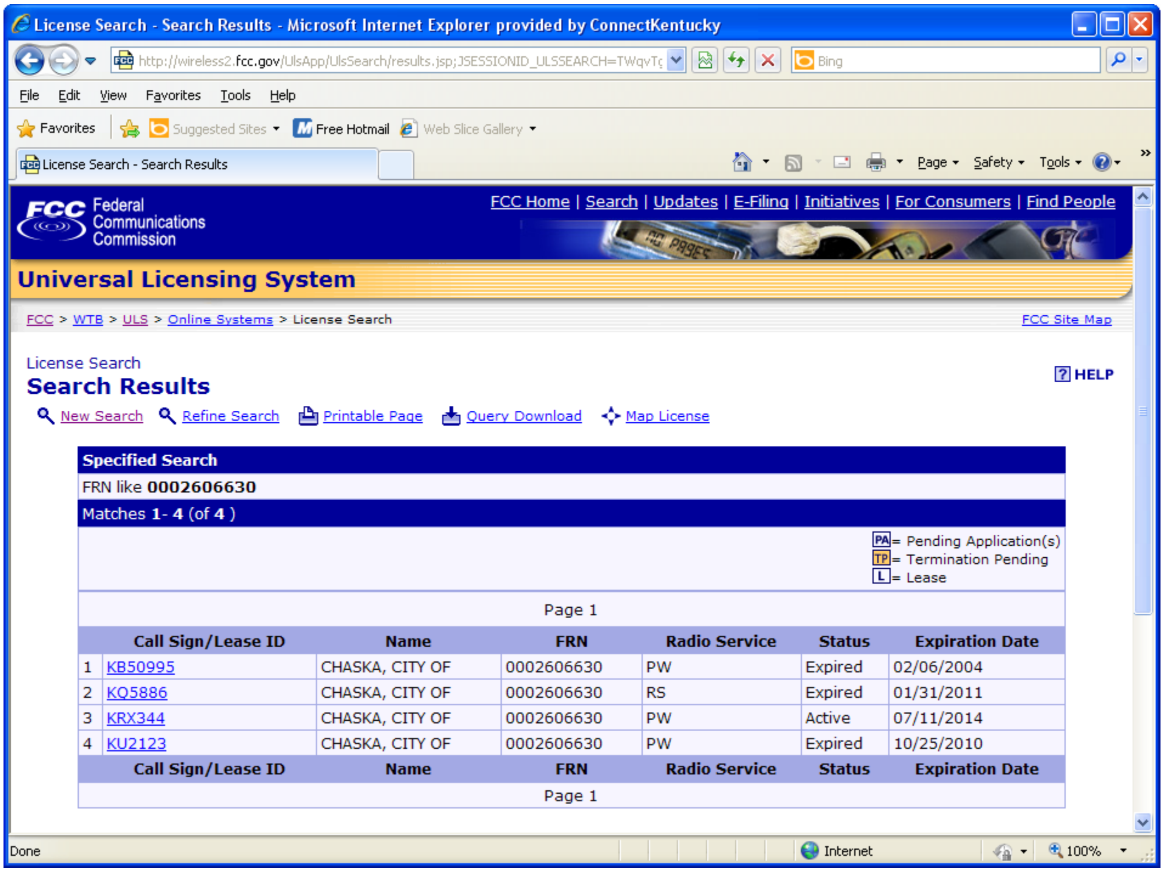


Exhibit C: Federal Registration Number



Registration Detail	
FRN:	0002606630
Registration Date:	06/24/2000 10:02:41 PM
Last Updated:	05/13/2004 10:34:37 AM
Business Name:	Chaska, City of
Business Type:	State or Local Agency , County
Contact Organization:	
Contact Position:	FCC CONTACT
Contact Name:	
Contact Address:	Two City Hall Plaza Chaska, MN 55318 United States
Contact Email:	
ContactPhone:	(612) 448-4200
ContactFax:	(612) 448-2307

Exhibit D: KRX344 License Reference



Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the Chaska.net service area polygon **(Exhibit B)** from its website. The website service area was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .2 mile (1058 ft.) to establish a minimum search criteria of a given access point. By estimating the coordinates for each polygon, search rings were created with the image overlay to determine the most probable locations for the transmit sites and/or structures. The estimated center coordinates were geocoded into Google Earth and examined utilizing the zoom option of the aerial imagery. This established the means of determining coordinates for the access point locations. A CN engineer then conducted an on-site field verification, and validation trip to the targeted areas to verify the theorems, related to transmit frequencies, locations, and device types. One hundred sixty-four (164) locations were entered into a GPS-enabled version of Microsoft's *Streets and Trips* software **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth - Provider's Service Area Image Overlay

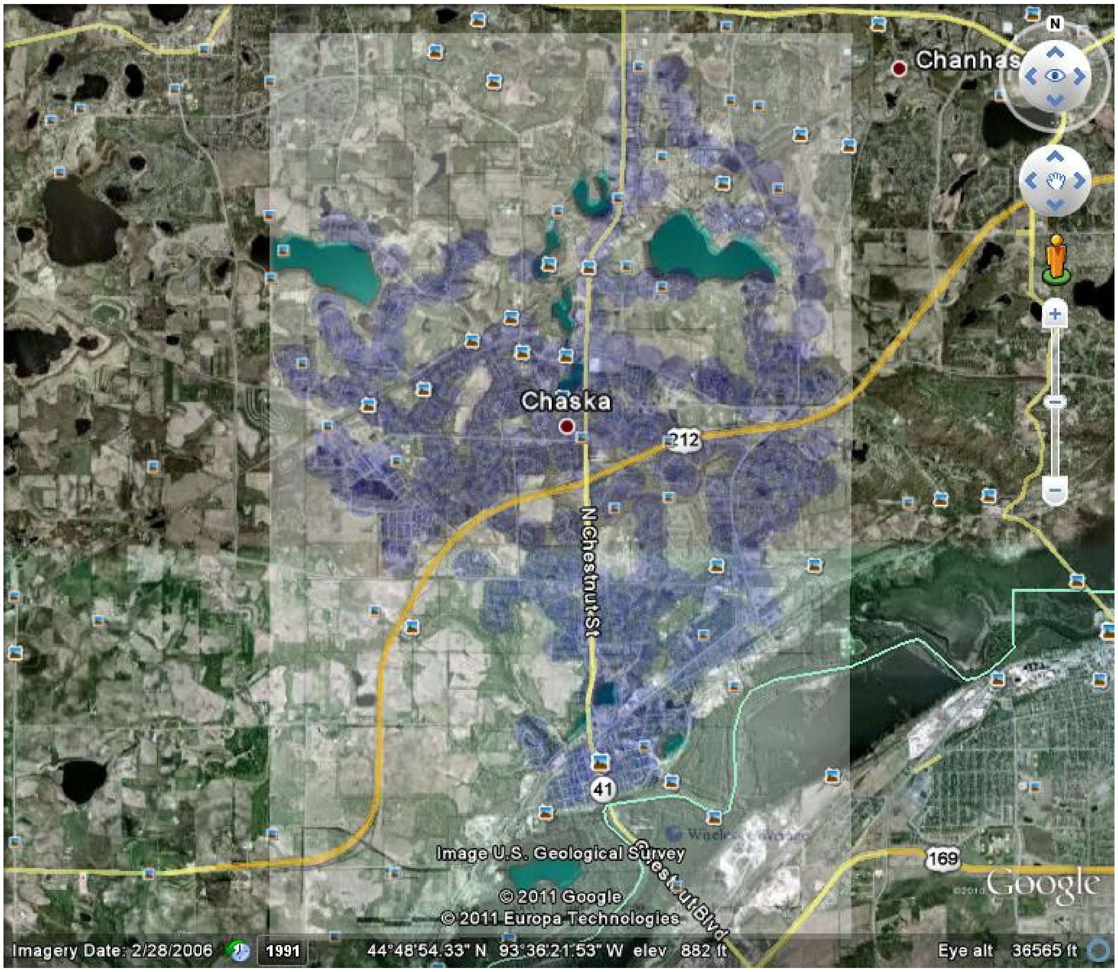
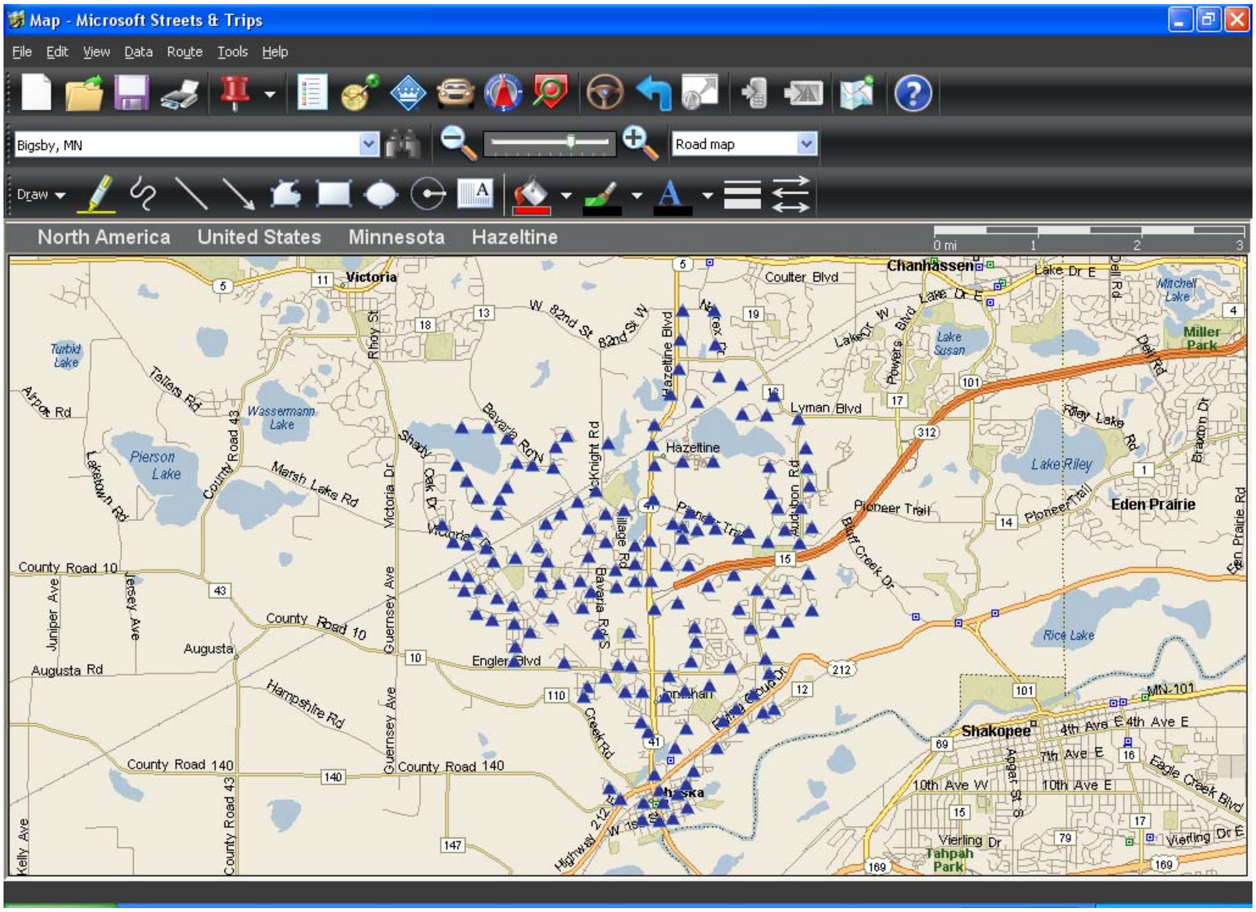


Exhibit F: Validation Points for AP Structures



Testing Techniques

At this juncture, a Connected Nation engineer developed a site test route based on the estimated coordinates for the center of each polygon The CN wireless engineer was equipped with an AVCOM PSA-37XP spectrum analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(see tabular chart contained within Exhibit G)**. Numerous validation points were scrutinized for frequency of operation, general notes were recorded for each location including approximate antenna height, frequency of operation, antenna type (omni or sectored), and exact coordinates, and digital photographs were taken of the wireless access points as each was discovered throughout the process.

Exhibit G: Field Data for Chaska.net Office/Hub Location

Unit name	DL	UL	Latitude(°	Longitude	Elevation(	Frequency	Ant Height	Ant Type
Chaskanet1	1.2 Mbps	1.2 Mbps	44.7847	-93.6039	222	2400	15	Omni
2	1.2 Mbps	1.2 Mbps	44.78453	-93.6006	219	2400	15	Omni
3	1.2 Mbps	1.2 Mbps	44.78497	-93.5977	217	2400	15	Omni
4	1.2 Mbps	1.2 Mbps	44.78646	-93.595	220	2400	15	Omni
5	1.2 Mbps	1.2 Mbps	44.78708	-93.6037	222	2400	15	Omni
6	1.2 Mbps	1.2 Mbps	44.78717	-93.5997	223.5	2400	15	Omni
7	1.2 Mbps	1.2 Mbps	44.7884	-93.5969	220.8	2400	15	Omni
8	1.2 Mbps	1.2 Mbps	44.78963	-93.5951	221	2400	15	Omni


CASCADE DR
TUPELO WAY
STOP

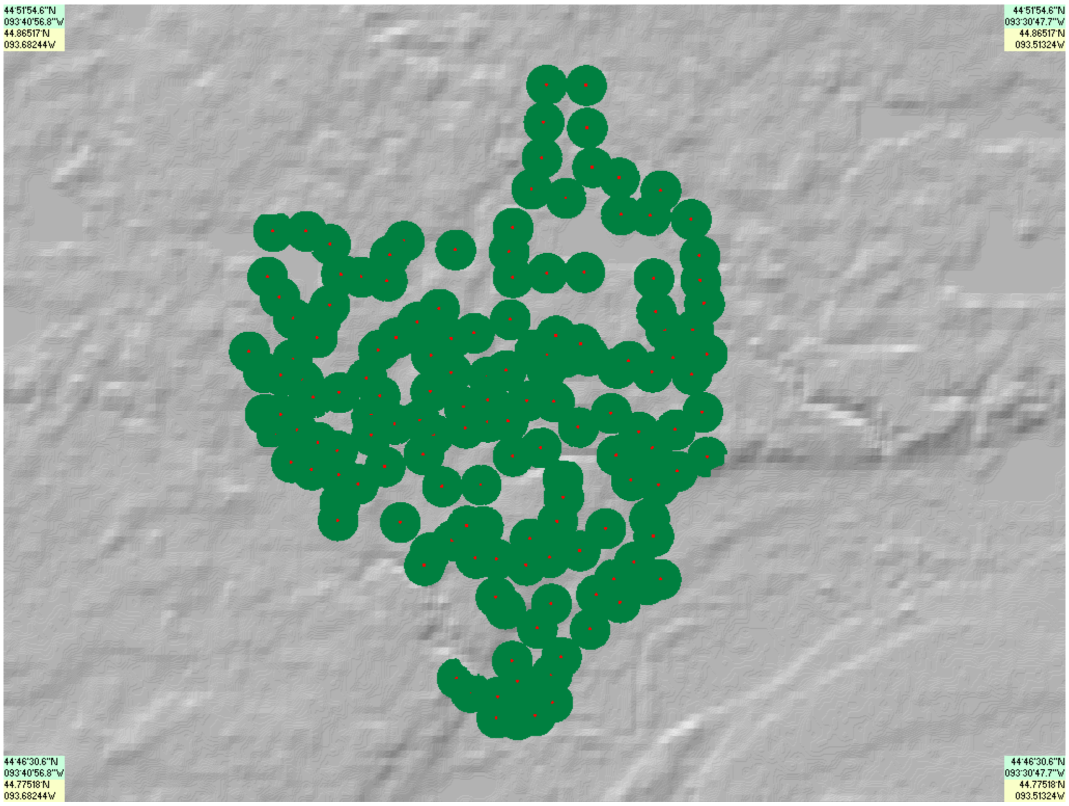
Background Results and Submission for April 2012

Of the locations visited during the validation point route, 15 access points were identified and relative information was logged into the Chaska.net data form and field validation notes file **(Exhibit H)**. The extensive field analysis and the publicly available data were transferred to the Connected Nation Provider Information file and a composite propagation study was completed, which yielded the propagation representation shapefiles **(Exhibit I)**. The CN developed propagation shapefiles and supporting documentation was e-mailed to Chaska.net on August 22, 2011, with a request for confirmation or comment; it was advised that, unless someone from Chaska.net contested the findings, this information would be submitted to the NTIA during the October 2011 mapping cycle. On January 17, 2012, the CN engineer spoke with a representative from the City of Chaska and, despite their inability to voluntarily submit data, the representative indicated that he was "ok with everything" submitted to NTIA herein.

Exhibit H: Field Validation Notes

Platform Type		Test Data		Visual Confirmation
Type	Presence Confirmed	Type	Pass or Fail?	Type
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip
Fixed Wireless	Yes	Visual	Pass	Pole Mounted Equip

Exhibit I: Chaska.net Composite Coverage



Nextera Communications

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 provides detail regarding the recent data collection activities related to Nextera Communications, a wireless Internet service provider (WISP), located in Baxter, Minnesota, with a service area around Minneapolis, St. Paul, and the surrounding areas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 20 instances of communication via telephone and e-mail sessions since February 10 2010, through July 20, 2011. One reply was received from a company representative on July 20, 2011, with a response of electing not to participate due to the resources needed for a project of this magnitude. Additionally, a CN staff member visited the Nextera Communications office on March 16, 2010, to discuss the broadband mapping project in person with Nextera Communications staff, but the appropriate contact person was unavailable at the time of the visit.

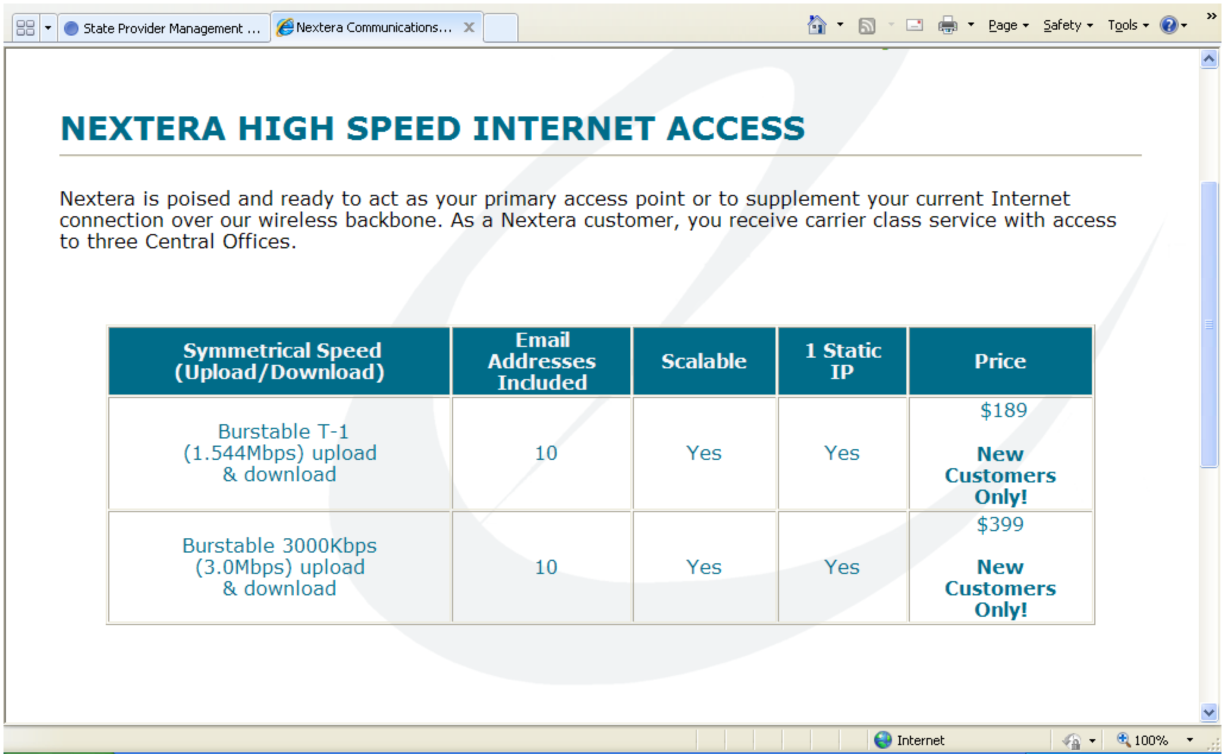
The Issue

Nextera Communications, by its lack of responsiveness since February 10, 2010, has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://nextera.net/) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0012927992 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded licenses WQLV608, WQNA425, and WQNA429 **(Exhibit D)**, with 0 unique locations in the area.

Exhibit A: Service Plans



State Provider Management ... Nextera Communications...

Page Safety Tools

NEXTERA HIGH SPEED INTERNET ACCESS

Nextera is poised and ready to act as your primary access point or to supplement your current Internet connection over our wireless backbone. As a Nextera customer, you receive carrier class service with access to three Central Offices.

Symmetrical Speed (Upload/Download)	Email Addresses Included	Scalable	1 Static IP	Price
Burstable T-1 (1.544Mbps) upload & download	10	Yes	Yes	$189 **New Customers Only!**
Burstable 3000Kbps (3.0Mbps) upload & download	10	Yes	Yes	$399 **New Customers Only!**

Internet 100%

Exhibit B: Service Area

Exhibit C: Federal Registration Number

Close Window

Registration Detail	
FRN:	0012927992
Registration Date:	03/04/2005 12:19:12 PM
Last Updated:	08/31/2009 04:36:54 PM
Business Name:	Nextera Communications
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	Nextera Communications
Contact Position:	President
Contact Name:	Mr Greg G Arvig
Contact Address:	619 Maple Street Brainerd, MN 56401 United States
Contact Email:	garvig@nextera.net
ContactPhone:	(218) 824-6400
ContactFax:	(218) 824-6401

Exhibit D: WQLV608 License Reference

License Search - Search Results

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Consumers | Find People

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

FCC Site Map

License Search

Search Results

HELP

New Search Refine Search Printable Page Query Download Map License

Specified Search

FRN like **0012927992**

Matches **1 - 3** (of **3**)

PA = Pending Application(s)
TP = Termination Pending
L = Lease

Page 1

	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
1 PA	WQLV608	Nextera Communications	0012927992	NN	Active	05/04/2020
2	WQNA425	Nextera Communications	0012927992	CF	Active	11/23/2020
3	WQNA429	Nextera Communications	0012927992	CF	Active	11/23/2020
	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date

Page 1

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the Nextera Communications service area map from its website. The website service area was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .2 mile (1058 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by polygons as shown in Exhibit B. Using the coordinates determined to be center coordinates a search ring was created with the image overlay to determine the feasibility of locating the towers to identifying coordinates of the locations. The 16 locations' center coordinates were inputted into Google Earth and examined utilizing the zoom option of the aerial imagery. The 16 transmitting locations structures were not all identified. This required a means of establishing coordinates for the access point locations. A site validation trip was planned and executed to the area. All 16 locations were entered into the *Streets and Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

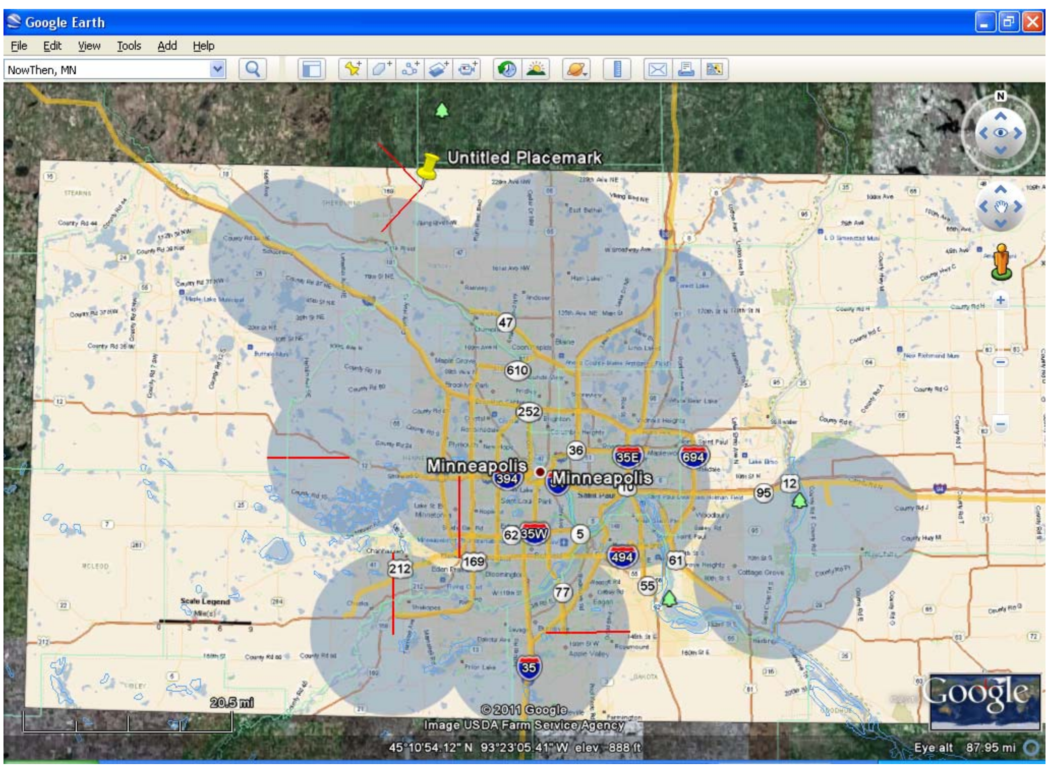
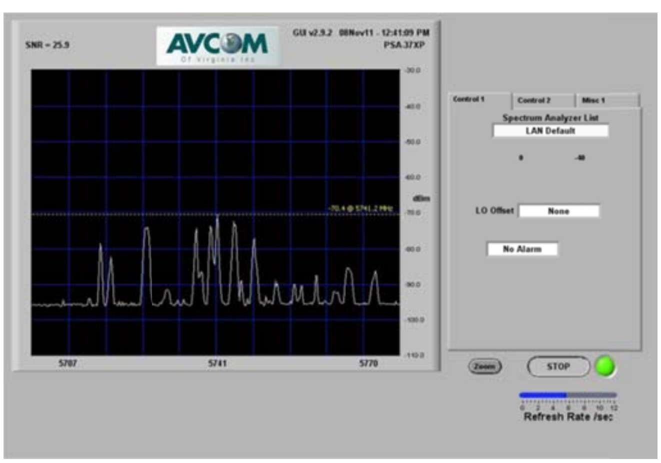


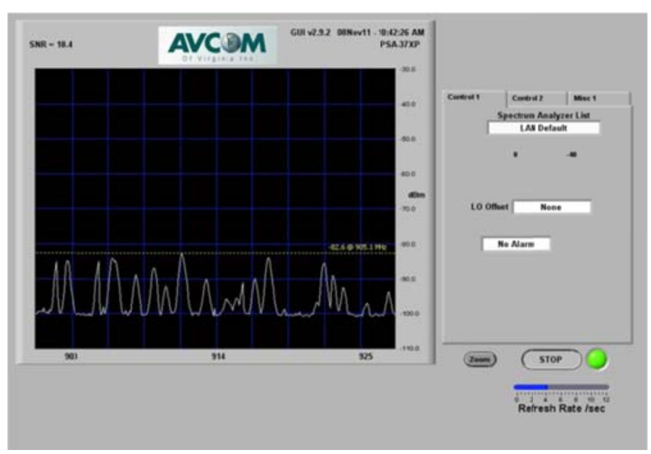
Exhibit F: Validation Points for AP Structures

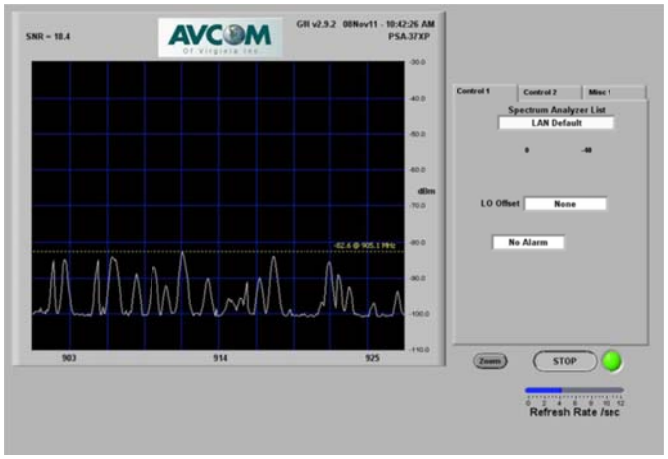
Testing Techniques

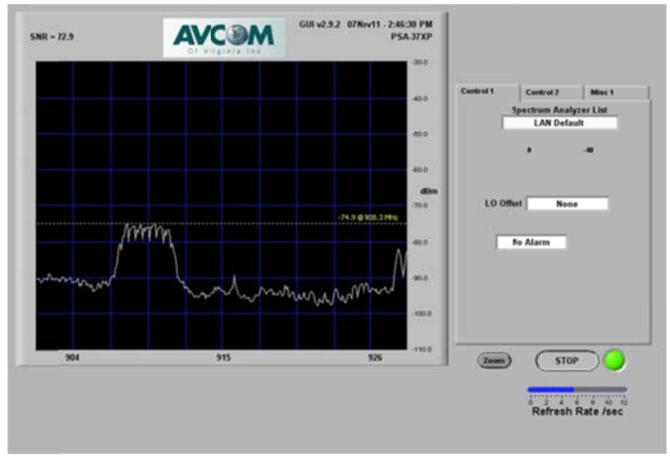
Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay for Nextera Communications. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored), and photographs were taken of the access points.

Exhibit G: Field Data for Nextera Communications









Test Site Info	Coordinates NAD 83 REQUIRED		Platform Type		Visual Confirmation		Signal Verification/Spectrum Analyzer		Notes
Test City	(N) Lat Decimal	(-)(W) Long Decimal	Type	Presence Confirmed	Type	Images	Peak Freq	Peak Sig Strength	
Monticello	45.279167	-93.768333	Fixed Wireless	Yes	Headend	Yes	914	-71	On tower Approx 220 Feet Sectors 900 Mhz
Hanover	45.124167	-93.633333	Fixed Wireless	Yes	Headend	Yes	2400	-70	On tower 280' 260 feet Sectors
Ostego	45.254722	-93.652500	Fixed Wireless	Yes	Headend	Yes	914	-65	180' 3 sectors on watertower
Maple Plain	45.003333	-93.652500	Fixed Wireless	Yes	Headend	Yes	914	-71	300' 3 sectors 900 Mhz on Tower no access
Chaska	44.751111	-93.553056	Fixed Wireless	Yes	Headend	Yes	914	-72	250' 3 sectors 900 Mhz FCC ID 1200989
Cedar	45.345140	-93.233990	Fixed Wireless	Yes	Headend	Yes	5741	-71	160' 3 sectors 5700 Mhz Tower
Hugo-LinoLakes	45.182510	-93.000900	Fixed Wireless	Yes	Headend	Yes	5742	-72	140' 3 Sectors 5750 Mhz Watertower
Hugo-WhiteBearLake	45.138579	-93.005850	Fixed Wireless	Yes	Headend	Yes	2467	-61	140' 3 sectors 900 Mhz/2400 Mhz Watertower
St Paul	44.950880	-93.096760	Fixed Wireless	Yes	Headend	Yes	2484	-74	250' 3 sectors 2400 mhz Building
Burnsville-AppleValley	44.752680	-93.291370	Fixed Wireless	Yes	Headend	Yes	914	-74	80 feet 3 sectors 900 Mhz Watertower/Tower near
Hastings-Afton	44.826990	-92.796690	Fixed Wireless	Yes	Headend	Yes	2434	-63	180 Omni 2400Mhz Tower
River Falls-Lakeland	44.902600	-92.689890	Fixed Wireless	Yes	Headend	Yes	5756	-63	200 feet 3 sectors 5700 Mhz tower
Medicine Lake	44.929770	-93.223220	Fixed Wireless	Yes	Headend	Yes	2434	-73	140' 2400 Mhz sectors Elevator
Powderhorn Park	44.937860	-93.231520	Fixed Wireless	Yes	Headend	Yes	2462	-59	180' Sectors 24090 mhz building
Ankoa	45.208130	-93.384420	Fixed Wireless	Yes	Headend	Yes	5743	-56	140' sectors 5700 Mhz tower
Spring Lake Park	45.118200	-93.231990	Fixed Wireless	Yes	Headend	Yes	5755	-64	140' Sectors' 5700 Mhz Watertower

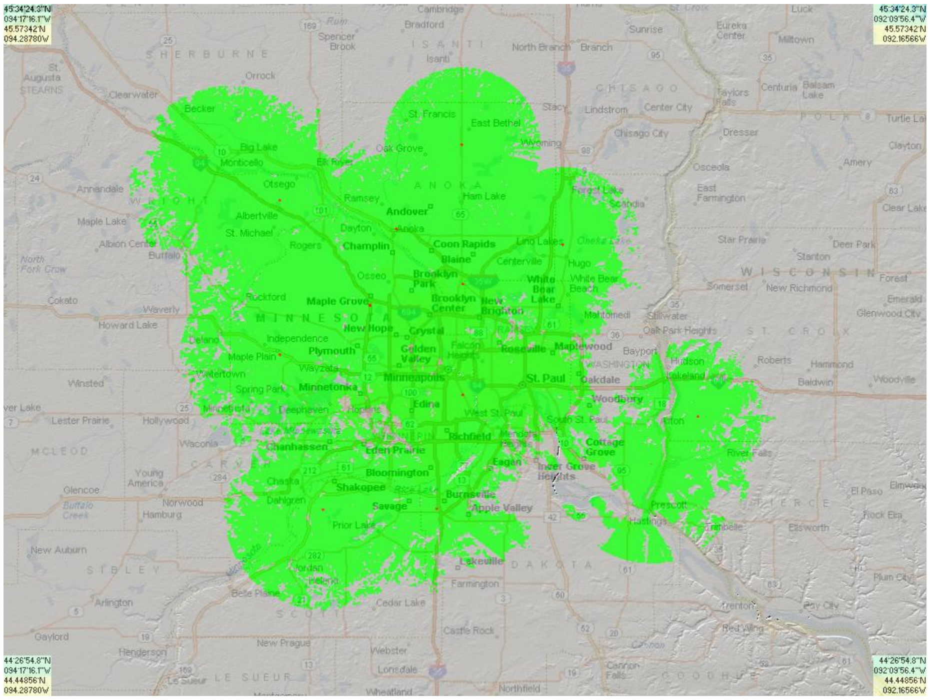
Results and Submission for April 2012

Of the 16 locations visited during the validation point route, 16 access points were identified and relative information was logged into the Nextera Communications field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to Nextera Communications and advised the information will be submitted to Connect Minnesota and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit H: Field Validation Notes

Primary Population Center Covered by Service (city, county, etc.)	**Transmission Location** (water tank, tower, silo, rooftop or other structure)	**Decimal Degree Conversion** (automatically converted here if you completed columns K, L and M)	**Decimal Degree Conversion** (automatically converted here if you completed columns O, P and Q)	**Is the Transmit Antenna Omni-Directional?**	**Transmit Frequency** (MHz)	**Polarity** (V or H)	**Antenna Elevation** (feet above ground)	**Comments:** Tell us anything you feel is important for us to know about your system (e.g., foliage).
Monticello	**Tower**	*45.279167*	*-93.768333*	☐ Yes ☐ No	**914**	☐ V ☑ H	**220**	**On tower Approx 220 Feet Sectors 900 Mhz**
Hanover	**Tower**	*45.124167*	*-93.633333*	☐ Yes ☐ No	2400	☐ V ☑ H	280	On tower 280' 260 feet Sectors
Ostego	Watertower	*45.254722*	*-93.652500*	☐ Yes ☐ No	914	☐ V ☑ H	180	180' 3 sectors on watertower
Maple Plain	Tower	*45.003333*	*-93.652500*	☐ Yes ☐ No	914	☐ V ☑ H	300	300' 3 sectors 900 Mhz on Tower no access
Chaska	Tower FCC ID 1200989	*44.751111*	*-93.553056*	☐ Yes ☐ No	914	☐ V ☑ H	250	250' 3 sectors 900 Mhz FCC ID 1200989
Cedar	Tower	*45.345140*	*-93.233990*	☐ Yes ☐ No	5741	☐ V ☑ H	160	160' 3 sectors 5700 Mhz Tower
Hugo-LinoLakes	Watertower	*45.182510*	*-93.000900*	☐ Yes ☑ No	5742	☐ V ☑ H	140	140' 3 Sectors 5750 Mhz Watertower
Hugo-WhiteBearLake	Watertower	*45.138579*	*-93.005850*	☐ Yes ☐ No	2467	☐ V ☑ H	140	140' 3 sectors 900 Mhz/2400 Mhz Watertower
St Paul	Building	*44.950880*	*-93.096760*	☐ Yes ☐ No	2484	☐ V ☑ H	250	250' 3 sectors 2400 mhz Building
Burnsville-AppleValley	Watertower/Tower	*44.752680*	*-93.291370*	☐ Yes ☐ No	914	☐ V ☑ H	80	80 feet 3 sectors 900 Mhz Watertower/Tower near
Hastings-Afton	Tower	*44.826990*	*-92.796690*	☑ Yes ☐ No	2434	☐ V ☑ H	180	180 Omni 2400Mhz Tower
River Falls-Lakeland	Tower	*44.902600*	*-92.689890*	☐ Yes ☐ No	5756	☐ V ☑ H	200	200 feet 3 sectors 5700 Mhz tower
Medicine Lake	Elevator	*44.929770*	*-93.223220*	☐ Yes ☐ No	2434	☐ V ☑ H	140	140' 2400 Mhz sectors Elevator
Powderhorn Park	building	*44.937860*	*-93.231520*	☐ Yes ☐ No	2462	☐ V ☑ H	180	180' Sectors 24090 mhz building
Ankoa	Tower	*45.208130*	*-93.384420*	☐ Yes ☐ No	5743	☐ V ☑ H	140	140' sectors 5700 Mhz tower
Spring Lake Park	Watertower	*45.118200*	*-93.231990*	☐ Yes ☐ No	5755	☐ V ☑ H	140	140' Sectors' 5700 Mhz Watertower

Exhibit I: Nextera Communications Composite Coverage



TotheHome.com

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 program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to TotheHome.com a wireless Internet service provider (WISP), located in Carver County, Minnesota, with a service area around Cologne. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

<u>Background</u>
CN staff members have continued trying to obtain the participation of the provider with 5 instances of communication via telephone and e-mail sessions since November 4, 2011, through January 25, 2012. Only one communication reply was received from a company representative on November 4, 2011, with a response indicating a willingness to review the requirements for the SBI project.

Additionally, a CN staff member visited the TotheHome.com office location on January 25, 2012, to discuss the broadband mapping project in person with TotheHome.com staff but necessary staff was unavailable to discuss the project with the CN engineer.

The Issue

TotheHome.com, by its lack of responsiveness since November 4, 2011, has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.tothehome.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded an FRN of 0021284443 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of wireless access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded no licenses through the FCC ULS search **(Exhibit D)**.

Exhibit A: Service Plans

Exhibit B: Service Area

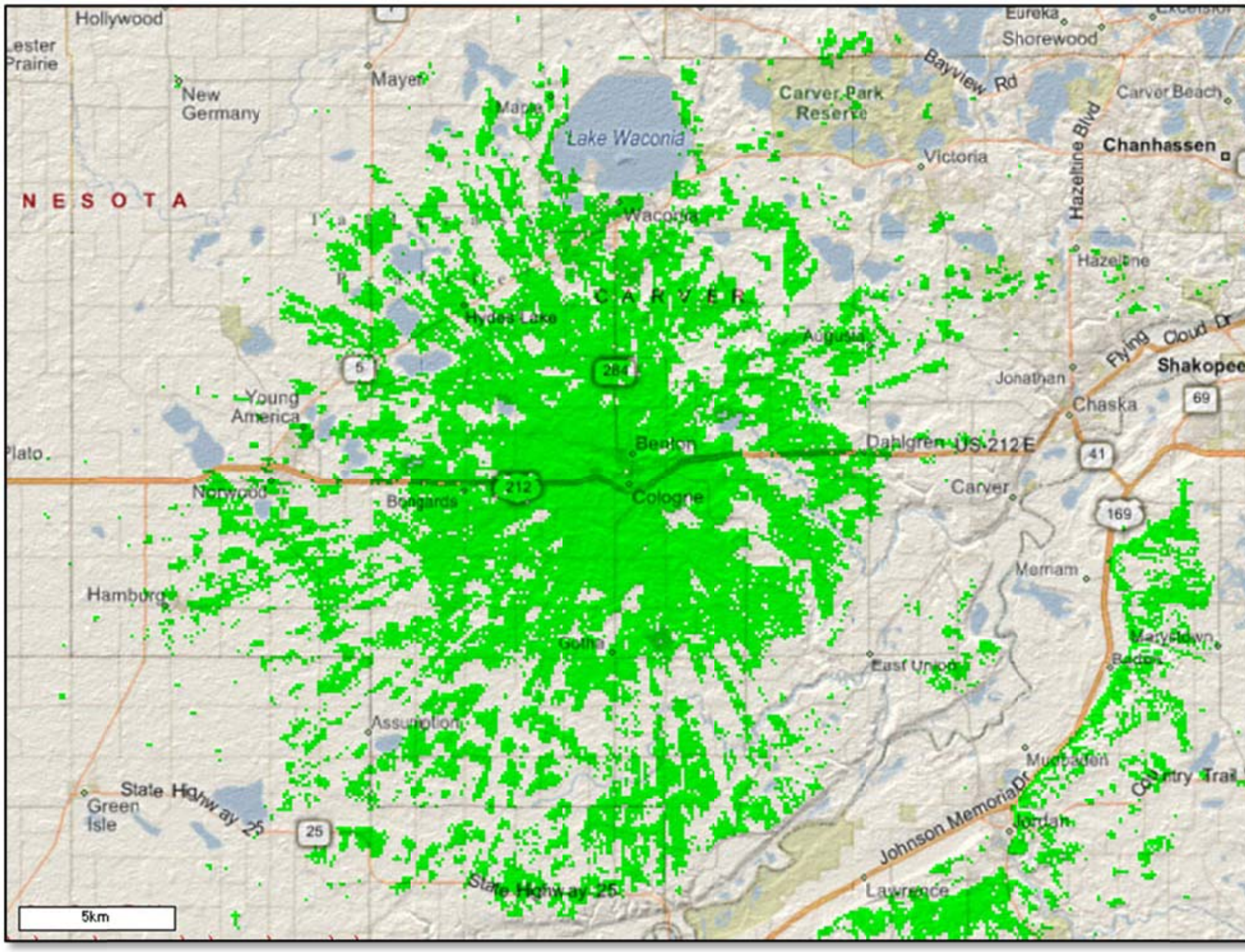


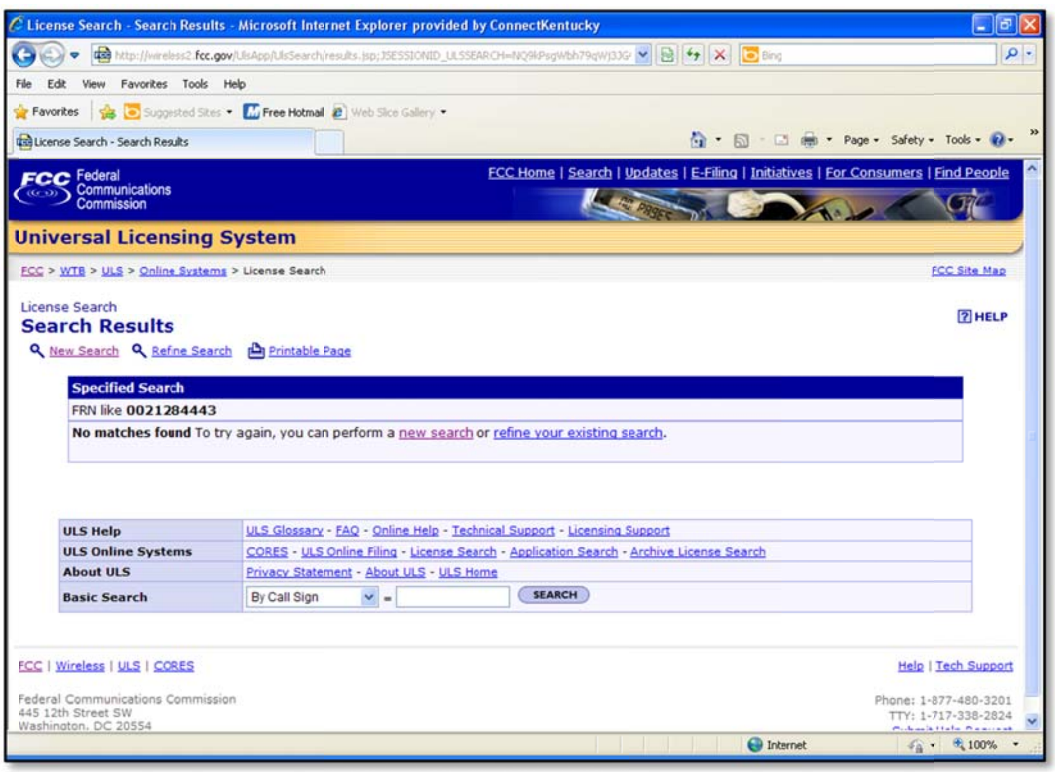
Exhibit C: Federal Registration Number

Close Window

Registration Detail

FRN:	0021284443
Registration Date:	11/11/2011 12:22:00 PM
Last Updated:	
Business Name:	totheHome.com, LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	totheHome.com, LLC
Contact Position:	President
Contact Name:	Mr Shawn L Sprengeler
Contact Address:	2195 Grimm Rd Chaska, MN 55318 United States
Contact Email:	
ContactPhone:	(952) 454-0716
ContactFax:	

Exhibit D: License Search Reference



<u>Preliminary Identification of Provider's Coverage Area</u>
CN extracted the TotheHome.com service area map directly from the provider's website. Information from that website was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .2 mile (1058 ft.) to establish a minimum search criteria of a given wireless access point. The provider's estimated service area depiction is represented by the wireless propagation model as shown in Exhibit B. The location's center coordinates were populated into Google Earth and examined utilizing the zoom option of the aerial imagery. An on-site trip was conducted in the area utilizing Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the coverage estimation and validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

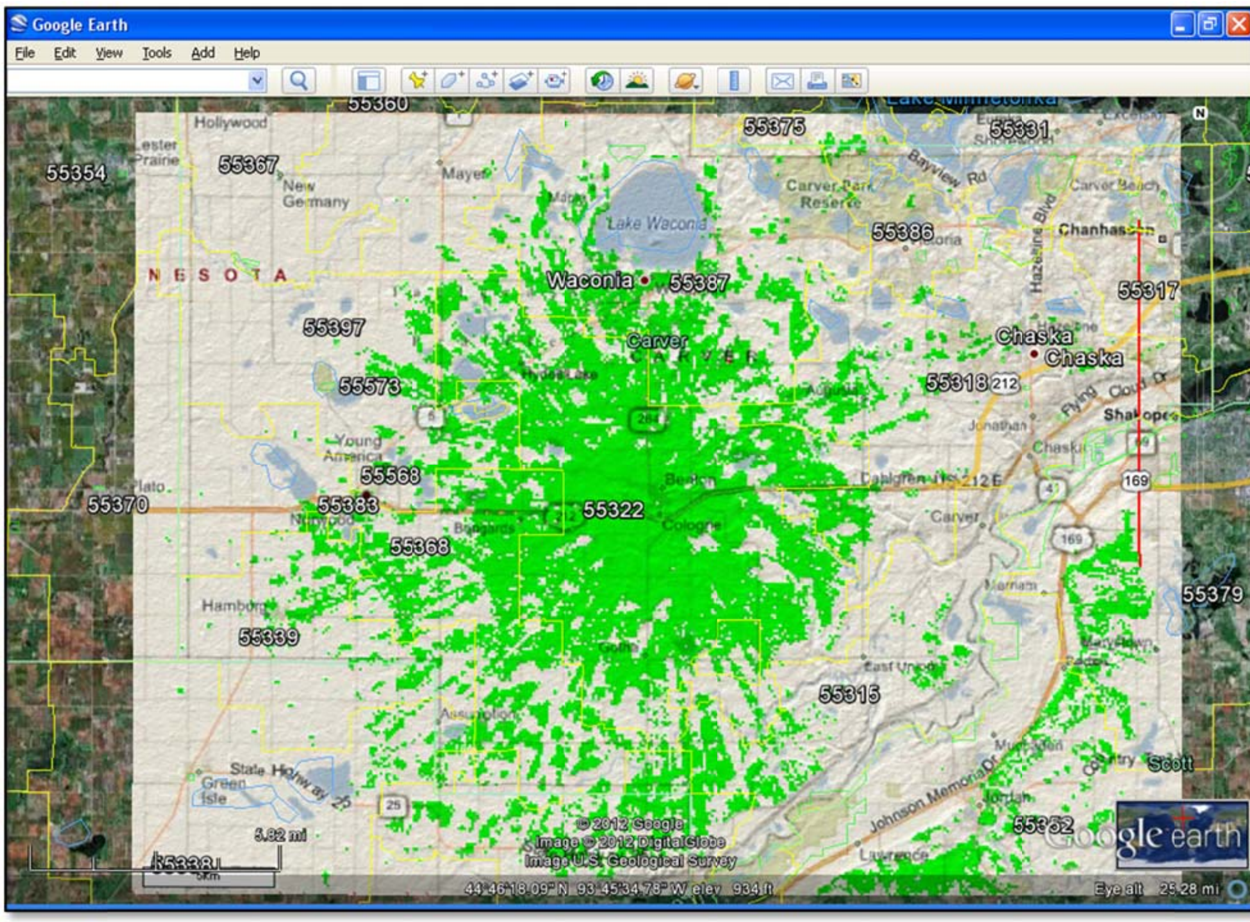
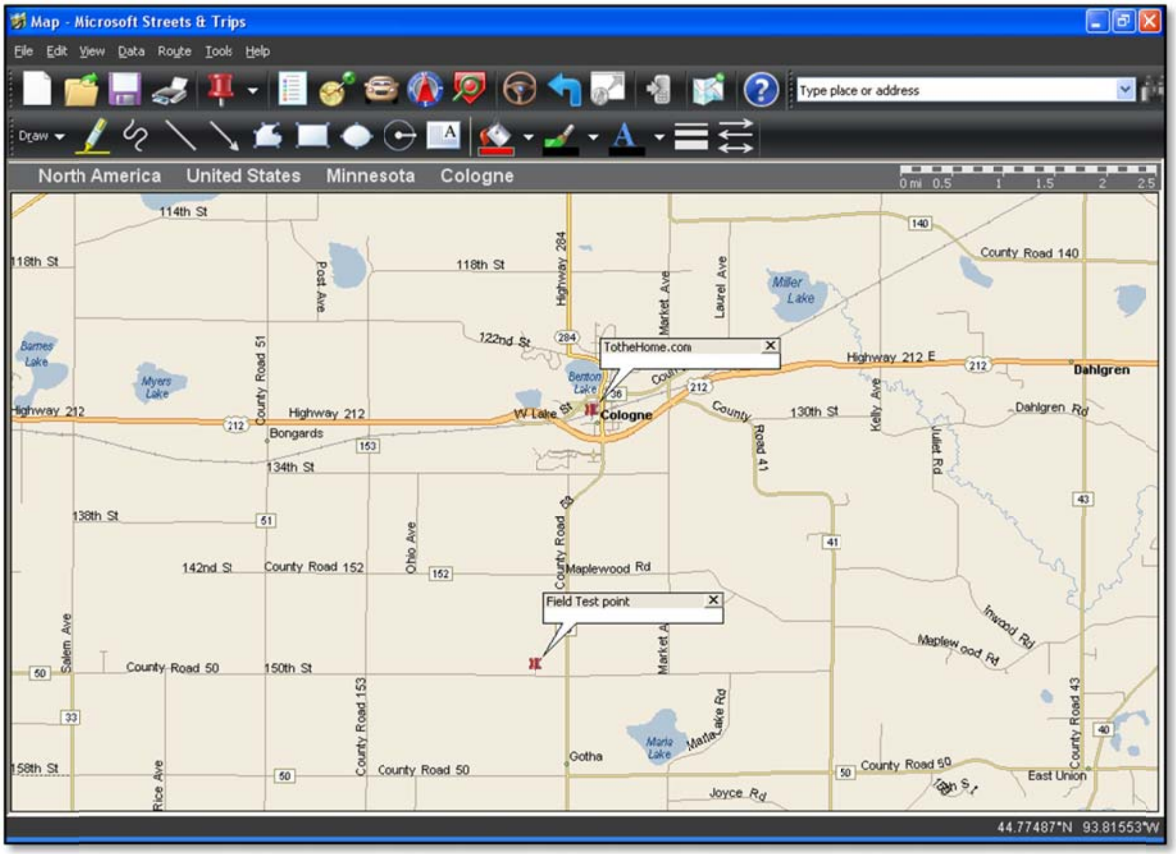


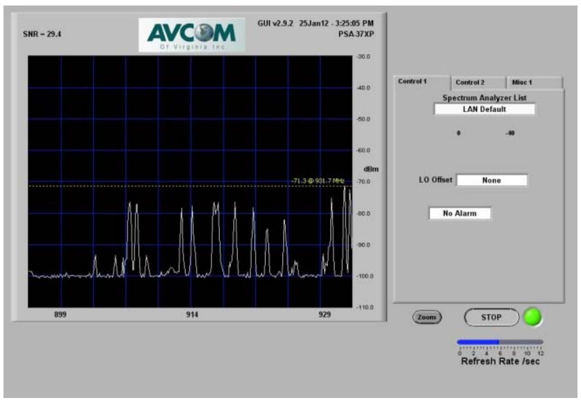
Exhibit F: Validation Points for AP Structures

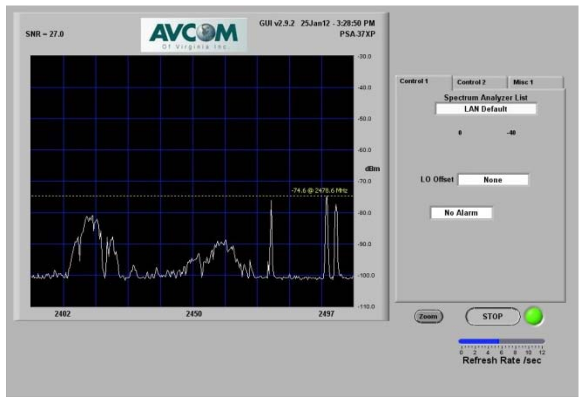


Testing Techniques

CN staff developed a data collection and site validation route based on information derived from the Google Earth image overlay and from data gleaned from the provider's website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Two validation points were scrutinized for frequency of operation. General notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored), and photographs were taken of the access points.

Exhibit G: Field Data for TotheHome.com Hub Location





Name of Access Point/Transmission Location:	DL Speeds	UL Speeds	lat	Long	Frequency	Ant type	Antenna Height
Cologne	1.5 Mbps	512 Mbps	44.7701	-93.7829	2400	120 Deg	140 feet

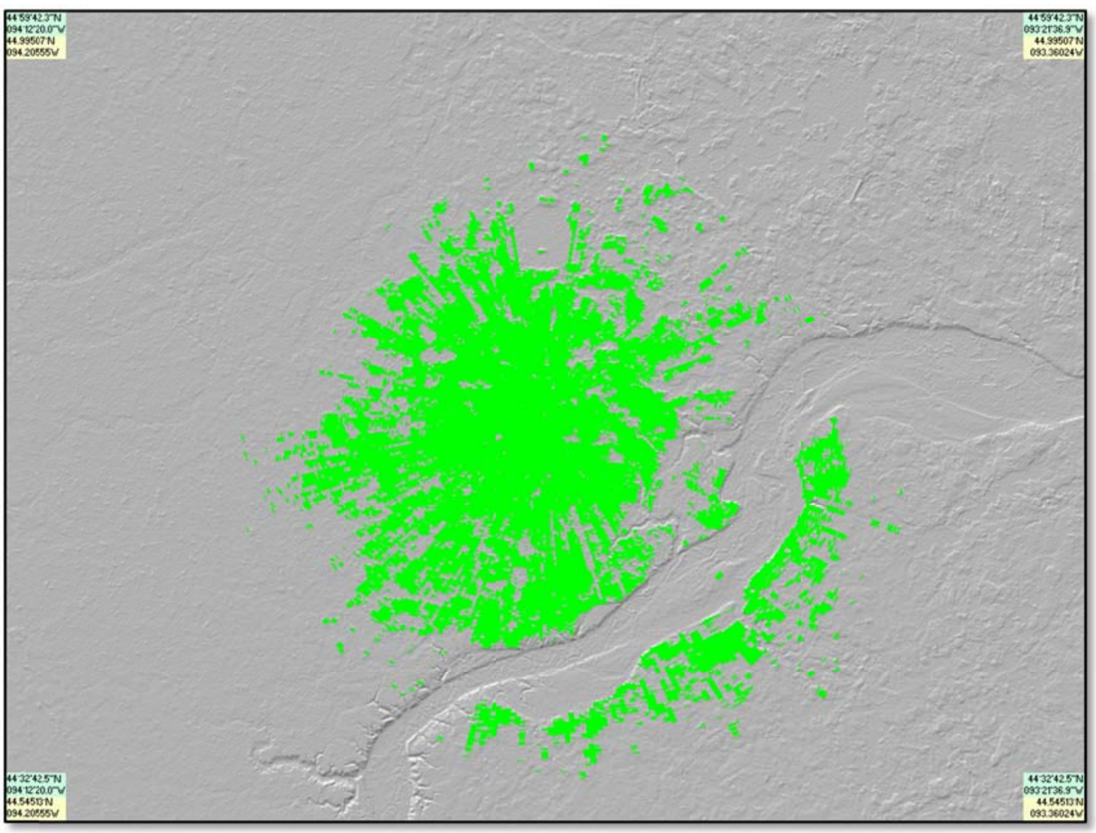

<u>Results and Submission for April 2012</u>

Of the 2 locations visited during the validation point route, 1 access point was identified and relative information was logged into the TotheHome field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data and goggle earth overlay information. **(Exhibit I)**. Both documents were forwarded to TotheHome.com and advised the information will be submitted to Connect Minnesota and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit H: Field Validation Notes

	Provider	Test Site Info							Platform Type		Test Data		Visual Confirmation		
Date	Provider	Test City	Test State	Test County	Physical Address	Location Description	Lat Decimal	Long Decimal	Type	Presence Confirmed	Type	Pass or Fail?	Type	Images	
1/25/12	TotheHome	Cologne	MN	Carver	111 Village Parkway	Security bank	44.764080	-93.783070	Fixed Wireless	Yes	Signal Verification	Pass	Wi-Fi/AP	Yes	Security Bank Parking lot
1/25/12	TotheHome	Cologne	MN	Carver	124 S Market Lane	Watertower	44.770100	-93.782900	Fixed Wireless	Yes	Signal Verification	Pass	Wi-Fi/AP	Yes	140' sectors 3 120 degree 2400 Mhz

Exhibit I: TotheHome.com Composite Coverage



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 2.23 percent of Minnesota h[1]ouseholds do not have terrestrial fixed broadband service available, and approximately 0.10 percent of Minnesota households have neither mobile nor fixed broadband service available.[2]

Within rural areas of the state, results derived from provider-validated data indicate that approximately 5.17 percent of rural Minnesota households do not have terrestrial fixed broadband service available, and approximately 0.24 percent[3] of rural Minnesota 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 state.

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

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information 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 Minnesota project has received a total of 36 inquiries (151 grant inception to date). As more inquiries are submitted to Connect Minnesota, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

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 Minnesota project launched BroadbandStat on May 21, 2010, and has received a total of 3,879 visits to date, of which 779 occurred this reporting period.

Speed Test Methodology

The 1,621 speed tests that are represented in the Connect Minnesota Speed Test Report during this reporting period (9,680 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Minnesota speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

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

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 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	360networks	http://www.360networks.com/	Acquired by another company
2	Access Media 3, Inc.	http://www.am3inc.com	Company is a bulk reseller to MDU and commercial properties
3	Airespring, Inc.	http://www.airespring.com	Company is a nonfacilities-based reseller
4	Akeva	n/a	Reseller of Verizon Mobile Phones in mall kiosk
5	Arrowhead Electric Cooperative, Inc.	http://www.aecimn.com/	Construction is underway; need to indicate provider viable for next submission
6	Boreal Access	http://boreal.org/drupal/	Provider does not meet minimum speed requirements for participation
7	Broadcore, Inc.	www.broadcore.com/	Broadcore is a national provider of business-class hosted unified communications services and has no ISP offerings
8	BullsEye Telecom, Inc.	http://www.bullseyetelecom.com	Company is a nonfacilities-based reseller
9	Carver County Fiber Initiative	www.co.carver.mn.us	Construction bids were approved and construction slated for Late 2012 completion; middle mile project
10	Cbeyond Communications, LLC	http://www.cbeyond.net/index.htm	Company is a nonfacilities-based reseller
11	City of Bagley	http://www.bagleymn.us/	Cable system does not offer Internet service
12	Cloudnet Inc.	http://www.cloudnet.com	Nonfacilities-based reseller for DSL services and wireless coverage; does not meet minimum speed requirements
13	Computer Pro Inc.	www.hickorytech.com	Company reporting data is provided by Hickory Tech
14	Delavan Telephone Company	http://www.bevcomm.net/	Company reporting data is provided by Blue Earth Valley Telephone Company (BEVCOMM)
15	Digital Telecommunications, Inc	http://www.pickdti.com/	No longer in business
16	Dunnell Telephone Company	http://bevcomm.net/	Offer service, but below broadband theshold.
17	EN-TEL	http://www.en-	Acquired by another company

	Communications, LLC	tel.com/	
18	Enventis Telecom, Inc.	http://www.enventis.com/	Provider does not offer broadband in Minnesota
19	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com/	Acquired by another company.
20	GN Wireless	n/a	Local phone disconnected and website not located; provider no longer in business
21	Home Telephone Company	http://www.hmtel.com	Company reporting data is provided by Arvig Communications Services
22	Lake County Fiber Network	http://www.co.lake.mn.us/	Construction slated to begin in late 2011
23	Lakedale LINK	http://www.lakedaletelephone.com/	Acquired by another company
24	Lakedale Telephone	http://www.lakedaletelephone.com/	Acquired by another company
25	LightEdge Solutions, Inc.	http://www.lightedge.com	Provider does not offer residential broadband service in Minnesota
26	Lightyear Network Solutions, LLC	www.lightyear.net	Nonfacilities-based reseller for DSL services
27	Lismore Cooperative Telephone Company	http://www2.lismoretel.com/	Provider does not offer residential broadband service in Minnesota
28	Lowry Telephone LLC	www.home.runestone.net/rta	Company acquired by Runestone Telecom Association
29	Maple Leaf Networks	http://www.mleaf.net/	No longer in business
30	Merit Network, Inc.	www.merit.edu	Provider has operations in Michigan; no operations in Minnesota completed to date
31	Metropolitan Telecommunications Holding Company	n/a	Nonfacilities-based reseller for DSL services
32	MLM Project Services, Inc.	http://www.mlmpsinc.com	Company does not offer residential broadband service in Minnesota
33	M-Tek Systems	www.mteksystems.com	Company does not offer residential broadband service in Minnesota
34	Nates Net	http://www.natesnet.com/	Offer service, but below broadband threshold
35	New Edge Network, Inc.	http://www.newedgenetworks.com/	Nonfacilities-based backhaul reseller

36	North American Communications Corp (NACC)	http://www.jaguarcommunications.com	Maps and data are supplied by DBA Jaguar Communications
37	Northeast Service Cooperative	http://www.nesc.k12.mn.us/	Middle mile fiber construction is underway; expect data for next submission
38	OrbitCom, Inc.	http://www.orbitcom.biz	Reseller of Qwest Services and has been non-responsive to multiple contact attempts
39	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company
40	Popp.com, Inc.	http://www.popp.com/	Provider is a supplier of business services only
41	Reliance Globalcom Services, Inc.	http://www.relianceglobalcom.com/	Wholesale reseller of backhaul and managed B2B circuits
42	Renville-Sibley Fiber to the Farm	http://www.scfiber.com/Sibley_County_Fiber/Home.html	Fiber to the Farm project still seeking funding; construction could start in 2012
43	Ridge Runner Internet Services Inc.	http://www.ridge-runner.com/index.html	No longer in business
44	RRC Net	http://www.rrcnet.org/java.shtml	Provider does not meet minimum speed requirements for participation
45	Sihope Communications	http://www.sihope.com/	Facilities-based company offering B2B solutions and reseller of circuits (non-residential)
46	Sioux Valley Rural Television, Inc.	n/a	Company does not offer broadband services; affiliate Sioux Valley Wireless coverage and data is provided
47	St. Olaf College Telecommunications	http://www.stolaftelephone.com/	Company does not offer broadband services
48	Tekstar Communication Systems, Inc.	n/a	Company reporting data is provided by Arvig Communications Services
49	Telefonica USA, Inc.	http://www.us.telefonica.com/	Provider does not offer services in Minnesota
50	Terril Telephone Cooperative	http://www.terril.com	Provider does not offer services in Minnesota
51	The City of Boyd, Minnesota	n/a	The City of Boyd offers cable television only over cable plant; leases cable spectrum to ISP, MVTV Wireless

52	United States Cellular Corporation	http://www.uscellular.com/uscellular/index.jsp	Provider does not offer broadband services in Minnesota
53	University Corporation for Advanced Internet Development	n/a	Nationwide Gbit network for anchor institutions; under construction utilizing existing fiber and new installations; will classify as middle mile in upcoming submission
54	US Cable Corporation	http://www.uscablegroup.com/	Acquired by another company
55	US Family Internet	http://www.usfamily.net/	Nonfacilities-based reseller of Qwest Services
56	US Internet of Minnetonka	http://www.usiwireless.com/	Provider coverage and data is reported by DBA USI Wireless
57	Velocity Telephone, Inc.	http://www.velocitytelephone.com	Nonfacilities-based reseller of Qwest Services
58	WilTel Communications, LLC.	n/a	As of December 23, 2005, WilTel Communications Group Inc. operates as a subsidiary of Level 3

Broadband Provider Log

Complete	180
Non-Responsive/Refused	4
In Progress	6
Count of Datasets by Status	**190**
Total Unique Providers Represented	**120**

Provider Name	Platform	Status	NDA Execution Date	Notes
Ace Telephone Association	DSL	Data Added to Statewide Inventory	8/3/2010	[FEB-07-12 Brian Dudek] Change: Provider expanded DSL territory and increased maximum advertised download speed near Brownsville to tier 7.
AirLink Broadband, LLC	Fixed Wireless	Data Added to Statewide Inventory		[NOV-08-11 Brian Dudek] Change: Provider modified coverage on two transmission sites and added an additional one as well.
Alliance Communications Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/2/2012	[JAN-17-12 Brian Dudek] Change: Provider converted rest of their DSL infrastructure to fiber and increased their speed capabilities in MN to max advertised speed tier 9 download, 7 upload.
Arvig Communication Systems	Fiber	Data Added to Statewide Inventory	2/2/2011	[JAN-18-12 Brian Dudek] Change: Expanded fiber territory primarily in and around the towns of Waubun and Flom.
AT&T Corp, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-28-12 Brian Dudek] Change: Provider expanded mobile territory.
Barnesville Municipal Telephone	DSL	Data Added to Statewide Inventory	3/4/2010	[MAR-16-12 Brian Dudek] Correction: Provider indicated that they want to be more conservative with the maximum advertised download speed tier. Decreased to tier 6.
Benton Cooperative Telephone Company	DSL	Data Added to Statewide Inventory	6/16/2010	[FEB-07-12 Brian Dudek] Change: Provider increased maximum advertised download speed to tier 6.
Benton Cooperative Telephone Company	Fiber	Data Added to Statewide Inventory	6/16/2010	[FEB-07-12 Brian Dudek] Change: Provider increased maximum advertised download speed to tier 6.
Benton Cooperative Telephone Company	Cable	Data Added to Statewide Inventory	6/16/2010	[FEB-07-12 Brian Dudek] Change: Provider increased maximum advertised download speed to tier 6 near Rice.
Blue Earth Valley Telephone Company	DSL	Data Added to Statewide Inventory	6/16/2010	[FEB-06-12 Brian Dudek] Change: Provider expanded DSL territory further into Delavan and Huntley exchanges. Increased speeds in Freeborn exchange.
Broadband Corp	Fixed Wireless	Data Added to Statewide Inventory	5/11/2010	[JAN-26-12 Brian Dudek] Correction: Provider indicated a correction that reduced the maximum advertised upload speed to tier 3 on some 3650 sites.
Cable ONE Inc.	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-21-12 Brian Dudek] Change: Provider added a few additional census blocks to their cable territory.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-17-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset for April 2012 submission.

Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[FEB-03-12 Brian Dudek] Change/Correction: possible service expansion or corrections to previous dataset; entirely new dataset for April 2012 submission. Minor spatial changes with an increase in maximum advertised download speed to tier 10. All now DOCSIS 3.0.
City of Detroit Lakes	Fixed Wireless	Data Added to Statewide Inventory	5/10/2010	[DEC-20-11 Brian Dudek] Correction: New provider for April 2012 submission that was previously unresponsive.
City of Windom	Fiber	Data Added to Statewide Inventory		[JAN-17-12 Brian Dudek] Change: Provider upgraded speed capabilities to max advertised speed tier 9 download, 8 upload.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/3/2010	[JAN-25-12 Brian Dudek] Change: Provider slightly expanded mobile territory on the northern side of their service area near Anoka. [MAR-12-12 Terry Holmes] Provider supplied additional information on coverage for substantial service sites in October 2011, however requested that CN not submit or publish this coverage since they do not market to these areas.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-14-12 Brian Dudek] Change/Correction: possible service expansion or corrections to previous dataset; entirely new dataset for April 2012 submission.
Consolidated Telephone Company	Fiber	Data Added to Statewide Inventory	3/1/2012	[JAN-24-12 Brian Dudek] Change: Provider expanded fiber coverage into two exchanges.
diversiCOM	Fiber	Data Added to Statewide Inventory	4/20/2010	[NOV-08-11 Brian Dudek] Change: Provider expanded fiber territory in Richmond and increased max advertised download speeds to tier 7.
Eagle Valley Telephone Company	DSL	Data Added to Statewide Inventory	4/14/2010	[MAR-16-12 Brian Dudek] Change/Correction: Service expansion and corrections to previous dataset; entirely new dataset for April 2012 submission.
Emily Cooperative Telephone Company	Fiber	Data Added to Statewide Inventory	6/24/2010	[OCT-20-11 Brian Dudek] Correction: Corrected fiber network speed tiers to current offering. Provider did not provide this data in the past submission even though it was available at the time. Advertised speeds increased to tier 10 download and tier 3 upload.
Fallsnet	Fixed Wireless	Data Added to Statewide Inventory		[FEB-29-12 Brian Dudek] Change: New fixed wireless provider in the market.
Federated Telephone Cooperative	Fiber	Data Added to Statewide Inventory	4/1/2010	[JAN-17-12 Brian Dudek] Change: Provider expanded fiber coverage into the Morris exchange.
Felton Telephone Company	DSL	Data Added to Statewide Inventory	4/14/2010	[MAR-16-12 Brian Dudek] Change/Correction: Service expansion and corrections to previous dataset; entirely new dataset for April 2012 submission.
Frontier Communications of Minnesota, Inc.	DSL	Data Added to Statewide Inventory	1/22/2010	[JAN-27-12 Brian Dudek] Change/Correction: Provider expanded DSL territory by adding additional CO/RT's. Reduced coverage in a few areas where residents claimed they could not get service.

Garden Valley Telephone Company	DSL	Data Added to Statewide Inventory	2/17/2010	[DEC-19-11 Brian Dudek] Change/Correction: Provider converted some DSL infrastructure to fiber and corrected speed capabilities. Previously speeds were reported as exchange maximum.
Garden Valley Telephone Company	Fiber	Data Added to Statewide Inventory	2/17/2010	[DEC-19-11 Brian Dudek] Change: Provider expanded fiber territory and upgraded speed capabilities to max advertised download speed tier 7.
Granada Telephone Company	DSL	Data Added to Statewide Inventory	4/14/2010	[FEB-27-12 Brian Dudek] Change/Correction: Service expansion and corrections to previous dataset; entirely new dataset for April 2012 submission.
Hiawatha Broadband Communications, Inc.	Fiber	Data Added to Statewide Inventory	3/8/2010	[FEB-27-12 Brian Dudek] Change: Provider expanded fiber territory into six additional town areas.
Hiawatha Broadband Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/8/2010	[MAR-01-12 Brian Dudek] Change: New provider platform in service for April 2012 submission.
Hickory Tech Corporation	DSL	Data Added to Statewide Inventory		[MAR-06-12 Brian Dudek] Change/Correction: Provider supplied new dataset indicating a reduction of speeds in entire service area.
IdeaOne Telecom Group, LLC	DSL	Data Added to Statewide Inventory	11/4/2011	[NOV-09-11 Brian Dudek] Correction: New provider for April 2012 submission that previously refused to participate.
IdeaOne Telecom Group, LLC	Fixed Wireless	Data Added to Statewide Inventory	11/4/2011	[NOV-16-11 Brian Dudek] Correction: New provider for April 2012 submission that previously refused to participate.
Info Link Wireless, Inc.	Fixed Wireless	Data Added to Statewide Inventory	4/19/2010	[FEB-21-12 Brian Dudek] Change: Provider added additional 2.5Ghz transmission sites. Increased speed capabilities for unlicensed and licensed area.
InvisiMax, Inc.	Fixed Wireless	Data Added to Statewide Inventory	2/29/2012	[FEB-06-12 Brian Dudek] Change: Added wireless traffic layer. No coverage change by area as this layer coverage is less than the Oct. 2011 unlicensed coverage.
Lismore Cooperative Telephone Company	Fiber	Data Added to Statewide Inventory		[MAR-01-12 Brian Dudek] Correction: New provider for April 2012 submission that was previously thought to be included under Woodstock Telephone.
Loretel Systems, Inc.	DSL	Data Added to Statewide Inventory	4/14/2010	[MAR-16-12 Brian Dudek] Change/Correction: Service expansion and corrections to previous dataset; entirely new dataset for April 2012 submission.
Midcontinent Communications	Cable	Data Added to Statewide Inventory	12/9/2009	[JAN-27-12 Brian Dudek] Change/Correction: Entirely new dataset submitted. Provider expanded cable coverage area by purchasing US Cable and increased maximum advertised upload speed in their already owned tier 8 area. Also provider made some corrections to their serviceable node boundaries, which increased the accuracy of their block submission.
Mille Lacs Energy Cooperative	Fixed Wireless	Data Added to Statewide Inventory		[MAR-02-12 Brian Dudek] Change: New provider in service for April 2012 submission.
Minnesota Valley TV Improvement Corporation	Fixed Wireless	Data Added to Statewide Inventory	4/13/2010	[JAN-05-12 Brian Dudek] Change: Provider added additional transmission sites, which expanded territory into multiple counties in SW Minnesota. Also increased max advertised download/upload speed tier to 5.

New Ulm Telecom, Inc.	Cable	Data Added to Statewide Inventory	2/25/2010	[JAN-12-12 Brian Dudek] Change: New provider platform in service for April 2012 submission. Provider purchased legacy CATV properties covering four towns.
NorthfieldWiFi LLC	Fixed Wireless	Data Added to Statewide Inventory	2/4/2011	[FEB-10-12 Brian Dudek] Change: Provider added an additional transmission point. Upgraded infrastructure of another tower to maximum advertised download tier 7.
Paul Bunyan Rural Telephone Cooperative	DSL	Data Added to Statewide Inventory	6/24/2010	[JAN-24-12 Brian Dudek] Change/Correction: Upon closer examination, minor adjustments made to DSL coverage as fiber is being added to multiple exchanges.
Paul Bunyan Rural Telephone Cooperative	Fiber	Data Added to Statewide Inventory	6/24/2010	[JAN-24-12 Brian Dudek] Change: Provider expanded fiber territory in multiple exchanges.
Pine Island Telephone Company	DSL	Data Added to Statewide Inventory	4/14/2010	[FEB-27-12 Brian Dudek] Change/Correction: Service expansion and corrections to previous dataset; entirely new dataset for April 2012 submission.
Red River Rural Telephone Association	Fixed Wireless	Data Added to Statewide Inventory	3/17/2010	[FEB-07-12 Brian Dudek] Correction: New dataset indicates that wireless speed change was missed last submission. Max Upload and typical download speeds only.
Red River Rural Telephone Association	DSL	Data Added to Statewide Inventory	3/17/2010	[FEB-07-12 Brian Dudek] Change: Provider increased maximum advertised download speed to tier 6 and converted some DSL infrastructure to fiber.
Red River Rural Telephone Association	Fiber	Data Added to Statewide Inventory	3/17/2010	[FEB-07-12 Brian Dudek] Change: Provider increased maximum advertised download speed to tier 9 and expanded fiber territory.
Savage Communications Inc.	Cable	Data Added to Statewide Inventory	2/19/2010	[FEB-06-12 Brian Dudek] Change: Provider expanded cable coverage into Grand Lake and Canosia townships. Also increased speed capabilities in Bovey and Coleraine.
Sjoberg's Inc.	Cable	Data Added to Statewide Inventory	12/21/2009	[MAR-06-12 Brian Dudek] Change: Provider increased upload speeds to tier 4 in DOCSIS-Other areas. Download and upload speeds increased in new DOCSIS 3.0 areas (Warroad and Roseau).
Sleepy Eye Telephone Company	DSL	Data Added to Statewide Inventory	4/14/2010	[FEB-27-12 Brian Dudek] Change/Correction: Service expansion and corrections to previous dataset; entirely new dataset for April 2012 submission.
SMBS	Fiber	Data Added to Statewide Inventory		[JAN-31-12 Brian Dudek] Change: New provider in service for April 2012 submission.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JAN-30-12 Brian Dudek] Change/Correction: Provider made significant refinements to their mobile coverage area. Increased coverage in some areas while decreased in others.
Starpoint Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory	2/18/2011	[FEB-03-12 Brian Dudek] Change: Added underlying unlicensed traffic layer at existing tower locations with speed tiers of 5.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-20-12 Brian Dudek] Change: Provider expanded mobile territory in UMTS and HSPA areas.

TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[FEB-28-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset for April 2012 submission.
TDS Telecommunications Corporation	Fiber	Data Added to Statewide Inventory	1/27/2010	[FEB-28-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset for April 2012 submission.
Upsala Cooperative Telephone Association	Fiber	Data Added to Statewide Inventory	2/29/2012	[DEC-16-11 Brian Dudek] Change/Correction: Provider expanded and reduced/corrected fiber territory in multiple parts of their exchange area.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-20-12 Brian Dudek Change/Correction: Provider corrected their speed tiers and increased coverage areas in EVDO and LTE areas.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[MAR-07-12 Brian Dudek] Change: Provider upgraded speed capabilities to maximum advertised download speed tier 5 and upload tier 3 in western portion of state. Changed provider name and DBA from WildBlue Communications, Inc. to ViaSat, Inc.
Western Telephone Company	DSL	Data Added to Statewide Inventory	4/14/2010	[JAN-12-12 Brian Dudek] Change: Provider upgraded speed capabilities in Springfield and Sanborn to max advertised speed tier download 7, upload 5.
Charter Communications, Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/15/2009	
Mediacom Communications Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/12/2010	
Midcontinent Communications	Backhaul	Backhaul Provider Only Processing Complete	12/9/2009	
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	
TDS Telecommunications Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/27/2010	
Zayo Group, LLC	Backhaul	Backhaul Provider Only Processing Complete		
City of Chaska	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
A Better Wireless, NISP, LLC	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[NOV-09-11 Brian Dudek] Correction: New provider for April 2012 submission that has refused to participate. Connected Nation estimated coverage for this provider.
Nextera Communications	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[DEC-20-11 Brian Dudek] Correction: New provider for April 2012 submission that has either been non-responsive or has refused to participate in past submissions. Connected Nation estimated coverage for this provider.
tothehome.com, LLC	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[MAR-08-12 Brian Dudek] Correction: New provider for April 2012 submission that was unresponsive. Connected Nation estimated coverage for this provider.
Ace Telephone Association	Backhaul	No Update to Provide	8/3/2010	
Albany Mutual Telephone Association	DSL	No Update to Provide	3/4/2010	
Albany Mutual Telephone Association	Fiber	No Update to Provide	3/4/2010	
Alliance Communications Cooperative, Inc.	Backhaul	No Update to Provide	3/2/2012	
Arrowhead Communications Corporation	DSL	No Update to Provide	4/14/2010	
Arvig Communication Systems	DSL	No Update to Provide	2/2/2011	
Arvig Communication Systems	Fixed Wireless	No Update to Provide	2/2/2011	
AT&T Corp, Inc.	Backhaul	No Update to Provide	12/16/2009	
Benton Cooperative Telephone Company	Mobile Wireless	No Update to Provide	6/16/2010	
Benton Cooperative Telephone Company	Cable	No Update to Provide	6/16/2010	
Blue Earth Valley Telephone Company	Cable	No Update to Provide	6/16/2010	
Blue Earth Valley Telephone Company	Fiber	No Update to Provide	6/16/2010	
Bradco-Wisp, Inc.	Fixed Wireless	No Update to Provide		
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Christensen Communications Company	Backhaul	No Update to Provide	2/2/2010	
Christensen Communications Company	DSL	No Update to Provide	2/2/2010	
CitEscape, LLC	Fixed Wireless	No Update to Provide	1/25/2010	
Clara City Telephone Company	DSL	No Update to Provide	2/5/2010	
Clear Choice Communications	Fixed Wireless	No Update to Provide		
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	

Consolidated Telephone Company	DSL	No Update to Provide	3/1/2012	
Consolidated Telephone Company	Fixed Wireless	No Update to Provide	3/1/2012	
Crosslake Telephone Company	Cable	No Update to Provide	6/16/2010	
Crosslake Telephone Company	DSL	No Update to Provide	6/16/2010	
Crosslake Telephone Company	Fiber	No Update to Provide	6/16/2010	
DISH Network Corporation	Satellite	No Update to Provide	1/27/2010	
diversiCOM	DSL	No Update to Provide	4/20/2010	
diversiCOM	Cable	No Update to Provide	4/20/2010	
diversiCOM	Fixed Wireless	No Update to Provide	4/20/2010	
Enterpoint Wireless	Fixed Wireless	No Update to Provide		
Evertek Enterprises, Inc.	Fixed Wireless	No Update to Provide	6/17/2010	
Farmers Mutual Telephone Company	Fiber	No Update to Provide	4/1/2010	
Farmers Mutual Telephone Company	Fixed Wireless	No Update to Provide	4/1/2010	
Federated Telephone Cooperative	Fixed Wireless	No Update to Provide	4/1/2010	[MAR-12-12 Brian Dudek] Correction: Portion of provider's licensed wireless is now a real-world propagation unlike prior submissions.
Fibernet Monticello	Fiber	No Update to Provide		
Frontier Communications of Minnesota, Inc.	Backhaul	No Update to Provide	1/22/2010	
FTTH Communications	Fiber	No Update to Provide		
Gardonville Cooperative Telephone Association	DSL	No Update to Provide	2/23/2010	
Gardonville Cooperative Telephone Association	Fixed Wireless	No Update to Provide	2/23/2010	
Gardonville Cooperative Telephone Association	Fiber	No Update to Provide	2/23/2010	
Genesis Wireless	Fixed Wireless	No Update to Provide		
Halstad Telephone Company	DSL	No Update to Provide	6/16/2010	
Halstad Telephone Company	Fixed Wireless	No Update to Provide	6/16/2010	[MAR-09-12 Brian Dudek] Correction: Portion of provider's licensed wireless is now a real-world propagation unlike prior submissions.
Harmony Telephone Company	Fiber	No Update to Provide	1/12/2010	
Hiawatha Broadband Communications, Inc.	Cable	No Update to Provide	3/8/2010	
HomeTown Solutions LLC	Fiber	No Update to Provide	4/1/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
Hutchinson Telecommunications, Inc.	DSL	No Update to Provide	4/14/2010	
Hutchinson Telecommunications, Inc.	Fixed Wireless	No Update to Provide	4/14/2010	
Interstate Telecommunications Cooperative, Inc.	DSL	No Update to Provide	2/10/2010	
Interstate Telecommunications Cooperative, Inc.	Fiber	No Update to Provide	2/10/2010	
Jaguar Communications	DSL	No Update to Provide	4/12/2010	
Jaguar Communications	Fiber	No Update to Provide	4/12/2010	
Jaguar Communications	Fixed Wireless	No Update to Provide	4/12/2010	
Johnson Telephone Company	DSL	No Update to Provide		
Kasson & Mantorville Telephone Company	DSL	No Update to Provide	6/30/2010	
Knology of the Plains, Inc.	Cable	No Update to Provide	7/13/2011	
Lonsdale Telephone Company, Inc.	DSL	No Update to Provide		
Lonsdale Telephone Company, Inc.	Fiber	No Update to Provide		
Mabel Cooperative Telephone Company	DSL	No Update to Provide	4/7/2010	
Manchester-Hartland Telephone Company	Fiber	No Update to Provide	4/14/2010	
Mediacom Communications Corporation	Cable	No Update to Provide	1/12/2010	
MegaPath Inc.	Backhaul	No Update to Provide	2/15/2010	
Minnesota Valley Telephone Company	DSL	No Update to Provide	4/29/2010	
Minnesota Valley TV Improvement Corporation	Cable	No Update to Provide	4/13/2010	
New Ulm Telecom, Inc.	DSL	No Update to Provide	2/25/2010	
Park Region Mutual Telephone Company	DSL	No Update to Provide	3/18/2010	
Park Region Mutual Telephone Company	Fiber	No Update to Provide	3/18/2010	
Polar Telcom, Inc.	DSL	No Update to Provide	2/11/2010	
River Valley Telephone Coop.	Fixed Wireless	No Update to Provide	4/28/2010	
Rothsay Telephone Company Inc.	DSL	No Update to Provide	2/18/2010	
Runestone Telecom Association	DSL	No Update to Provide	4/14/2010	
Runestone Telecom Association	Fiber	No Update to Provide	4/14/2010	
Sacred Heart Telephone Company	DSL	No Update to Provide	2/5/2010	
Savage Communications Inc.	Backhaul	No Update to Provide	2/19/2010	
Scott Rice Telephone Co.	DSL	No Update to Provide	2/15/2010	
Scott Rice Telephone Co.	Fiber	No Update to Provide	2/15/2010	
Sheehan Gas	Fixed Wireless	No Update to Provide		
Sioux Valley Wireless	Fixed Wireless	No Update to Provide	4/21/2010	
Southern Cablevision, Inc.	Cable	No Update to Provide	3/30/2010	
Spring Grove Cooperative Telephone Co.	Fiber	No Update to Provide	1/12/2010	
Starbuck Telephone Company	DSL	No Update to Provide	2/5/2010	
tw telecom of minnesota, llc	Backhaul	No Update to Provide	4/20/2010	
Upsala Cooperative Telephone Association	DSL	No Update to Provide	2/29/2012	
US Internet of Minnetoka	Fixed Wireless	No Update to Provide	2/29/2012	[MAR-12-12 Brian Dudek] According to provider representative, service area is derived from a real-world wireless propagation and is cut to the allowed service boundary. It is a city funded project and the provider is required to only provide within this service boundary.
VAL-ED Joint Venture, LLP	DSL	No Update to Provide	4/21/2010	
VAL-ED Joint Venture, LLP	Fixed Wireless	No Update to Provide	4/21/2010	
West Central Telephone Association	DSL	No Update to Provide	2/18/2010	

West Central Telephone Association	Fiber	No Update to Provide	2/18/2010	
Wikstrom Telephone Company	DSL	No Update to Provide	4/12/2010	
Wikstrom Telephone Company	Fixed Wireless	No Update to Provide	4/12/2010	
Windstream Communications	Backhaul	No Update to Provide		
Windstream Communications	DSL	No Update to Provide		
Windstream Communications	Fixed Wireless	No Update to Provide		[MAR-12-12 Brian Dudek] Correction: Provider's licensed wireless is now a real-world propagation unlike prior submissions. It has also been clipped to their serviceable exchange boundary.
Winnebago Cooperative Telecom Association	DSL	No Update to Provide	6/17/2010	
Winnebago Cooperative Telecom Association	Fiber	No Update to Provide	6/17/2010	
Winnebago Cooperative Telecom Association	Fixed Wireless	No Update to Provide	6/17/2010	
Winnebago Cooperative Telecom Association	Backhaul	No Update to Provide	6/17/2010	
Wolverton Telephone Company	DSL	No Update to Provide	6/22/2010	
Woodstock Telephone Company	DSL	No Update to Provide	2/18/2010	
Woodstock Telephone Company	Fiber	No Update to Provide	2/18/2010	
Zumbrota Telephone Company	DSL	No Update to Provide	2/5/2010	
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
KeyOn Communications, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Verizon Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
XO Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	2/12/2010	
Knology of the Plains, Inc.	Backhaul	Solicited Initial Data	7/13/2011	
Nextera Communications	DSL	Solicited Initial Data		
Alliance Communications Cooperative, Inc.	DSL	Other	3/2/2012	[JAN-17-12 Brian Dudek] Provider indicated DSL is now inactive. All prior coverage was converted to fiber.
Arvig Communication Systems	Cable	Other	2/2/2011	[NOV-08-11 Brian Dudek] Cable properties are reported under Arvig Communications, subsidiary company Home Telephone, dba Southern Cablevision.
Emily Cooperative Telephone Company	DSL	Other	6/24/2010	[FEB-22-12 Brian Dudek] Provider indicated DSL is now inactive.
Windstream Communications	DSL	Other		[FEB-08-12 Brian Dudek] Company representative notified us that they do not have the ability at this time to provide data for the acquired company.
Access Broadband	Fixed Wireless	Non-Responsive to Multiple Attempts		[FEB-28-12 John Determan] After soliciting data in accordance with the NOFA and clarification, provider has not provided data within the deadline and has become non-responsive.

Submitted to:

National Telecommunications and Information Administration

Data Collection and Processing

Missouri
Broadband Data and Development

Submitted by:

GeoDecisions®
A Division of Gannett Fleming

MISSOURI

April 1, 2012

Table of Contents

1 Introduction

This document provides background for the data collection and processing phases of the Missouri Broadband Data and Development Project. It covers the initial processing of data to meet specific requirements defined by the National Telecommunications and Information Administration (NTIA), governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, at page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, at page 40569 of the Federal Register. It also covers the quality control aspects of the project, including back lab, field, and independent verification.

2 Non-Disclosure Agreement Development Process

The State Parties to the Non-Disclosure Agreement (NDA) process include the State of Missouri, the University of Missouri, GeoDecisions, and CBG Communications. Each party, along with the individual broadband service provider, is a signatory of each NDA.

A standard NDA was developed using an initial template provided by CBG, existing templates from providers, and was subsequently edited with inputs from all state parties. This NDA was then vetted with representatives from the Missouri broadband provider community in order to develop a data sharing document that reflected the concerns of both the state and industry.

The state drafted, signed, and distributed an initial letter to providers; including data collection guidelines and a draft of the standard NDA (see Attachment A). This letter was initially sent to 129 providers initially in late March 2010. Most partners to the NDA signed this initial NDA as provided. Some providers have asked for some changes to this NDA which then require legal review by all 5 parties to the agreement. These negotiations have taken some time to complete for individual providers.

We have also found that having a signed NDA does not ensure the State that data will be forthcoming as we have at least five providers with signed NDAs that we have not received data for. These are still being pursued.

3 Identifying Providers

The state parties used multiple methodologies to: a) identify broadband providers potentially offering service in the State of Missouri, and b) to acquire contact information for each of the providers.

Identification of providers began by accessing the FCC's Form 477 publically available data.
This data provides the Holding Company Name, the FCC Registration number (FRN), and the filing company name of all broadband providers in the state that completed the Form 477. We began with this information and performed research tasks, including internet research of each of the companies to obtain a high-level contact within the company, as well as their phone and e-mail contact information. If some of this information was not obtainable via Internet research, CBG made initial contact with the company, primarily through phone, to further explore the most pertinent contact.

In addition, we performed research of various websites to determine if there are providers that had not filed a Form 477 with the FCC that should be included in the data collection process. We researched these companies again for the best contact information through various public records including, but not limited to, Missouri Public Service Commission databases, State Telecommunications Industry Association memberships, FCC Cable TV Community Unit and Physical System ID databases, FCC telephone company databases, business licenses, state and local tax records, etc., as well as various state, local and other departments and agencies, including Division of Corporations, Division of Revenue, Local Franchise Authorities, Chambers of Commerce, etc.

We also continue to identify additional potential providers during our field verification processes. This list of potential providers is comprised of business names advertised (signage/trucks etc.), labeled infrastructure observed, or are mentioned by Missouri citizens through an interview.

As new providers are identified, the contact information is given to MU for delivery of initial contact letters to identified providers. These documents are mailed out by MU via e-mail, in order to expedite the process, and through the USPS as a formal notification. Based on input from providers in other states, these documents were sent by the State in order to show the importance that the State places on the project. All correspondence with the providers, including clarification of the NDA or Data Request, data formatting issues, and data submission by the providers, was then handled by GeoDecisions and CBG personnel unless the provider required interaction with state personnel (ie. negotiation of NDA).

Due to the initial timeframe for completion (May 31, 2010) for Missouri's first version of the statewide map of broadband provision, the providers were requested to return the signed NDAs within five (5) business days of receipt and submit their data, in as usable a format as possible, by April 15, 2010.

The state parties performed follow-up with the providers on an as-needed basis. This included making contact with a provider if we did not hear from them after sending out the NDA and Data Request, following up to receive initial data sets, clarification regarding data sets, etc. Contact with the providers included phone calls, voicemail, and e-mail. In the case where a provider did not respond after numerous attempts, we also followed up with USPS mail as well as through their affiliated associations.

A spreadsheet was utilized to keep track of all contact information that was developed and contacts that were made to ensure the accuracy of each provider's pertinent contacts for the statewide project. These have been maintained as contacts and personnel change within the provider's industry.

4 Requested Data Format

The overarching goal of the data collection was to satisfy the requirements of the State Broadband Data and Development (SBDD) grant program, which is governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, at page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, at page 40569 of the Federal Register. Both the NOFA and subsequent discussions with the NTIA have indicated that time is of the essence, and strict deadlines are in place for the delivery of data to the NTIA. As such, timely, accurate data collection was of primary concern. GeoDecisions requested that broadband providers submit data in a timely manner in whatever format the information was currently available to eliminate the lag that can be expected with the providers attempting to meet NOFA formatting compliance themselves; however, it was determined that many national providers, having gone through this process in other states, could deliver NOFA compliant data as part of their data submittal.

To assist in the NDA execution process and to further facilitate the timely delivery of data from the providers, GeoDecisions and CBG reviewed the State's NOFA cover letter. The cover letter provided background on the project and the contacts to project team members from the State, GeoDecisions, and CBG. The cover letter stressed the incredibly short initial project timeline and specified the requirement to collect this data on an ongoing basis – every 6 months.

In addition to the cover letter, GeoDecisions and CBG developed a separate attachment to the NDAs. This *Data Collection Guidelines* was reviewed by the State and provided further background and project goals associated with Missouri's State Broadband Data and Development project. The document also specified the guidelines to which the project would abide. The *Data Collection Guidelines* informed providers of the intended use of the data that they would be submitting. The intended uses included delivery of NOFA-compliant data to the NTIA, data dictionary, the intention of generating static maps, as well as the creation of a Missouri-specific interactive broadband mapping website. Finally, the *Data Collection Guidelines* specified the NOFA data and format standards that were required of the State for delivery to the NTIA.

GeoDecisions also developed a provider data request spreadsheet template document that was distributed upon request and allowed the providers to enter NOFA compliant data as they chose to do so. It included mock-up sample data as reference for their own data entry. GeoDecisions, under the guidance of the State, also developed a preliminary Missouri-centric web site that displayed census blocks, census tracts, counties, and major roads in order to assist providers in correlating their service areas to census blocks. Providers could access this site and zoom, pan and print census block maps as needed.

Spatial data was requested from the providers in the following hierarchy of data format preferences.

1) Shapefiles or Geodatabase (personal or file)
2) CAD files with embedded attributes included
3) Text-based data (MS Access, spreadsheets, comma-delimited files, etc.)
4) Paper maps
5) Any method in which the provider could readily submit the required data

5 Data Processing

Because of the variety of ways providers could submit their data, one of the major challenges of this project was to consolidate and then integrate this data into a common model. For each provider, the work was divided into three main steps:

1. Capture the supplied data into a provider-specific staging geodatabase

2. Process and QA features in the provider's staging geodatabase
3. Move the data from the provider's staging geodatabase into the final deliverable geodatabase model.
4. Final QA of all features and associated attribute data.

The first step was the most involved and time consuming. Regardless of the type of data provided, the base-level data (the 2010 census blocks, the 2010 TIGER street segments, and the county boundaries), all came from a single source, so are therefore consistent across all providers. A number of different processes were developed for loading the staging geodatabase, depending on the type and form of data supplied. Each process was extensively documented through a process checklist to ensure accuracy and consistency. A description of these different processes used to load data into the provider specific staging geodatabase follows:

Availability Area
If a provider supplied their availability area as a single boundary or multiple boundaries drawn on a paper map or image file, those area(s) were geo-referenced and digitized into a shape file. If the boundary was provided as a CAD drawing or arose from another GIS system, it was also converted to a shape file format. Some wireless providers defined their area of availability as their wireless coverage area. This may be a supplied boundary, but it may also have been defined using the location of the wireless tower, the angle of coverage, and the coverage distance. This would result in a sector of a circle, which was then used as the availability area.

Once a shape file of the boundary was created, interpreted, and available, all census blocks intersecting that boundary were collected. Those census blocks less than two square miles were assembled into one feature class. For census blocks greater than two square miles, all street segments that overlapped both the census blocks and the availability area were collected into another feature class. Along with the availability area, the providers were also to supply the technology of transmission and speed information. These attributes were assigned to either the census blocks or street segments. Additional provider information including Name, DBA, and FRN, were also added as attributes.

Census Blocks
Some providers submitted a list of census blocks for their area of availability, along with technology of transmission and speed information specified for each census block. In these cases, the census block polygon was selected for each listed census block. If the census block's area was less than two square miles, it was added to the census block feature class and the technology of transmission and speed information were assigned from the provided list. If the census block's area was greater than two square miles, all street segments that overlapped it were added to the street segment feature class and the technology of transmission and speed information were assigned from the associated census block on the list.

The 2010 census block dataset was used for our data processing however a few providers submitted data using 2000 or 2009 vintage census blocks. When a provider submitted in a vintage other than 2010, the 2010 census blocks for the corresponding availability area were coded for that provider. Thus the true coverage of the census blocks were maintained and consistent with the provider's list but represented in the 2010 block structure.

Address Information
If a list of addresses was provided as the availability area, the first step was to obtain the coordinates of these addresses. When geocoded successfully, this resulted in a point for each address located. The census blocks intersecting all the points were collected. If the block's area was greater than two square miles it was treated separately. If a census block contained address locations with different technologies of transmission, the census block was duplicated, and a distinct technology of transmission assigned to each duplicated census block. For different locations in a census block with the same technology of transmission, the maximum value for each speed was obtained and that maximum assigned to the census block.

If the geocoded point lay within a census block with an area greater than two square miles, the nearest street segment was located and the technology of transmission and speed assigned to that segment. As with census blocks, if there were several locations with different technologies of transmission along the same street segment, the street segment was duplicated and each segment assigned a different technology of transmission. The speed assigned to that segment was the maximum speed for all locations along the segment sharing that segment's technology of transmission.

Wireless Boundary
In most cases, wireless providers supplied a boundary, either in electronic format or as a paper map. These were converted to a shape file either by digitizing or by performing a data conversion as appropriate. Some providers supplied tower locations, the angle of coverage, and the distance. In these cases the wireless boundary was constructed from this. Finally, some providers defined their wireless boundary using an exchange boundary or as an aggregate of their customers. Although these boundaries may not accurately represent the wireless availability area, they were initially included in the dataset in order for the providers to submit feedback and more accurately specify boundaries of availability in future iterations.

Middle Mile Points
If middle mile points were supplied on a hardcopy or image file map, the point was digitized. Usually these points were provided with latitude and longitude, so it was a simple matter to add them to the feature class. The elevation data was not always supplied due to the provider not having this information available, but when it was, it was often given as feet above sea level. The model requires elevation to be feet above (or below) grade. In these cases, a digital terrain model was used to obtain the ground elevation at the middle mile structure location, which was subtracted from the height above sea level to obtain the height above grade.

The above processes were used to capture the provider-supplied data into provider-specific individual staging geodatabases using the common National States Geographic information Council (NSGIC) data model suggested for use by the NTIA. Once this was completed, the data could be updated or modified and Quality Checked (QC) using the same processes regardless of how it was originally submitted.

One such process was the creation of overview areas. The census blocks and street segments for a provider were collected and grouped by technology of transmission. County boundaries that overlapped each of these groups were then collected. The technology of transmission of all census blocks and street segments for the group was then assigned to the county. *The assignment of maximum speed within the group to the county has been discontinued per NTIA's request.*

At this point the dataset for a particular provider was complete. An extensive QC checklist was used to examine the dataset, verify consistency, and ensure that it matched the data submitted by the provider. Once the dataset was passed the quality check, the features were appended into final database model along with all data from other completed providers. Both the *Validate Topology* and *Validate Features* ESRI tools were run, any corrections necessary were made, and the Tools were re-run until they processed without error. As individual provider data sets were appended into the master database and again when all data sets were appended, the NTIA supplied 'SBDD Check Submission' tool was also run against the data. Any errors detected were corrected and the tool re-run. A final manual QC review was performed to ensure that all the provider data is present and consistent. This was then followed by a final run of the SBDD Check Submission tool against the master data model to determine if any further corrections / changes were necessary.

Public Data Sources

The University of Missouri (UM) was in charge of the process to obtain and compile cable strand maps, as well as maps of service / coverage areas obtained from the service provider's public offices directly or from their Web sites and advertising materials. This was particularly true in cases where no other authoritative source was available for the given provider. Websites were collected and inventoried through the use of a 'surveymonkey' instrument to standardize and assemble the database from the webcrawling activities. All files and maps found through the webcrawling were then either imported, scanned, or screen-captured to create a digital representation or image of the associated service area. These files were then georeferenced to a common Missouri base map. The spatial transformation methodology used was determined by the image type, confidence in a real representation, and scale of source materials. In addition, maps of telephone company exchange areas and cable franchise areas from their respective associations were digitized and attributed to provide additional points of reference as well. These files were then held as elements of independent validation for the GeoDecision/CBG files created from Provider sources.

Community Anchor Institutions

The University of Missouri (UM) was lead on the development of the Community Anchor Institution database. Many elements of the Community Anchor Points were initially compiled by the UM in coordination with the Department of Public Safety (SEMA and OHS) providing a starting point for this data collection. The list of Anchor Institutions inventoried and monitored in this project include: Police, Fire, Hospitals, EOC, PSAPs, Municipal Courthouses, Libraries, K-12, Higher Education, Extension Offices, Correctional Facilities, Government Buildings, Community Centers, County Courthouses, and Armories.

The community anchor attribute information was gathered by the University through phone calling and site visits by UM students and staff. These efforts were coordinated with respective state agencies / associations with jurisdiction over these sites. For example, the State Fire Marshall's Office sent out a memo under their letterhead informing their constituency of the inventory and assessment so that the student callers and those conducting site visits would be received positively. UM also used their ongoing local data review, validation, and verification processes in partnership with Regional Planning Councils, Regional Homeland Security Oversight Committees, and associated local governments to assemble and verify data for some counties within Missouri. This process of data development had already been deployed in some areas of Missouri in association with the development and review of public safety structure-based information and has proven to work well.

6 Data Accuracy – Back Lab Verification Methods

Throughout the project, GeoDecisions and CBG performed numerous verification tasks to determine the level of accuracy of the information gathered from the broadband providers in the State. The initial verification methods were called back lab verification tasks by the NTIA. Unlike the field verification processes (described below), these tasks were performed in a lab or office setting. Each of the following GeoDecisions/CBG back lab processes was utilized to validate the data collected from some or all of the providers:

After the data from a given provider was captured into the geodatabase, the mapped data was then compared against information gleaned from various sources. The FCC had documentation that was used such as the Form 320 (Basic Signal Leakage Performance Report), which is filled out by cable television providers on an annual basis, and Cable TV Community Unit and Physical System databases. These information databases provided high-level information of geographic areas served by cable TV and other broadband providers. This information alerted our team to areas not included in gathered data from a broadband provider.

Additional sources of information utilized during the back lab verification process included franchise and exchange boundaries, cable strand maps, media prints, as well as business and taxation licenses. These sources varied in value to the project, depending on the level of information gathered and maintained by local franchising authorities and state agencies such as the PSC. Telecommunications associations were also queried for information regarding providers and system boundaries or areas of the state where specific providers offer service.

The above processes primarily relate to wireline broadband providers. For wireless broadband providers, we compared information gathered from the providers against FCC and FAA tower databases and private tower databases, as needed.

Independent Validation and Assessment: The UM also performed similar verification tasks as listed above to determine the level of accuracy and confidence in the information delivered by GeoDecisions/CBG as assembled from the broadband providers in the State. Again, these verification methods were called back lab verification tasks by the NTIA as these tasks were performed in a lab or office setting.

In addition to the above, the UM back lab processes took the assembled public sourced data for all providers (where this type of information could be found) and intersected it with the supplied GeoDecisions / CBG provider service areas. As well, Ookla site data, survey data, and presence/absence data assembled were also used to assess these data. From these data, additional analyses were performed to create measures of agreement, confidence indexes, spatial confidence indexes, and to visualize patterns of service and gaps in service.

These gaps and patterns of service are currently being examined to determine common threads for the State of Missouri across socio-economic, demographic, density of CAI, and other measurable elements of this mapping. We hope to use these data to inform the Regional Technology Planning Teams of opportunities and impediments.

The results of the independent assessment and validation were then combined with findings from GeoDecisions/CBG to form a report that then was delivered back to the provider to initiate the 'provider feedback' element (see Section 19 of this report) of the assessment and to validate/verify the assessments of these data and their extents by both UM and GeoDecisions/CBG with the respective provider.

7 Development/Implementation of a field verification guide and checklist

Prior to beginning field verification activities, CBG Communications, Inc. (CBG) developed a field verification guide for use by each member of the field verification team. The guide included systematic instructions and a checklist related to verification of each broadband system and service type. The guide and checklist were drafted, reviewed and finalized prior to the beginning of field verification activities.

As we continue to move forward with each submission, our field verification efforts continue to advance. Provider data is used to determine higher success areas having overlapping or common areas as well as including providers not able to be thoroughly verified from prior rounds. Those areas are the initial focus, medium priority areas are determined using similar stepped-down criteria. Lower priority areas are for providers thoroughly verified in past rounds but current data is needed. This also includes locations in between the higher and medium priority areas. Provider data is loaded on laptops or Garmin units for use by field verification personnel.

8 Field verification team training

To ensure uniformity of the team's approach to field verification, field team training was held immediately prior to the beginning of field verification activities. Training was conducted for GeoDecisions, CBG, and University students and staff. The training covered all field verification activities, including:

- Use of the guide, instructions and checklist
- Understanding of each system and service types
- Understanding of coverage characteristics
- Understanding of service attributes, including system technology type, upstream and downstream connection speeds, and other attributes required (by the NTIA) to be documented and verified
- Use of the equipment needed for field verification activities
- Proper documentation of field verification activities

The office tutorial lasted ½ day. An additional field-based ½ day session was utilized for actual demonstration of field verification activities.

9 Team Assignments

Two person teams were utilized the next 2 days after office and field training in order to work together and become more comfortable with the process. Eventually, field verification team members were expected to perform field verification activities on their own, with the exception of University student teams, who continued to participate in pairs of two for safety and security reasons. The State was divided into five (5) large areas encompassing Northwest, Northeast, Southwest, Southeast and Central Missouri. The contractor assembled ten (10) team members, and assigned two for each area. Initially the UM team assembled eight (8) team members to form four (4) teams, and assigned them to certain counties and particular census blocks within those counties. In subsequent iterations the UM team assembled 6 team members to form two (2) 2-3 person teams that reviewed targeted areas within counties and larger census blocks. As well, these teams conducted the surveys and interaction at the Missouri State Fair and other regional fairs as discussed in Section 13 of this report.

Each team member was provided an official-looking ID card and a letter of certification on Missouri State letterhead in order to mitigate findings early-on that residents were suspicious of individuals asking unsolicited questions. These two items proved very effective in minimizing these concerns.

10 Verifying Coverage

Broadband system coverage was verified by sampling whether services were available at various locations shown on the providers' system coverage maps randomly chosen from all of the census blocks that are at the ends of the providers' systems. The random sample was developed separately by the UM and contractor teams.

The contractor team initially verified availability by looking for a mixture of large and small providers across the state, being sure to hit each of the 19 Regions which would form the basis for the Regional Technology Planning Teams involved in the state broadband planning process. Efforts were made to locate and verify all providers that had submitted data. Verifying the large providers, especially, in each of these regions was a priority. Each contractor team member collected field gathered data in an MS Access database. The data included: Lat/Lon of verification point, provider name, technology type, speed test results if available, customer comments and notes from team member. All data was compiled and used to not only validate provider submitted data as mapped, but for providing feedback to the providers.

As a cross check, the UM team sampled a selection of counties, looking for more detailed coverage in a subset of the state's counties.

As we continue to move forward with each submission, our field verification efforts, as with all other aspects of the project, continue to advance. Providers are now categorized from prior verification rounds as unverified, high, medium or low priority. Unverified are new providers or one not able to be verified in previous attempts. High are providers with minimal verification in previous attempts. Medium are providers fairly thoroughly verified in previous verification and low are providers heavily verified in prior verification. Provider data is also used to determine highest provider concentration areas having overlapping or common areas. Those areas are the initial focus for unverified and high priority providers. Medium and lower priority providers and areas are secondary and my include locations between the unverified and high priority areas. Provider data is loaded on laptops or Garmin units for use by field verification personnel.

11 Ookla Speed Test Web Site

As part of the field verification process, State residents and businesses interviewed or visited were given a card briefly explaining the project and directed them to the State's designed speed test website. These cards were broadly distributed at the State Fair and other regional fairs as well. This has led to more responses on the Speed Test. This project specific Ookla speed test web site was set up to collect information on providers, users, as well as the upstream and downstream speeds associated with their broadband connection.

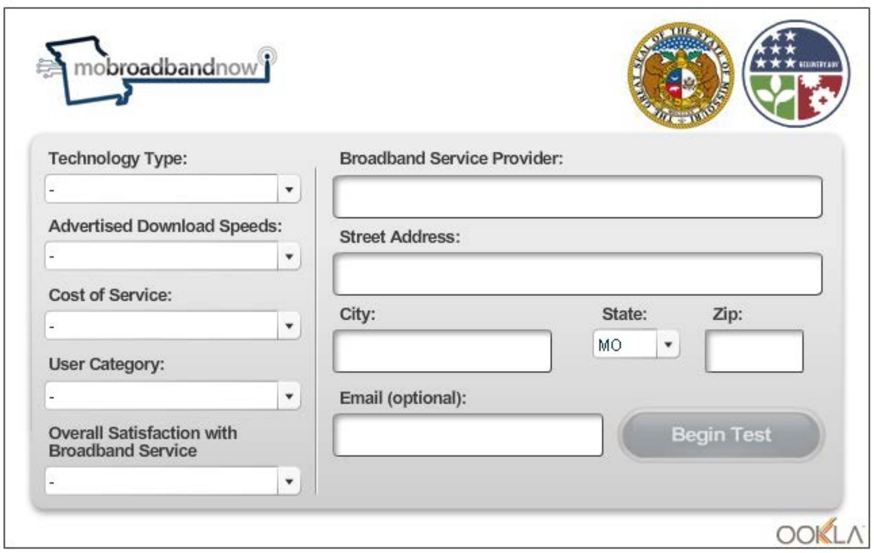


Figure 1: Depiction of Ookla Speed Test Site

12 Equipment Utilized for Field Verification Activities

Each team member carried the following equipment in order to perform field verification activities for the various types of services:

a. Laptop with Wi-Fi capability and provider GIS data installed
b. Cellular 3G/4G and WiMAX aircards (independent card for each provider) for use with laptop
c. Binoculars

d. GPS for verifying and documenting exact locations
e. Hardcopy forms and electronic database for documenting verification data
f. Cell phone with 3G or 4G used in lieu of laptop for certain types of wireless broadband services
g. Digital recorder for aural field notes, as needed
h. Identification documents (business cards, State or other ID badges, letter from the State acknowledging that the team member is part of the verification team, for those with questions)
i. Car chargers and/or DC to AC Inverters for equipment chargers
j. Census block maps (boundary details shown) and other maps as needed
k. Garmin GPS unit.
l. Postcards advertising the Ookla web site for distribution, as shown below

Figure 2: Postcards Distributed to Residents

13 Other Verification Methods

In addition to utilizing the above mentioned equipment and the methodologies listed below for verifying coverage and characteristics, team members entered into discussions with residents in the various areas. Residents were asked questions such as: Do they currently have broadband service?, Who their provider is?, If they know what speeds they could achieve, and if they knew of other provider's services being available in the area. This information needed to be confirmed by multiple residents before being considered accurate. Residents often did not know what their service level was nor what their speed of service was. Questions such as how much were they paying for the service led to a better understanding of their service level. Residents were encouraged to visit the Ookla speed test site to assist in gathering actual speed data. To date, nearly 7500 results have been received.

Missouri State Fair: In order to collect a large amount of information from Missouri residents for verification, the Broadband Mapping Team (BB Team) visited the Missouri State Fair in Sedalia, Missouri. The 2010 Missouri State Fair had an estimated attendance of over 330,000 people. With such a high attendance, it was determined that this event would be useful for data collection. For the 2011 Missouri State Fair, attendance exceeded that of the previous year, estimated at 330,000 to 350,000 attendees. The BB Team had two locations at the fair. The first was in the Mizzou Central Building in the MO-AG Theater organized by the College of Agriculture, Food and Natural Resources. This was the main location for the BB Team, where an informational slide show continuously played and signage was displayed throughout the booth area. At this location, Missouri residents were asked to fill out a survey regarding their internet service. A total of 699 surveys were completed at the 2011 Missouri State Fair, an increase of 117 surveys from the previous year, and were later geocoded to be used as verification and validation for UMs independent assessments.

The second BB Team location was on the lawn outside of the MO-AG Theater, where a Mizzou Tent was assembled daily and tables were set displaying a large Missouri map divided into four quadrants. Each of the four quadrants represented different regions of Missouri, northwest, northeast, southwest and southeast. At this station, Missouri residents were able to physically place a colored pin on their home location. The color of the pins was used to differentiate whether or not broadband was available. A total of 320 pins were placed by Missouri residents, denoting presence or absence of broadband. The 2010 Missouri State Fair pin total was 880, a difference of 560 pins down from the previous year due to severe weather that occurred two out of the four days the team was present at the fair.

In addition to the 2011 Missouri State Fair, the BB Team also visited three regional fairs and an extra state fair, the Boone County Regional Fair, Phelps County Regional Fair, the Shelby County Regional Fair and the Southeast Missouri District Fair in the city of Cape Girardeau. The three regional fairs, all located near the University, were chosen specifically to increase the amount of broadband data for the Mid-Missouri region. The Southeast Missouri District Fair was selected because the 2010 Missouri State Fair results displayed little or no data in the southeast Missouri region. In total, 1053 surveys were completed and approximately 390 pins were placed during this verification phase.

At all of the fairs, the broadband speed test cards for the Missouri Ookla site were handed out to residents after filling out a survey or placing a pin on one of the four maps. The BB Team also distributed drinking cups, refrigerator magnets, and pens with the State Broadband speedtest site on them.

In terms of verifying provider coverage, the state and regional fairs have provided valuable data that could not have been otherwise obtained. The color-coded push pin maps have been converted to point-based shape files. Combined with additional information collected from the fair attendees while interacting with the push pin maps, the resulting shape file has provided a statewide, grassroots survey of internet service provider, type of internet service (broadband, dial-up, etc.), technology of transmission, subscribed speed, and customer satisfaction. This data has been used in the verification process as a visual comparison to census block provider footprints. The results, so far, have been very positive and the fair points have displayed a high spatial correlation with the census blocks. More data collection will be required before this verification method can be formalized, but the results are very promising.

14 Verifying Wireline Broadband Coverage Characteristics

Using the specified random sampling technique, field team members searched for the physical endpoints of cable systems, telephone/DSL and fiber optic infrastructure and noted when additional infrastructure was not seen moving outward from the core either in an aerial (overhead) or underground manner. These areas were targeted for discussions with residents and to perform speed tests. Observations and findings were documented accordingly.

15 Wireless Broadband Coverage

Verification team members reviewed the provider's information and looked for network availability near the antenna site or in the middle of the provider's service area to confirm network and test equipment compatibility. Using the specified random sampling technique, the team member tested with pertinent gear to determine when service could and couldn't be achieved by the laptop, cell phone, or other wireless broadband-enabled device. These locations were documented accordingly.

16 Upstream and Downstream Connection Speeds for Wireline Providers

The field verification team member:

a. *For cable modem* – Upstream and downstream connection speeds were verified using the Ookla speed test at locations within the providers' coverage area using the specified random sampling technique. An already installed cable modem connection was utilized, as available. These included both preselected points with arrangements made for testing (such as at local libraries or at public facilities utilizing cable modem service) and at randomly chosen business and homeowner locations where the business or homeowner consented to test the service. Findings were documented accordingly on electronic or paper forms. In addition, the speed test was documented via the Ookla site.

b. *For DSL connection speed testing* –The same procedures were used as for cable modem testing. Findings were documented accordingly on paper or electronic forms.

c. *For fiber optic connection speeds* – For services to homes and small businesses the same procedures were used as above for cable modem and DSL. For higher speed services to larger businesses, institutional network connections, enterprise/wide area network connections, etc., the team member worked with the business or institutions' IT group to perform connection speed testing. If actual testing could not be performed, team members attempted to gain existing end user documentation tests and performance documentation related to speeds of the network. Findings were documented accordingly on paper or electronic reports.

17 Wireless Broadband Service Connection Speed Testing

For cellular broadband 3G and 4G testing – A provider specific air card was needed in order to enable the laptop to access the Ookla speed test to determine the speed of connection. Some service providers provided air cards to conduct this testing. All teams also used both personal and corporate cards to assist in the testing. The speed of connection was tested at randomly selected points beginning close to the providers' tower/antenna infrastructure, at a mid-point and then at the ends of the verified coverage area. Findings were documented accordingly on paper or electronic reports. Documentation was uploaded daily by the team members to ensure timely and uniform oversight and modifications of the processes.

The MU BB team also conducted a more detailed test of fixed mobile wireless coverage areas throughout Boone County using high-speed wireless broadband air cards. For wireless broadband testing purposes, the top five providers, AT&T, US Cellular, T-Mobile, Sprint/Virgin Mobile and Verizon were tested to understand how mobile broadband varies in different locations by collecting information such as: signal strength, speed, as well as the latitude and longitude coordinates of where the test was performed.

To gather upload and download speed information for each air card, the team members used the MOBroadbandNow Speed Test website on Ookla. During the speed testing it was not uncommon that the speeds varied at a specific point for each air card, therefore the air card was tested a total of three times for analysis and comparison. The signal strength was determined by how many "bars" were displayed for each provider. The bars would vary depending on if the team was in a mobile coverage area or not. The latitude and longitude coordinates were recorded using a GPS unit. The speed, signal strength, and coordinates were tested and recorded in ½ mile increments along selected urban and/or rural routes throughout Boone County.

Additional air card testing and verification was completed over this past May-July in various counties such as: Howard, Callaway, Cooper, Moniteau, Cole, Morgan, Miller and Camden using specific provider footprints. For this testing method, random locations were chosen within the provider footprint and air cards were tested to see how each provider varied in strength and signal.

18 Coordination of Contractor and State Parties' Field Verification

The state and contractor utilized the process in the diagrams below to coordinate field verification activities:

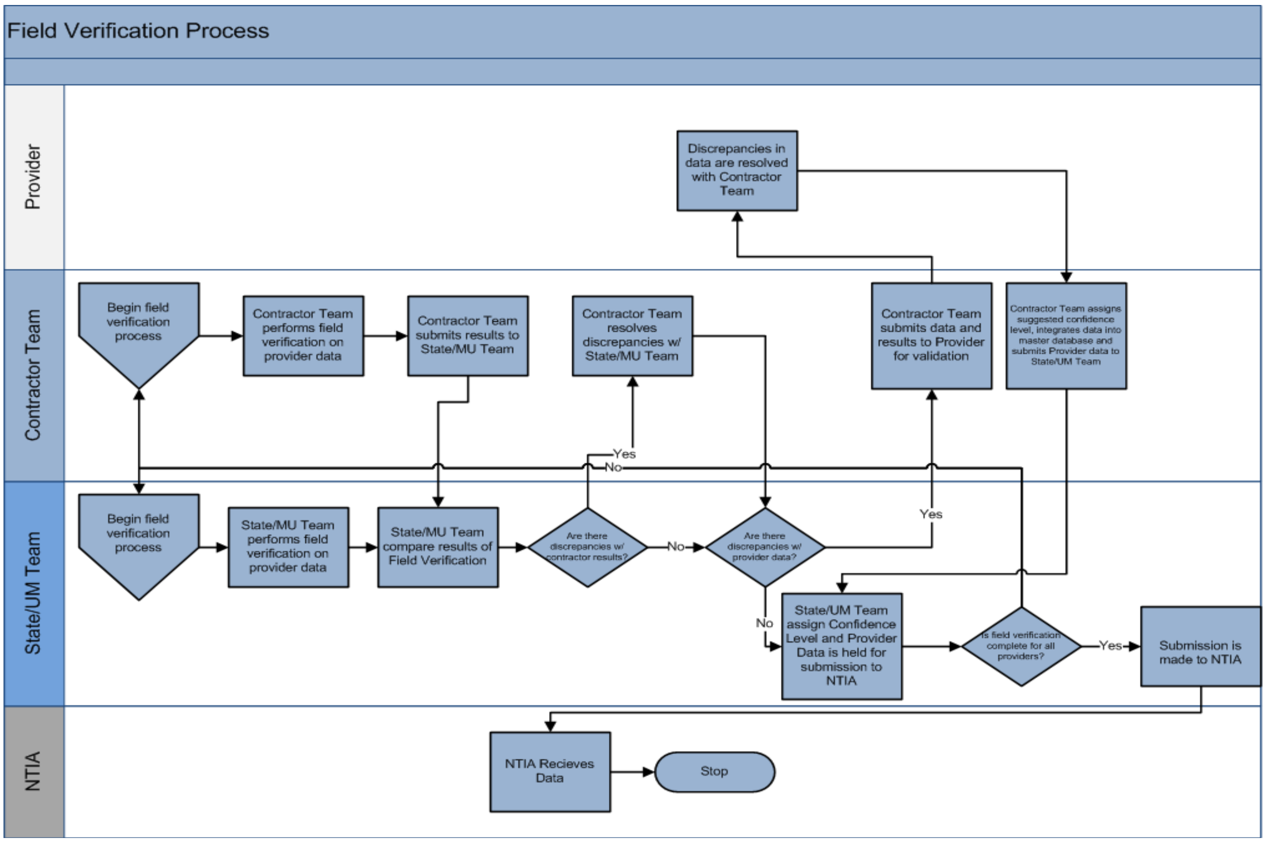


Figure 3: Field Verification Coordination Process

19 Provider Feedback Reporting

Upon completion of the provider submitted data, feedback information was supplied to each of the 91 providers that had submitted data. This feedback was presented in the following forms:

1. A detailed Data Review Report in MS Word format,
2. All provider attribute data exported into MS Excel format, and
3. Multiple Overview, Wired and Wireless GIS exported image files in pdf format.

This information would allow each provider to review our validation findings, as well as check their submitted data as depicted in the GIS data model, both in a graphical and tabular form.

The Data Review Report detailed the usability and completeness of their submitted data as well as an estimate of our confidence in their submitted data based on field verification efforts and back lab verification steps as detailed above. The report also requested feedback on the accuracy of how we characterized their availability areas, technologies, speeds etc. Based on the provider's feedback, the data was adjusted and refined accordingly.

Field verification and back lab verification processes and procedures were utilized, as available and as needed, to ensure the highest level of confidence that the information gleaned from the providers was as accurate as possible. During this process, GeoDecisions contacted providers when we found instances that appeared to conflict with the information they initially provided and worked with the providers to adjust the maps accordingly.

20 Statistics

File Type	Number of Records
Total Records in all Files	**700,342**
Census Block < 2 sq. miles	490,736
Address-Level	Not Required
Street Segment	201,246
Wireless Shape File	63
BB Service Overview	559
Community Anchor Institution	6,913
Middle Mile	824
State Boundary	1
Metadata Provided for Geospatial Data	YES
Number of ISP's Provided in Submission	101

Providers Completed	101
Pending Additional Data	15
Non-Responsive/Refused	22
Researching	56
Non-Facilities Based	84
Out of Business	8
TOTAL	286

Provider Name	Status	FRN	NDA Execution Date	Notes/Comments
Adams Networks	Data Included in Missouri State Submission	0011616356	5/18/2010	No updates submitted in fifth data call response.
Alma Communications Company	Data Included in Missouri State Submission	0007196207	5/18/2010	No updates submitted in fifth data call response.
Alsat Wireless	Data Included in Missouri State Submission	0021067509	8/3/11	Fifth data call updates included.
Holway Telephone Company	Data Included in Missouri State Submission	0004746863	4/5/2010	No updates submitted in fifth data call response.
KLM Telephone Company	Data Included in Missouri State Submission	0003772274	4/5/2010	No updates submitted in fifth data call response.
N. W. Communications	Data Included in Missouri State Submission	0003772290	4/5/2010	No updates submitted in fifth data call response.
American Fiber Systems, Inc. – Zayo Group	Data Included in Missouri State Submission	0006651202	4/27/2010	No updates submitted in fifth data call response.
AT&T Corp.	Data Included in Missouri State Submission	0004496774	4/7/2010	Fifth data call updates included.
AT&T Mobility, LLC.	Data Included in Missouri State Submission	0004979233	4/7/2010	Fifth data call updates included.
AT&T Southwest	Data Included in Missouri State Submission	0016657918	4/7/2010	Fifth data call updates included.
Bay's Internet	Data Included in Missouri State Submission	0018912576	Not Req'd by Provider	No response to fifth data call.
Big River Telephone, LLC	Data Included in Missouri State Submission	0018520320	Not Req'd by Provider	No updates submitted in fifth data call response.
BlueBird Network, LLC.	Data Included in Missouri State Submission	0018995944	Not Req'd by Provider	No updates submitted in fifth data call response.
Boycom Cablevision, Inc.	Data Included in Missouri State Submission	0007630791	Not Req'd by Provider	No updates submitted in fifth data call response.
Boycom Cablevision, Inc. – Partel Broadband Telecom Inc.	Data Included in Missouri State Submission	0020795449	Not Req'd by Provider	No updates submitted in fifth data call response.
Cable One, Inc.	Data Included in Missouri State Submission	0003474327	4/5/2010	Fifth data call updates included.
Cable America Missouri, LLC	Data Included in Missouri State Submission	0015466766	6/10/2010	Fifth data call updates included.
Carthage Water & Electric	Data Included in Missouri State Submission	0007147143	Not Req'd by Provider	No updates submitted in fifth data call response.
Suddenlink Communications – Cebridge	Data Included in Missouri State Submission	0014367650	6/12/2010	Fifth data call updates included.
Suddenlink Communications – Friendship Cable	Data Included in Missouri State Submission	0004999025	6/12/2010	Fifth data call updates included.
Suddenlink Communications – Cequel III Communications II	Data Included in Missouri State Submission	0009725870	6/12/2010	No updates submitted in fifth data call response.
CenturyLink	Data Included in Missouri State Submission	0018626853	4/20/2010	Fifth data call updates included.
Chariton Valley Telephone Corporation	Data Included in Missouri State Submission	0002549392	5/26/2010	No updates submitted in fifth data call response.
Chariton Valley Telecom Corporation	Data Included in Missouri State Submission	0008437147	5/26/2010	No updates submitted in fifth data call response.
Charter Communications	Data Included in Missouri State Submission	0017179383	6/10/2010	Fifth data call updates included.
Citizens Telephone Company of Higginsville Missouri	Data Included in Missouri State Submission	0002504298	4/5/2010	No updates submitted in fifth data call response.
LiNKCity	Data Included in Missouri State Submission	0016051450	Not Req'd by Provider	Fifth data call updates included.
City Utilities Springfield (SpringNet)	Data Included in Missouri State Submission	0004759411	3/23/2011	Fifth data call updates included.
Cogent Communications, Inc.	Data Included in Missouri State Submission	0019898303	Not Req'd by Provider	No updates submitted in fifth data call response.
Comcast	Data Included in Missouri State Submission	0004441663	5/27/2010	Fifth data call updates included.
Covad Communications Company	Data Included in Missouri State Submission	0003753753	5/18/2010	Fifth data call updates included.
Craw-Kan Telephone	Data Included in Missouri State Submission	0002334225	4/5/2010	Fifth data call updates included.
T-Mobile	Data Included in Missouri State Submission	0006945950	5/4/2010	Fifth data call updates included.
Ellington Telephone Company	Data Included in Missouri State Submission	0003741956	4/5/2010	No updates submitted in fifth data call response.
FairPoint Communications Missouri, Inc.	Data Included in Missouri State Submission	0014710388	9/1/2010	Fifth data call updates included.
FairPoint Kearney	Data Included in Missouri State Submission	0004969697	9/1/2010	Fifth data call updates included.
Farber Telephone Company	Data Included in Missouri State Submission	0003748043	4/5/2010	Fifth data call updates included.
BPS Telephone Company	Data Included in Missouri State Submission	0003730835	4/5/2010	No updates submitted in fifth data call response.
BPS Networks	Data Included in Missouri State Submission	0016026965	4/5/2010	No updates submitted in fifth data call response.
Brown Dog Networks	Data Included in Missouri State Submission	0009254095	Not Req'd by Provider	No response to fifth data call.
Fidelity Cablevision, Inc	Data Included in Missouri State Submission	0000013326	4/5/2010	Fifth data call updates included.
Fidelity Communications Services I, Inc.	Data Included in Missouri State Submission	0004351722	4/5/2010	No updates submitted in fifth data call response.
Fidelity Telephone Company	Data Included in Missouri State Submission	0002550309	4/5/2010	No updates submitted in fifth data call response.
Granby Telephone Company	Data Included in Missouri State Submission	0005061189	4/5/2010	No updates submitted in fifth data call response.
Grand River Mutual Telephone Corp.	Data Included in Missouri State Submission	0002505519	4/7/2010	Fifth data call updates included.
Green Hills Technologies	Data Included in Missouri State Submission	0003736246	4/5/2010	No updates submitted in fifth data call response.
Green Hills Telephone ILEC	Data Included in Missouri State Submission	0003736238	4/5/2010	No updates submitted in fifth data call response.
Green Hills Telecommunications Services	Data Included in Missouri State Submission	0003736253	4/5/2010	No updates submitted in fifth data call response.
Hughes Network Systems, LLC	Data Included in Missouri State Submission	0017434911	Not Req'd by Provider	No updates submitted in fifth data call response.
KC Coyote – Isotech	Data Included in Missouri State Submission	0014669097	Not Req'd by Provider	No updates submitted in fifth data call response.
KTIS (Kingdom Telephone Company)	Data Included in Missouri State Submission	0002212314	4/5/2010	Fifth data call updates included.
Cricket Communications, Inc. (Leap Wireless International)	Data Included in Missouri State Submission	0002963528	4/20/2010	Fifth data call updates included.
Le-Ru Telephone Co.	Data Included in Missouri State Submission	0002490472	4/7/2010	No updates submitted in fifth data call response.
Level 3 Communications, LLC	Data Included in Missouri State Submission	0003723822	4/27/2010	No updates submitted in fifth data call response.
LTO Communications, LLC	Data Included in Missouri State Submission	0019008036	Not Req'd by Provider	No response to fifth data call.
Mark Twain Communications Company	Data Included in Missouri State Submission	0002531879	4/5/2010	No response to fifth data call.
Mark Twain Rural Telephone Co	Data Included in Missouri State Submission	0002549228	4/5/2010	No response to fifth data call.
McDonald County Telephone Co	Data Included in Missouri State Submission	0002504058	4/5/2010	No updates submitted in fifth data call response.
MCC Missouri LLC (Mediacom)	Data Included in Missouri State Submission	0005184247	9/1/2010	No updates submitted in fifth data call response.
Mid States Services, LLC.	Data Included in Missouri State Submission	0018511303	5/26/2010	No updates submitted in fifth data call response.
MyChoice Network LLC	Data Included in Missouri State Submission	0000000000	Not Req'd by Provider	No response to fifth data call.
New Florence Telephone Company, Inc.	Data Included in Missouri State Submission	0004374047	4/5/2010	Fifth data call updates included.
Northeast Missouri Rural Telephone Company	Data Included in Missouri State Submission	0004337044	4/20/2010	No updates submitted in fifth data call response.
Northwest Missouri Cellular	Data Included in Missouri State Submission	0002534618	Not Req'd by Provider	No updates submitted in fifth data call response.
Oregon Farmers Mutual Telephone Company	Data Included in Missouri State Submission	0003733847	4/5/2010	No updates submitted in fifth data call response.
New Wave Communications	Data Included in Missouri State Submission	0001202938	Not Req'd by Provider	No response to fifth data call.
Iland Internet Services	Data Included in Missouri State Submission	0017606898	Not Req'd by Provider	Fifth data call updates included.
Mid Missouri Telephone Co.	Data Included in Missouri State Submission	0002509040	4/5/2010	Fifth data call updates included.
Ozark Computers	Data Included in Missouri State Submission	0018658179	Not Req'd by Provider	No updates submitted in fifth data call response.
Peace Valley Telephone Co., Inc.	Data Included in Missouri State Submission	0018539742	4/5/2010	No updates submitted in fifth data call response.
Poplar Bluff, City of	Data Included in Missouri State Submission	0002514529	Not Req'd by Provider	Fifth data call updates included.
ProTronics Technologies, Inc.	Data Included in Missouri State Submission	0010790061	Not Req'd by Provider	No response to fifth data call.
Radio Wire, Inc.	Data Included in Missouri State Submission	0018912626	Not Req'd by Provider	No response to fifth data call.
Ralls Technologies (Ralls County Electric Cooperative)	Data Included in Missouri State Submission	0018539916	Not Req'd by Provider	Fifth data call updates included.
Midwest Data Center – Subsidiary of Rock Port Telephone	Data Included in Missouri State Submission	0004362505	4/7/2010	No updates submitted in fifth data call response.
Rock Port Cablevision	Data Included in Missouri State Submission	0004362505	4/7/2010	No updates submitted in fifth data call response.

Goodman Telephone Company, Inc.	Data Included in Missouri State Submission	0004269775	4/12/2010	No updates submitted in fifth data call response.
Ozark Telephone Company	Data Included in Missouri State Submission	0004269817	4/12/2010	No updates submitted in fifth data call response.
Seneca Telephone Company	Data Included in Missouri State Submission	0004269809	4/12/2010	No updates submitted in fifth data call response.
Sho-Me Technologies, LLC	Data Included in Missouri State Submission	0008875890	Not Req'd by Provider	No updates submitted in fifth data call response.
Sprint Nextel Corporation	Data Included in Missouri State Submission	0003774593	6/11/2010	Fifth data call updates included.
StarBand Communications Inc.	Data Included in Missouri State Submission	0005087457	4/5/2010	No updates submitted in fifth data call response.
Steelville Telephone Exchange Inc	Data Included in Missouri State Submission	0002549665	4/5/2010	No updates submitted in fifth data call response.
Miller Telephone Company	Data Included in Missouri State Submission	0004269528	4/5/2010	No updates submitted in fifth data call response.
TDS Telecommunications Corporation – Stoutland	Data Included in Missouri State Submission	0002502243	4/26/2010	Fifth data call updates included.
TDS Telecommunications Corporation – New London	Data Included in Missouri State Submission	0002529733	4/26/2010	Fifth data call updates included.
TDS Telecommunications Corporation – Orchard Farm	Data Included in Missouri State Submission	0003767340	4/26/2010	Fifth data call updates included.
Time Warner Cable	Data Included in Missouri State Submission	0013430244	6/21/2010	Fifth data call updates included.
Total Highspeed Internet Service	Data Included in Missouri State Submission	0017633405	Not Req'd by Provider	Fifth data call updates included.
Townes Tele-Comm, Inc. – Choctaw Telephone Company	Data Included in Missouri State Submission	0004928792	Not Req'd by Provider	No updates submitted in fifth data call response.
Townes Tele-Comm, Inc. – MoKan Dial, Inc.	Data Included in Missouri State Submission	0004928750	Not Req'd by Provider	No updates submitted in fifth data call response.
Tw telecom	Data Included in Missouri State Submission	0017348061	4/27/2010	Fifth data call updates included.
United Services, Inc. (United Sky Wireless)	Data Included in Missouri State Submission	0016087876	4/5/2010	No updates submitted in fifth data call response.
Verizon Wireless – Cellco Partnership	Data Included in Missouri State Submission	0003290673	5/26/2010	Fifth data call updates included.
WildBlue Communications, Inc.	Data Included in Missouri State Submission	0007843766	5/4/2010	Fifth data call updates included.
Windjammer Communications LLC	Data Included in Missouri State Submission	0017915182	Not Req'd by Provider	No response to fifth data call.
Windstream Corporation	Data Included in Missouri State Submission	0014400220	6/10/2010	No updates submitted in fifth data call response.
YHTI	Data Included in Missouri State Submission	0014205504	4/5/2010	No updates submitted in fifth data call response.
Lathrop Telephone Company	Data Included in Missouri State Submission	0003737376	4/7/2010	No updates submitted in fifth data call response.
NPG Cable, Inc. (St. Joseph Cablevision)	Data Included in Missouri State Submission	0002508687	Not Req'd by Provider	Fifth data call updates included.
United States Cellular Corporation	Data Included in Missouri State Submission	0004372322	8/21/2010	Fifth data call updates included.
KC Web Internet Services, LLC	Compiling Data – No Data Submitted	0011513751	Not Req'd by Provider	No source data received to date.
KEI Internet Service	Compiling Data – No Data Submitted	0000000000	Not Req'd by Provider	No source data received to date.
Wisper ISP, INC	Compiling Data – No Data Submitted	0016278970	Not Req'd by Provider	No source data received to date.
AccuBak Data Systems, Inc.	Data Compiled But Not Submitted By Provider	0018543744	Not Req'd by Provider	Owner still having trouble seeing the benefit to submitting data.
Ritter Cable Corporation	NDA Fully Executed – No Data Submitted	0014054449	4/20/2010	No source data received to date.
IAMO Telephone Company	NDA Fully Executed – No Data Submitted	0014067565	4/7/2010	No source data received to date.
SureWest Kansas, LLC – Everest Midwest LLC	NDA Fully Executed – No Data Submitted	0004069035	4/12/2010	No source data received to date.
Blue Mule Wireless	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
TA Highspeed	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
Tower Internet	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
US Cable of Coastal-Texas, L.P.	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
Crystal Broadband	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
Socket Telecom, LLC	Working Toward Signed NDA	0008515595	NA	Reseller currently. Becoming facilities based provider
Haug Communications, Inc.	Working Toward Signed NDA	0004711735		NDA Sent – Speeds currently below Broadband.
Finally Broadband, LLC.	Working Toward Signed NDA			Not fully operational as of 8/31/11
Iowa Telecommunications Services, Inc.	Non-Responsive	0003911385		
Mo-Ark Communications – (Wasp Wireless)	Non-Responsive	0004376919		NDA Sent
CorpraNet	Non-Responsive			NDA Sent
Cox Communications	Non-Responsive			NDA Sent
True Broadband Networks	Non-Responsive			No answer at phone numbers and e-mails kick-back
Enventis Telecom Inc.	Non-Responsive	0008394322		NDA Sent
Dexter Broadband	Non-Responsive		NA	Phones disconnected and e-mails are unanswered
St Joe Wireless	Non-Responsive	0002545929		Attempting to make initial contact.
First Cable of MO (Mississippi Valley)	Non-Responsive			
Galactic Broadband	Non-Responsive			No contact information found
SES Americom	Non-Responsive			Attempting to make initial contact.
Verizon Business Global LLC dba Verizon Business	Non-Responsive	0010856284		Submitted data with wireless company only.
Momentum	Non-Responsive			
Mid Missouri Broadband & Cable LLC	Non-Responsive			
St Louis Broadband	Refused to participate at this time			Does not see benefit
Birch Telecom of Missouri, Inc.	Refused to Participate	0003732294	NA	Refuse to sign NDA or participate
Ionex Communications, Inc.	Refused to Participate	0005027453	NA	Refuse to sign NDA or participate - Birch Communications
Pixius Communications	Refused to Participate	0010480176	NA	Refuse to sign NDA or participate at this time
Poplar Bluff Internet, Inc (SEMO)	Refused to Participate	0013662408	NA	Refuse to sign NDA or participate at this time
Semo Communications Inc.	Refused to Participate	0003788775	NA	Poplar Bluff Internet - refuse to sign NDA or participate at this time
NuVox, Inc.	Researching - Acquired By Windstream	0004319414	6/10/2010	No source data received to date.
Stouffer Communications	Researching - Included as Granby Telephone	0005061189		
CenturyTel Fiber Co. II, LLC dba LightCore, a CenturyTel Co	Researching Included in CenturyLink submission	0008612293	4/20/2010	
Falcon Cablevision	Researching Acquired By Charter Comm		NA	Data included in Charter submission.
New Cingular Wireless Services, Inc.	Researching – Purchased by AT&T	0003766532	4/7/2010	Included in AT&T submissions
City Light Gas & Water Office – City of Kennett	Researching To Determine If Broadband Provider			
City of Marshall	Researching To Determine If Broadband Provider			
Fidelity Communication Services II, Inc.	Researching To Determine If Broadband Provider	0005918503	4/5/2010	Researching inclusion with other Fidelity Provider submissions.
Fidelity Networks, Inc.	Researching To Determine If Broadband Provider	0004312963	4/5/2010	Researching inclusion with other Fidelity Provider submissions.
Excel Telecommunications – SureWest	Researching To Determine If Broadband Provider		4/12/2010	
TDS Metrocom	Researching To Determine If Broadband Provider		4/26/2010	Researching inclusion with other TDS Provider submissions.
TDS Missouri	Researching To Determine If Broadband Provider		4/26/2010	Researching inclusion with other TDS Provider submissions.
Telephone and Data Systems	Researching To Determine If Broadband Provider		4/26/2010	Researching inclusion with other TDS Provider submissions.
Aurora Communications, Inc.	Researching To Determine If Broadband Provider	0015696180	4/5/2010	Researching inclusion with other YHTI Provider submissions.
Full Stream Wireless	Researching To Determine If Broadband Provider			
Broadview Networks Holdings, Inc.	Researching To Determine If Broadband Provider	0010296853		
Broadwing Communications, LLC	Researching To Determine If Broadband Provider	0008599706	4/27/2010	Researching inclusion with other Level 3 Provider submission
WilTel Communications, LLC.	Researching To Determine If Broadband Provider	0003716511	4/27/2010	Researching inclusion with other Level 3 Provider submission
AT&T Services, Inc.	Researching To Determine If Broadband Provider	0008644056	4/7/2010	Researching inclusion with other AT&T Provider submission.

Advanced Digital LLC	Researching To Determine If Broadband Provider			
BMU Internet	Researching To Determine If Broadband Provider			
Co-Mo Electric	Researching To Determine If Broadband Provider			
Computer Magic Internet LLC	Researching To Determine If Broadband Provider			
DNG Electronics	Researching To Determine If Broadband Provider			
Extreme	Researching To Determine If Broadband Provider			
Green City Electric Utility	Researching To Determine If Broadband Provider			
Human Span	Researching To Determine If Broadband Provider			
Insight Cable	Researching To Determine If Broadband Provider			
Jaguar Technologies Inc (JagTec)	Researching To Determine If Broadband Provider			
Jobe Internet Services	Researching To Determine If Broadband Provider			
Keno Telephone	Researching To Determine If Broadband Provider			
LocalNet	Researching To Determine If Broadband Provider			
MCM System Wireless	Researching To Determine If Broadband Provider			
MHE Net	Researching To Determine If Broadband Provider			
Midwest Internet Technologies (MITI)	Researching To Determine If Broadband Provider			
Midwest Telecommunications	Researching To Determine If Broadband Provider			
Mist Valley	Researching To Determine If Broadband Provider			
Momentum	Researching To Determine If Broadband Provider			
MoreNet	Researching To Determine If Broadband Provider			
NetZero	Researching To Determine If Broadband Provider			
North Missouri Internet Services	Researching To Determine If Broadband Provider			
Optimum Cablevision	Researching To Determine If Broadband Provider	0003301363		
Pacific Wireless Internet	Researching To Determine If Broadband Provider	0018044297		
PIP Internet	Researching To Determine If Broadband Provider			
Primary Networks	Researching To Determine If Broadband Provider			
Regis	Researching To Determine If Broadband Provider			
Sikeston Internet	Researching To Determine If Broadband Provider	0018375808		
Suddenlink Communications - Cequel Communications	Researching To Determine If Broadband Provider	0015784663	6/12/2010	
Superior Cable	Researching To Determine If Broadband Provider			
Tri-Lakes Internet	Researching To Determine If Broadband Provider			
Turbo Net	Researching To Determine If Broadband Provider			
Utopian Wireless Corporation	Researching To Determine If Broadband Provider			
United Electric	Researching To Determine If Broadband Provider			
Vaughn's Computer Central	Researching To Determine If Broadband Provider	0019846674		
Wave Internet Technologies LLC	Researching To Determine If Broadband Provider	0020090023		
Access US	Not Facilities Based			
Board of Municipal Utilities	Not Facilities Based	0016073389		Discontinued offering service
McLeodUSA Telecommunications Services, Inc. (PaeTec)	Not Facilities Based	0003716073	NA	
XO Communications, LLC	Not Facilities Based	0006275945	NA	
Telnet Worldwide	Not Facilities Based		NA	
Terre Star	Not Facilities Based		NA	
TMC Communications	Not Facilities Based		NA	
TracFone	Not Facilities Based		NA	
Sofnet	Not Facilities Based		NA	
Clear Communications, Inc.	Not Facilities Based			Equipment seller
Superfone Inc.	Not Facilities Based	0008402202		
Tritel	Not Facilities Based		NA	
Missouri Broadband	Not Facilities Based		NA	
Mobilcom Pittsburg, Inc.	Not Facilities Based	0002324465	NA	
PneumaTek	Not Facilities Based		NA	Not responding to email
City of Newburg	Not Facilities Based		NA	
Qwest Communications Company, LLC	Not Facilities Based	0003605953	NA	
South Holt Cablevision	Not Facilities Based		NA	Offer Internet through Oregon Farmers Mutual Telephone Co
ADC	Not Facilities Based		NA	
Adva Optical Networking North America, Inc.	Not Facilities Based		NA	
AFL Communications	Not Facilities Based		NA	
Aircell	Not Facilities Based		NA	
Airdis Telecom	Not Facilities Based		NA	
Airespring, Inc.	Not Facilities Based	0006875322	NA	
ANPI	Not Facilities Based		NA	
Arch Communications	Not Facilities Based		NA	
Atlantis Holdings LLC	Not Facilities Based	0018587402	NA	
Bluegrass Cellular	Not Facilities Based		NA	
Boost Mobile	Not Facilities Based		NA	
Broadband National	Not Facilities Based		NA	
BullsEye Telecom, Inc.	Not Facilities Based	0004350930	NA	
Cellular one	Not Facilities Based		NA	
CHR Solutions	Not Facilities Based		NA	
Charles Industries	Not Facilities Based		NA	
Chillicothe Municipal Utilities	Not Facilities Based	0004192225	NA	
City of Newburg	Not Facilities Based		NA	
Cooperative Communications, Inc.	Not Facilities Based		NA	
Curt's Custom Cable	Not Facilities Based		NA	
DeSoto ISP	Not Facilities Based		NA	
Digital Landing	Not Facilities Based		NA	
DirecTV	Not Facilities Based		NA	
DSL,net, Inc. (Megapath)	Not Facilities Based	0004324851	NA	
Earthlink	Not Facilities Based		NA	

Extel	Not Facilities Based		NA	
Freedom Communications	Not Facilities Based		NA	
GlobalNet	Not Facilities Based		NA	
Golden State Cellular	Not Facilities Based		NA	
Granite Telecommunications	Not Facilities Based		NA	
Illinois Valley Cellular	Not Facilities Based		NA	
Innovative Systems	Not Facilities Based		NA	
Interglobe Communications, Inc.	Not Facilities Based	0005156229	NA	
Inter-Linc	Not Facilities Based		NA	
Jitterbug	Not Facilities Based		NA	
LightEdge Solutions, Inc.	Not Facilities Based	0015546443	NA	
Logix Communications	Not Facilities Based		NA	
Metropolitan Telecommunications Holding Company	Not Facilities Based	0009806019	NA	
Mid America Computer Corporation	Not Facilities Based		NA	
Mohave Wireless	Not Facilities Based		NA	
Netlogic, Inc.	Not Facilities Based	0006825954	NA	
New Edge Holding Company	Not Facilities Based	0003720471	NA	
Nex-Tech Wireless	Not Facilities Based		NA	
Nortel Solutions	Not Facilities Based		NA	
Open Range	Not Facilities Based		NA	
OFS	Not Facilities Based		NA	
Pacific Wireless	Not Facilities Based		NA	
Preferred Long Distance	Not Facilities Based		NA	
Protel	Not Facilities Based		NA	
Pulse Broadband	Not Facilities Based		NA	Reseller for Ralls Tech.
Ralls Technologies, LLC	Not Facilities Based	0018539916	NA	Becoming facilities based in the near future
SkyTerra Communications	Not Facilities Based		NA	
SkyWay USA	Not Facilities Based		NA	
Spirit Telecom	Not Facilities Based		NA	
Stutler Technologies Corp	Not Facilities Based		NA	
Tablerock Net	Not Facilities Based		NA	
TCO Network, Inc.	Not Facilities Based		NA	
TCS Telecom, Inc.	Not Facilities Based		NA	
Telefonica Data Corp SA	Not Facilities Based	0018547828	NA	
Tellabs	Not Facilities Based		NA	
Toast.Net	Not Facilities Based		NA	
Tranquility Internet	Not Facilities Based		NA	
Video Direct	Not Facilities Based		NA	
Vonage	Not Facilities Based		NA	
Zone Telecom, Inc.	Not Facilities Based		NA	
WestLink	Not Facilities Based		NA	
Aero-Surf Wireless Internet	Out of Business			Appear to be out of business
Almega Cable	Out of Business		Not Req'd by Provider	Phone number no longer in service. Out of business?
Longview Cable and Data, LLC.	Out of Business	0013948609	NA	Sold off Assets
Total Wireless Communications	Out of Business	0018726729	Not Req'd by Provider	Acquired by Total Highspeed Internet Services
Missouri Network Alliance	Out of Business	0015540669	Not Req'd by Provider	Acquired by BlueBird Network
Worldcom Broadband Solutions	Out of Business		NA	
Global Crossing Telecommunications, Inc.	Out of Business	0002850519	NA	
Sikeston Board of Municipal Utilities	Out of Business	0016073389	NA	

Attachment A

NONDISCLOSURE AGREEMENT

THIS NONDISCLOSURE AGREEMENT ("Agreement"), dated and effective as of ________________, 2010, is made by and among the Parties to this Agreement, which are __________________________________including its affiliates (collectively referred to hereinafter as "the Company"), and the State of Missouri, Office of Administration ("OA"), The Curators of the University of Missouri on behalf of the University of Missouri - Columbia ("MU"), GeoDecisions, a Division of Gannett Fleming, Inc. ("GeoDecisions"), and CBG Communications, Inc. ("CBG") (collectively referred to hereinafter as "the State Parties," except where otherwise indicated.)

WHEREAS:

I. The National Telecommunications and Information Administration (NTIA) has made available a grant program to fund broadband mapping known as the State Broadband Data and Development (SBDD) grant program, which is governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, at page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, at page 40569 of the Federal Register, both of which are incorporated fully herein; and

II. Both OA and MU have partnered with the mapping entities, GeoDecisions and CBG, to implement the SBDD grant program; and

III. The Company possesses confidential and proprietary information necessary to such implementation and acknowledges that it desires to share certain of that information with the State Parties and with the NTIA; and

IV. When the Company shares that information with the State Parties, the confidential and limited use conditions of this Agreement shall apply; and

V. Missouri law allows governmental entities to close records that: 1) relate to scientific and technological innovations in which the owner has a proprietary interest pursuant to §610.021(15); and 2) fall within the definition of "trade secret" pursuant to the Uniform Trade Secrets Act, §417.450, RSMo.; and 3) have been submitted to an institution of higher education in connection with a proposal to license intellectual property or perform sponsored research and which contains sales projections or other business plan information the disclosure of which may endanger the competitiveness of a business, §610.021(22) ; and

NOW THEREFORE, the Parties agree as follows:

TERMS:

a) "Confidential Information" shall be defined in identical terms to the SBDD NOFA and any subsequent SBDD NOFA Clarification(s).

b) All Confidential Information received by the State Parties from the Company may be used as follows:

   i) The State Parties may use the Company's information to derive maps, interactive websites and tabular data representations of the Company's broadband coverage area, network information, coverage attributes, and such other uses as may be required to implement the SBDD, referred to as the State Parties' Work Product; and

   ii) The State Parties may, at a given location, estimate broadband coverage and identify broadband providers within the associated census block or estimated area, including Company, if applicable; and

   iii) That State Parties may provide the NTIA with any such State Works as may be reasonably required by the terms and conditions as outlined in any applicable NOFA. The Company acknowledges that such provision may likely result in the disclosure of Confidential Information to governmental authorities and that, once such disclosures are made by the State Parties as required by a Project, the State Parties

1

Figure 4: Standard NDA pg 1

are fully released from any liability for the actions of the third party governmental authority regarding the disclosure, sharing or use of such Confidential Information; and,

iv) The State Parties may use the Confidential Information in any other way to the extent such use is consistent with this Agreement and the SBDD program, that does not result in disclosing it, and

v) The Company waives any claims of ownership to the State Parties' Work Products.

c) Per the terms of this Agreement, the State Parties will protect Confidential Information provided to it from any use, distribution or disclosure pursuant to §610.021 (14), (15) and (22) and §417.450, RSMo, except as permitted herein.

d) Confidential Information provided to Recipient in written or other tangible or electronic form shall be marked by Company with a confidential and proprietary notice prior to receipt by the State Parties.

e) Parties acknowledge that any discrepancy between the SBDD NOFA and the terms provided for herein shall be resolved in favor of the SBDD NOFA. Nothing contained herein shall be construed to limit the State Parties' reporting and data sharing obligations under the SBDD NOFA, including sharing of Company's Confidential Information with NTIA pursuant to the terms of the SBDD NOFA and Clarification.

f) The State Parties may provide Confidential Information only to those employees, consultants, independent contractors and agents who:

i) Have a substantive need to know such Confidential Information in connection with the State Parties' Work Product;

ii) Have been advised of the confidential and proprietary nature of such Confidential Information; and

iii) Have agreed in writing prior to disclosure to protect from unauthorized disclosure all confidential and proprietary information to which they have access in the course of their participation in the creation of the State Parties' Work Product in accordance with all the terms of this Agreement.

g) Confidential Information does not include information the State Parties lawfully obtain from any source other than Company, provided that such source lawfully disclosed such information.

h) If the State Parties are required to provide Confidential Information to any court, government agency or third party pursuant to written court order, subpoena, Missouri Sunshine Law request, or other process of law, they must provide the Company with prompt written notice of such requirement or request and cooperate with the Company to protect against or limit the scope of the disclosure.

i) All Confidential Information remains at all times the Company's property. Any State Party Recipient may make tangible or electronic copies and notes of Confidential Information only as necessary for use as authorized herein. All such copies or notes must be marked with the same confidential and proprietary notice as appears on the original. All such copies will be destroyed when the State Parties' Work Product is fully completed and finally approved, and all originals shall be either destroyed or returned to the Company, at the Company's option.

j) The State Parties may publicly identify the Company as a contributing broadband service provider, provided no information covered by this Agreement is revealed. No license for use, beyond that provided for herein, under any trademark, patent, copyright, trade secret or other intellectual property right is either granted or implied by disclosure of Confidential Information to the State Parties.

k) If and to the extent any provision of this Agreement is held invalid or unenforceable, all other provisions of this Agreement shall remain in full force and effect to the fullest extent permitted by law.

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Figure 5: Standard NDA pg 2

l) This Agreement is binding upon and inures to the benefit of the Parties and their heirs, executors, legal and personal representatives, successors and assigns, as the case may be.

m) This Agreement is the entire agreement between the Parties hereunder and may not be modified or amended except by a written instrument signed by all Parties. Each Party has read this Agreement, understands it and agrees to be bound by its terms and conditions. There are no understandings or representations with respect to the subject matter hereof, express or implied, that are not stated herein. This Agreement may be executed in counterparts, and signatures exchanged by facsimile or other electronic means are effective for all purposes hereunder to the same extent as original signatures.

n) This Agreement shall be governed, construed, and enforced in accordance with the laws of the State of Missouri, without regard to its principles of conflict of law.

IN WITNESS WHEREOF, the Parties have read and agreed to this Nondisclosure Agreement as evidenced by the signatures of the Parties' authorized representatives below:

Company:

By: ______________________________
(Authorized Signature)

Name: ______________________________

Title: ______________________________

GeoDecisions, a Division of Gannett Fleming, Inc.:

By: ______________________________
(Authorized Signature)

Name: ______________________________

Title: ______________________________

State of Missouri, Office of Administration, Information Technology and Services Division:

By: ______________________________
(Authorized Signature)

Name: ______________________________

Title: ______________________________

The Curators of the University of Missouri:

By: ______________________________
(Authorized Signature)

Name: ______________________________

Title: ______________________________

CBG Communications, Inc:

By: ______________________________
(Authorized Signature)

Name: ______________________________

Title: ______________________________

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Figure 6: Standard NDA pg 3

Commonwealth of the Northern Mariana Islands Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Ivan A. Blanco
Contact Phone Number:	(670) 664-3023
Contact E-mail:	**deputy.blanco@commerce.gov.mp**
Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**

Product Specification:	Spring 2012 NTIA Data Model
Product/Process:	NTIA—April 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Providers Included
  - IT& E
  - MCV

- Non-Responsive/Non-Cooperative Providers
  - None

- Other Provider Comments
  - iConnect
    - Currently not a broadband service provider; however they are researching further on entering the Terrestrial Fixed Wireless market
  - GTA
    - Working towards becoming a reseller provider in this area

  - Docomo Pacific
    - Provided data required for mapping their wireless footprint; however it was removed as it does not meet the NOFA standards of broadband speeds

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
  - MCV (TT-41) map refinement per provider's request

- Coverage Footprint Expansion –
  - No expansion for this data submission round

DATA CORRECTIONS

- There were no data corrections required for this data submission
  - There was also no NTIA 3rd Party data review results posted on the Broadband State Data Management Tool that could lead to potential data corrections.

COMMUNITY ANCHOR INSTITUION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	Transmission Technology	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	19	0	0	0
Category 2 - Library	3	0	0	0
Category 3 - Medical/Healthcare	3	0	0	0
Category 4 - Public Safety	0	0	0	0
Category 5 - Universities/Colleges	1	0	0	0
Category 6 - Other: Government	7	0	0	0
Category 7 - Other: Non-Government	11	0	0	0
Total	**44**	**0**	**0**	**0**

CAI CHANGES

- The CAI's within the following categories were reviewed again against the below-mentioned databases to identify if any CAIID's need to be updated or added.
  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**
  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**
  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

  MP_2012_3_28.txt

- Error Report

  All items flagged within the submission receipt where confirmed by NTIA as exceptions during the 03/27/12 webinar. The exceptions mentioned are as follows:
  - Middle Mile Elevation Fails
  - Middle Mile Latitude/Longitude Fails
  - Middle Mile Ownership Fails
  - Address SpeetTier Fails
  - CAI Transtech Fails

Hyperlinks to Grantee Workspace in which the same issues were identified by other Grantees:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

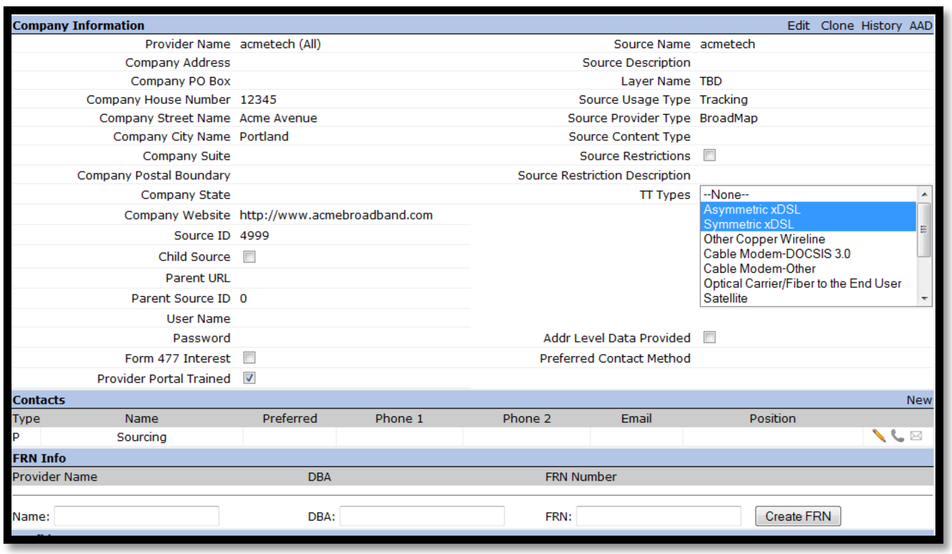
HIGH-LEVEL SUMMARY

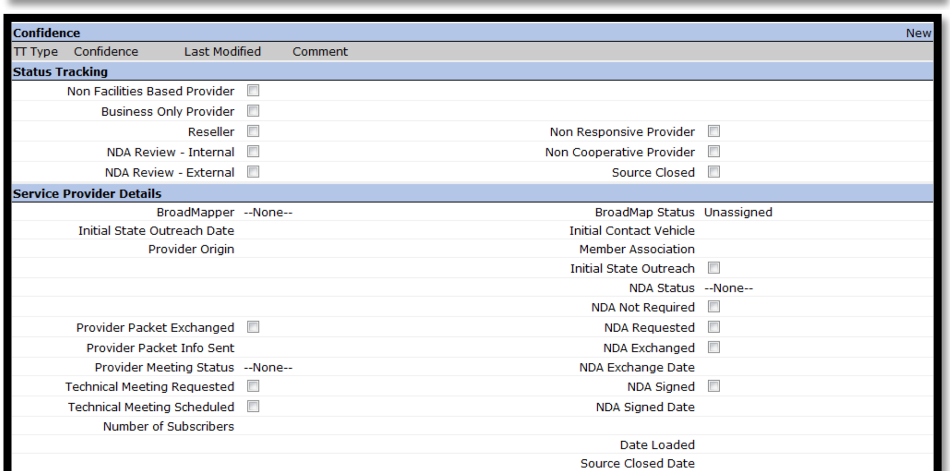
DATA GATHERING

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

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

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





BDIA Delivery 0412			Edit
Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	
Additional Data			
Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission.

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

COMMUNITY ANCHOR INSTITUTION (CAI)

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

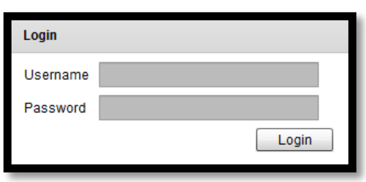
DATA INTEGRATION PROCESS

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

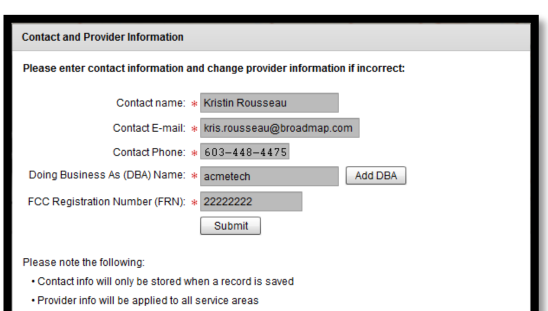
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type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

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

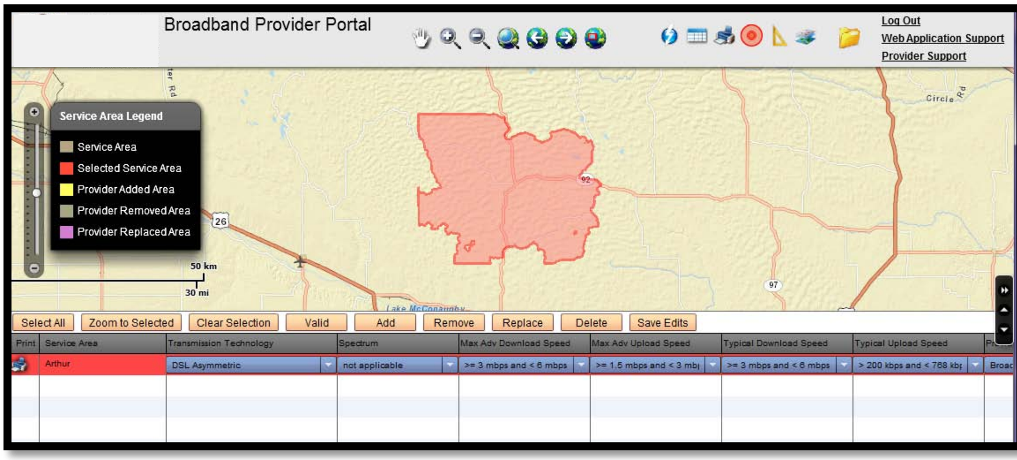
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



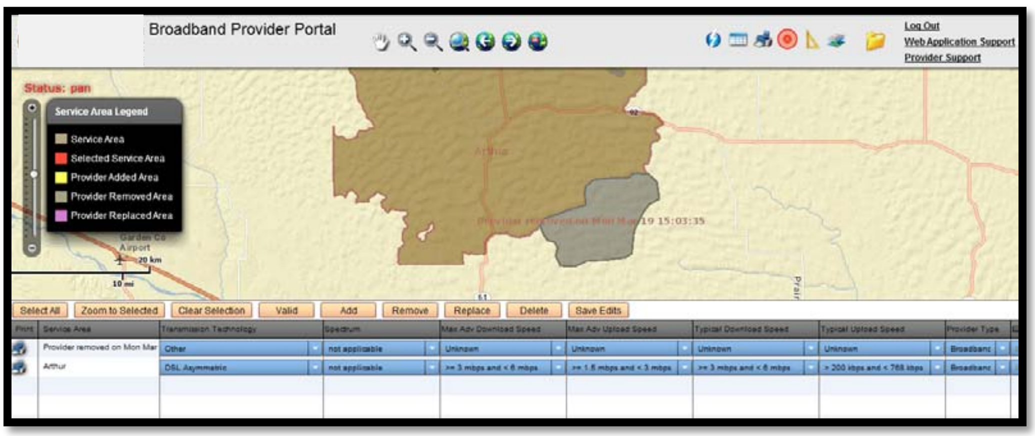
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



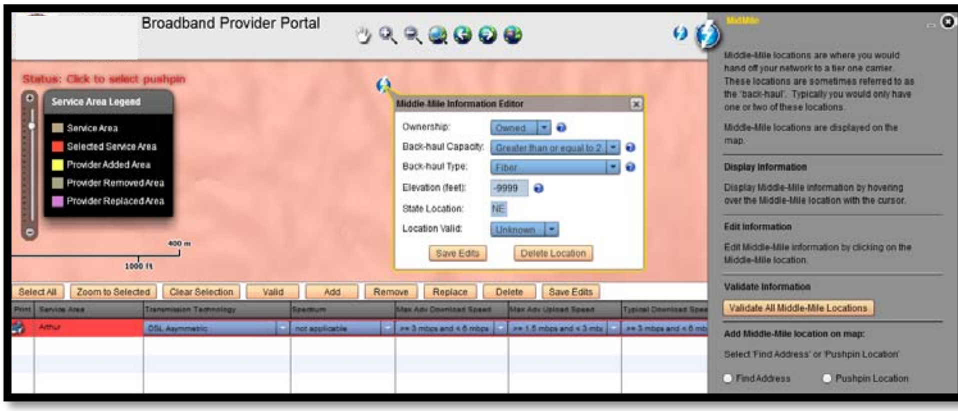
- Capability to review and request changes to the coverage footprint

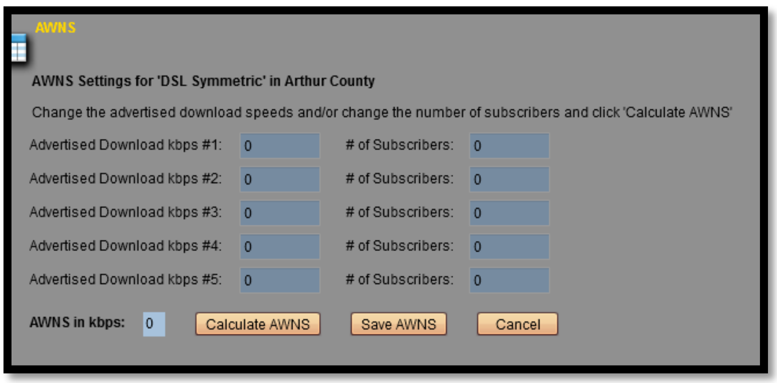


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

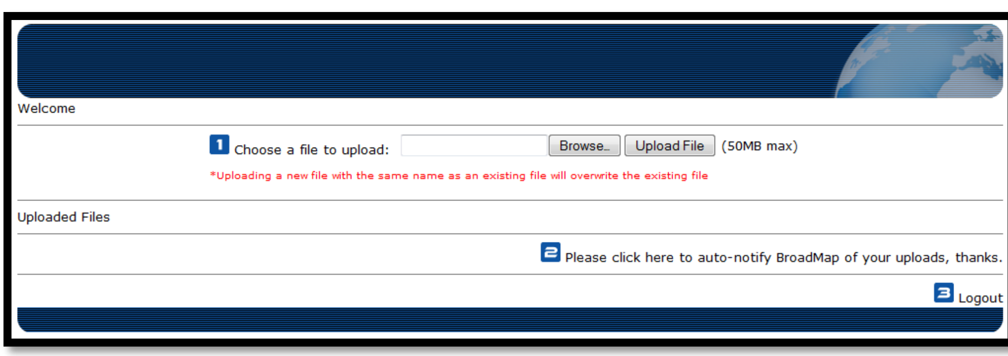


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





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



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

DATA VALIDATION AND VERIFICATION

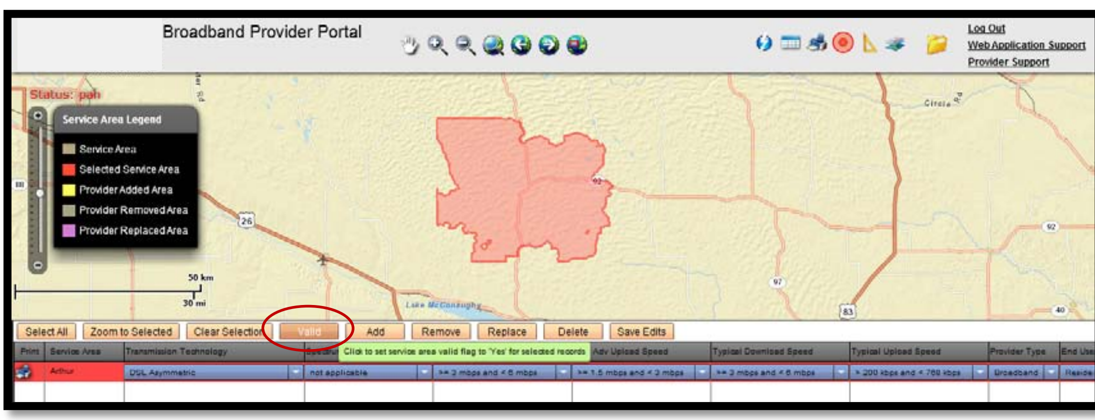
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage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

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

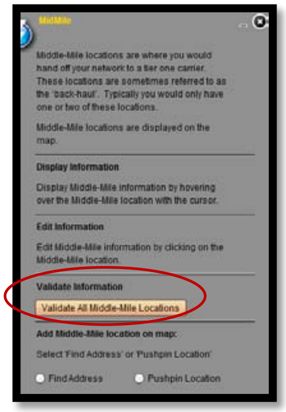
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process**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

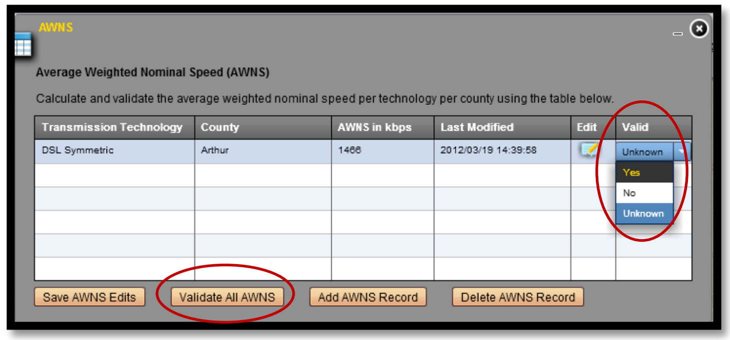
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

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



- Middle Mile & AWNS Validation





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

THIRD-PARTY DATA VERIFICATION

Due to a change in mapping partners, the focus for this data submission was placed on implementing an improved process methodology and integrating provider's coverage areas into a new internal model. Included in these efforts was educating the providers on the new process, encouraging continued participation and supporting their validation prior to the data submission.

For this submission, the NTIA 3rd Party Data summary was reviewed to ensure any corrections required were represented in the final product and the supporting documentation.

This submission was also compared to the previous data submission, fall 2011, as a quality check to identify and resolve any potential erroneous discrepancies between the two products. Since they originated from two different processes, we wanted to ensure there were no unexpected changes or regression.

PUBLIC VERIFICATION

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

The public website can be viewed at the following hyperlink:

http://cnmi-bb.broadmap.com/PublicMap/

CONFIDENCE VALUES

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

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

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

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

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

List of errors within the script, which will be listed as exceptions, can be found on PB Works – Grantee Workspace at the following link:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

DETAILED PROCESS REVIEW

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

BMap_ProcessDetails
_2012_04_01.docx

Mississippi Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Gary Rawson
Contact Phone Number:	601-432-8113
Contact E-mail:	**Gary.Rawson@its.ms.gov**
Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**

Product Specification:	Spring 2012 NTIA Data Model
Product/Process:	NTIA—April 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted (Includes Resellers)	222
Total Valid Broadband Providers	43
Non-Responsive Providers	0
Non-Cooperative Providers	0
Number of Providers – Represented in Data Submission	43
Number of Providers - Supplied Updates for this Submission	26
Number of Providers - Confirmed No Updates	17

- New Providers Since Last Data Submission
  - WildBlue Communications, Inc.

- Existing Providers – No Updates
  - Bruce Telephone Co. Inc.
  - DeltaCom, Inc.
  - Dixie Net Communications, Inc.
  - Frontier Communications of Miss. LLC
  - Fulton Telephone Co. Inc.
  - Georgetown Telephone Company Inc.
  - Lakeside Telephone Company Inc.
  - Level 3 Communications, LLC
  - Megagate Broadband, Inc.
  - Mound Bayou Telephone & Communications, Inc.
  - NetWireless Solutions, LLC
  - Sledge Telephone Co. Inc.

- Southern Light, L.L.C.
- StarBand Communications Inc.
- TEC of Jackson, Inc.
- Telepak Networks, Inc.
- Windstream Mississippi LLC

- Providers Included (listed by Provider and Holding Company name)

Bay Springs Telephone Co. Inc.
BellSouth Telecommunications, Inc. d/b/a AT&T Mississippi
BPM Inc. (Noxapater Telephone Company)
Bruce Telephone Co. Inc.
Cable One, Inc.
Cellular South Licenses, Inc. (C Spire Wireless)
CenturyTel Of North MS. Inc.
Charter Fiberlink MS - CCVI, LLC
Comcast Phone of Mississippi, LLC
Contact Network, Inc. (Inline)
Covad Communication
Cricket Communications of MS
Decatur Telephone Co. Inc.
Delta Telephone Co. Inc.
DeltaCom, Inc.
Dixie Net Communications, Inc.
Franklin Telephone Co. Inc.
Frontier Communications of Miss. LLC
Fulton Telephone Co. Inc.
Georgetown Telephone Company Inc.
GulfPines Communications, LLC
Lakeside Telephone Company Inc.

Level 3 Communications, LLC
Megagate Broadband, Inc.
MetroCast of MS, LLC
Mound Bayou Telephone & Communications, Inc.
NetWireless Solutions, LLC
Verizon Wireless
Sledge Telephone Co. Inc.
Smithville Telephone Co. Inc.
Southern Light, L.L.C.
Sprint PCS
StarBand Communications Inc.
TDS Telecommunications Corporation
TEC of Jackson, Inc.
Telepak Networks, Inc.
Trust Communications
tw telecom of mississippi llc
Windstream Mississippi LLC
XFone USA, Inc.
T-Mobile USA, Inc.
Delta Link LLC.
WildBlue Communications, Inc.

- Non-Responsive/Non-Cooperative Providers
    - None

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
  - Delta Telephone Co. Inc. (TT-10)
  - BellSouth Telecommunications, Inc. (TT-10)
  - Charter Communications, Inc. (TT-41)
  - tw telecom of mississippi llc (TT-30)
  - Myrtle Telephone Company, Inc. (TT-10)

- Technology Changes –
  - Comcast Cable Communications, LLC. - TT41 decreased and was replaced with TT-40.

- Coverage Footprint Expansion –
  - Contact Network, Inc. (TT-50)
  - Southeast Mississippi Telephone Company, Inc. (TT-10)
  - tw telecom of mississippi llc (TT-50)
  - T-Mobile USA, Inc. (TT-80)
  - Delta Telephone Co. Inc. (TT-50)
  - Leap Wireless International, Inc. (TT-80)
  - AT&T Mobility LLC (TT-80)
  - Sprint Nextel Corporation (TT-80)
  - Cable One (TT-40)
  - C Spire Wireless (TT-80)
  - Bay Springs Telephone (TT-10)
  - Decatur Telephone Co. Inc. (TT-10)
  - Verizon Wireless (TT-80)

DATA CORRECTIONS

- Per NTIA's guidance on 02/21/12, we updated all Verizon speed data to support the business rules they laid out.

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  All grantees should then apply the following business rule, as some of the speed ranges fall into two tiers:

  3G Speeds:
  Maximum <u>and</u> Typical download speed: 600 kbps to 1.4 Mbps (Speed Tier 3: 768 kbps – 1.5 Mbps)
  Maximum <u>and</u> Typical upload speed: 500 kbps to 800 kbps (Speed Tier 2: 200 – 768 kbps)

  4G LTE Speeds:
  Max Adv Download Speed: 12 Mbps (Speed Tier 7: 10 Mbps – 25 Mbps)
  Max Adv Upload Speed: 5 Mbps (Speed Tier 5: 3 Mbps – 6 Mbps)

  Typical download speed: 8.5 Mbps (Speed Tier 6: 6 Mbps – 10 Mbps)
  Typical upload speed: 2 Mbps to 5 Mbps (Speed Tier 5: 3 Mbps – 6 Mbps)

- The NTIA 3rd Party data review and summary were also compared to the product prior data submission and no changes were required. The Technology/Speed tier differences highlighted were reviewed with the providers and corrected, where needed.

COMMUNITY ANCHOR INSTITUTION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	Broadband Subscriber (1 or 2)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	697	502	502	502	56
Category 2 - Library	278	197	197	197	37
Category 3 - Medical/Healthcare	437	243	243	243	136
Category 4 - Public Safety	869	136	136	136	93
Category 5 - Universities/Colleges	40	0	0	0	0
Category 6 - Other: Government	409	335	335	335	142
Category 7 - Other: Non-Government	0	0	0	0	0
Total	**2730**	**1413**	**1413**	**1413**	**464**

CAI CHANGES

- No significant changes for the CAI layer this round.

- The CAI inventory was reviewed again against the database mentioned below for the following categories: Category 1: K-12 Schools, Category 2: Libraries and Category 5: Colleges
  These databases are as follows:

  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**

  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**

  - For Libraries (CAI type 2) please. Combine (do not add) “FSCSKey” and “FSCs_SEQ” from the “puout08av2000” file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state’s unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

MS_2012_3_29.txt

- Error Report

  All items flagged within the submission receipt where confirmed with either the provider or with NTIA that the values are valid. We called each provider that was identified in the warnings due to Technology/Speed matches, and validated again that they were accurate.

  - The exceptions also NTIA noted during the 03/27/12 webinar are as follows:
    - Middle Mile Elevation Fails
    - Middle Mile Latitude/Longitude Fails
    - Middle Mile Ownership Fails
    - Address SpeetTier Fails
    - CAI Transtech Fails

Hyperlinks to Grantee Workspace in which the same issues were identified by other Grantees:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

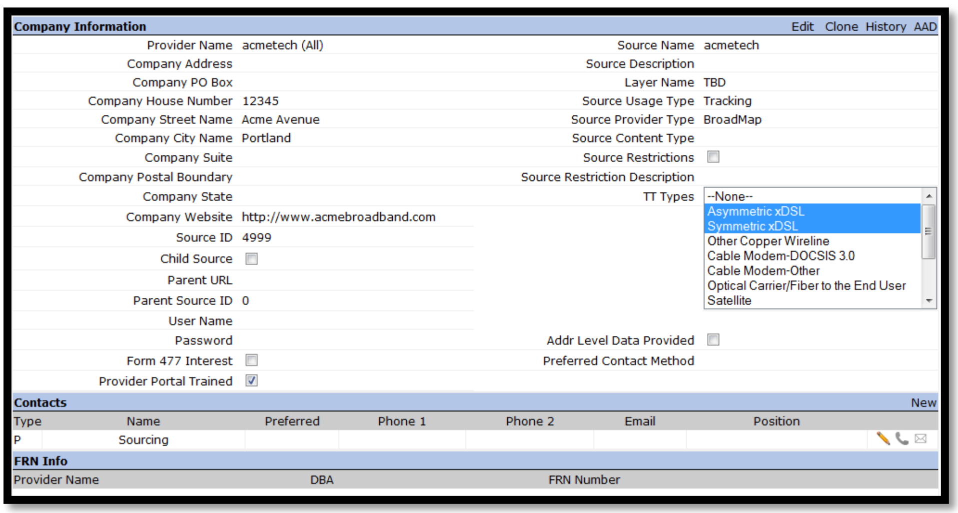
HIGH-LEVEL SUMMARY

DATA GATHERING

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

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

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



Company Information — Edit Clone History AAD

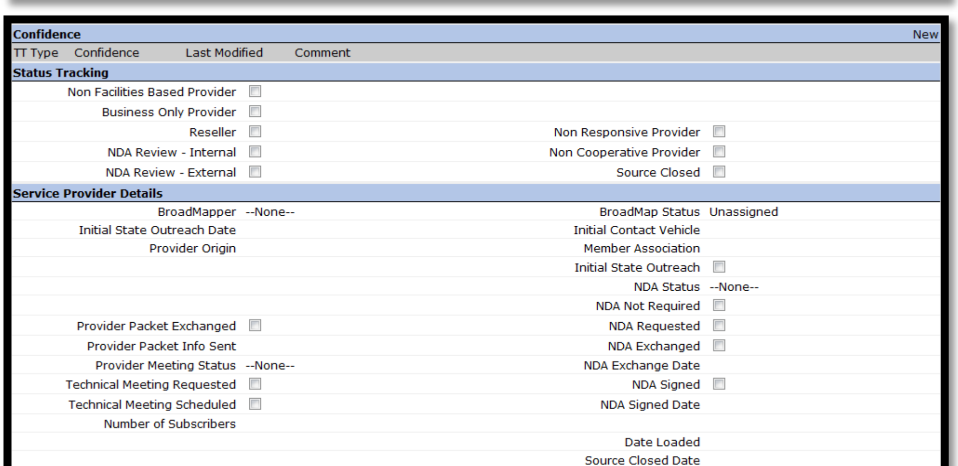
Provider Name	acmetech (All)	Source Name	acmetech
Company Address		Source Description	
Company PO Box		Layer Name	TBD
Company House Number	12345	Source Usage Type	Tracking
Company Street Name	Acme Avenue	Source Provider Type	BroadMap
Company City Name	Portland	Source Content Type	
Company Suite		Source Restrictions	☐
Company Postal Boundary		Source Restriction Description	
Company State		TT Types	--None--, Asymmetric xDSL, Symmetric xDSL, Other Copper Wireline, Cable Modem-DOCSIS 3.0, Cable Modem-Other, Optical Carrier/Fiber to the End User, Satellite
Company Website	http://www.acmebroadband.com		
Source ID	4999		
Child Source	☐		
Parent URL			
Parent Source ID	0		
User Name			
Password		Addr Level Data Provided	☐
Form 477 Interest	☐	Preferred Contact Method	
Provider Portal Trained	☑		

Contacts — New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number



Confidence — New

TT Type	Confidence	Last Modified	Comment

Status Tracking

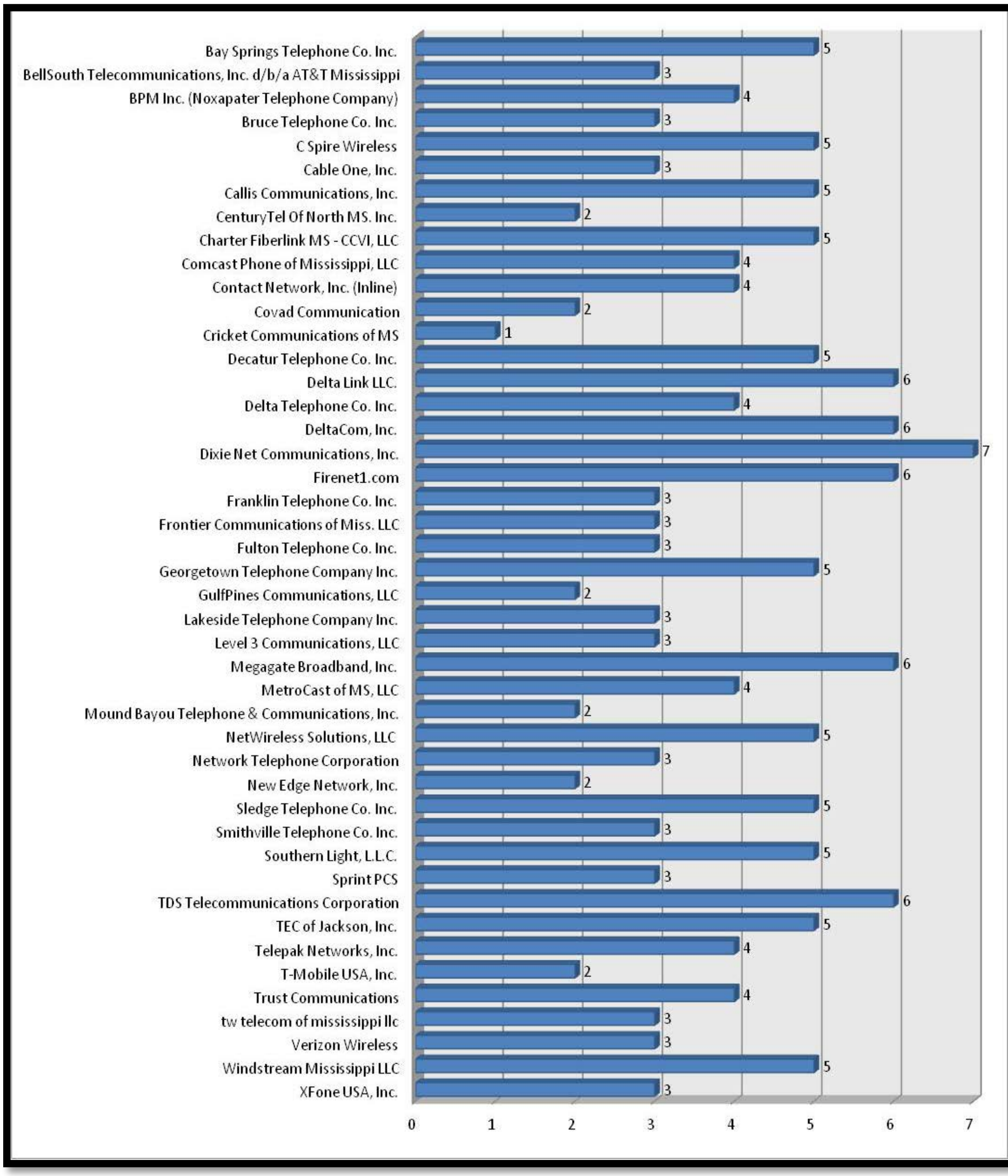
Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐

Service Provider Details

BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	

BDIA Delivery 0412			Edit
Status	--None--	Provider Data Reviewed	
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	
Additional Data			
Notes			
Next Steps			
Inactive		Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission. The chart below represents that interaction count with each provider.



- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:

- Requirements of this project;
- Broadband data required to support the product data model;
- Submission protocols available;
- Capability to validate how the supplied data is aggregated.

- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

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

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

DATA INTEGRATION PROCESS

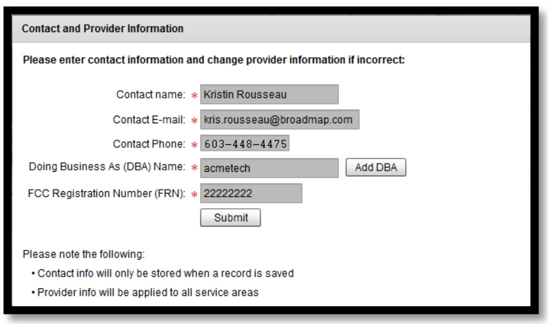
The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

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

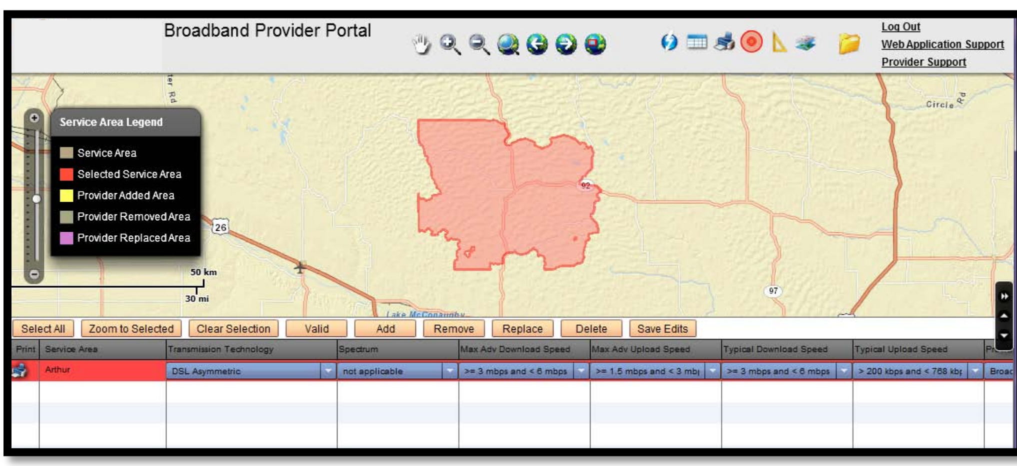
With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is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

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

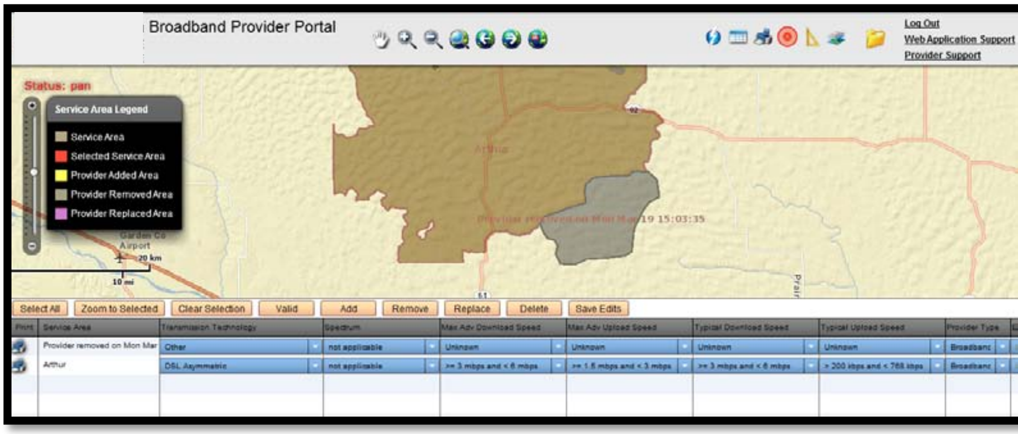
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



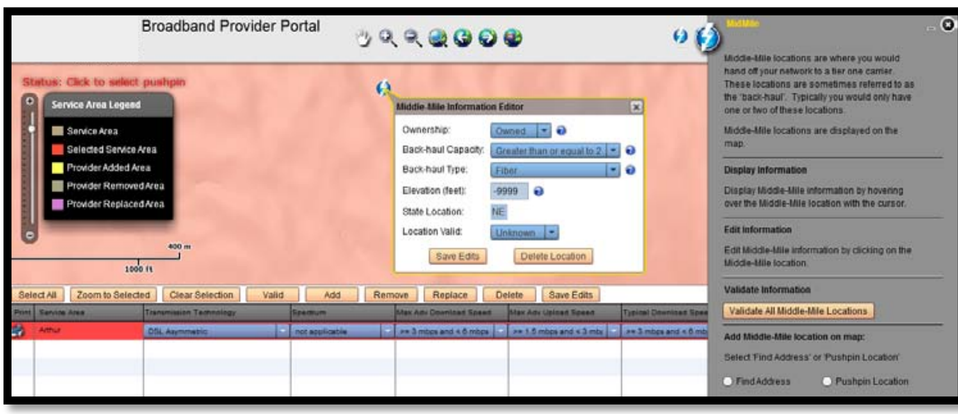
- Capability to review and request changes to the coverage footprint

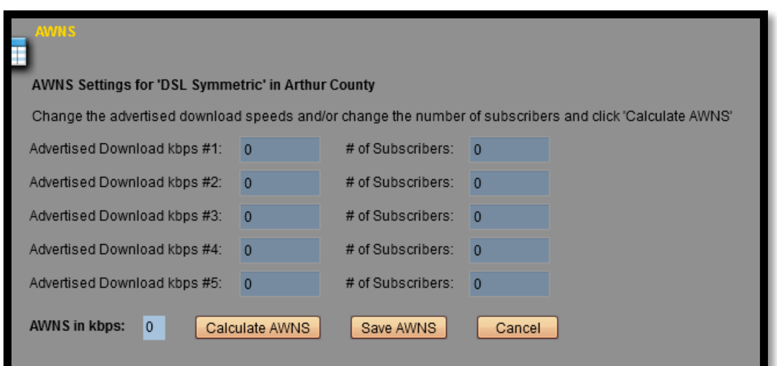


  - The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

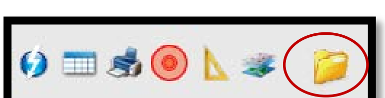


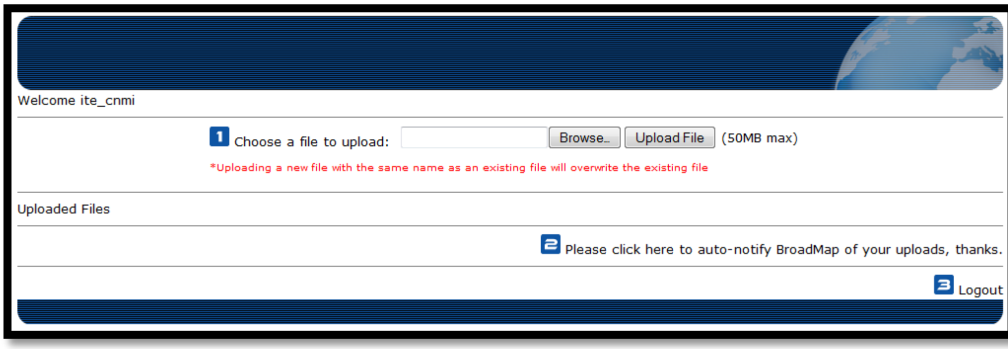
- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





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





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

DATA VALIDATION AND VERIFICATION

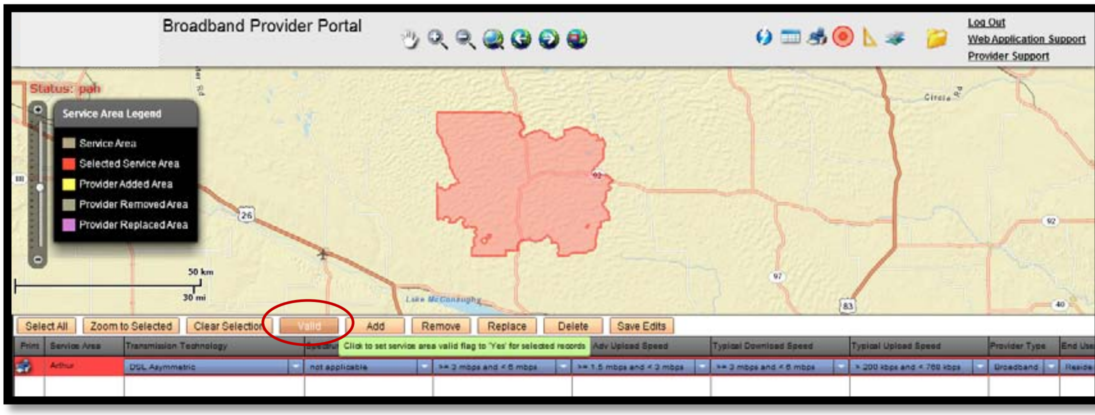
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage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

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

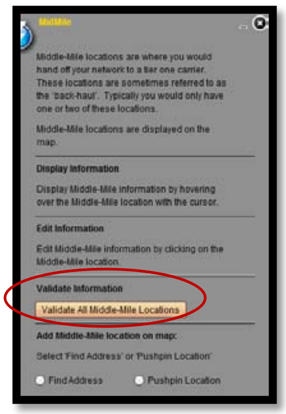
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process**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

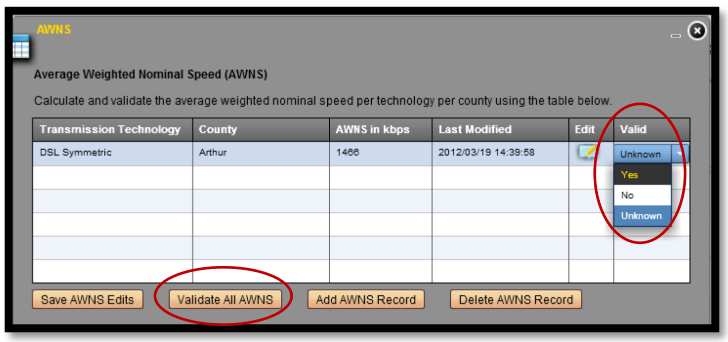
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

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



- Middle Mile & AWNS Validation





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

THIRD-PARTY DATA VERIFICATION

The coverage is visually and programmatically compared against third-party data as new or updated coverage area information is received and ingested from providers. All anomalies identified during this analysis are reviewed with the providers.

3rd Party Source Name	Source Type	Verification Type
Pitney Bowes (PBBI)	Exchange Info Plus (Central Office Locations)	Exchange datasets are used to verify the following Transmission Technologies (TT): Asymmetric xDSL (10), Symmetric xDSL (20), Other Copper Wireline (30), and Optical Carrier/Fiber to the End User (50).
Media Prints	Cable Boundaries	Used to verify the following TT: Cable Modem—DOCSIS 3.0 (40) and Cable Modem—Other (41)
American Roamer	Wireless Coverage	Used to verify the following TT:

	Patterns (EVDO, GPRS, WISP, HSPA)	Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)
Comsearch	Wireless Spectrum Holdings and Tower Data	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)

PUBLIC VERIFICATION – CROWD SOURCING

Since the last data submission, we have improved the public website - interactive map to collect more detailed feedback on the represented broadband coverage areas. This data had been reviewed with providers during the outreach phase and during one-on-one provider meetings.

The State website can be reviewed at the following hyperlink:
http://msbb.broadmap.com/StateMap/

CONFIDENCE VALUES

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

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

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

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

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

List of errors within the script, which will be listed as exceptions, can be found on PB Works – Grantee Workspace at the following links:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues
https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

DETAILED PROCESS REVIEW

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

BMap_ProcessDetails
_2012_04_01.docx

PROVIDERS RESEARCHED

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

1-800-RECONEX, INC. -- TC-123-1525-01
5LINX Enterprises Inc. DBA Globalinx
8x8, Inc.
Access Point Inc.
Access Point, Inc. -- TC-123-1518-00
Accessline Communications Corporation
AccuTel of Texas, Inc. -- TC-123-1851-01
ACN Communication Services, Inc. -- TC-123-1793-00
ACN Digital Phone Service, LLC
Airespring, Inc.
Airespring, Inc. -- TC-123-2068-00
ALEC, Inc.
Alternative Phone, Inc.
Alternative Phone, Inc.
American Fiber Network, Inc. -- TC-123-2213-01
Apptix, Inc.
Aptela, Inc.
AT&T Communications of the South
Baldwin County Internet/DSSI Serv., LLC -- TC-123-2091-01
Bandwidth.com CLEC, LLC -- TC-123-2262-01
BANDWIDTH.COM, INC.
Bay Springs Communications, Inc. -- TC-123-2147-01
BellSouth Long Distance, Inc. -- TC-123-1530-00
Benchmark Communications, L.L.C. -- TC-123-2185-01
Benchmark Communications, LLC d/b/a Com One
Big River Telephone Company, LLC
Big River Telephone Company, LLC -- TC-123-1923-00
Birch Communications, Inc.
Birch Telecom of the South, Inc.
BLC Management LLC
BLC Management LLC -- TC-123-2110-00
Broadstar, LLC
Broadview Networks, Inc. -- TC-123-2263-00

iNetworks Group, Inc. -- TC-123-2297-01
Infinity Networks, Inc. -- TC-123-1984-01
InPhonex.com, LLC
Intellicall Operator Services Inc. -- TC-123-1143-00
Interface Security Systems, LLC
Intrado Communications, Inc.
IP Communications, LLC.
IP Networked Services, Inc.
Kentucky Data Link, Inc. -- TC-123-2123-01
Kosmaz Technologies LLC
Level 3 Communications, LLC -- TC-123-1655-00
LightSquared LP
Lightyear Network Solutions, LLC
M5 Networks, Inc.
Madison River Communications, LLC -- TC-123-1835-01
Matrix Telecom Inc. -- TC-123-1045-00
Matrix Telecom, Inc.
MCC Telephony of the South, LLC
MCImetro Access Transmission Serv., LLC
McLeodUSA Telecomm. Services, Inc. -- TC-123-1452-00
Mediacom Southeast LLC
Megagate Broadband, Inc. -- TC-123-1058-02
Metropolitan Telecommun. of MS, Inc. -- TC-123-2174-00
Metropolitan Telecommunications Holding Company
Micro-Comm, Inc. -- TC-123-2084-01
Midwestern Telecommunications, Inc
Millicorp
Mitel NetSolutions, Inc. -- TC-123-2020-00
Momentum Telecom, Inc
Momentum Telecom, Inc. -- TC-123-1927-01
Navigator Telecommunications LLC
Network Telephone Corporation -- TC-123-1609-00
Network USA, LLC

Broadvox-CLEC, LLC -- TC-123-2299-00	Neutral Tandem-Mississippi, LLC -- TC-123-2236-00
BroadvoxGo!, LLC	New Edge Network, Inc.
Broadwing Communications, LLC	Nextg Networks of Illinois, Inc.
Broadwing Communications, LLC -- TC-123-2047-00	NextGen Communications, Inc.
Budget Prepay, Inc. -- TC-123-1668-01	Nexus Communication, Inc. dba TSI
Budget PrePay, Inc. d/b/a Budget Phone	Nexus Communications, Inc.
BullsEye Telecom, Inc.	nexVortex,Inc.
Business Telecom Inc. -- TC-123-1152-00	Norlight, Inc. -- TC-123-2247-01
Cable tv of Belzoni Inc.	Norris Telecom, LLC -- TC-123-2056-01
Call Catchers Inc.	NOS Communications Inc. -- TC-123-1316-00
Callis Communications, Inc.	NOS Communications, Inc.
Callis Communications, Inc. -- TC-123-2227-01	Ojo Service LLC
Cause Based Commerce Incorporated	OnWav, Inc
Cellco Partnership	Phone.com, LLC
Cellular South, Inc. -- TC-123-0900-04	PNG Telecommunications, Inc. -- TC-123-1716-00
CenturyTel Acquisition LLC	Proximiti Technologies, Inc.
Centurytel Fiber Company, II, LLC -- TC-123-2155-01	Quality Telephone, Inc.
CenturyTel Solutions, LLC -- TC-123-1748-01	QuantumShift Communications, Inc.
Charter Fiberlink MS - CCVI, LLC	Qwest Communications Company, LLC
Cincinnati Bell Any Distance, Inc. -- TC-123-2094-00	Razorline LLC
Columbia Telecommunications, Inc.	RING CONNECTION, INC.
Comcast Phone of Mississippi, LLC -- TC-123-2196-01	Ring Connection, Inc. -- TC-123-1995-01
CommPartners, LLC	Ripley Video Cable, Inc.
Communication Lines, Inc.	RNK, Inc.
ConnectMe, L.L.C.	Rosebud Telephone, LLC
Contact Network, Inc. -- TC-123-1993-01	Select Connect Communications, LLC -- TC-123-1986-00
Covista, Inc. -- TC-123-1646-00	SinglePipe Communications
Credit Loans, Inc. -- TC-123-1742-01	Smartresort Co, LLC dba Beyond Communications
Crexendo Business Solutions, Inc. -- TC-123-2329-00	Southern Communications Services, Inc., d/b/a Southern LINC
Cypress Communications, Inc.	Southern Light, L.L.C. -- TC-123-2118-00
DAVCO, INC. -- TC-123-1449-01	Southern Telecommunications Co. LLC -- TC-123-1600-01
DeltaCom, Inc. -- TC-123-1076-00	Spectrotel, Inc. -- TC-123-2159-01
Dialog Telecommunications Inc.	Sprint Communications Company L.P.
Dialog Telecommunications, Inc. -- TC-123-2070-01	Stratos Offshore Services Company
Diamond Telephone Services, Inc.	Suddenlink
DIECA Communications, Inc. -- TC-123-1775-01	Suddenlink Communications
Dixie Net Communications, Inc. -- TC-123-1634-01	Talk America Inc.
Dixie-Net Fiber, Inc. -- TC-123-2026-01	TC Systems, Inc.
dPI Teleconnect, L.L.C.	TEC of Jackson, Inc. -- TC-123-0820-00
DSLnet Communications, LLC -- TC-123-1679-01	TecInfo Communications, LLC -- TC-123-2050-01
ECR Voice, LLC	TecInfo, Inc
EnTelegent Solutions, Inc.	TelCove Operations, LLC
Equinox, Inc.	Telepak Networks, Inc. -- TC-123-1741-01
Ernest Communications, Inc.	Telesphere Networks Ltd.
Etan Industries	TelLan Network Technologies, Inc. DBA: VoIPnet Technologies
EveryCall Communications, Inc.	Tennessee Telephone Service, LLC -- TC-123-2125-01
EveryCall Communications, Inc. -- TC-123-2131-01	Tennessee Telephone Service, LLC d/b/a Freedom Communications USA, LLC
Evolve IP, LLC	The Other Phone Company, Inc. -- TC-123-1612-01
Excel Home Phone, Inc.	Thinking Phone Networks, LLC
Express Phone Service, Inc.	Trans National Commun. Internat'l, Inc. -- TC-123-1750-00
Fast Phones, Inc.	Trans National Communications International, Inc.
Fionda VOIP, LLC	tw telecom of mississippi llc -- TC-123-1991-01
Florida Multi-Media Services, Inc	UCN, Inc. -- TC-123-2052-00
Four Star Marketing, LLC -- TC-123-2324-00	Universal Telecom, Inc.
France Telecom Corporate Solutions, LLC	US LEC of Tennese Inc., d/b/a PAETEC Business Services
Frontier Communications of America, Inc. -- TC-123-1853-01	US LEC of Tennessee Inc. -- TC-123-1720-00
Global Capacity Direct, LLC -- TC-123-2188-01	Velocity Networks Inc

Global Capacity Group, Inc. -- TC-123-2259-01
Global Connection Inc. of America
GLOBAL CROSSING TELECOMMUNICATIONS, INC.
Go-Tel, LLC
GRANITE TELECOMMUNICATIONS LLC
Granite Telecommunications, LLC -- TC-123-2000-01
GreatCall, Inc.
GulfPines Communications, LLC -- TC-123-1664-01
Hypercube Telecom, LLC -- TC-123-1921-01
iCore Networks, Inc.
IDT America Corporation -- TC-123-1253-00
IDT Corporation
Image Access, Inc. -- TC-123-1638-01
iNETWORKS GROUP, INC

Velocity The Greatest Phone Co. Ever Inc -- TC-123-2312-00
VoIPStreet, Inc.
Vonage Holdings Corp.
Wave2Wave Communications Inc.
WEHCO Video, Inc.
Wholesale Carrier Services, Inc. -- TC-123-1992-00
WiMacTel, Inc.
Windstream NuVox, Inc. -- TC-123-1606-00
WirelessLand Technologies, Inc.
XFone USA, Inc. -- TC-123-2121-01
XO Communications, LLC
YMax Communications Corp. -- TC-123-2203-01
Zayo Enterprise Networks, LLC

Montana Broadband Mapping Methodology Report

Submitted To:
Chad Hultin
Montana Broadband Mapping Project Coordinator
State Information Technology Services Division

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Tetra Tech EC Inc.
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April 1, 2012

Contents

Executive Summary

The following report describes methods and issues related to the April 1, 2012 deliverables to NTIA for Broadband Mapping in Montana. This data submission is compliant with all guidance and specifications provided by NTIA. As per NTIA guidance we are using the current versions of the Broadband data model and the validation script.

Montana has developed a robust operational data model, components of which are described in this report, to support our broadband mapping efforts. We feel our operational model can support any reasonable modifications to NTIA requirements. Since this deliverable format is derived from our operational data model, we anticipate some modifications will be required. We are able to take best practices recommendations from the NTIA and incorporate those into the final deliverable without major modifications of our work flow and operating rules.

Our mapping process started with infrastructure points (central offices, remote terminals, wireless towers and antenna locations, middle mile and backhaul), cable franchise areas, and anchor institution addresses. Those have continued to play an important role, especially with providers who have not actively participated in coverage mapping. When providers have not supplied detailed information of their service areas that can be mapped at the census block level, coverage models are derived dynamically from this infrastructure based on geoprocessing techniques specific to each broadband technology. Examples of geoprocessing techniques include developing propagation models for wireless coverage and using infrastructure points in conjunction with the road network to predict the area served for DSL coverage.

We have developed a system to quantify “validated” data for the purpose of determining what is suitable for delivery to NTIA. The operational data model maintains reliability and validity codes, together with completeness checks to track which data elements are complete or still in process of refinement. Infrastructure is compared to public data, independent measurements, and telecommunications provider submittals at varying levels of geography. As more data is obtained from providers in maintenance updates, the validity and reliability of infrastructure points has diminished. The reliability and validity progress from 1 (not validated or reliable) to 10 (validated and reliable) are still useful for non-participating broadband providers. Completeness is primarily dependent on provider input, and can be supplemented in many instances with independent measurements. The process is iterative. Some providers included in this data set submitted infrastructure data at the address level. Other providers have submitted detailed coverages or census blocks. The remainder have submitted data at a coarser geographic scale, such as census tract, small scale paper or digital map, or generalized town location. Our validation methods provides the ability to use general information and iteratively cross check and improve the coverage models as more accurate data is obtained.

Provider Summary

Through extensive research we identified a master list of 160 potential providers in Montana with 55 companies identified as actual broadband providers. The Montana Broadband map includes 45 broadband providers. The full list of the potential providers researched but subsequently identified as not providing broadband service is included in Appendix A.

Reliability, Validity and Completeness

Throughout the course of the broadband project the State of Montana has employed several validation and verification techniques to help quantify the accuracy of the broadband map. The techniques used are listed below:

- Reliability Codes Assigned to Infrastructure Points
- State Run Speed Test Portal
- State Wide Broadband Survey

Reliability codes apply to the source data points and polygons and assess the authority of the source we obtained the data from and the level or coarseness of the geography (address or town). Validity codes are determined from cross checks of data sources and the number of independent sources of verification. These are as simple as comparing speed test locations against DSL modeled polygons, or as complex as geospatial analysis operations such as a kernel density function cluster analysis. Completeness is determined by public sources, independent measurements or provider submittals and checks on the domain classes required for the final NTIA deliverables such as Technology of Transmission domains, Speed Test domains and serving facility and wireless spectrum facility types and categories. The categories for these, and the subsequent records in our operational geodatabase tables grow and change as new data is obtained. We are maintaining these as feature level metadata tied to points and polygons maintained by analysts and technicians in a wiki table and coding them to the geodatabase. In this way the unique situations that arise can be cataloged and maintained with some level of flexibility while contributing to the final indices in a controlled fashion.

Reliability Codes

The two factors incorporated in reliability codes include the level of geography that was used as a source or provided as a clarification of location and the authority of the source for the information. We are also considering clusters of point information from independent measurements and sources to be higher in reliability than individual point information.

Generally, the coarser the source geography the lower the resultant score. Everything besides an address or street intersection, latitude/longitude location, or location provided in a georeferenced digital source is assigned a reliability score less than 5. This applies to source data coming (e.g. a central office located in a city instead of an address) and review comments on a previously mapped location (e.g. "That location is wrong, I know it is on the south side of town").

We have incorporated the reliability code into our last point of aggregation (LPA) and provider coverage geodatabase files, and into some of the publicly available data (PAD) geodatabases. We are also carrying a short text field (50 characters) with a descriptive rationale for the score. This will allow us to focus more on the lower scores that need to be confirmed, and ignore the high confidence data scored as 9 and 10.

Reliability Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Checked but unverified
2	Level 2	• County • Presence by other coarse geography (e.g. administrative region)
3	Level 3	• City • Census tracts • Cable Plus (area likely to have been annexed into an incorporated town or CDP)
4	Level 4	• Cable - incorporated • Zipcodes • Census blocks
5	Level 5	• GeoTel unverified • Confirmed by provider or anchor institution key advisor but to geography coarser than address or intersection
6	Level 6	• Qwest/Midcontinent or other web site random testing check • Speed test from individual average residential
7	Level 7	• From anchor institution key advisor Webex • GeoTel verified address only with no 3rd party confirmation from public sources o Building unverified • Speed test from anchor institution
8	Level 8	• From provider • FCC ULS or ARS • Geotel verified address and possibly verified by 3rd party source (Google Streetview) o Another provider's sign is on building (usually Qwest) • Geotel possibly verified by 3rd party source (NAIP, Google Streetview) • From state authoritative public data source (e.g. DCN or SummitNet) o Address or building unverified • Speed test from cluster of average residential
9	Level 9	• From provider as coverage with authoritative confirmation

		• Geotel verified address and verified by 3rd party source (NAIP, Google Streetview)
		  ○ Provider sign on building
		  ○ Tower or dish visible
		• From provider or anchor institution check of our data * Root Wireless

10	Level 10	• From 2+ authoritative confirmations

Validity Codes

We included validity codes in the last point of aggregation infrastructure data which drives creation of the DSL models. We also included validity codes in each of the final technology of transmission deliverables for polygons and point feature classes. The scales of validity vary by each major type and function.

Infrastructure Validity Codes

The purpose of this validity code is twofold:

1. To determine which infrastructure points are turned into DSL model coverages
2. To use as a reference in other coverage validity checks

Infrastructure Validity Codes		
Code	**Description**	**Detailed Description**
0	Level 0	• Not yet assigned
1	Level 1	• Not yet assigned
2	Level 2	• Not yet assigned
3	Level 3	• Checked against MT PSC Report or DSLReports at the town level • Checked against SummitNet anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Qwest ICONN) at the town level
5	Level 5	• Not yet assigned
6	Level 6	• Confirmation of DSL or cable from authoritative public data to broader geography than address not confirmed by provider
7	Level 7	• Authoritative public data at address level (e.g. Geotel) not confirmed by provider
8	Level 8	• Provider submission at the census tract level • Provider website independent address checks (Qwest, Verizon)
9	Level 9	• Provider submission at the census block level or address level
10	Level 10	• Provider submission at the coverage level at census block scale or blocks less than 2 square mile and larger scale then census block for blocks larger than 2 square miles

Final Technology of Transmission Validity Codes

The purpose of this validity code is twofold:

1. To determine which elements are loaded in the spreadsheet provider submission packages in their review
2. To determine which provider coverages are chosen for submittal with one of the NTIA deliverables (April 15, June 24)

Final Technology of Transmission Validity Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Unassigned at this time
2	Level 2	• Unassigned at this time
3	Level 3	• Checked against MT PSC Report or DSL sources at the town level • Checked against SummitNet anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Centurylink ICONN) at the town level
5	Level 5	• Confirmation of DSL or cable from authoritative public data
6	Level 6	• Provider website independent address checks (Qwest, Verizon) • Provider submission at the census tract level
7	Level 7	• Provider submission at the census block level • Provider submission at the census block level confirmed by Speed test cluster OR other independent measuremen
8	Level 8	• Provider submission at the address level
9	Level 9	• Provider submission at the address level confirmed by Speed test cluster OR other independent measuremen
10	Level 10	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement

State Specific Issues

The most notable issue specific to Montana is the lack of non-disclosure agreements (NDAs) with the providers. To date no provider has agreed to sign an NDA in Montana due to open records laws in the State. However, the vast majority of broadband providers in the State have elected to cooperate with the project and have provided at least some information about their coverage areas. Where providers have not provided data, or not provided adequate data we have used a variety of methods including modeling, field mapping, and use of public sources to develop map data.

Data Sources

In the first rounds of broadband mapping, provider presence maps were developed for central office locations and incumbent local exchange carrier locations for all assumed providers in the state. These were identified through a commercial spatial database purchased from GeoTel Inc., and supplemented by other public data sources such as the State's Public Service Commission and DSLReports.com. These were intended to be "talking maps" and general intelligence on where providers have infrastructure for subsequent phone and written communications with providers. These maps were compared to counties served by provider in the state’s telecommunications association directory.

Web site research, review of materials submitted to the state by providers, and public websites, such as the FCC were researched for each provider.

New providers are contacted to request data when a significant number of speed tests are recorded, or when we learn of their presence through ancillary sources. Providers that contact us directly and submit data are also included.

Broadband Coverage

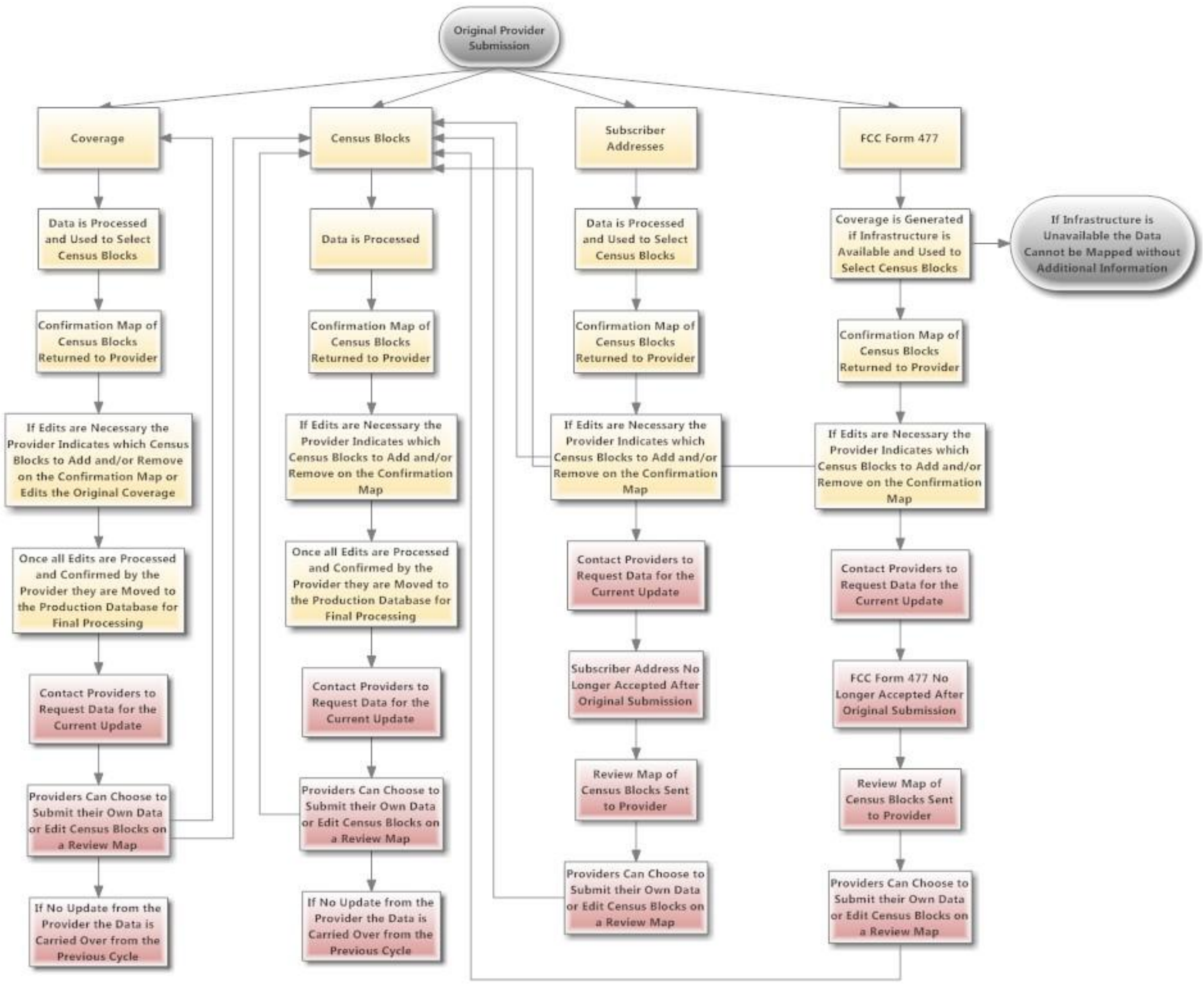
Data submitted by broadband providers was accepted as is and was mapped in complete form when provided as a broadband coverage at the same scale or larger scale than the census block level. Provider coverage submitted at a coarser geographic scale (e.g., census tracts, counties, zipcodes) was supplemented with public data, independent measurements and GIS modeling techniques. When provider submitted data appeared to be exaggerated or providers did not participate in the broadband mapping process, independent measurements and other data sources (e.g., state GIS framework structure locations, speed tests, survey results, website data and infrastructure) were used to override or supplement the provider data.

Broadband providers that chose to submit data did so in a wide variety of formats, levels of completeness, and at varying geographic scales including: narrative descriptions, analog and digital coverage maps, CAD files, GIS shapefiles and geodatabases, KMZ and KML files, FCC 477 reports, and data spreadsheets. All data formats were accommodated and processed whenever possible.

If data was submitted by a provider in a format that did not allow mapping at the census block level of geography, providers were sent standardized maps that included census blocks and a data spreadsheet in an attempt to standardize the inputs and increase the geographic granularity of the provider data submission.

Although each provider had individual characteristics and nuances in their data submissions, several data patterns can be described generalizing the provider submissions.

Figure 1 Provider Submission Types and Workflow



Providers Submitting FCC Form 477 Reports or Similar Format

Broadband providers are required to submit FCC Form 477 reports twice a year to the FCC; recently 477 submissions have been done using a structured web site maintained by the FCC. The 477 reports require broadband providers to submit a list of census tracts with the number of subscribers based on maximum advertised downstream and upstream speed tiers. Several providers submitted their actual FCC 477 report or a modified version in analog or digital format.

Figure 2 FCC Form 477 Example

Upload	>200<768	>200<768	>200<768	>3m<6m	
Download	>768<1.5m	>1.5m<3m	>3m<6m	>6m<10m	
Census Tract					Total
MT-[redacted]	60	-	-	-	60
MT-[redacted]	60	3	-	1	64
MT-[redacted]	27	1	-	-	28
MT-[redacted]	311	9	2	-	322
MT-[redacted]	120	2	-	-	122
	578	15	2	1	596

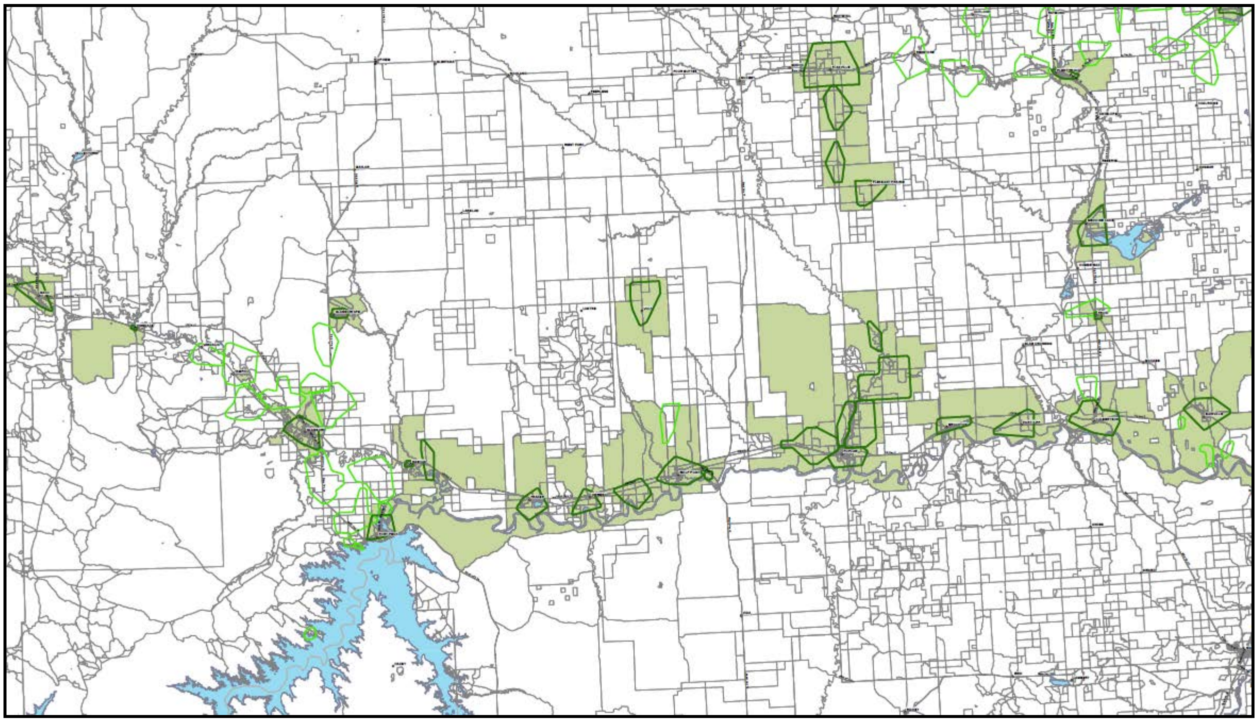
How They Were Handled

FCC Form 477 reports were entered into a standardized format that included the census tract ID code, maximum advertised downstream and upstream speed tier code, and number of subscribers (when available). Since the FCC 477 reports requires providers to submit data for all speed tiers within a census tract, only the highest maximum advertised speed for any given census tract was entered into the standardized spreadsheet in order to be compliant with the definition of broadband service.

The spreadsheets were then joined to a census tract feature class template that included the attribute fields from the NTIA schema. The resulting feature class was a geographical representation of the FCC 477 report including the technology of transmission and speed information. This feature class was used in conjunction with validated infrastructure data (i.e., central offices and/or remote terminals) to run the DSL or Cable geoprocessing models respectively.

The resulting census block selection from the DSL or Cable model was displayed on a standardized review map and returned to the provider for confirmation.

Figure 3 Review Map Example



If additional edits were required the provider "marked-up" the review map(s) to indicate which census blocks should be added and/or removed. The provider submission was handled as a census block update (describe in the section below) from that point forward. In future updates from those providers FCC Form 477 data was not accepted and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 4 Provider's "Marked-Up" Map Example

Several providers did not respond to the original confirmation maps and their final submission represented the best modeled estimate of their coverage at the census block level for DSL and/or Cable technologies. Providers that submitted FCC 477 data for fiber to the end user or fixed wireless could not be mapped and were not included in the final broadband map unless they provided additional data at the census block level or equivalent coverage at a similar scale.

Providers Submitting Census Block Coverage

Census blocks submitted by providers representing their broadband coverage area come in a wide range of formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases, tabular lists, and spreadsheets.

Figure 5 Census Block Submission Example (names blacked out)

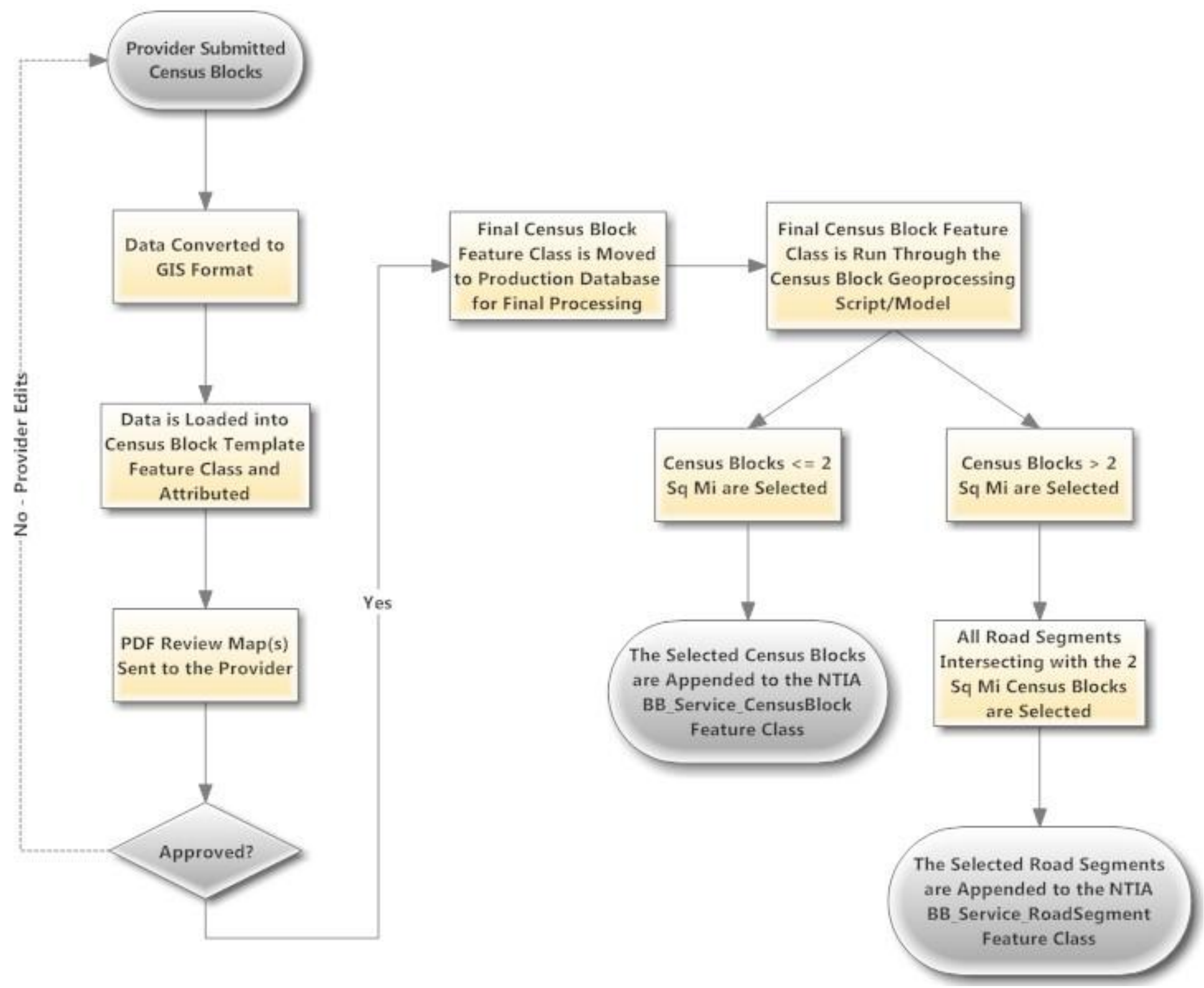
STATE	PROVIDER	DBA_NAME	FRN	CENSUS_BLO	TECHNOLOGY
MT	[redacted]	[redacted]	0018626853	300470002001003	10
MT	[redacted]	[redacted]	0018626853	300470002001008	10
MT	[redacted]	[redacted]	0018626853	300470002001072	10
MT	[redacted]	[redacted]	0018626853	300470002001079	10
MT	[redacted]	[redacted]	0018626853	300470002001083	10
MT	[redacted]	[redacted]	0018626853	300470002001092	10
MT	[redacted]	[redacted]	0018626853	300470002002012	10
MT	[redacted]	[redacted]	0018626853	300470002002021	10
MT	[redacted]	[redacted]	0018626853	300470002002023	10
MT	[redacted]	[redacted]	0018626853	300470002002027	10
MT	[redacted]	[redacted]	0018626853	300470002002029	10
MT	[redacted]	[redacted]	0018626853	300479403011013	10
MT	[redacted]	[redacted]	0018626853	300479403011018	10
MT	[redacted]	[redacted]	0018626853	300479403011022	10
MT	[redacted]	[redacted]	0018626853	300479403011048	10
MT	[redacted]	[redacted]	0018626853	300479403011051	10
MT	[redacted]	[redacted]	0018626853	300479403011055	10
MT	[redacted]	[redacted]	0018626853	300479403011056	10
MT	[redacted]	[redacted]	0018626853	300479403011057	10
MT	[redacted]	[redacted]	0018626853	300479403011058	10
MT	[redacted]	[redacted]	0018626853	300290013011000	10
MT	[redacted]	[redacted]	0018626853	300290013011005	10
MT	[redacted]	[redacted]	0018626853	300290013011010	10
MT	[redacted]	[redacted]	0018626853	300290013011011	10

How They Were Handled

All census block submittals were loaded into a census block feature class template that included all of the attribute fields from the current NTIA schema. Census 2010 geography was used as required by NTIA. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, and maximum advertised upstream speed. If a provider did not identify the technology of transmission for a given census block or blocks, they were contacted by phone or email in order to obtain this information. In instances where speed information was not included in the data submission providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, and their advertised speeds were not available on their web site, the lowest domain code was entered in the applicable attribute field.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider's census block submission, the census block feature class was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles and road segments that intersected census blocks greater than two square miles and were appended to the appropriate NTIA transfer data model feature classes.

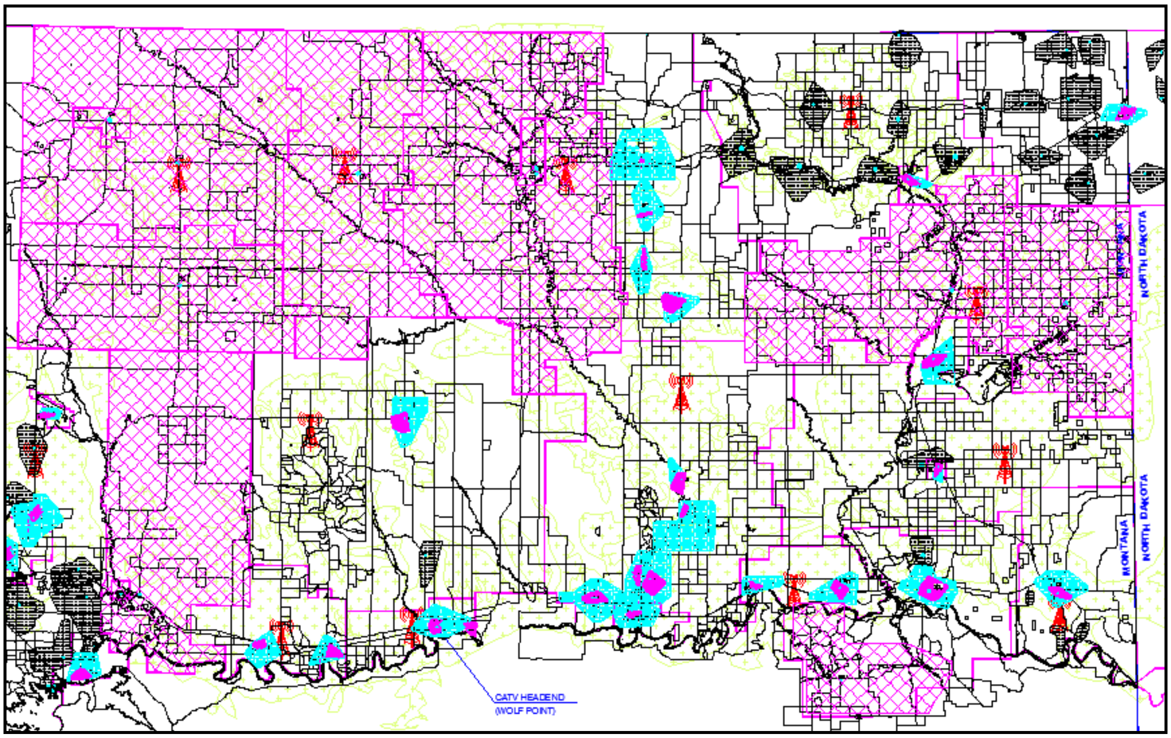
Figure 6 Census Block Geoprocessing Model



Providers Submitting Coverage Data

Provider submitted coverage data were differentiated from the other types of geographic data submissions coarser than a census block since they represented the full and explicit range of broadband coverage. Similar to the other types of data submissions, coverage data was also provided in a wide range for formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases. Coverage data was submitted by several providers or was available on several providers' websites.

Figure 7 Coverage Data Example



How They Were Handled

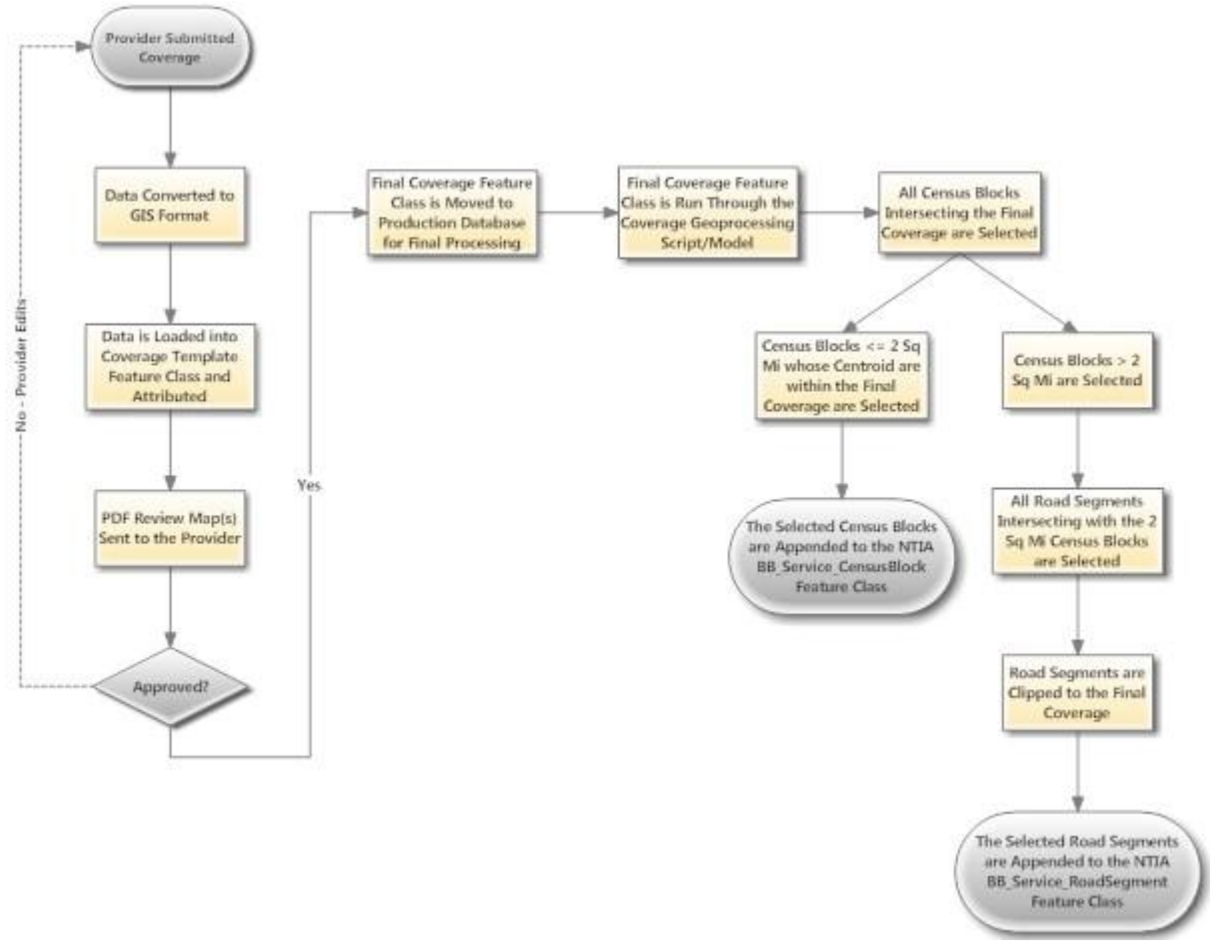
All coverage data was loaded into a coverage template feature class schema that included all of the attribute fields from the NTIA schema. The method of data loading was driven by the format in which it was received. Providers who supplied GIS shapefiles or feature classes could generally be loaded into the coverage template feature class schema using the simple data loader while CAD data had to be exported to GIS format prior to being loaded into the coverage template.

Coverage data supplied as digital or analog maps required georectification and digitizing prior to loading into the coverage template feature class. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, maximum advertised upstream speed, and spectrum. If a provider did not identify the technology of transmission for a given coverage area, they were contacted by phone or email in order to obtain this information.

When speed information was not included in the data submission, providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, the lowest domain code was entered in the applicable attribute field. If a provider did not specify the type and spectrum used for fixed wireless the default values for unlicensed were used.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider's coverage submission, the data was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles when the centroid of the census block was within the coverage area. Road segments that intersected with census blocks greater than two square miles were selected and then clipped to the coverage area in order to provide the most accurate representation based on the provided coverage. The selected census blocks and road segments were appended to the appropriate feature class in the NTIA data transfer model.

Figure 8 Coverage Geoprocessing Model

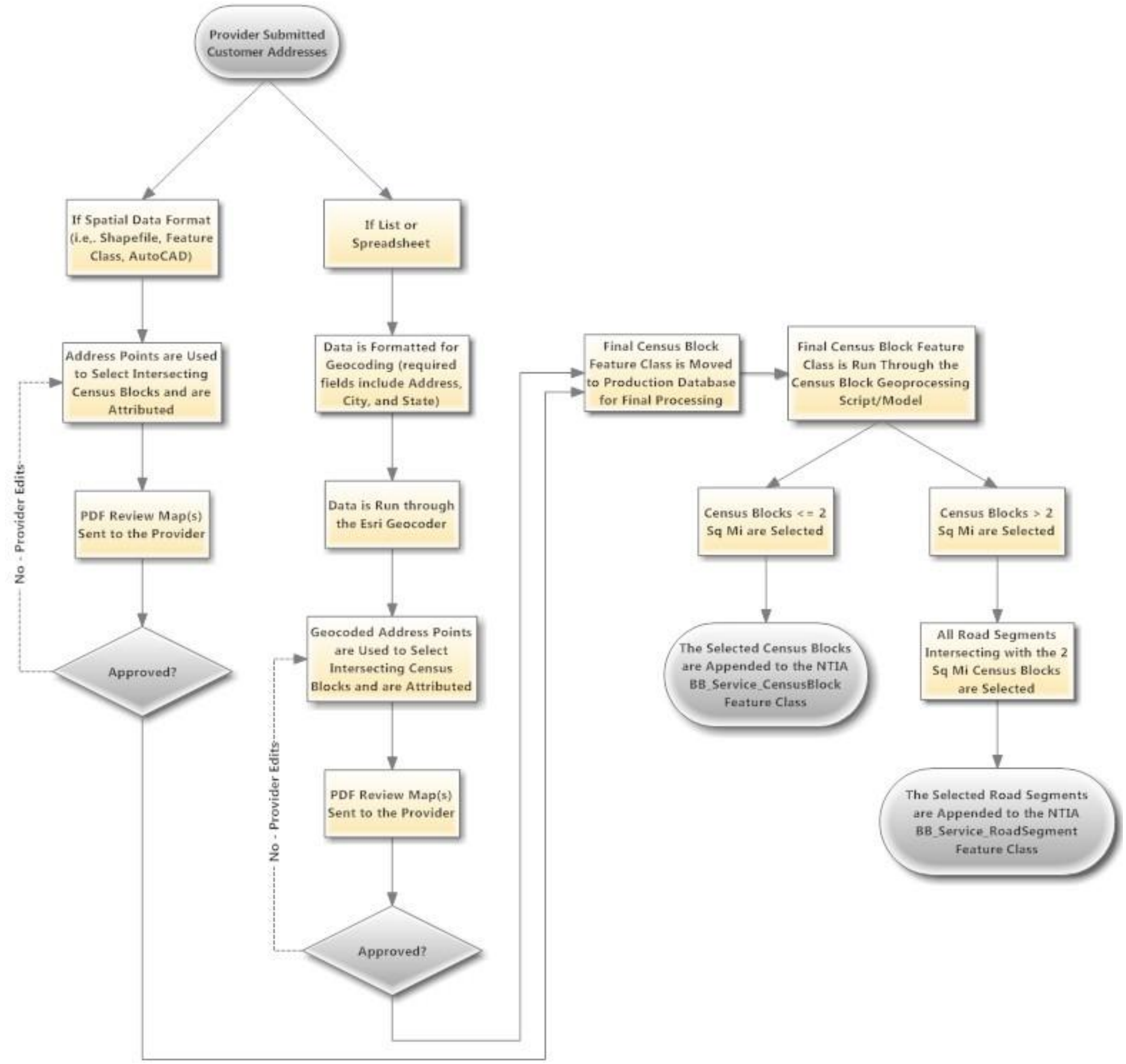


Providers Submitting Customer Locations

Providers that submitted customer locations typically fell into one of four categories. Several providers submitted customer locations in AutoCAD files, the points were exported to a shapefile and used to select all intersecting census blocks. Other providers submitted analog or digital maps that included customer locations, these images were georectified and census blocks were selected by an operator viewing the customer point images underlying the census blocks. Lists of customer addresses were also submitted. The data was loaded into a spreadsheet and geocoded using ESRI Business Analyst USA Geocoding engine. The geocoded points were treated identically to customer locations submitted in GIS or CAD format and used to select intersecting census blocks.

The resulting census blocks were added to confirmation maps and returned to the provider. If edits were necessary the provider indicated on the map which census blocks needed to be added and/or removed. The provider submission was handled as a census block update (described in the section above) moving forward. In subsequent updates subscriber address data was discouraged and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 9 Customer Addresses Geoprocessing Model



Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common were telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. These coarse geographic submissions were problematic because these areas were typically very large and lacked the detail of a defined coverage area resulting in over-exaggerated broadband coverage.

How They Were Handled

Operational rules established early in the project heavily scrutinized provider data that appeared to significantly over-represent broadband coverage and often resulted in a rejection of the submitted data. Providers who submitted coarse geographic levels of coverage data and infrastructure for DSL or cable modem service were initially that also were represented in the last point of aggregation infrastructure point file were sent estimated census block coverage maps and spreadsheets, and provided a second submission with finer level geography.

Providers submitting town locations for DSL or Cable were handled differently, and used as validation for central offices from the last point of aggregation table, and subsequently to run the DSL modeling routine or validate a cable or cable plus areas.

Cable Modem Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for Cable providers who did not submit census block or coverage data (i.e., census tract providers).

The most authoritative GIS layer available from the state with incorporated areas and city boundaries was used as a surrogate to model cable broadband coverage. Some towns that were not incorporated were also added. Municipalities and towns were sporadic in their digital update of these maps, since annexations and other boundary modifications were ongoing and difficult to maintain in real time updates. To compensate, likely areas contiguous to these city boundaries were added, labeled "Cable-Plus" in the operational data model. These additional polygons were determined using operator interpretation, road density, structures points from Info USA in Esri Business Analyst, speed test results, and in some instances NAIP imagery. In general areas were added that were immediately contiguous to existing city or town boundaries that represented likely areas where cable service existed. We were conservative in this approach and did not include populated areas near the cable plus boundaries unless they were directly contiguous to existing boundary areas.

Cable broadband providers primarily work under the structure of franchise agreements with municipalities. In the early rounds of broadband mapping updates, phone calls were made to the largest cities in the state in order to obtain that respective city's cable franchise agreement. They were all either unknown or a text agreement without maps.

The full set of potential cable areas were then passed through validation sources to determine if cable was provided. This included public sources, such as the Warren Communications Cable Fact book (http://www.warren-news.com/factbook.htm).

The second and most authoritative form of validation was data received from cable providers at the census tract, block, or coverage level of geography. A spatial join geoprocessing operation was performed on these datasets with the full set of potential cable coverage areas in order to further validate areas with cable coverage.

The third source of validation came from the public speed test site maintained throughout the project. Whenever user submitted speed tests identified cable modem broadband service near or adjacent to existing estimated cable areas, the cable-plus boundaries were expanded using the same method of digitizing outlined above.

It was not possible to differentiate between technology of transmission codes 40 and 41 using this indirect mapping method. The only authoritative way to determine this information was from data submitted by a provider. In all cases where the provider did not indicate the type of cable modem technology being used, the code for Cable Modem-Other (41) was assumed.

DSL Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for DSL providers who did not submit census block or coverage data (i.e., census tract providers). This model is based on typical DSL technology which can provide service up to 18,000 feet from a central office or remote terminal, unless otherwise specified by a provider.

Since DSL lines are typically buried alongside roadways, underneath roadbeds, or strung on aerial telephone lines which tend to run alongside a road, a GIS dataset of a state's road network were used as a surrogate to model DSL areas. In the initial rounds of broadband maintenance we purchased commercial (GeoTel) and publicly available data sources representing last points of aggregation (LPA) for DSL, including central offices and remote terminals. Each LPA was validated based on publicly available data, provider data, and independent measurements. LPAs were used in a DSL model only if they were supplied directly from a provider or could be verified by two or more sources. The actual geoprocessing model used the validated central office and remote terminal locations to generate a raster cost surface based on all of the available roads radiating out 18,000 feet from each active LPA point. The raster coverage was converted to a polygon feature class and a small back-buffer was applied to achieve the final DSL coverage polygon representing a provider's maximum possible DSL coverage area. The DSL coverage areas were then used to select intersecting census blocks and road segments.

Remote terminals were provided or publicly available for only a small number of providers, therefore this method may tend to underestimate the full DSL coverage for a provider.

It was not possible to differentiate between ADSL or SDSL based on the LPA data; the only authoritative way to determine this was from data submitted by a provider. In all cases where the provider did not indicate which type of DSL service was being provided, the technology code was assigned to 10 "Asymmetric xDSL".

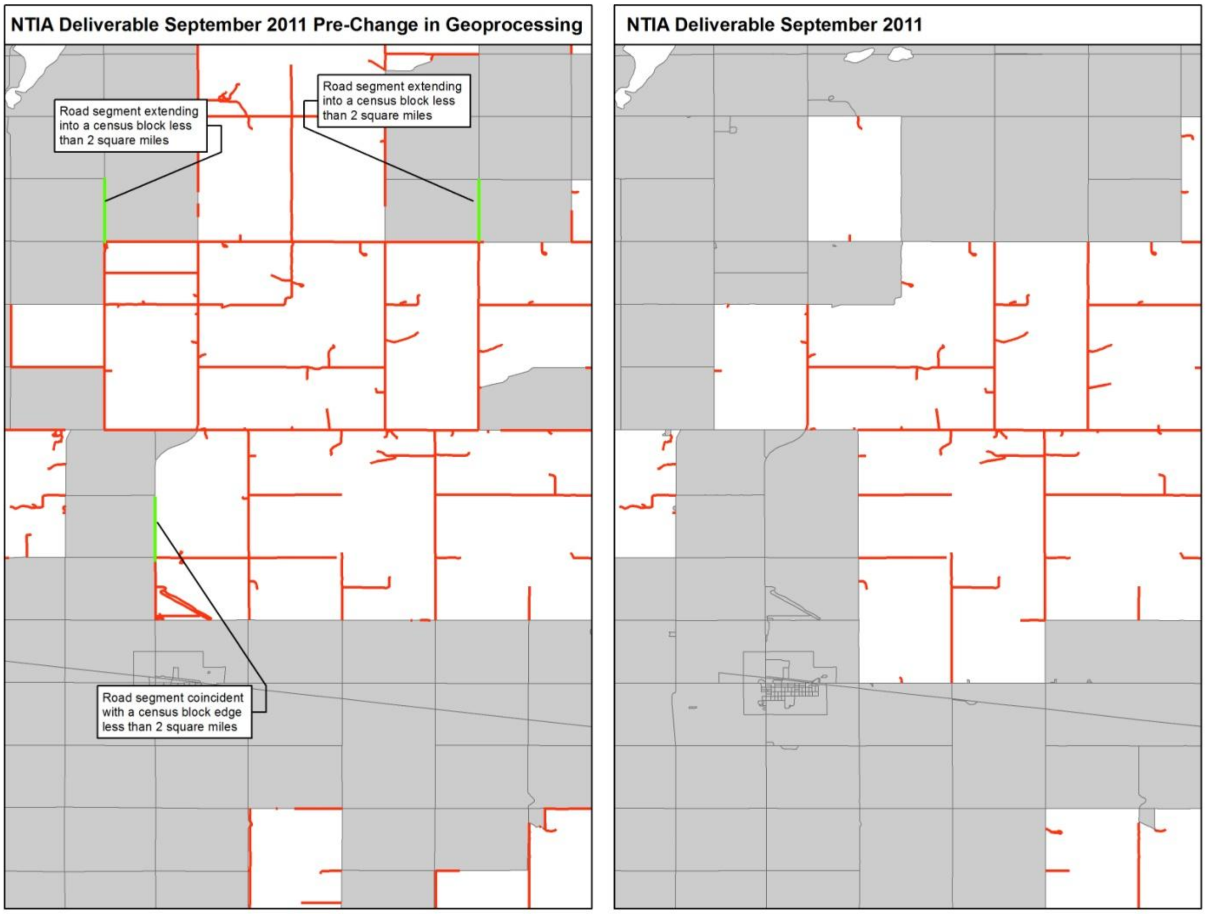
2000 T0 2010 Census Block Conversion

The September 2011 deliverable to NTIA required the transition from 2000 census data to 2010 census data, but the conversion process was dependent upon the type of data submitted by a provider. These providers fell into two categories, block providers or coverage providers. The conversion to 2010 census geography was a straightforward process for the coverage providers; the reference to the census block data in the geoprocessing model used to select census blocks and road segments was simply changed from the 2000 data to the 2010 data and each provider's data was re-run. The conversion from 2000 census to 2010 census data for block providers required several geoprocessing steps due to the inability to simply match census block IDs across vintages. The census blocks for each provider were dissolved by type of technology to form a quasi-coverage area. The dissolved blocks were then used to select any 2010 census block whose centroid fell within the "coverage area."

Road Segment Geoprocessing Change

Prior to the September 2011 NTIA data submission, road segment in census blocks greater than 2 square miles were selected with a straight intersect. This resulted in road segments being selected that were coincident with census block edges in blocks less than or equal to 2 square miles. Using this same geoprocessing methodology combined with the new 2010 census blocks and TIGER roads, road segments were selected that were coincident with census block edges and that extended into census block less than or equal to 2 square mile. We believe this "error" occurred due to the improvements in the spatial accuracy of both the 2010 census blocks and road segments for 2010 where features were now coincident. For the September 2011 submittal a small negative buffer (-0.5 feet) was applied to the intersect to avoid selecting roads that were coincident with census block edges and/or those that extended into census blocks less than 2 square miles. This resulted in a significant decrease in the number of road segments reported but overall we believe this method more accurately portrays each provider's coverage area.

Figure 10 Road Segment Geoprocessing Change Example



Community Anchor Institutions

Lists were obtained from the state and affiliated processional organizations for anchor institutions to be included in the broadband mapping in each of the community anchor institution community code categories. These were sorted and cross referenced and an initial round of elimination of duplication was accomplished.

All institutions on the initial draft spreadsheets used for the first two submittals were geocoded using ESRI Business Analyst Desktop with the USA Geocoding engine using TeleAtlas premium road features. This was judged to be the best available geocoding source for batch processing of addresses. No commercial source is 100% accurate in a primarily rural state such as this with low population numbers compared to other states and no large cities or metropolitan statistical areas. In subsequent rounds of updates since the first two submittals, we have used the same geocoding engine from esri Business Analyst, but the geocoding locator switched to NavTech geocode locator. In every round of geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode.

All geocoding is dependent on accurate road locations and complete and accurate street segment attribution. The GIS road layers available from the state were not judged as complete as the premium commercial sources. The Tiger 2009 road files, while spatially comparable to the commercial sources, have a large percentage of null values in the database attribution and street segment address ranges necessary for accurate geocoding. As in most parts of the country, geocoding is more accurate in urban settings than in rural routes. Complicating the process in a rural state for anchor institutions are the situation where some anchor institutions, such as public safety anchors are often staffed by volunteer staff and a post office box is the only valid address, and the physical address is wherever the public safety equipment is parked or stored at any given point in time.

Category codes were assigned based on the original source list and from keywords in the name of the institution and independent research. Technology of transmission and advertised speeds were obtained when possible, which initially was entirely based on the anchor institutions maintained by the state for consortiums providing state service contracts. Two iterations were accomplished with these state maintained lists, and all available attributes were obtained with assistance of the state analysts.

After initial data collection, analysts worked on researching, calling and improving the addresses for those below an 80% match criteria. Many in the 70% matching range were fairly accurately located. The difference between a 70% and 80% match typically occurred when an address lacked a prefix or suffix cardinal direction on a street that had two cardinal directions (example 101 1st Street, on a street segment with 101 N. 1st Street and 101 S. 1st Street).

Analysts were also able to obtain physical addresses for some lists supplied by the state with only a P.O. Box.

The lists with updated and corrected addresses were re-geocoded for the final mapping effort, and any anchor with any level of geocoding was included on the final map. The operational database identifies the type of match, so future maintenance cycles can be prioritized and targeted to those matching only zip codes or with address changes.

From the results of the previous step some attribution of database attributes for attributes with null values was accomplished. This step was rule based. The attribute of whether an anchor institution subscribes to broadband service could only authoritatively be answered yes, if the information was provided by the state, or a confirmation from an anchor speed test could be matched. Those anchors that were located within an area covered by a DSL, cable, other copper or fixed wireless were also assumed to have the ability to subscribe to broadband coverage and were also estimated to be subscribers. Assigning the technology of transmission and the advertised speeds (which required identifying a provider for the anchor institution) was only possible on a subset of all coverage in those areas where only one provider/technology of transmission was present. This allowed a few hundred more anchors to be identified, but typically only occurred in rural settings. Most urban settings had multiple providers. In addition many providers submitted multiple technology options, so identifying one provider/technology of transmission combination was not possible even if there was only one provider possible for the anchor institution.

It is likely that in some instances in the rural settings and small towns an anchor institution may rely on mobile wireless broadband. This is common in public safety mobile equipment such as vehicles, but likely less common in anchor facilities. For the purpose of assigning attribution to anchor institutions with remaining null attributes, we took a conservative approach and did not overlay anchor institutions on mobile wireless coverages to assign attributes.

Maximum advertised downstream and upstream speeds were not available or collected for any of the CAIsA new domain value of “U” for Unknown was added to the data model for the current submission, and all values formerly coded as 0, were changed to “U”. A new optional attribute was requested by NTIA for the current submittal requesting knowledge about the presence or absence of WIFI at the CAI locationThis was not researched and attributed by the state in the current submission. All records were set to “Unknown” for the attribute, Public Wi-Fi.

In the first two submission processes for geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode. The current submission was completed by state analysts, and new additions to the list were not geocoded. The additions of new anchor institutions in this submission were assigned their latitude and longitude geographic location based on their location used in the Montana Structures Framework.

A new optional attribute was requested by NTIA after the initial maintenance updates requesting a CAI unique identification number for K-12 schools, libraries and colleges and universities. The following steps were completed for this request.

1. Added CAIID for the Library category using a combination of the FSCSKEY and FSCS_SEQ number attributes from http://harvester.census.gov/imls/data/pls/index.asp. Added 49 records using the Montana Structures Framework to assign their geographic location.
2. Added CAIID for the University, college, other post-secondary category using the NCES IPEDS ID from http://nces.ed.gov/ipeds/datacenter/. Added 10 records using the Montana Structures Framework to assign their geographic location.
3. Added CAIID for the School – K through 12 category using the NCES ID CCD ID from http://nces.ed.gov/ccd/bat/ . Added 118 schools using information from the OPI Schools http://www.publiclibraries.com/montana.htm list, the NCES Schools List and the Montana Structures Framework. NOTE: NTIA asked that each school be given a unique ID but in the CAI table, many schools at the same address were combined. These were not separated for this round of the NTIA submittal.

A new optional attribute was requested by NTIA for the current submittal requesting a URL for each anchor institution.

Assigned URLS to CAI records: for the University, college, other post-secondary category assigned the actual URL for that institution; for the Library category added a standard URL (http://www.publiclibraries.com/montana.htm); for the School – K through 12 category added the OPI URL (http://opi.mt.gov/Resources/Directo the 2011 update cycry/Index.html); and for other institutions, added an appropriate URL for the type of CAI.

The State of Montana assigned administrative staff to update the anchors during the 2011 update cycles. They eliminated duplicate entries, added additional schools based on Office of Public Instruction data, and updated the NCES codes.

Wireless Coverage

Three forms of wireless coverage were provided in this table, fixed point to point wireless, mobile wireless and satellite. No public data was located on fixed wireless infrastructure points, except notification of availability on provider's web pages, and in some instances, specific towns, recreation or commercial locations where wireless service was provided. No modeling was attempted on fixed wireless coverage. All coverage came directly from providers or was mapped from locations provided on a provider web page. We did not attempt any propagation modeling on fixed wireless, since that can be influenced by local structures and vegetation in the vicinity. A few providers did provide coverage that appeared to be derived from propagation modeling.

Most of the public data research focused on mobile wireless providers using cellular service spectrums. The Federal Communications Commission (FCC) Universal Licensing System (ULS) is the consolidated database and application filing system for most Wireless Radio Services. ULS supports electronic filing and provides public access to licensing information, weekly Public Notices, FCC rulemakings, processing utilities, a telecommunications glossary, and much more." The FCC ULS Advanced Licensing Search was queried for all FCC licenses filed in the state; a relational database was built from the results. Information from the database was extracted in order to perform the cellular tower propagation modeling for wireless broadband.
The FCC ALS and ULS reporting systems were the source for most of the tower locations. Towers were required to be licensed when they meet specific published criteria. These included some variables that could be modeled with GIS statewide, such as varying proximity to airports and heliports, combined with specific local level criteria not easily obtained or modeled statewide such as the grade construction within proximity of these, and any structure over 200 ft in height. A number of cell towers providing broadband were likely not located in the FCC database. None of the mobile wireless providers were willing to provide infrastructure such as tower locations and parameters, and the coverage provided were very generalized.
The mobile wireless coverage in the state is in transition. There were currently no GSM mobile wireless providers meeting the NOFA criteria for being a provider. There is some GSM infrastructure in the state maintained for wholesale arrangements and roaming users with GSM technology.

Any fixed or mobile wireless antenna or tower location submitted by a provider, or obtained from the FCC that was used in the final processing for wireless broadband coverage was maintained in the operational database for last point of aggregation, and subsequently transferred to Table 3 backhaul and middle mile points.

Providers submitted coverage data in a wide variety of formats, levels of completeness, and at varying geographic scales. All types of data was accommodated and processed whenever possible. An open structure process for submittals was allowed, accepting any data, and attempting to work with the provider when questions arose. If data was submitted by a provider in a format that did not allow a direct coverage to be mapped, such as a coarse level of geography such as a census tract, or county, feedback was provided to the providers in the form of standardized spreadsheets in an attempt to standardize the inputs, and increase the geographic granularity of the provider data submission. Although each provider had individual characteristics and nuances in their data submissions, some data patterns can be described generalizing the typical types of submissions. In general, for fixed wireless to be mapped it was necessary to receive data from a provider, since there were no public sources available on point to point wireless tower locations in public form, except as depicted on providers web pages in a few instances.

Providers Submitting FCC Form 477 Report or Similar Format

Geographically, these were lists of census tracts of coverage, accompanied by additional documentation on technology of transmission, speed tiers, and number of customers. Providers submit these twice a year to the FCC and recent submissions have been done using a structured web site maintained by the FCC. A few providers submitted printouts that appeared to be from this web format and were typically complete and standardized. More providers submitted spreadsheets roughly in the F477 format, but with modified and generalized data.

How They Were Processed
If the providers identified specific coverage areas as census blocks, or direct coverage area, or as infrastructure tower locations, they were processed and mapped. Providers identifying census blocks were processed by dissolving the census blocks into single coverage polygons by speed tier. Providers identifying a direct coverage area were converted directly to GIS polygon files and attributed. Providers submitting tower locations were mapped as circular polygons centered on the tower with a radius averaging 10 miles measured as Euclidian (straight line) distance from the tower. Providers that specified variable radius were mapped as circles at the radius they submitted.

Providers Submitting Census Block Coverage

Some providers submitted coverage as census blocks, either through a tabular listing of census blocks or spreadsheet, or in map format. It was common that a provider where public data indicated multiple technologies of transmission only submitted some of the technologies of transmission.

How They Were Processed
These were loaded directly into the master Census 2000 block coverage by provider and attributed with available data submitted by the provider. In instances where some data attributes were missing, such as advertised or typical speed tiers, or subscriber data, the data attributes were left blank or null. Providers identifying census blocks were processed by dissolving the census blocks into single coverage polygons by speed tier. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Actual Coverage Maps

Coverage maps were submitted by several providers, or coverages were derived from public sources or from other indirect indicators of coverage such as customer point maps or tabular lists in text or spreadsheet format. These were differentiated from the other types of geographic submission coarser than a census block since they represented the full and explicit range of coverage.

How They Were Processed

Coverage maps were treated as explicit coverage and all census blocks intersecting any portion of a coverage were selected and attributed with the provider coverage by technology of transmission, and all related attributes were transferred to the census block representation. The method of creating the coverage varied by source. Providers who supplied broadband coverage as a GIS polygon or CAD feature were converted to polygons. Some providers, including non-responsive providers who did not submit anything to the project, had published coverage maps of various forms on their web sites or submitted an image in jpg, tiff, pdf or other graphic format. These were geogeorectified to base map layers, typically roads, but sometimes other features such as state or county boundaries or towns, and subsequently converted to polygon features. Then they were intersected and transferred to census block feature classes like the digital GIS submissions. Providers who submitted customer locations typically fell into four categories. Some were submitted as AutoCAD files where the points could be transferred to the GIS, then spatially joined to the census blocks they were located within. Others submitted maps in image format that were georectified in the same manner as other images, then census blocks were selected by an operator viewing the customer point images underlying the census blocks. When customer lists were submitted, they were loaded in a database and geocoded using ESRI Business Analyst USA Geocoding engine based on TeleAtlas road features. The geocoded points were subsequently treated identically to customer locations submitted in GIS or CAD format, and spatially joined to the census block template file. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common was as telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. The problem with these submissions was that often a given polygon overlapped a census block or multiple blocks, and in most cases, they were much larger geographic entities than a census block.

How They Were Processed

Our operating rules established early in the project did not allow final provider coverage to significantly over represent provider coverage. Those providers that submitted coverage area by coarse geographic features and did not specifically identify coverage as a coverage layer or census blocks were not able to be processed. No interpolated data was used to calculate these data, if the data was not provided by a provider in a format capable of processing; the data was not calculated for that provider.

Satellite

The parameters below show the satellite wireless models for MT. A few satellites are use the same azimuth and altitude, so they only need to be run once and subsequently copied and renamed for different providers. There was one coverage for WildBlue and Starband, and four coverage for Hughes/DirectTV. The Anik-F2 satellite appears to be shared by Hughes and WildBlue coverage, and was listed under both.

The process included running a hillshade with the parameters shown below, selecting the "Model shadows" parameter. This was reclassed into 3 classes 0,1,Max value. Then the Majority filter model in Spatial Analyst Generalization was run with a 4x4 neighborhood grid to filter out the smallest isolated shadow pixels. A conditional selection of the class 0 (shadow values) was made for the final grid. This was run through a raster to polygon conversion and added to the master coverage template from geodatabase.

Provider Satellite	Azimuth	Altitude	Operator
Hughes / DirectTV			
Anik-E2	141.6	33.7	Telesat Canada Ltd.
Anik-F2	181.8	36.13	Telesat Canada Ltd.
Spaceway-1	170.6	35.68	Direct TV, Inc.
Spaceway-3	160.1	34.17	Hughes Network Systems
WildBlue			
Anik-F2	181.8	36.13	Telesat Canada Ltd.
Wildblue 1	181.8	36.1	Wildblue Communications
Starband			
Echostar 9	195.1	35.03	Echostar Technologies, LLC

Middle Mile

Middle mile and backhaul points were included for all public data and provider submitted infrastructure judged to be reliable and valid. A systematic reliability (geographic scale and authority of the source) rating and a validity rating (cross referencing between multiple sources) were developed and used throughout the project, both on a scale of 1-10, along with feature level metadata to maintain the last point of aggregation. A persistent unique identifier was used to track each point and each instance of a point as they moved through the system and improved in quality. Old points were retired but were not deleted from the operational database. Only active records were used in the final processing.

A feature class labeled "Last point of aggregation" (LPA) in the operational database was created to hold point locations of broadband infrastructure (examples include central offices, remote terminals, head ends, etc.). Addresses purchased or obtained at any level of geography were geocoded to a street address (using ESRI Business Analyst and TeleAtlas data) or located more generally to the center of a town (snapped to the USGS Geographic Names Information System location) when no address information was available. and All mobile wireless locations obtained from public sources or commercial sources that were not already validated were confirmed using NAIP aerial imagery and Google Street View (when available). All FCC tower locations included a latitude and longitude, however all towers were validated and moved to the NAIP aerial imagery location.

A reliability code indicating the source and geographic scale represented as an integer from 1 (low) to 10 (high) was assigned. Validity codes were assigned cross-referencing public and provider data submissions; it was also rated on a scale of 1-10. A point with a validity code of 7 that fell within a provider's coverage for DSL, mobile or fixed wireless, or was used in a final modeled coverage was included in this table. In addition, backhaul points identified by the state, by providers and consortiums providing services to the state and anchor institutions, were included in the table. Providers were typically reluctant or unwilling to provide infrastructure data, and often unwilling to confirm data obtained through public sources. The methods used in the state allowed a significant level of identification and mapping of infrastructure locations and feature level metadata on reliability and validity of point locations, but data on owned or leased characteristics, serving facility codes, and for elevation of infrastructure was confirmed by few providers who responded directly in a spreadsheet provided to them to list infrastructure.

Speed Test Data Processing

A public facing website was created in the spring of 2010 asking internet users in the state to complete a brief survey regarding their internet connection and run a speed test on their connection using the Ookla speed test. The speed test site asked that a user enter their location as an address on a Google map interface. If the address did not geocode to their satisfaction, the user could choose to move the place mark to their desired location. Next, users were asked to select their technology of transmission from a list, enter their provider in a free form text field, complete an optional questionnaire, and run a standard speed test on their connection. The date and time, and IP address of the user were captured during the speed test.

All speed tests were geocoded, and the IP address was looked up in batch mode in the WHOIS database returning one or two providers registered with WHOIS. All speed tests were cleaned and analyzed against provider submissions and models. For the first two submissions a final provider assignment was assigned by examining the WHOIS fields, and the provider submitted by users. Consistent rules were not always possible, but generally when two WHOIS records were returned, the second more specific WHOIS provider was selected. In some instances, where the WHOIS providers were backhaul or other and were not providers meeting the NOFA criteria, the user submitted provider designation was cleaned and standardized and assigned as the final provider. For the current submission a rule based database program was built by the Montana Dept. of Administration to automate the final provider assignment.

There was considerable variation between the user reported technology of transmission (TOT) and the known technologies for any given provider. Records were divided on unique provider/ TOT combinations for the first and second submissions, which limited the record count in many instances. For the current submission the records were divided only by provider, not taking TOT into consideration.

For the first two submissions, the speed test records were used in two ways for the final processing.

1) As an independent measurement to validate the presence/absence of a provider coverage for DSL and/or Cable technologies.

In the first submission a few providers were identified as DSL broadband providers based primarily on speed tests. In these instances, DSL models were executed for both providers based on verified central office locations. Some speed tests with an identified technology of transmission of Cable Modem were used to expand “likely” cable areas which were typically adjacent to incorporated and urban areas. These “cable-plus” areas were created to supplement submissions from Cable Modem providers who did not provide detailed coverage or census blocks. No new DSL providers or Cable providers were identified using speed tests in the current submission.

2) As an independent measurement for typical upload and download speeds.

Once data were cleaned and final provider and technology of transmission assigned, these fields were concatenated. In the first two submissions, if the remaining records exceeded 10 for the combination of provider and technology, and the speed test was successfully completed (values > 0) the average value and standard deviation of the download speed were calculated. Any values exceeding 1 standard deviation were removed as outliers, and the mean of the remaining records within 1 standard deviation was calculated for the download and upload speed. This value was reported for each provider/technology of transmission record as the typical speeds for that provider. In some instances the typical speed was lower than that required to meet the definition of broadband by NTIA, but that did not preclude the records from being included in the broadband map in the first two submissions as it did in the current submission.

For the current submission, these procedures were modified and all records were re-run. The steps of the current processing are provided below. The primary procedural change was to drop the validation of the presence/absence of provider coverage for DSL and/or Cable technologies, since providers had been validated in the first two submissions and potential new providers identified through additional speed tests were determined to not meet the NOFA criteria for being considered a broadband provider. The use of the speed test data for determining typical speeds was implemented with similar rules as the first two submissions with the exception of the use of the technology of transfer, and raising the minimum number of speed tests to 15, after removing outliers, to be used in typical speed calculations. Procedurally, the process was also automated with a Python script to improve processing performance and minimize quality control/quality assurance testing.

Typical upload and download speeds for all providers with less than 15 processed speed test records were coded as null values. In addition, based on telephone communication with NTIA on March 9, 2011, all typical speeds less than minimum NOFA upload of download speed criteria were also ignored and reported as null. Based on a related request in the same communication, the typical speeds greater than the advertised speeds were ignored and reported as null. Subsequently on March 17, in the NTIA grantee webinar, the NTIA staff indicated that typical speeds would not be compared to advertised speeds. This rule change was not received in time to implement in the workflow for the current submission, and will be implemented in the fourth submission in the fall, 2011. Processing steps for the current submission are provided below:

1. Speed test records were imported into a SQL Server data file, adding fields Final Provider and IPGroup to the initial records.

2. IPGroup attribute was set by extracting the left three nodes of the IP Address of the speed test (e.g. 161.7.1.236 had 161.7.1) moved to the IPGroup attribute.

3. An IPGroup to Final Provider cross reference table was created to determine the final provider from the unique three part IPGroup (e.g. 161.7.1 is known to be the State of Montana).

4. Each IPGroup was reviewed with the data in the who is 1 provider, who is 2 provider and then the user specified provider to determine the most authoritative final provider from the official list of providers. None of the WHOIS or user submitted fields were absolutely authoritative in all instances, so expert opinion by technicians knowledgable of the providers was used in some instances to assign the IPGroups, and subsequently the Final Provider attribute.

5. Run a python script to remove outliers and calculate summary statistics for each Final Provider assignment. The rationale for removing outliers was to mitigate the many

variables that effect a typical speeed test, such as the time of day, others on the network, etc. The script implemented the following work flow rules:

   a. Use all records for each unique FinalProv attribute value with D_kbps greater than 0 or U_kbps greater than 0 , then:

   b. Calculate a mean for the unique provider group for each D_kbps and U_kbps.

   c. Calculate a standard deviation for the unique provider group for each D_kbps and U_kbps. Each speed attribute was calculated independently of the other.

   d. Subtract the outliers (if any) higher or lower than one standard deviation from the mean.

   e. Calculate the median value of the remaining non-outliers for each provider D_kbps and U_kbps respectively.

   f. Create a summary table with the final calculated assignment of FinalProv, D_kbps and U_kbps.

6. Post process the summary table in the following sub steps:

   a. Join the summary tables by provider for the upload and download speeds into one summary file including the number of records or frequencies for up and down speeds for each provider after removing the outliers, and the mean up and down speeds in kilobits per second for each provider.

   b. Select "FreqDown" < 15 AND "FreqUp" < 15 then delete the resulting selection set from the joined table. The FreqDown/Up fields counted the number of speed test records for a provider after the outliers more or less than one standard deviation from the mean value were removed from consideration.

   c. Select "D2_kbps" <= 768 kbps AND "U2_kbps" <= 200 kbps. then delete the resulting selection set from the joined table.

7. Import the remaining valid mean values for each provider into the appropriate broadband coverage feature classes.

8. Select any typical speeds greater than advertised speeds either up or down, and make the resulting records null in the final broadband coverage feature classes (as per NTIA request 3/9/2011).

Quality Assurance Testing

A separate analyst checked each provider submission. Due to the variety of provider submissions, the analyst originally doing the work and the analyst checking discussed the interpretations when the criteria were subject to interpretation.

Coverage, technology of transmission, and speed tier were checked completely for each provider.

Many of the models and block, tract and coverage level processes were completed with ESRI Modelbuilder and Python scripts, and these methods were tested for quality assurance in the preliminary mapping stages and in the initial sample data submissions to NTIA.

All providers who submitted geographic coverage coarser than a census block were provided a data checking package to assess for accuracy and completeness. Any comments received from providers were processed.

1. QA/QC Checks prior to Individual Data Processing (i.e., block or coverage geoprocessing model). [Automated Modelbuilder tools and follow-up by an analyst]
    a. Check for inconsistencies within the Provider Name, DBA Name, FRN
    b. Check for duplicate census blocks or coverage areas
    c. Check the Provider Name, DBA Name, FRN against the “Official Provider Table”

2. For each provider after initial data processing is completed [Review by an analyst that did not process the original data]
    a. Review correspondence log
        i. Review recent correspondence, since previous NTIA submission
        ii. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, subscriber weighted nominal speeds (SWNS)
    b. Review wiki data processing page (current metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    c. Review individual Provider Wiki page (historic metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    d. Check Provider Data Folder
        i. Review recent data submissions, since previous NTIA submission
    e. Check Working Data Folder
        i. Review current update feature class geography
        ii. Review coverage with provider’s submissions

iii. Review technology of transmissions (TOTs) with provider's submissions
iv. Review Max Adv Speeds: Down/Up with provider's submissions

3. For each provider after final data processing is completed [Review by an analyst that did not process the original data]
   a. Check PROVCOV_Master geodatabase:Provider Blocks feature class and/or Provider Coverage feature class
      i. Review geography
      ii. Review TOTS
      iii. Review Max Adv Speeds: Down/Up

4. Check Infrastructure feature class [Review by an analyst that did not process the original data]
   a. Review recent submissions, since previous NTIA submission

5. Check SWNS feature class [Review by an analyst that did not process the original data]
   a. Determine if provider submission is valid

6. For each provider after speed tests are processed [Review by an analyst that did not process the original data]
   a. Check PROVCOV_Master geodatabase for Typical Speeds: Down/Up

7. QA/QC Checks and Reports on the Final NTIA Deliverable [Automated Modelbuilder tools and follow-up by an analyst]
   a. Check the Provider Name, DBA Name, FRN against the "Official Provider Table" for each NTIA feature class (i.e., BB_Service_CensusBlock, BB_Service_RoadSegment, BB_Service_Wireless, etc.). NTIA_Provider_Name_DBA_FRN_Errors_Sample.xls, looks at each NTIA feature class (i.e., census blocks, road segments, wireless, etc…) and checks to see if there is an identical match in the "Official Provider Table." If an identical match does not exist for that Provider Name, DBA Name, FRN concatenation it is written to a geodatabase table along with the NTIA feature class where the "error" occurred. When an "error" does occur it then has to be checked by an analyst and corrected if necessary.
   b. Change Detection Report – This geoprocessing model compares and reports any changes in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. The user needs to supply the feature classes for each NTIA version as well as the name of

the final change detection table. NTIA_Change_Detection_Example.xls, compares and reports any changes (limited to Provider Name, DBA Name, FRN, TOT combinations) in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. If the final change detection table has no records, then no changes were detected between the two databases. If a Provider Name, DBA Name, FRN, TOT combination does not have a "pair" in either direction (the current or previous NTIA database) then it is written to a geodatabase table along with the NTIA feature class and version where the "error" occurred. This report does not change any data in either database but rather acts as a flag, requiring an analyst to check if the "error" is valid.

c. Check for duplicate census blocks or road segments or wireless coverage areas.
d. Check for duplicate anchor institution points.

8. Review Final NTIA deliverables [Review by an analyst that did not process the original data]
   a. Review BB_ConnectionPoint_MiddleMile
   b. Review BB_Service_CAInstitutions
   c. Review BB_Service_Census Block
   d. Review BB_Service_Overview
   e. Review BB_Service_RoadSegment
   f. Review BB_Service_Wireless

9. Run the NTIA Check submission tool and python tool to confirm that all possible records passed the NTIA data checks. The only items that failed in the checking process were those where inconsistencies in the final NTIA NSGIC data model did not agree with the final documentation and rules established by NTIA and FCC in the final webinar and documentation presented March 17, 2011. These exceptions were documented along with the submission.

Appendix A

Potential providers researched but subsequently identified as not providing broadband service.

Company Name	Filing Company DBA	FRN	URL
5LINX Enterprises Inc. DBA Globalinx	5LINX Enterprises, Inc.	0015304645	www.5linx.com/products
8x8, Inc.	8x8, Inc.	0007099773	www.8x8.com
Access Point Inc.	Access Point Inc.	0004057352	www.accesspointinc.com
Accessline Communications Corporation	Accessline Holdings, Inc.	0015982366	www.accessline.com
ACN Digital Phone Service, LLC	ACN, Inc.	0015312606	www.myacn.com/index.html
All Digital Telecom, Inc.	All Digital Telecom, Inc.		none
Alltel Wireless	Alltel Wireless		www.att.com
Ameripages, Inc.	Ameripages, Inc.		none
AmeriVision Communications, Inc.	AmeriVision Communications, Inc.		http://www.affinity4.com/
Aptela, Inc.	Aptela, Inc.	0015304850	www.aptela.com
AT&T Corp.	AT&T Inc.	0004496774	www.att.com
B2B Advantage, Inc.	B2B Advantage, Inc.		http://www.b2badvantage.net/b2b/index.asp
Bandwidth.com, Inc.	Bandwidth.com, Inc.	0015443773	www.bandwidth.com
Big Sky Wifi, Inc.	Big Sky Wifi, Inc.		www.3rivers.net
BigHoof New Media	BigHoof New Media		none
Birch Telecom	Birch Telecom		www.birch.com
BroadvoxGo!, LLC	BroadvoxGo!, LLC	0017679523	www.broadvox.com
Broadwing Communications, LLC	Level 3 Communications, LLC	0008599706	www.level3.com
Bulldog Cable	Bulldog Cable		www.bulldogcable.com
BullsEye Telecom, Inc.	BullsEye Telecom, Inc.	0004350930	www.bullseyetelecom.com

C-A Information Systems Inc.	C-A Information Systems Inc.		www.consumer.hughesnet.com
Cable & Communications Corporation d/b/a Mid-Rivers Wireless	Mid-Rivers Telephone Cooperative, Inc.	0001634443	www.midrivers.com
Call Catchers Inc.	Call Catchers Inc.	0016109803	none
Cause Based Commerce Incorporated	Cause Based Commerce Inc.	0015173503	www.causebasedcommerce.com
COMCAST CABLE COMMUNICATIONS, INC.	Comcast Corporation	0003768165	www.onlinecomcast.com
CommPartners, LLC	CommPartners Holding Corporation	0011045127	www.commpartnersconnect.com
Contact Communications	Contact Communications		none
CRJ Communications Indications Corp.	CRJ Communications Indications Corp.		none
Dialog Telecommunications	Dialog Telecommunications		none
DSLnet Communications, LLC	Megapath, Inc.	0004324851	www.megapath.com
EarthLink	EarthLink	0015192453	www.earthlink.net
ECR Voice, LLC	ECR Voice, LLC	0015518129	www.ecrvoice.com
Engineered Communication Systems, Inc	CommPartners Holding Corporation	0019615400	www.commpartnersconnect.com
Ernest Communications, Inc.	Ernest Communications, Inc.	0004948642	www.ernestgroup.com
Essen Communications Corporation	Essen Communications Corporation		www.essencommunications.com
Fionda VOIP, LLC	Fionda VOIP, LLC	0015321961	www.fionda.com
First	First	0003764	www.firstcomm.com

Communications, LLC	Communications, LLC	487	
Get Mobile	Get Mobile		none
Gilat	Gilat		www.gilat.com
Global Crossing Telecommunications, Inc.	Global Crossing North America, Inc.	0002850519	www.globalcrossing.com
Granite Telecommunications, LLC	Granite Telecommunications, LLC	0008676975	www.granitenet.com/ProductsAndSolutions/Pages/Broadband.html
GreatCall, Inc.	GreatCall, Inc.	0018554386	www.greatcall.com
Greenfly Networks, Inc.	Greenfly Networks, Inc.	0015808736	www.clearfly.net
HughesNet	HughesNet		www.consumer.hughesnet.com
iCore Networks, Inc.	iCore Networks, Inc.	0015340326	www.icore.com
IDirect	IDirect		www.idirect.net
IDT Corporation	IDT Corporation	0003790037	www.idt.net
InPhonex.com, LLC	InPhonex.com, LLC	0010488351	www.inphonex.com
Integra Telecom	Integra Telecom		www.integratelecom.com
Internet Montana	Internet Montana		www.imt.net/services/dsl.html
Ionex Communications North, Inc.	Birch Communications Inc.	0005027305	www.birch.com/about/
IP Networked Services, Inc.	IP Networked Services, Inc.	0016088882	none
iSmart Mobile LLC	iSmart Mobile LLC	0019107051	www.smartcall.us
Jefferson Broadband	Jefferson Broadband		www.cutthroatcom.com
Kosmaz Technologies LLC	Kosmaz Technologies LLC	0014855084	www.kosmaz.com
LightSquared LP	LightSquared LP	0007705742	www.lightsquared.com
Lightyear Network Solutions, LLC	LY Holdings, LLC	0010045128	www.lightyear.net
LinkStar	LinkStar		www.viasat.com
Matrix Telecom, Inc.	Matrix Telecom, Inc.	0004333068	www.matrixbt.com
Metropolitan Telecommunicatio	Metropolitan Telecommunicatio	0009806019	www.mettel.net

ns Holding Company	ns Holding Company		
Millicorp	Millicorp	0018930 511	www.millicorp.com
Missouri Valley Communications, Inc.	Missouri Valley Communications, Inc.		www.nemont.net
Montana Advanced Information Network, Inc.	Montana Advanced Information Network, Inc.		www.vision.net
Montana Lincnet	Montana Lincnet		www.montanasky.net
Montana Wireless Inc.	Montana Wireless Inc.		none
Mountain West Internet Inc.	Mountain West Internet Inc.		www.mwtn.net
MTPCS, LLC dba Chinook Wireless	MTPCS Holdings, LLC	0013518 741	www.cellularone.com
Multiband Communications, Inc.	Multiband Communications, Inc.		www.cutthroatcom.com
Navigator Telecommunications LLC	Navigator Telecommunications LLC	0004349 924	www.navtel.com
New Cingular Wireless Services, Inc.	AT&T Inc.	0003766 532	www.att.com
New Edge Network, Inc.	New Edge Holding Company	0003720 471	www.newedgenetworks.com
nexVortex,Inc.	nexVortex,Inc.	0015282 155	www.nexvortex.com
NOS Communications, Inc.	NOS Communications, Inc.	0004321 006	www.nos.com
Omnicom Paging Plus, LLC	Omnicom Paging Plus, LLC		www.omnicom-paging.com
OnWav, Inc	OnWav, Inc	0018007 898	www.onwav.com/home
OPCOM, INC.	OPCOM, INC.		wcstelecom.com
P.W.I. Holdings, Inc.	P.W.I. Holdings, Inc.		none
PAETEC Communications	PAETEC Communications	0003716 073	www.paetec.com
Phone.com, LLC	Phone.com, LLC	0016845 190	www.phone.com

Proximiti Technologies, Inc.	Proximiti Technologies, Inc.	0016431603	www.proximiti.com/default.aspx
QuantumShift Communications, Inc.	vCom Solutions	0004337523	vcomsolutions.com
Qwest Communications Company, LLC	Qwest Communications International, Inc.	0003605953	centurylink.com
Qwest Corporation	Qwest Corporation		centurylink.com
RNK, Inc.	Wave2Wave Communications, Inc.	0002477743	www.wave2wave.com
Sagebrush Cellular, Inc.	Nemont Telephone Cooperative, Inc.	0001608645	www.nemont.com
Skyland Technologies, Inc.	Skyland Technologies, Inc.		none
SoFast Internet Services, LLC.	SoFast Internet Services, LLC.		none
Sprint Nextel Corporation	Sprint Nextel Corporation	0003774593	www.sprint.com
Summit Wireless, LLC	Summit Wireless, LLC		none
Telesphere Networks Ltd.	Telesphere Networks Ltd.	0015328032	www.telesphere.com
Thinking Phone Networks, LLC	Thinking Phone Networks, LLC	0015343478	thinkingphones.com
Time-Warner	Time-Warner		www.timewarner.com
Trans National Communications International, Inc.	Trans National Communications International, Inc.	0004337846	www.tncii.com
tw telecom holdings inc.	tw telecom inc.	0014942668	www.twtelecom.com
UC	UC		www.integratelecom.com
Velocity Networks Inc	Velocity Networks Inc	0015327430	www.vel.net
Verizon Business Global LLC dba Verizon Business	Verizon Communications Inc.	0010856284	www.verizon.com
Virgin Mobile USA, LLC	Virgin Mobile USA, LLC		www.virginmobileusa.com/
Vivid Networks, Inc.	Vivid Networks, Inc.		www.lightnex.com/
VoIP360, Inc.	VoIP360, Inc.	0016868	none

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VoIPStreet, Inc.	VoIPStreet, Inc.	0016266 157	www.voipstreet.com
Vonage Holdings Corp.	Vonage Holdings Corp.	0018401 844	www.vonage.com
Western CLEC Corporation	Western CLEC Corporation		www.cellularone.com
Yellowstone Media Design	Yellowstone Media Design	0016059 842	www.ymdesign.net
YMAX Communications Corp.	YMAX Communications Corp.		none

North Carolina Data Submission
April 2012

Data Collection Methodology

NC Broadband, a Division of the North Carolina Department of Commerce

3/31/12

Table of Contents

Executive Summary

North Carolina's SBDD Grant

In 2009 the e-NC Authority, the state broadband authority for North Carolina at the time, was designated as the Eligible Entity in North Carolina to receive funding under the State Broadband Data and Development (SBDD) grant program of the National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce. In 2009-2010, the e-NC Authority was awarded $6,610,996 in federal funding under Award #37-50-M09002, to implement the following programs for North Carolina: broadband data collection and mapping, technical assistance, state capacity building, computer ownership and address file improvements, with the grant running from October 1, 2009 – October 1, 2014.

During the 2011 legislative session in North Carolina, the sunset date of the e-NC Authority was not extended by the legislature, so North Carolina's state broadband authority ceased to exist after December 31, 2011. The Appropriations Act (Session Law 2011-145) directed the e-NC Authority to work with the NTIA to transfer the federal NTIA grant to the North Carolina Department of Commerce (DOC). The e-NC Authority worked closely with NCDOC and the NTIA on the due diligence process for this grant transfer and in December 2011 the Governor designated the NC Department of Commerce as the new Eligible Entity under this grant. North Carolina's SBDD grant was transferred to the North Carolina Department of Commerce this quarter, effective January 1, 2012. The remainder of North Carolina's SBDD project is now being implemented by the newly-created Broadband Division (NC Broadband) of the NC Department of Commerce. The overall goals, activities and deliverables for North Carolina's SBDD program are the same, with just this substitution of grant entities.

Under this federal award of $4,045,959 (remaining funding transferred to NCDOC), NC Broadband is responsible for implementation of the following programs:

- State Capacity Building
- Data Collection and Mapping of broadband availability
- Technical Assistance to communities
- Implementation of the LITE-UP Pilot Program
- Update of the NC Master Address File

North Carolina Department of Commerce

NC Broadband, a division of the North Carolina Department of Commerce, was created specifically and primarily to carry out the remaining work of the State Broadband Data and Development Grant awarded to North Carolina by the National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce. In this capacity, NC Broadband serves as the State Broadband Initiative for North Carolina. Work under the SBDD grant is being conducted by staff members of NC Broadband as well as the relevant contractors under the grant.

The Department of Commerce is the state's leading economic-development agency, working with local, regional, national and international companies. The Department's mission is to improve the economic well-being and quality of life for all North Carolinians. The mission is carried out by serving existing business and industry, including providing international trade assistance; recruiting new jobs and domestic and foreign investment; encouraging entrepreneurship and innovation; marketing North Carolina and its brand; supporting workforce development; strengthening communities; and promoting tourism, film and sports development. The Department also provides data, statistics, information and reports for state government and agencies, which regulate commerce in the state. As such, the Department of Commerce is a natural fit to house the State Broadband Initiative for North Carolina, with broadband infrastructure being key to reaching North Carolina's business and workforce goals, and with broadband infrastructure being a critical component to allow all NC businesses and communities to participate in the global economy.

Spring 2012 Broadband Data Collection and Mapping Process

Data Collection

The official data request letter from the NC Department of Commerce was sent to all identified providers of broadband service on January 30, via e-mail, with a hardcopy mailed letter distributed as well. The grant transfer to DOC was explained in the letter. Providers were given a link to the relevant Webpage which housed: Data Instructions, the Excel Data Template, the NC Department of Commerce Designation Letter, the Guidance Letter from NTIA from June 2011, and a file to download the 2010 Census Block GIS layer from NC OneMap. Providers were also reminded that they may choose to submit availability data by census block and street segment, considered public data under the grant program, or address-level data, and were asked to contact DOC with questions about confidentiality of data. Providers were asked to reply to the data request on or before February 17, 2012.

During this data collection, as providers inquired about data confidentiality, they were provided with a letter from the NC Department of Commerce explaining the protections provided under North Carolina's Public Records Act. Working through the NC Telecommunications Industry Association at their request, DOC provided letters to sixteen telco providers explaining these protections. Working through the North Carolina Cable Telecommunications Association at their request, DOC provided three additional letters. Letters were provided directly to four additional providers (three of these being mobile providers). Non-Disclosure Agreements were secured with four of DOC's contractors with potential access to the data. The DOC did not enter into NDAs with any providers. There were no unresolved confidentiality issues brought forward by providers.

As mentioned above, Excel and geodatabase templates were shared with providers, along with PDF format instructions summarizing all NTIA requirements and information relevant to each type of provider (fixed wireless, mobile wireless, and wireline). Technical assistance was provided to any organization who requested it.

A secure server hosted by MCNC is configured with an open source, browser-based direct file upload system called eGroupware. Providers were sent a log-in name and password for this upload system once they contacted either Samantha Jackson or Stephanie Jane Edwards to communicate that their data was ready for submission. A confirmation e-mail went to Stephanie Jane once data had been uploaded.

Individual reminder e-mails were sent, or phone calls made, to targeted providers. NC Broadband did use some Fall datasets for providers that were unresponsive, or who asked that previous data be used for this round. NC Broadband plans to make a more concerted effort at full participation in the Fall 2012 data round. Participation in this round was more challenging due to the transfer of the SBDD grant (effective as of January 1, 2012, and executed on March 19, 2012), and the additional negotiations required on data confidentiality. The number of known broadband service providers operating in North Carolina is now at 105.

Out of these 105 known providers, 75 now have broadband data in this statewide geodatabase.

Integration of Provider Data into NTIA Statewide Geodatabase

For ease of data integration, a front-end Excel format template was offered to all providers, containing notes defining required fields, explanations of which data is required in which formats by which types of providers, and hyperlinks connecting fields to additional tables listing the corresponding NTIA-specified values and codes (for speed tiers, technology types, connection point facility types and capacities, county codes, end user types). A brief description of how census block FIPS codes work was also taken from an internet source and distributed as needed to providers who had questions about how to report this information.

BB Service by Census Block

As requested by the NTIA mapping and planning team, all census block data is included with 2010 census block geometry. Technical assistance was often needed by providers to correctly report served areas by either the 15-digit FIPS codes or in some way by which NC Broadband staff could derive the appropriate FIPS codes.

BB Service Road Segment

The reporting and mapping of data by street segment presented significant challenges to accurate interpretation of where broadband availability is and is not. This is mainly attributed to the difficulty of standardization among the many data structures by which providers report street segments. Quality of data has improved since some providers have switched to submitting data in shapefile format, and others have been able to start including a Tigerline ID (TLID) field for reference in mapping tabular information. Use of this unique identifier has reduced ambiguity in some tabular datasets and improved data quality upon mapping.

BB Service Address

A few address-level datasets were submitted to NC Broadband with the latitude/longitude coordinates already determined in a spatial format, but most needed to be geocoded. This was done using the NC Master Address file as the primary reference file, significantly increasing the accuracy of matching records. Secondary sources for address records that did not find a match this way included street segment interpolation, ESRI data utilizing the 4-digit ZIP extension, and manual placement/digitizing based on a combination of reference data and online browser maps. Upon completion of geocoding for each provider submitting address data, the address point features were overlain with a 2010 census block layer to add the census block FIPS code attribute, then all address feature points were loaded into the geodatabase feature class. The geocoded shapefiles for each provider are kept with geocode match score and match reference type for every matched address, so the thoroughness of this data type could be tracked and/or improved with more time.

BB Service Wireless

Approximately seven small, fixed wireless providers have been able to share technical information about their transmitting towers, antennae, and frequencies, so that NC Broadband can produce for them a service coverage shapefile using the contracted services of the University of NC at Greensboro Center for Geographical Information Science (http://cgis.uncg.edu) . An Excel template was developed with all the relevant information that can be filled in by providers with technical assistance in some cases, and the propagation model is field-calibrated to reflect actual ground conditions.

BB Service Overview

Records for overview containing subscriber-weighted nominal speeds of a given provider were generally joined to a template layer of county features, using the option to keep matching records only. Then these matching features and their new attributes were exported as a new shapefile before being loaded into the collective overview feature class. For providers with multiple technology types serving a given county in at least one instance, this information was single-field geocoded using the 5-digit county FIPS code, and then geocoded point features were spatially joined to the county polygon using "within" criteria.

Some detail formatting performed as needed:

- Add state FIPS code and any needed leading zeros onto county code for the new State+County FIPS code. Most providers list just the county code because this was the original NOFA request.
- Change state abbreviation values from "37" to "NC".
- Change weighted speeds to appropriate units (kbps) and remove unit text.
- Translate to county from weighted speeds reported by RSA/MSA.

BB Service - Critical Anchor Institutions

Only anchor Institutions that could be geolocated were included. Only 17 CAIs were identified that could not be geocoded to a point feature. CAIs were collected by contacting administrative offices of some CAI category types and receiving databases of information, as well as collecting from individual CAI locations for other types using survey emails and follow up phone calls as necessary. There are 5,857 CAI's identified, located, and included in the geodatabase to date. There were no changes to the CAI feature class since the previous data collection round in fall 2011.

Census Block data (tabular)

- Fields standardized and transferred into Excel template
- Geocoded to centroids of census blocks using 2010 Census Block layer in WGS1984 projection as reference file for "Address Locator".
- Spatial join of geocoded census block data points to polygon features

Street Data

Some datasets were submitted to NC Broadband by providers already in shapefile format, and others were reported in various tabular formats (text, Excel, CSV, etc.). Of the tabular datasets, some included a Tigerline ID ("TLID") field along with some or all other fields such as city, state, zip, and census block FIPS.

- For datasets submitted tabular with TLID:
  - Max and Min address ranges were calculated from the FromRight, ToRight, FromLeft, ToLeft format used by most standard street segment reference files and incoming datasets

- All data formatted into back-end Excel format, including converted speeds if reported at some other granularity.
  - Table geocoded to Tigerline 2010 street segment file using single-field and "TLID" values, with zero offset.
  - Geocoded point features converted to street segment geometry via spatial join using "contains" criteria, keeping matched records only.
- For datasets submitted tabular without TLID:
  - Max and Min address ranges were calculated from the FromRight, ToRight, FromLeft, ToLeft format used by most standard street segment reference files and incoming datasets
  - All data formatted into back-end Excel format, including converted speeds if reported at some other granularity.
  - Table geocoded to Tigerline 2010 street segment file using false midpoint address and either ZIP5 or census block FIPS (whichever available) as address locator zone.
  - Geocoded point features converted to street segment geometry via spatial join using "contains" criteria, keeping matched records only.
- For datasets submitted as shapefiles: VB If/Then statements used to calculate "Max" and "Min" address range attributes required by the NTIA/FCC, converted from the FromRight, ToRight, FromLeft, ToLeft format used by most standard street segment reference files and incoming datasets:
  - **To calculate "Min":**

```
Dim fromRight
Dim toRight
Dim fromLeft
Dim toLeft

fromRight = [FROMRIGHT]
toRight = [TORIGHT]
fromLeft = [FROMLEFT]
toLeft = [TOLEFT]


Dim minright
If fromRight = 0 And toRight = 0 Then
   minright = 0
ElseIf fromRight = 0 Then
  minright = toRight
ElseIf toRight = 0 Then
  minright = fromRight
Else
  If fromRight < toRight Then
    minright = fromRight
  Else
    minright = toRight
  End If
End If
```

```
Dim minleft
If fromLeft = 0 And toLeft = 0 Then
   minleft = 0
ElseIf fromLeft = 0 Then
  minleft = toLeft
ElseIf toLeft = 0 Then
  minleft = fromLeft
Else
  If fromLeft < toLeft Then
    minleft = fromLeft
  Else
    minleft = toLeft
  End If
End If
```

- **To calculate “Max”:**

```
Dim fromRight
Dim toRight
Dim fromLeft
Dim toLeft


fromRight = [FROMRIGHT]
toRight = [TORIGHT]
fromLeft = [FROMLEFT]
toLeft = [TOLEFT]


Dim maxright
If fromRight > toRight Then
  maxright = fromRight
Else
  maxright = toRight
End If

Dim maxleft
If fromLeft > toLeft Then
  maxleft = fromLeft
Else
  maxleft = toLeft
End If

Dim max
If maxleft > maxright Then
  max = CStr(maxleft)
Else
  max = CStr(maxright)
End If
```

Creating last mile and middle mile features

- Formatted numeric fields in Excel as text since the short integer format in the data model for these fields will not accept values from the Excel import's default general format.
- ArcToolbox > Data Management Tools > Layers and Table Views > Create XY Event Layer
- Zoom to Layer, verifying that all points are located inside NC boundaries

Provider-specific notes, functions and corrections performed by NC Broadband as needed

Access/On Multimedia Inc.

- This is a middle mile only provider
- Provider confirmed no changes since last round so fall data was used

AT&T S12

- Converted subscriber weighted nom speed data from CBSA to county
- Converted max advertised speed data from CBSA to county
- Translated max advertised speeds from KBPS to NTIA codes
- Applied converted speeds to appropriate availability records by county based on FIPS codes, by pasting the CBlock FIPS codes into speed columns and using Find/Replace functions in Excel (ex Find fields with 37001* and Replace with 7). For data by street and CB.
- Copied max advertised speeds into typical speed columns (for which data was not supplied by AT&T)
- Calculated conversion of Left and Right To/From addresses for street segment data to NTIA's required Max/Min values (using "min" and "max" formulas in Excel)
- Checked data by CB for duplicates, none found.
- Geocoded street-level data using 2010 TLID field.
- Selected counties from mapped subscriber weighted nominal speed data that actually contain broadband availability data by census block or street segment. Exported selection as Overview file.
- Linked geocoded points representing street segment data to polyline street segments via one-to-many spatial join, using intersect criteria with a 2 foot search radius. Eliminated extraneous joins by selecting out records in the results where target and joined TLID fields did not match.

AT&T Mobility S12

- Merged shapefile features into a single multipart polygon to remove arbitrary grid boundaries.
- Validation: Ran "Eliminate Polygon Part" tool to remove any parts or donut holes less than 0.125 square miles in area.
- Removed extraneous vertices using a max offset of 150 feet.
- Added attributes supplied in Excel spreadsheet.

ATMC S12

- Merged shapefiles of address level data from two counties served, renaming and consolidating attribute fields.
- Added Address field populated with a concatenation formula of component address information.

- Added EndUserCat field and populated with code 5
- Overlay of address points w/CB layer to get FIPS code field
- Created new fields and used Calculate Geometry function in ArcMap to generate Lat and Long attributes
- Deleted 9,836 duplicates (using FRN, TransTech, and Address fields for check). 96,071 records remaining.

ATMC Wireless S12

- Clipped shapefile to state boundary
- Eliminated polygon parts less than 0.125 square miles
- Ran simplify polygon to remove extraneous points, set to 150 feet max offset.
- Added spectrum attribute

CenturyLink S12

- Copied CB and street shapefiles and changed format of some fields for loading (created new fields of compatible type for TransTech, EndUserCat, and Provider_Type fields)
- Used If/Then scripts to calculate min and max address fields from left and right max/min ranges in ArcMap field calculator

Charter

- Re-projected and formatted attribute fields. Added EndUserCat field with value 5 for "Other/Unknown"
- Streets submitted and mapped in 2010 Tigerline, with no address range information. No unique identifier in common with reference Tigerline file, so no resulting address range info.
- Checked for duplicates in CB shapefile using Delete Identical, none found.

Comporium S12

- For DBA Springboard: Tidied up text submission of address data and removed duplicates of equal or lesser max speeds. Ran address sorter script, all addresses found a match with previous data and were transferred new GDB (with the newer tech and speed attributes).

Comcast S12

- Mapped CB's submitted this round
- Calculated min/max address ranges for street segment data in Excel
- Manually cleaned up street data text.
- Geocoded hypothetical midpoint of tabular street segments by address range, using composite street geolocator with zero offset.
- Spatially joined the above geocoding results to TIGER 2010 street segment features (using Intersect criteria with search range of 150 feet). Ran Delete Identical tool on the resulting street segments based on unique shape, TLID, and TransTech.
- Mapped Overview data as submitted in Fall 2010
- Clipped all mapped data to Caswell county, as directed by Comcast point of contact
- Created ArcGIS Explorer map for provider to review and feedback on data quality issues

Cricket S12

- Eliminated polygon parts smaller than 0.125 square mile, and removed extraneous points using a max 20-foot offset.

- Merged and duplicated polygons based on spectrum used
- Formatted attribute fields

Electronics Service Co of Hamlet

- Customized propagation model for unique antenna setup high up in trees
- Clipped output to state boundary

Electronic Solutions S12

- Compared to Fall 2011 data, found the newly submitted data to be the same except for the number of end users (in wireless and last mile tabs).
- Copied and renamed the formatted/mapped layers from Fall 2011, updated numbers of end users.

Ellerbe Telephone Company S12

- Converted 2010 census blocks as well as middle mile, last mile, and overview information from Fall 2011 data collection transferred into current geodatabase.

Epproach

- Copied Census blocks from Fall 2010 geodatabase
- Merged census block polygons
- Loaded into geodatabase and populated Unlicensed for spectrum field.

Frontier

- Began new with data submitted in this round, as per the provider this dataset includes/supercedes data previously combined from updates and formerly-Verizon's network.
- Applied speed codes based on email follow-up with provider
- Added fields for EndUserCat and ProviderType, populated all records with 5 and 1, respectively.
- Created XY Event layer for new last mile/DSLAM points submitted.
- Applied a 15,000 foot service circle to new last mile points for availability (no dissolve).
- Created subset of 2010 road segments that intersect the 15,000 ft radius buffers, via spatial join using intersect criteria.
- Applied appropriate speed codes as explained by the provider contact.

Greenlight (City of Wilson) S12

- Re-projected shapefiles into WGS84.
- Added FRN2 field with leading zeroes, Lat, Long, EndUserCat (populated with code 5), and Provider type field (populated with code 1) to address attributes, and re-concatenated "Address" field.
- Spatial join of address points to obtain census block FIPS codes
- Removed duplicate addresses using Delete Identical tool in ArcToolbox, checking in Address, TransTech, MaxAdDown and MaxAdUp fields.
- Populated missing Typical speed fields with Maximum Advertised fields.
- Added/populated FRN w/leading zeroes, lat and long fields for middle and last mile
- Attribute join to county template feature class for Overview

Interstar

- Mapped subscriber addresses supplied by the provider, then used the point locations to derive a Minimum Bounding Polygon (Convex Hull) representing available wireless coverage.
- One-to-one spatial join associating provider attributes and speeds (max for served area) with minimum bounding polygon.
- Added spectrum field and populated with code 6.

Inteliport

- Provider is working on but has not yet been able to compile equipment specs that would allow us to run a propagation model, so in the meantime, polygons were created from census block locations.
- Follow up from provider in March 2012 clarified the max advertised speed values, based on service tiers and throttling used to keep streaming media from overloading the bandwidth when many users are subscribing to a given microcell. These were reduced from the maximum bandwidth capacity values included previously.

Mediacast S12

- Max Advertised speed values duplicated to populate typical speed fields.
- Wireless propagation of previous data, this time using a higher minimum signal strength threshold of -80 dBm.

Mediacom S12

- Confirmed with provider that address data includes both current and potential customers, and that the list of serviceable addresses had not changed since the fall. Provider did submit new file with typical speeds. These values were the same as populated in fall by duplicating the max advertised speeds.
- Transferred formatted and mapped data from Fall 2011 database. (112,075 points as these do not include duplicates or those we could not geocode).

MI-Connection S12

- Deleted 5,989 duplicate records (using address, transtech, and EndUserCat fields)
- Ran script to sort out new address records from previously submitted addresses.
- Populated unmatched/ungeocoded addresses with placeholder values (-9999)
- Concatenated Address field for cleaner, consistent contents

Morris S12

- Use of same address list as Fall 2011, confirmed that these include both current and potential broadband customer locations.
- Learned that speeds for fiber records had been reported by Mbps and converted these to NTIA codes to match other records.
- Spatial join with 2010 census blocks for FIPS field.

NC Wireless

- Wireless propagation of data, this time using a higher minimum signal strength threshold of -80 dBm.
- Follow up helped correct the max advertised and typical speeds of one tower footprint within more practical values based on channel availability.

North State

- Emailed about missing FIPS digit and inserted (leading zero for tracts) upon their response.
- Speeds were reported as Typical Up/Down only. Substituted these values into Max Ad Up/Down as well.
- Duplicate CB records were given to us for each service tier. Merged into CB shapefile after geocoding by:
    - Splitting into separate shapefiles by tech type (10, 30, and 50)
    - One-to-one spatial join field merge rule taking the maximum value from duplicates' speed fields.
- Middle Mile, Last Mile: Added negative sign to longitude values
- Last Mile point with longitude -70.97528 fell out of state boundaries and was changed to -79.97528 based on locations of all the other last mile locations.

Randolph TMC and Randolph Telephone Company S12

- Formatted text information and consolidated into one Excel file
- Generated hypothetical street addresses based on the min, max, and integer midpoint of each address range provided. Geocoded these addresses to Tigerline 2010 reference file, with zero offset (3 potential points for every address range record sent by Randolph). Each original record assigned a unique ID which was duplicated with each set. Set field created as well to distinguish.
- Geocoded addresses spatially joined to corresponding street segments
- Merged any duplicates based on TLID, FRN, and temporary ID.

Sprint Nextel

- Validation: Ran "Eliminate Polygon Part" tool to remove any parts or donut holes less than 0.125 square miles in area.

Star Telephone Membership Corporation S12

- Followed up with provider on census block FIPS codes that would not match existing blocks. Identified a formatting issue with zeroes in the tract number section and corrected this. Followed up a second time about a remaining 71 (3%) census block records that did not find a match.
- Corrected one last mile connection point with a formatting issue on lat/long that was creating an inconsistent extent when mapped.
- Used field calculator to make the contents of Provider Name and DBAName fields consistent and spelled out in every feature class rather than sometimes abbreviating Corporation to Corp.
- Corrected FRN to have sufficient number of digits/leading zeroes.
- Added lat/long coordinates to middle mile point reported, based on communication that Star TMC, Starvision, and Interstar all share this connection point.

Skybest and Skyline S12

- Created missing .prj file for shapefile exports from provider, based on follow up determining an NAD 83 North Carolina FIPS 3200 ft projection.
- Converted polylines to polygon for each DSL and fiber-to-the-home technology layers.
- Created fields and attributed manually from contents of provider-supplied .mdb files.
- Spatial join with Tigerline 2010 streets WGS84 by location inside newly created polygons (using streets was found to be more accurate, with less overstatement, than an overlay with census blocks).

- Manual touch up, deletion of streets that only touch the boundary of served polygons.
- Used VB script in Field Calculator to derive max/min address range information

Sky Catcher

- Wireless Propagation study.
- Created XY Event Layer to map Middle Mile information, deleted duplicate records. Remaining records loaded into geodatabase.

SkyeNet Wireless Communications S12

- Provider does not participate in data collection. Information was gleaned from the provider's website in previous data collections, by selecting and merging the relevant census blocks corresponding to served areas indicated on the provider's online map. Maximum speeds were obtained from the FAQ page of the same website.
- Speeds were updated after checking the website again on 3/28/2012.

Surry TMC and Piedmont Communications S12

- Created 3 hypothetical addresses from within the address ranges supplied in Excel format: one street number being the integer midpoint, one being the min value plus 2, and one being the max value minus 2. (only 3 address ranges supplied went completely unmatched).
- Spatially joined the geocoded points to polyline street segments using intersect criteria and a search radius of 2 feet.
- Manually copy/pasted additional street segments that fell between the segments captured by min, max, midpoint point locations.
- Extended attribution to the new copy/pasted street segments based on attributes of surrounding availability data.
- Corrected technology codes for Piedmont Communications from 40 to 41 based on follow up with provider.
- Changed max and typical speeds for one record for Piedmont Communications tech type 41 from zeroes to the codes matching all other type 41 records of the same provider.

TDS Telecom S12

- Data submitted as geodatabase feature classes, availability at address level. Addresses and mid-mile points spatially joined with 2010 census blocks to derive complete/correct FIPS codes.
- ZIP code information added to approximately 1700 address records
- Address field reparsed to include commas and new ZIP code info
- 256 duplicate address records removed
- 74 addresses with null geometry sent to UNCG Center for GIS for geocoding (excluded from original load)
- Duplicated max advertised speed codes in typical speed fields

Tele-media S12

- Provider type of 1 assumed and populated.
- Checked for duplicates CB's in Excel, none found
- No changes reported since last two rounds. Converted 2010 census blocks from Fall 2011 data collection transferred into current geodatabase.

Time Warner Cable S12

- CB and Streets:
  - Reprojected into WGS 1984
  - Added Provider Type field and coded as a "1"
  - Added EndUserCat field and coded as "5"
  - Input Max Advertised speeds as Typical Speeds as well, since they were not included.
- Streets: no min or max address ranges of any kind were included in the data, so this was left null in the transfer geodatabase.
- Mapped middle mile data, which contained nationwide connection facilities TWC chose to include as middle mile, and none of these fall within North Carolina's boundaries, so none was added to the transfer geodatabase.

T-Mobile S12

- Reprojected shapefiles into WGS 1984.
- Added field to categorize by technology type/T-mobile service tier (3G, 4G).
- Attributed manually from information sent in a text file from T-Mobile.
- Executed spatial Union between coverage of higher speed and the broader 3G coverage, then extracted (Data Export selected features) resulting 3G only features to distinguish max speeds here versus where higher speeds are also available. Merged into single shapefile
- Eliminate Polygon part tool to remove features <0.125 square mile.

Tri-County S12

- Concatenated address information into single Address field in BackEnd template spreadsheet.
- Fall data used for wireless.
- Addresses geocoded for DSL availability, then aggregated to corresponding census blocks and street segments
- For Tech Type 10: Selected and exported resulting aggregated CB data for CB's <2 mi. These were loaded into the geodatabase with associated broadband data.

Post-processing Functions for Final Integration

Census Block

After Census Block data was loaded into the transfer geodatabase feature class, FIPS code fields were calculated using commands in the Field Calculator and contents of the FullFIPSID field. The following calculation formulas were used:

STATE FIPS = Left ([FULLFIPSID],2)
COUNTYFIPS = Mid([FULLFIPSID],3,3)
TRACT = Mid([FULLFIPSID],6,6)
BLOCKID = Right ([FULLFIPSID],4)

- Duplicate records were identified using the ArcToolbox Frequency tool and various field combinations.

- 1177 duplicate records (with same value for Provider Name, DBA Name, FRN, TransTech, FullFIPSID, EndUserCat, and all four speed fields) were removed using the ArcToolbox Delete Identical tool.
- 1087 duplicate records (with same value for Provider Name, DBA Name, FRN, TransTech, and FullFIPS ID) were removed using the ArcToolbox Dissolve tool on the original provider dataset for CenturyLink and those records were reloaded into the transfer geodatabase.
- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran repair geometry tool 2x and confirmed that no features were deleted.

Road Segment Data

- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran repair geometry tool and confirmed that no features were deleted.

Address Data

- Populated FIPS code field for 3 address points that did not have a value after their dataset's spatial join (because of location on the state border).
- Verified that all FRN's were either 9999 or 10 digits with leading zeroes.
- 970 duplicates (with same value for shape, Provider Name, DBA Name, FRN, Address, TransTech, FullFIPSID, EndUserCat, and all four speed fields) removed using the ArcToolbox Delete Identical tool.
- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran Repair Geometry tool and confirmed that no features were deleted.

Wireless

- Duplication of multipart coverage polygons to reflect multiple spectrum ranges used, per NTIA/FCC instruction.
- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran Repair Geometry tool 2x and confirmed that no features were deleted.

Overview

- Field Calculated "Geographic Unit Type" field to CO, and "StateAbbr" field to NC.
- Field Calculated missing Maximum Advertised Up and Down speed fields to "ZZ" "default" values.
- Deleted records of information for wireless technology types.
- Verified that all FRN's were either 9999 or 10 digits with leading zeroes.
- Ran Repair Geometry tool 2x and confirmed that no features were deleted.

Last Mile

- Field Calculated “Ownership” field to -9999 for records null in this field. Calculated “StateAbbr” field to NC.
- Ran Repair Geometry tool and confirmed that no features were deleted.

Middle Mile

- Spatial join with census block layer to derive the 15-digit FIPS code, then reload features into middle mile feature class including the new values for populating the “FullFIPSID” field.
- Replaced Null Elevation values with -9999 “default” value using Field Calculator.
- Populated State Abbreviation column with “NC”.

CAI

- Parsed address information for address fields
- Excluded 526 records for which survey respondents report that they do subscribe to broadband but did not give speed information accepted by the NTIA’s script.

Verification Implemented Prior to Spring Data Submission

Data verification methods implemented by NC Broadband in time for submission at the federal level followed generally along the lines of quality control. Methods most often used are outlined below. Time constraints on existing staff did not allow for the execution of some more complex verification approaches that are in the planning/setup stages, but more substantial verification involving multiple data sources continue to develop.

Standardizing

The files from datasets received from each provider, except for those few submitted in shapefile format, were manually transferred to a back end Excel-format template with field headers, to create a single-file, standardized field structure for each provider’s data that could be used for quick reference and map feature creation. This step also helped staff to ensure that all required components were either present or requested in follow up to the provider, and that the components were reported in the correct format.

Lat/long coordinates

Some information was submitted to NC Broadband with lat/long coordinates included for the location of point features. This location information was checked during the mapping process, and values were corrected if the provider had made mistakes such as reversing the latitude with the longitude, or forgetting to include the negative sign for the longitude value. In addition, NC Broadband followed up with providers on point features that showed up in the map outside the state and/or outside the provider’s reasonably expected service area. Point features that mapped outside the state after follow up with providers, including those that mapped to zero degrees latitude and longitude due to an unknown location, were deleted from the geodatabase for submission at the federal level. For fixed wireless data generated by propagation model from antenna specs, the latitude/longitude coordinates of the antenna locations reported by the provider to NC Broadband were verified by NC Broadband’s university GIS research contractor using high-resolution orthoimagery.

Multiple FRNs

In several instances, providers reported multiple FRN's that increased in numerical increments of one for each record of data, and this was found to be a simple error when the providers were trying to paste their organization information down the rows applying to a list of broadband data records. This was checked for and corrected after confirming that the lowest/first reported FRN was the correct one.

Correct technology type codes

Knowledge from our technical staff and online research was sometimes used to supplement data that NC Broadband had relevant to a provider that was unresponsive or otherwise did not supply this specific piece of the information. For example, a provider may have gaps in their transmission technology field and these were filled in when technical staff could confirm that the provider operates with only a single technology type. Or the staff may know which technology type is used by a provider who left this field blank on all records.

Subscriber-weighted nominal speeds

Weighted nominal speed values were checked, and staff followed up with the provider if all values were the same for multiple counties, as this could result from either a single speed tier for a given transmission technology across counties, or in some cases providers were not following the formula provided and had manually entered the same value regardless of differences in subscriber numbers. When these cases were discovered, technical assistance was offered and a new subscriber-weighted nominal speed dataset created to reflect variation between counties.

Wireless model fieldwork

For fixed wireless provider data that was generated as coverage area output from models based on technology and environmental factors, the data was verified by "ground-truthing" with measurements of signal strengths at sample locations within a provider's service area, observation of the influential ground conditions in each location, and comparison to the expected signal strengths at the same locations in the model. Some calibration of the model was then performed so that the resulting polygons could more accurately reflect what would be found in real life.

Check Geometry

After compiling all datasets into the geodatabase feature classes, the check geometry process in Arc Toolbox's Data Management section was used on each feature class to identify and repair any geometry errors in the features.

Comparisons with Citizen-Sourced Data

NC Broadband has recently begun mapping layers of input from citizens who report having no access to broadband at their location from any broadband provider (or possibly just mobile or satellite options that don't meet the users needs or budget from their perspective). A compiled layer is collected from local citizen advocates, citizen input on NC Broadband's website feedback form, and locally conducted surveys. Comparison of provider-sourced data with this source of information has allowed for targeted follow up with providers in order to promote access to broadband for these citizens, as well as to begin refinement of our statewide broadband data. FCC deadzone and speed test data has also been retrieved and is being processed for inclusion and comparison. Further data collection from citizen input and comparative analysis approaches will be described in fall 2012.

North Dakota Broadband Mapping Methodology Report

Submitted To:
Dirk Huggett
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Information Technology Department
Enterprise Services Division
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Submitted By:
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Tetra Tech EC Inc.
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April 1, 2012

Contents

Executive Summary

The following report describes methods and issues related to the April 1, 2012 deliverables to NTIA for Broadband Mapping in North Dakota. This data submission is compliant with all guidance and specifications provided by NTIA. As per NTIA guidance we are using current versions of the Broadband data model and the validation script.

North Dakota has developed a robust operational data model, components of which are described in this report, to support our broadband mapping efforts. We feel our operational model can support any reasonable modifications to NTIA requirements. Since this deliverable format is derived from our operational data model, we anticipate some modifications will be required. We are able to take best practices recommendations from the NTIA and incorporate those into the final deliverable without major modifications of our work flow and operating rules.

Our mapping process started with infrastructure points (central offices, remote terminals, wireless towers and antenna locations, middle mile and backhaul), cable franchise areas, and anchor institution addresses. Those have continued to play an important role, especially with providers who have not actively participated in coverage mapping. When providers have not supplied detailed information of their service areas that can be mapped at the census block level, coverage models are derived dynamically from this infrastructure based on geoprocessing techniques specific to each broadband technology. Examples of geoprocessing techniques include developing propagation models for wireless coverage and using infrastructure points in conjunction with the road network to predict the area served for DSL coverage.

We have developed a system to quantify "validated" data for the purpose of determining what is suitable for delivery to NTIA. The operational data model maintains reliability and validity codes, together with completeness checks to track which data elements are complete or still in process of refinement. Infrastructure is compared to public data, independent measurements, and telecommunications provider submittals at varying levels of geography. As more data is obtained from providers in maintenance updates, the validity and reliability of infrastructure points has diminished. The reliability and validity progress from 1 (not validated or reliable) to 10 (validated and reliable) are still useful for non-participating broadband providers. Completeness is primarily dependent on provider input, and can be supplemented in many instances with independent measurements. The process is iterative. Some providers included in this data set submitted infrastructure data at the address level. Other providers have submitted detailed coverages or census blocks. The remainder have submitted data at a coarser geographic scale, such as census tract, small scale paper or digital map, or generalized town location. Our validation methods provides the ability to use general information and iteratively cross check and improve the coverage models as more accurate data is obtained.

Provider Summary

Through extensive research we identified a master list of 172 potential providers in North Dakota with 52 companies identified as actual broadband providers. The North Dakota Broadband map includes 50 broadband providers. The full list of the potential providers researched but subsequently identified as not providing broadband service is included in Appendix A.

Reliability, Validity and Completeness

Reliability codes apply to the source data points and polygons and assess the authority of the source we obtained the data from and the level or coarseness of the geography (address or town). Validity codes are determined from cross checks of data sources and the number of independent sources of verification. These are as simple as comparing speed test locations against DSL modeled polygons, or as complex as geospatial analysis operations such as a kernel density function cluster analysis. Completeness is determined by public sources, independent measurements or provider submittals and checks on the domain classes required for the final NTIA deliverables such as Technology of Transmission domains, Speed Test domains and serving facility and wireless spectrum facility types and categories. The categories for these, and the subsequent records in our operational geodatabase tables grow and change as new data is obtained. We are maintaining these as feature level metadata tied to points and polygons maintained by analysts and technicians in a wiki table and coding them to the geodatabase. In this way the unique situations that arise can be cataloged and maintained with some level of flexibility while contributing to the final indices in a controlled fashion.

Reliability Codes

Throughout the course of the broadband project the State of North Dakota has employed several validation and verification techniques to help quantify the accuracy of the broadband map. The techniques used are listed below:

- Reliability Codes Assigned to Infrastructure Points
- State Run Speed Test Portal
- State Wide Broadband Survey

The two factors incorporated in reliability codes include the level of geography that was used as a source or provided as a clarification of location and the authority of the source for the information. We are also considering clusters of point information from independent measurements and sources to be higher in reliability than individual point information.

Generally, the coarser the source geography the lower the resultant score. Everything besides an address or street intersection, latitude/longitude location, or location provided in a georeferenced digital source is assigned a reliability score less than 5. This applies to source data coming (e.g. a central office located in a city instead of an address) and review comments on a previously mapped location (e.g. "That location is wrong, I know it is on the south side of town").

We have incorporated the reliability code into our last point of aggregation (LPA) and provider coverage geodatabase files, and into some of the publicly available data (PAD) geodatabases. We are also carrying a short text field (50 characters) with a descriptive rationale for the score. This will allow us to focus more on the lower scores that need to be confirmed, and ignore the high confidence data scored as 9 and 10.

Reliability Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Checked but unverified
2	Level 2	• County • Presence by other coarse geography (e.g. administrative region)
3	Level 3	• City • Census tracts • Cable Plus (area likely to have been annexed into an incorporated town or CDP)
4	Level 4	• Cable - incorporated • Zipcodes • Census blocks
5	Level 5	• GeoTel unverified • Confirmed by provider or anchor institution key advisor but to geography coarser than address or intersection
6	Level 6	• Qwest/Midcontinent or other web site random testing check • Speed test from individual average residential
7	Level 7	• From anchor institution key advisor Webex • GeoTel verified address only with no 3rd party confirmation from public sources o Building unverified • Speed test from anchor institution

8	Level 8	• From provider
		• FCC ULS or ARS
		• Geotel verified address and possibly verified by 3rd party source (Google Streetview)
		  o Another provider's sign is on building (usually Qwest)
		• Geotel possibly verified by 3rd party source (NAIP, Google Streetview)
		• From state authoritative public data source (e.g. DCN or SummitNet)
		  o Address or building unverified
		• Speed test from cluster of average residential

9	Level 9	• From provider as coverage with authoritative confirmation

		• Geotel verified address and verified by 3rd party source (NAIP, Google Streetview)
		  ○ Provider sign on building
		  ○ Tower or dish visible
		• From provider or anchor institution check of our data * Root Wireless

10	Level 10	• From 2+ authoritative confirmations

Validity Codes

We included validity codes in the last point of aggregation infrastructure data which drives creation of the DSL models. We also included validity codes in each of the final technology of transmission deliverables for polygons and point feature classes. The scales of validity vary by each major type and function.

Infrastructure Validity Codes

The purpose of this validity code is twofold:

1. To determine which infrastructure points are turned into DSL model coverages
2. To use as a reference in other coverage validity checks

Infrastructure Validity Codes		
Code	**Description**	**Detailed Description**
0	Level 0	• Not yet assigned
1	Level 1	• Not yet assigned
2	Level 2	• Not yet assigned
3	Level 3	• Checked against ND PSC Report or DSLReports at the town level • Checked against DCN anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Qwest ICONN) at the town level
5	Level 5	• Not yet assigned
6	Level 6	• Confirmation of DSL or cable from authoritative public data to broader geography than address not confirmed by provider
7	Level 7	• Authoritative public data at address level (e.g. Geotel) not confirmed by provider
8	Level 8	• Provider submission at the census tract level • Provider website independent address checks (Qwest, Verizon)
9	Level 9	• Provider submission at the census block level or address level
10	Level 10	• Provider submission at the coverage level at census block scale or blocks less than 2 square mile and larger scale then census block for blocks larger than 2 square miles

Final Technology of Transmission Validity Codes

The purpose of this validity code is twofold:

1. To determine which elements are loaded in the spreadsheet provider submission packages in their review
2. To determine which provider coverages are chosen for submittal with one of the NTIA deliverables (April 15, June 24)

Final Technology of Transmission Validity Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Unassigned at this time
2	Level 2	• Unassigned at this time
3	Level 3	• Checked against ND PSC Report or DSLReports at the town level • Checked against DCN anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Qwest ICONN) at the town level
5	Level 5	• Confirmation of DSL or cable from authoritative public data
6	Level 6	• Provider website independent address checks (Qwest, Verizon) • Provider submission at the census tract level
7	Level 7	• Provider submission at the census block level • Provider submission at the census block level confirmed by Speed test cluster OR other independent measurement
8	Level 8	• Provider submission at the address level
9	Level 9	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement
10	Level 10	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement

Data Sources

In the first rounds of broadband mapping, provider presence maps were developed for central office locations and incumbent local exchange carrier locations for all assumed providers in the state. These were identified through a commercial spatial database purchased from GeoTel Inc., and supplemented by other public data sources such as the State's Public Service Commission and DSLReports.com. These were intended to be "talking maps" and general intelligence on where providers have infrastructure for subsequent phone and written communications with providers. These maps were compared to counties served by provider in the state's telecommunications association directory.

Web site research, review of materials submitted to the state by providers, and public websites, such as the FCC were researched for each provider.

New providers are contacted to request data when a significant number of speed tests are recorded, or when we learn of their presence through ancillary sources. Providers that contact us directly and submit data are also included.

Broadband Coverage

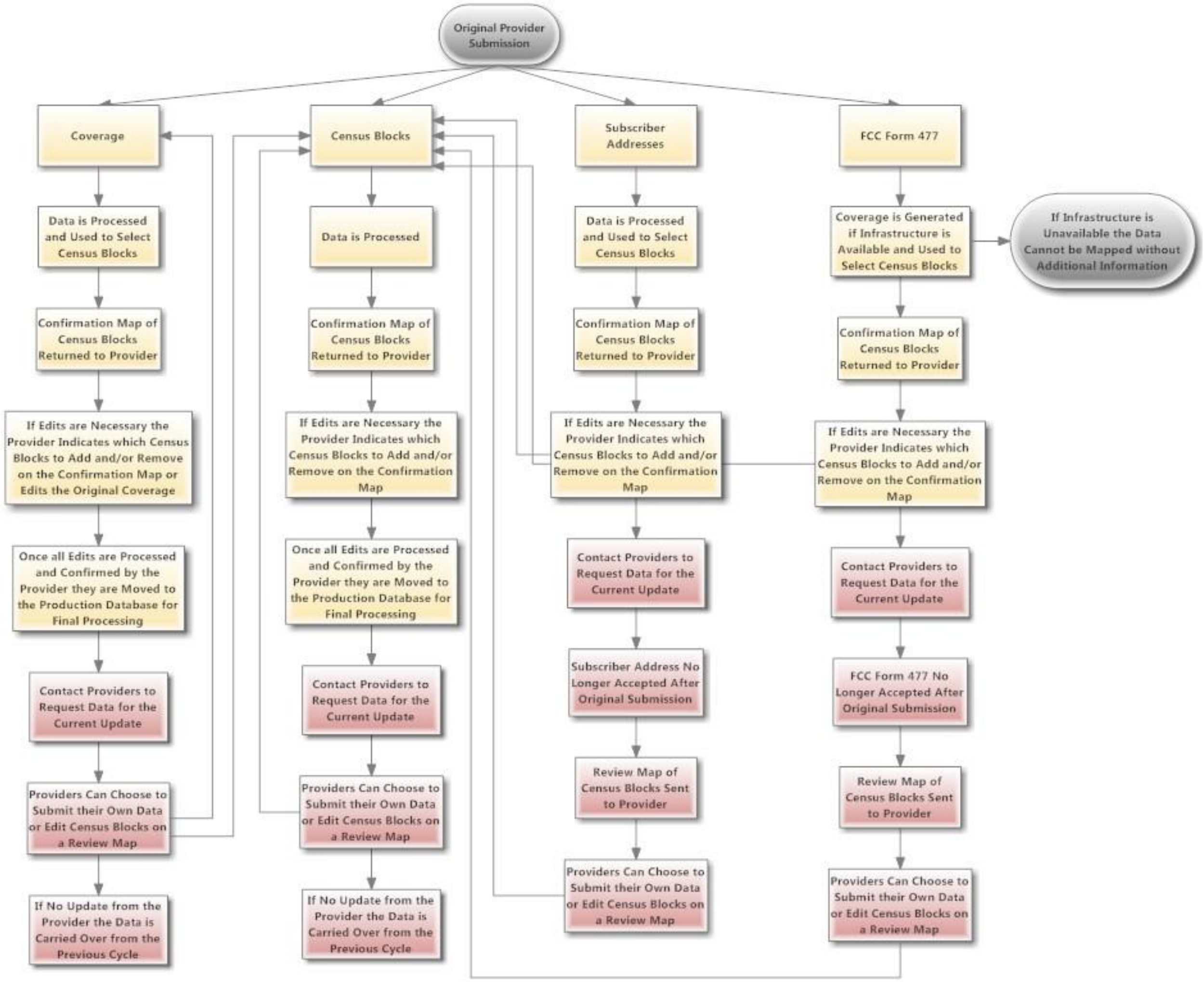
Data submitted by broadband providers was accepted as is and was mapped in complete form when provided as a broadband coverage at the same scale or larger scale than the census block level. Provider coverage submitted at a coarser geographic scale (e.g., census tracts, counties, zipcodes) was supplemented with public data, independent measurements and GIS modeling techniques. When provider submitted data appeared to be exaggerated or providers did not participate in the broadband mapping process, independent measurements and other data sources (e.g., state GIS framework structure locations, speed tests, survey results, website data and infrastructure) were used to override or supplement the provider data.

Broadband providers that chose to submit data did so in a wide variety of formats, levels of completeness, and at varying geographic scales including: narrative descriptions, analog and digital coverage maps, CAD files, GIS shapefiles and geodatabases, KMZ and KML files, FCC 477 reports, and data spreadsheets. All data formats were accommodated and processed whenever possible.

If data was submitted by a provider in a format that did not allow mapping at the census block level of geography, providers were sent standardized maps that included census blocks and a data spreadsheet in an attempt to standardize the inputs and increase the geographic granularity of the provider data submission.

Although each provider had individual characteristics and nuances in their data submissions, several data patterns can be described generalizing the provider submissions.

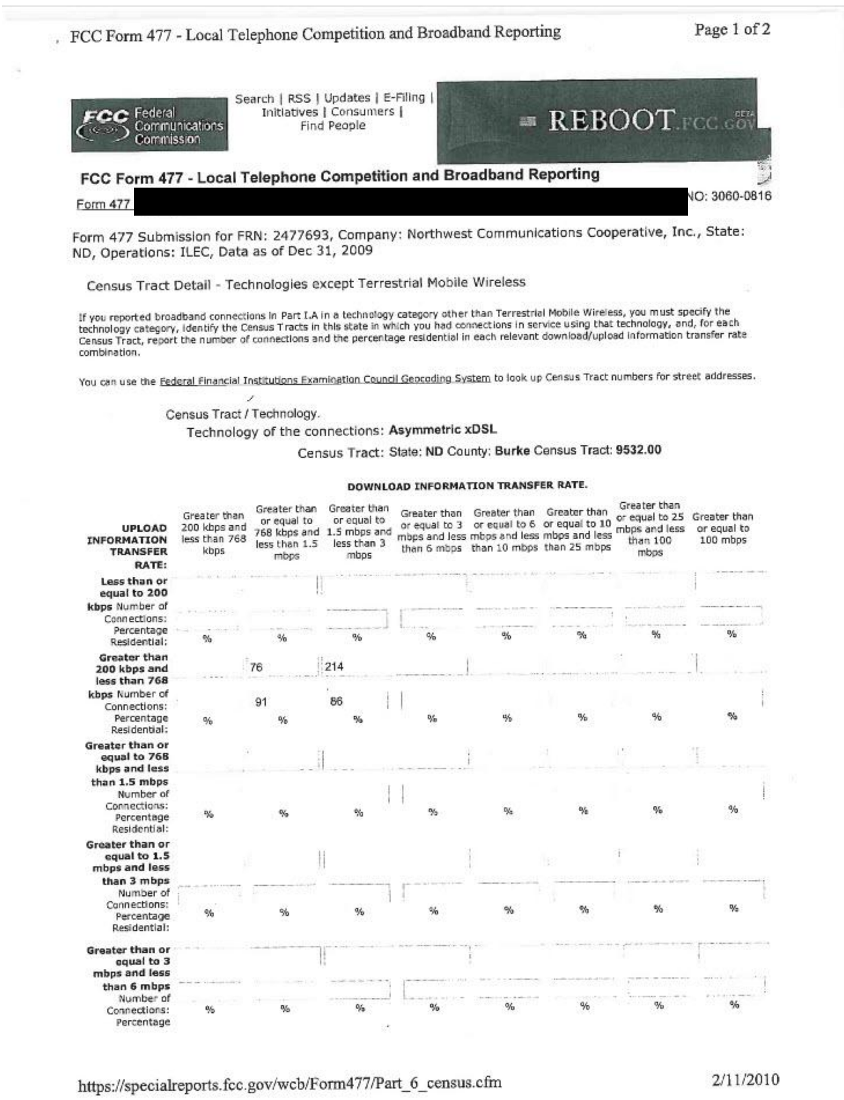
Figure 1 Provider Submission Types and Workflow



Providers Submitting FCC Form 477 Reports or Similar Format

Broadband providers are required to submit FCC Form 477 reports twice a year to the FCC; recently 477 submissions have been done using a structured web site maintained by the FCC. The 477 reports require broadband providers to submit a list of census tracts with the number of subscribers based on maximum advertised downstream and upstream speed tiers. Several providers submitted their actual FCC 477 report or a modified version in analog or digital format.

Figure 2 FCC Form 477 Example



FCC Form 477 - Local Telephone Competition and Broadband Reporting Page 1 of 2

FCC Federal Communications Commission

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REBOOT.FCC.GOV BETA

FCC Form 477 - Local Telephone Competition and Broadband Reporting

Form 477 [redacted] NO: 3060-0816

Form 477 Submission for FRN: 2477693, Company: Northwest Communications Cooperative, Inc., State: ND, Operations: ILEC, Data as of Dec 31, 2009

Census Tract Detail - Technologies except Terrestrial Mobile Wireless

If you reported broadband connections in Part I.A in a technology category other than Terrestrial Mobile Wireless, you must specify the technology category, identify the Census Tracts in this state in which you had connections in service using that technology, and, for each Census Tract, report the number of connections and the percentage residential in each relevant download/upload information transfer rate combination.

You can use the Federal Financial Institutions Examination Council Geocoding System to look up Census Tract numbers for street addresses.

Census Tract / Technology.

Technology of the connections: **Asymmetric xDSL**

Census Tract: State: **ND** County: **Burke** Census Tract: **9532.00**

DOWNLOAD INFORMATION TRANSFER RATE.

UPLOAD INFORMATION TRANSFER RATE:	Greater than 200 kbps and less than 768 kbps	Greater than or equal to 768 kbps and less than 1.5 mbps	Greater than or equal to 1.5 mbps and less than 3 mbps	Greater than or equal to 3 mbps and less than 6 mbps	Greater than or equal to 6 mbps and less than 10 mbps	Greater than or equal to 10 mbps and less than 25 mbps	Greater than or equal to 25 mbps and less than 100 mbps	Greater than or equal to 100 mbps
Less than or equal to 200 kbps Number of Connections:								
Percentage Residential:	%	%	%	%	%	%	%	%
Greater than 200 kbps and less than 768 kbps Number of Connections:		76	214					
Percentage Residential:	%	91 %	86 %	%	%	%	%	%
Greater than or equal to 768 kbps and less than 1.5 mbps Number of Connections:								
Percentage Residential:	%	%	%	%	%	%	%	%
Greater than or equal to 1.5 mbps and less than 3 mbps Number of Connections:								
Percentage Residential:	%	%	%	%	%	%	%	%
Greater than or equal to 3 mbps and less than 6 mbps Number of Connections:								
Percentage	%	%	%	%	%	%	%	%

https://specialreports.fcc.gov/wcb/Form477/Part_6_census.cfm 2/11/2010

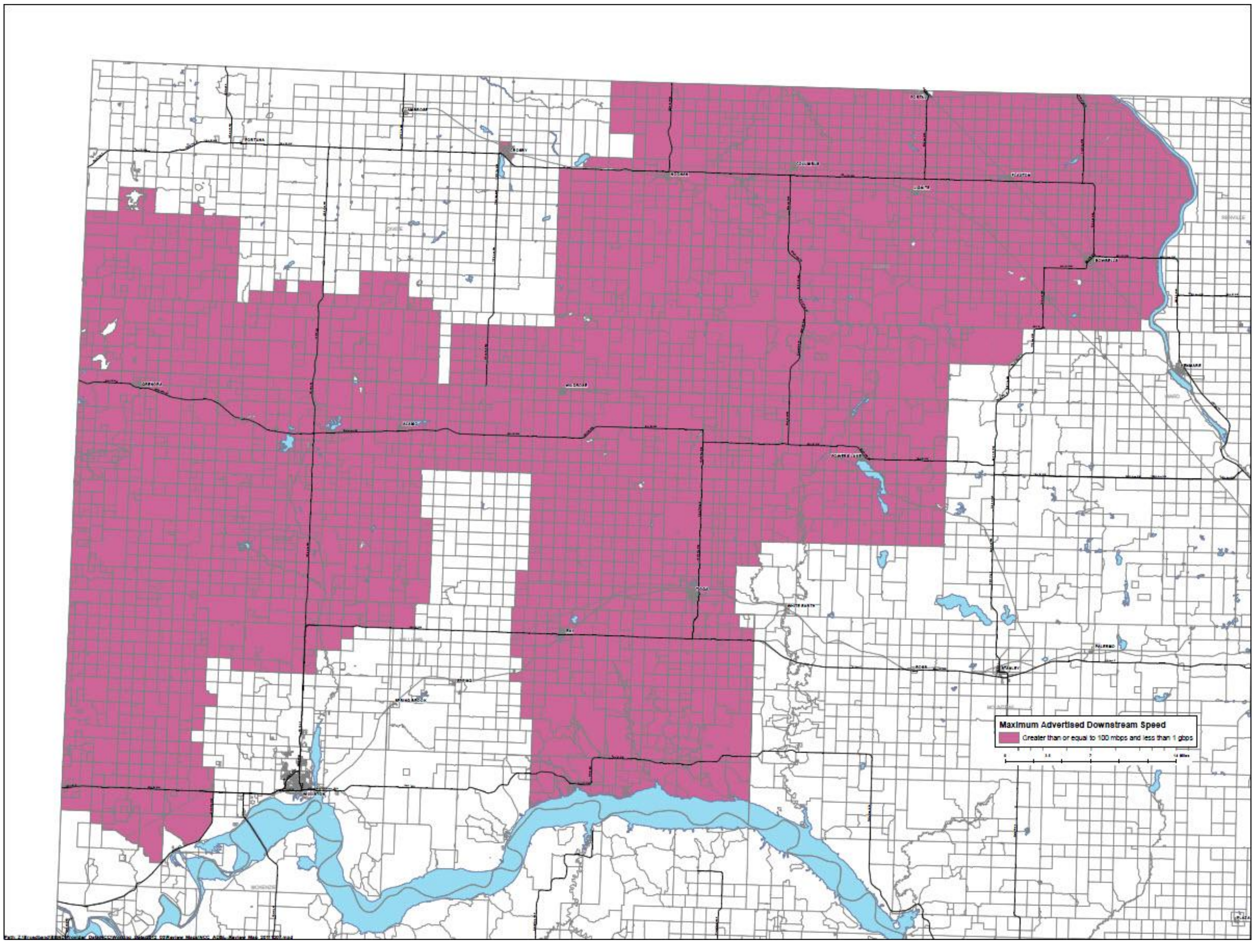
How They Were Handled

FCC Form 477 reports were entered into a standardized format that included the census tract ID code, maximum advertised downstream and upstream speed tier code, and number of subscribers (when available). Since the FCC 477 reports requires providers to submit data for all speed tiers within a census tract, only the highest maximum advertised speed for any given census tract was entered into the standardized spreadsheet in order to be compliant with the definition of broadband service.

The spreadsheets were then joined to a census tract feature class template that included the attribute fields from the NTIA schema. The resulting feature class was a geographical representation of the FCC 477 report including the technology of transmission and speed information. This feature class was used in conjunction with validated infrastructure data (i.e., central offices and/or remote terminals) to run the DSL or Cable geoprocessing models respectively.

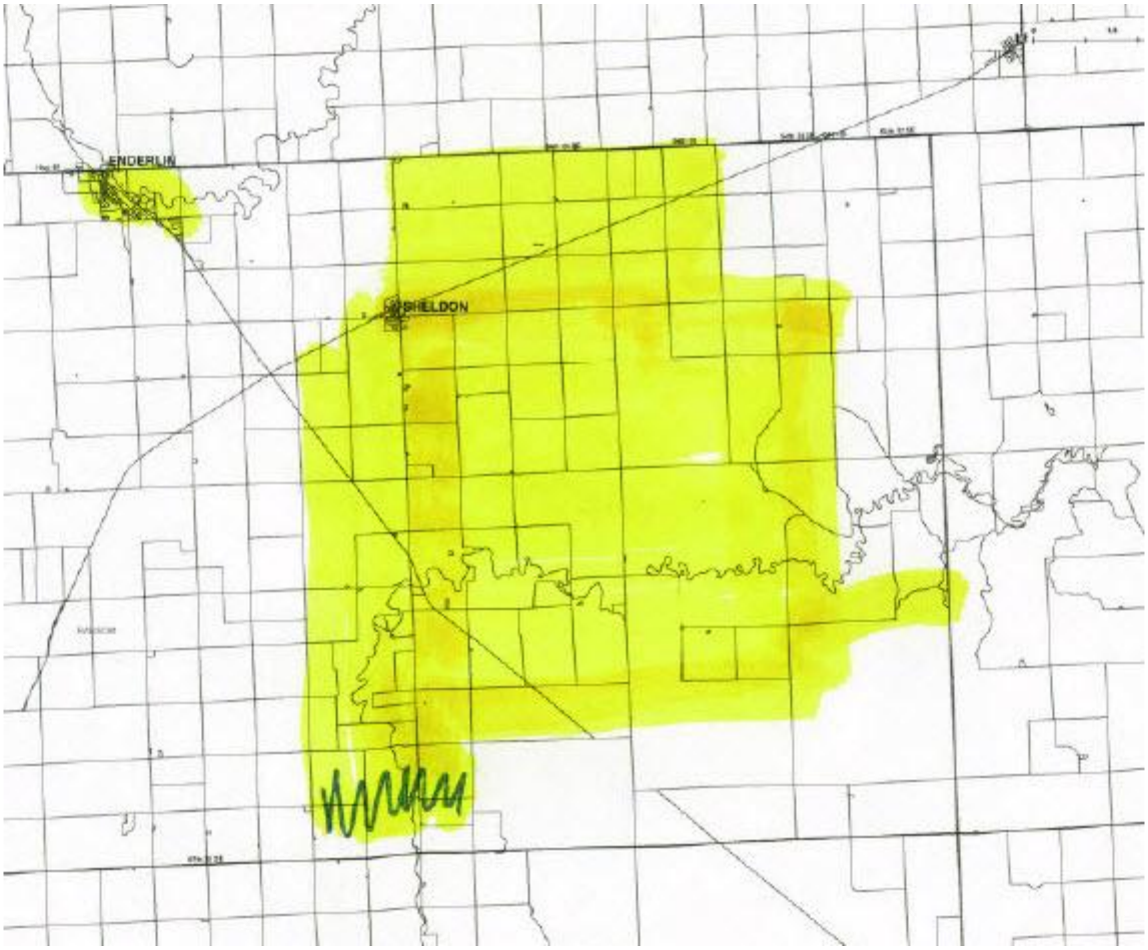
The resulting census block selection from the DSL or Cable model was displayed on a standardized review map and returned to the provider for confirmation.

Figure 3 Review Map Example



If additional edits were required the provider “marked-up” the review map(s) to indicate which census blocks should be added and/or removed. The provider submission was handled as a census block update (describe in the section below) from that point forward. In future updates from those providers FCC Form 477 data was not accepted and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 4 Provider's "Marked-Up" Map Example

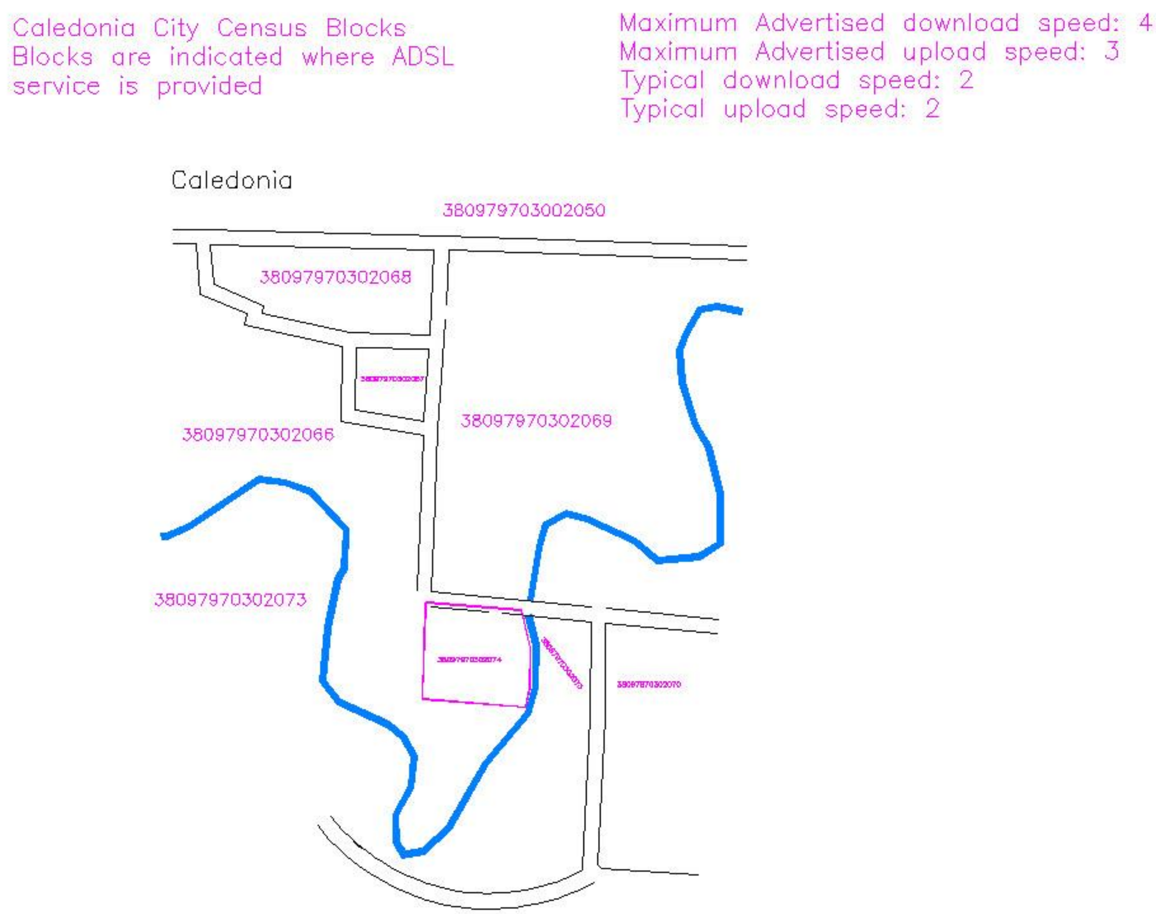


Several providers did not respond to the original confirmation maps and their final submission represented the best modeled estimate of their coverage at the census block level for DSL and/or Cable technologies. Providers that submitted FCC 477 data for fiber to the end user or fixed wireless could not be mapped and were not included in the final broadband map unless they provided additional data at the census block level or equivalent coverage at a similar scale.

Providers Submitting Census Block Coverage

Census blocks submitted by providers representing their broadband coverage area come in a wide range of formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases, tabular lists, and spreadsheets.

Figure 5 Census Block Submission Example

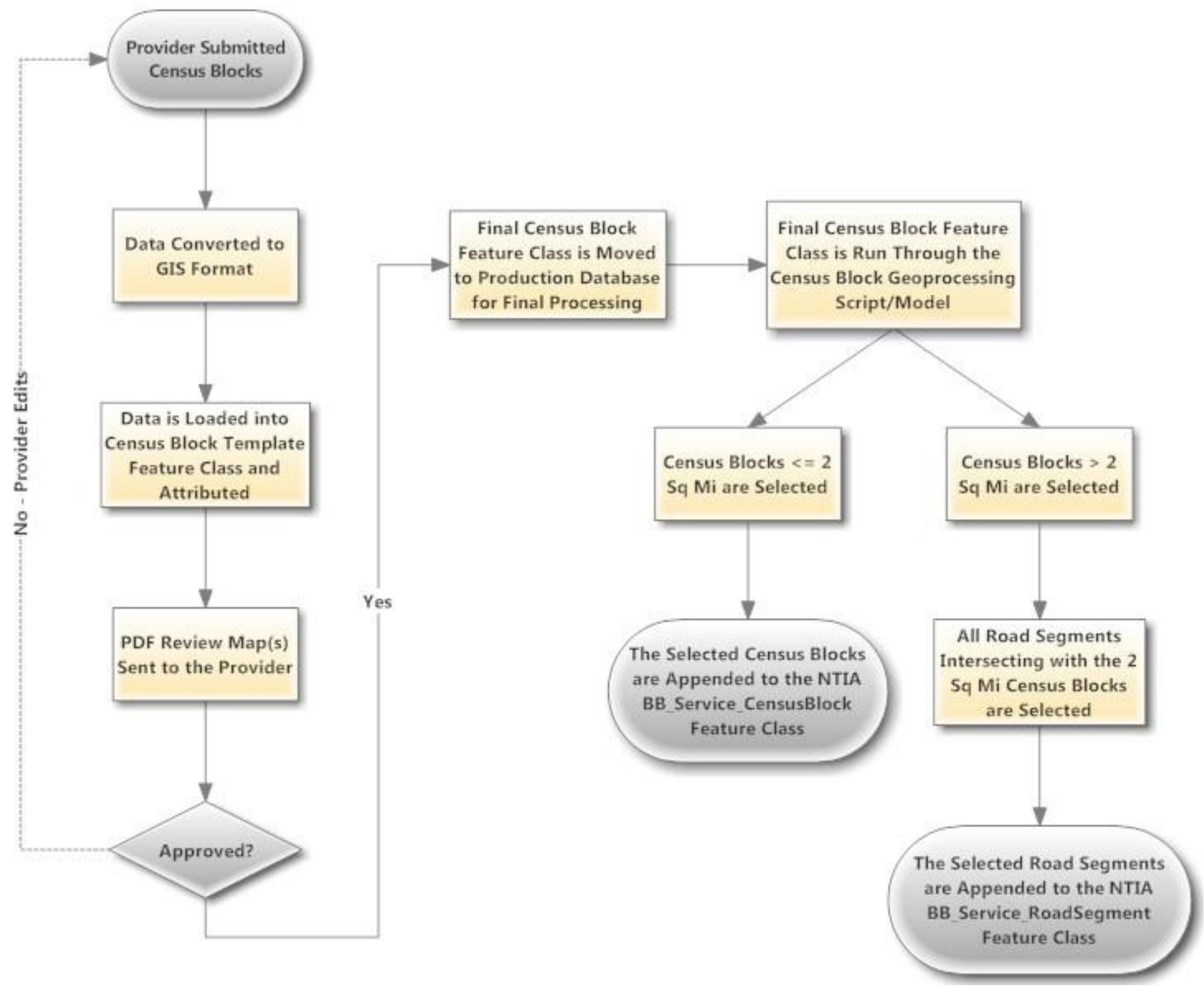


How They Were Handled

All census block submittals were loaded into a census block feature class template that included all of the attribute fields from the current NTIA schema. Census 2010 geography was used as required by NTIA. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, and maximum advertised upstream speed. If a provider did not identify the technology of transmission for a given census block or blocks, they were contacted by phone or email in order to obtain this information. In instances where speed information was not included in the data submission providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, and their advertised speeds were not available on their web site, the lowest domain code was entered in the applicable attribute field.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider's census block submission, the census block feature class was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles and road segments that intersected census blocks greater than two square miles and were appended to the appropriate NTIA transfer data model feature classes.

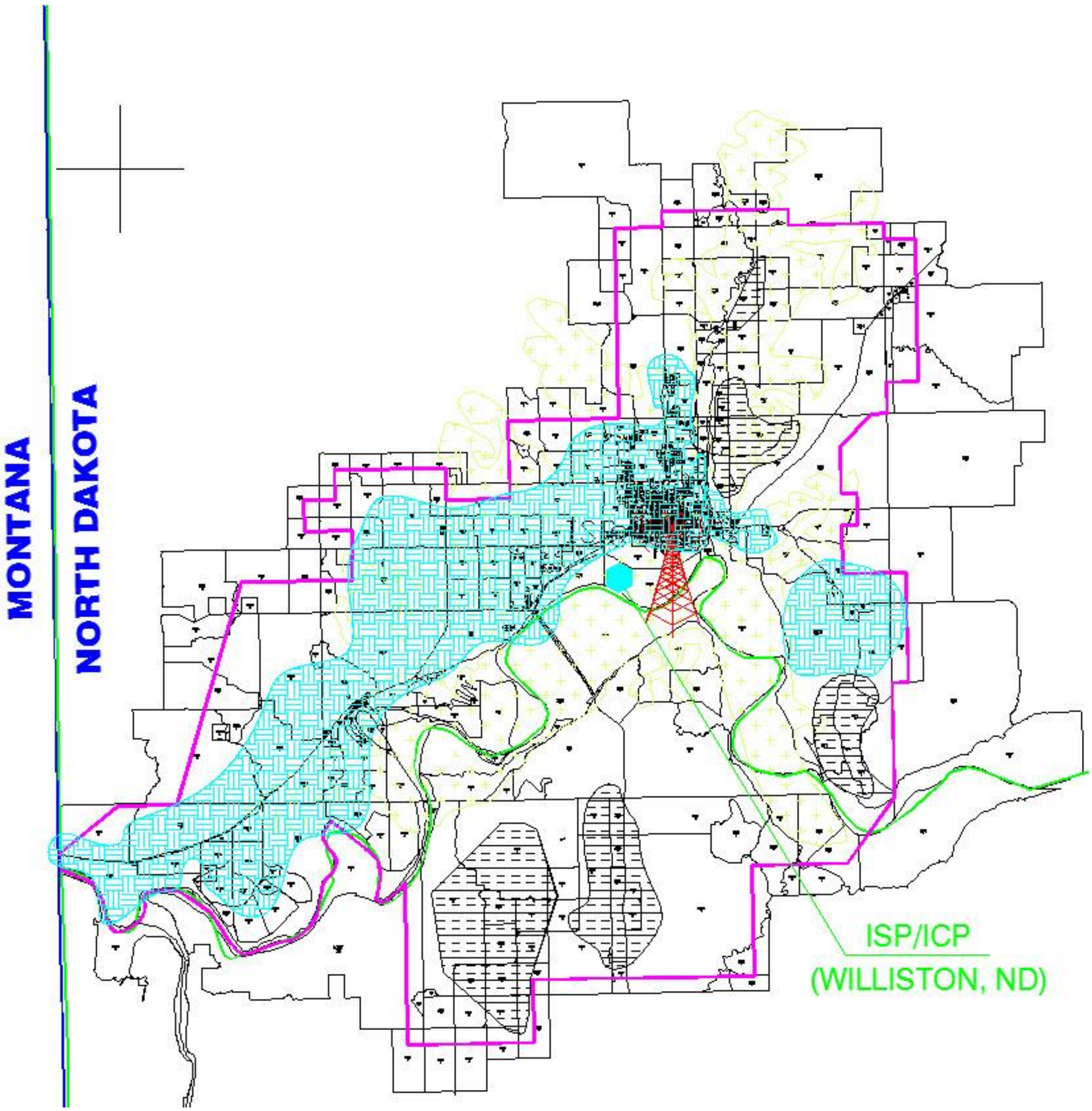
Figure 6 Census Block Geoprocessing Model



Providers Submitting Coverage Data

Provider submitted coverage data were differentiated from the other types of geographic data submissions coarser than a census block since they represented the full and explicit range of broadband coverage. Similar to the other types of data submissions, coverage data was also provided in a wide range for formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases. Coverage data was submitted by several providers or was available on several providers' websites.

Figure 7 Coverage Data Example



How They Were Handled

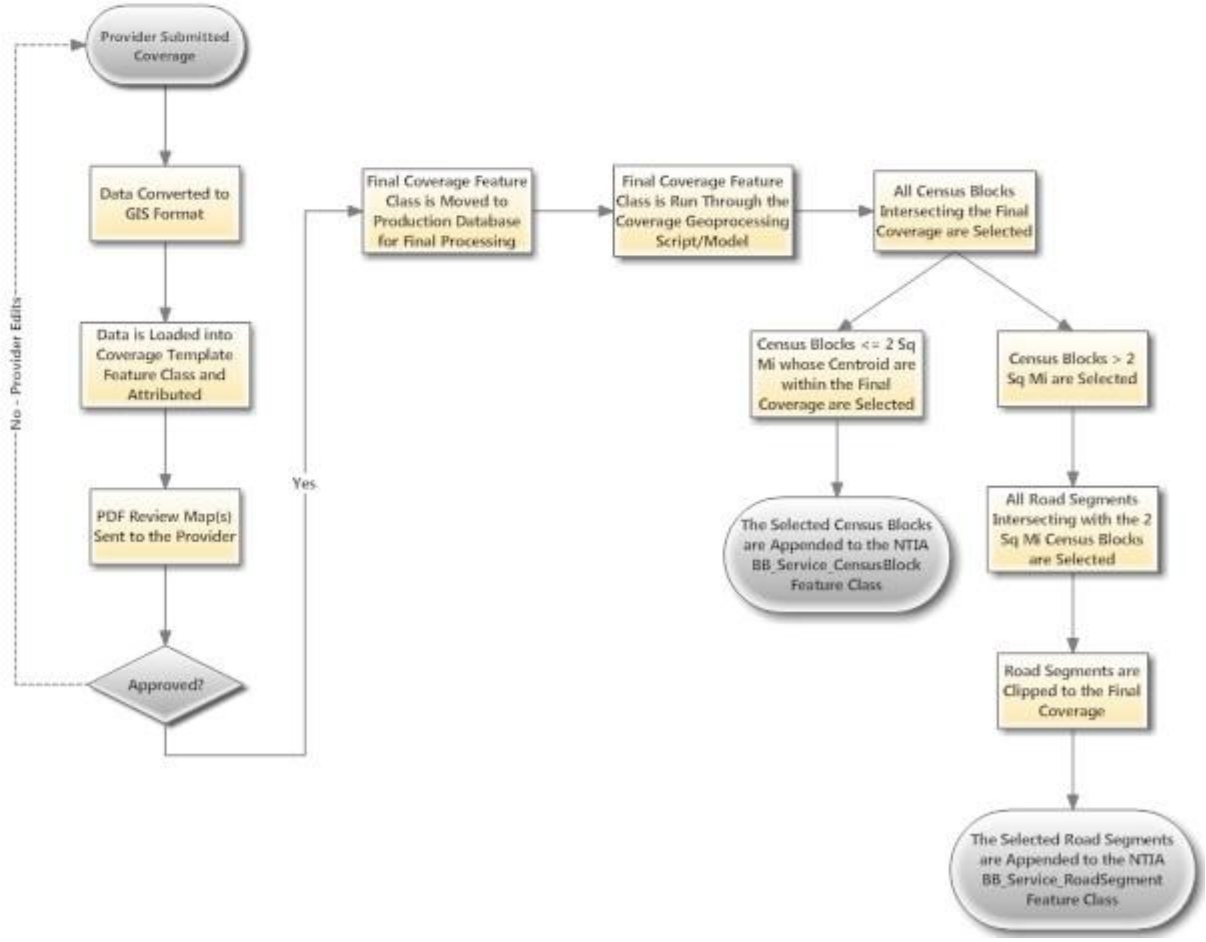
All coverage data was loaded into a coverage template feature class schema that included all of the attribute fields from the NTIA schema. The method of data loading was driven by the format in which it was received. Providers who supplied GIS shapefiles or feature classes could generally be loaded into the coverage template feature class schema using the simple data loader while CAD data had to be exported to GIS format prior to being loaded into the coverage template.

Coverage data supplied as digital or analog maps required georectification and digitizing prior to loading into the coverage template feature class. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, maximum advertised upstream speed, and spectrum. If a provider did not identify the technology of transmission for a given coverage area, they were contacted by phone or email in order to obtain this information.

When speed information was not included in the data submission, providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, the lowest domain code was entered in the applicable attribute field. If a provider did not specify the type and spectrum used for fixed wireless the default values for unlicensed were used.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider’s coverage submission, the data was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles when the centroid of the census block was within the coverage area. Road segments that intersected with census blocks greater than two square miles were selected and then clipped to the coverage area in order to provide the most accurate representation based on the provided coverage. The selected census blocks and road segments were appended to the appropriate feature class in the NTIA data transfer model.

Figure 8 Coverage Geoprocessing Model

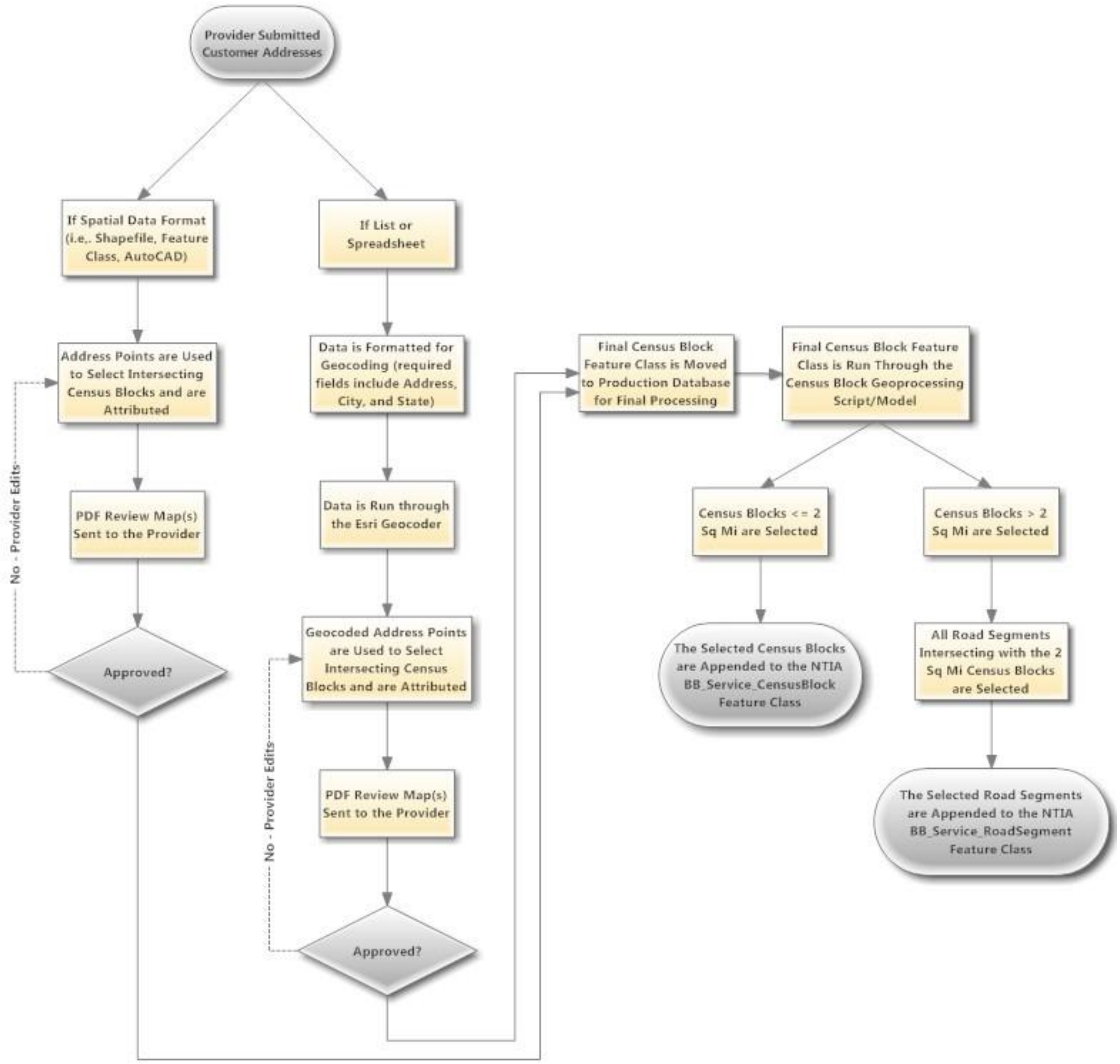


Providers Submitting Customer Locations

Providers that submitted customer locations typically fell into one of four categories. Several providers submitted customer locations in AutoCAD files, the points were exported to a shapefile and used to select all intersecting census blocks. Other providers submitted analog or digital maps that included customer locations, these images were georectified and census blocks were selected by an operator viewing the customer point images underlying the census blocks. Lists of customer addresses were also submitted. The data was loaded into a spreadsheet and geocoded using ESRI Business Analyst USA Geocoding engine. The geocoded points were treated identically to customer locations submitted in GIS or CAD format and used to select intersecting census blocks.

The resulting census blocks were added to confirmation maps and returned to the provider. If edits were necessary the provider indicated on the map which census blocks needed to be added and/or removed. The provider submission was handled as a census block update (described in the section above) moving forward. In subsequent updates subscriber address data was discouraged and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 9 Customer Addresses Geoprocessing Model



Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common were telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. These coarse geographic submissions were problematic because these areas were typically very large and lacked the detail of a defined coverage area resulting in over-exaggerated broadband coverage.

How They Were Handled

Operational rules established early in the project heavily scrutinized provider data that appeared to significantly over-represent broadband coverage and often resulted in a rejection of the submitted data. Providers who submitted coarse geographic levels of coverage data and infrastructure for DSL or cable modem service were initially that also were represented in the last point of aggregation infrastructure point file were sent estimated census block coverage maps and spreadsheets, and provided a second submission with finer level geography.

Providers submitting town locations for DSL or Cable were handled differently, and used as validation for central offices from the last point of aggregation table, and subsequently to run the DSL modeling routine or validate a cable or cable plus areas.

Cable Modem Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for Cable providers who did not submit census block or coverage data (i.e., census tract providers).

The most authoritative GIS layer available from the state with incorporated areas and city boundaries was used as a surrogate to model cable broadband coverage. Some towns that were not incorporated were also added. Municipalities and towns were sporadic in their digital update of these maps, since annexations and other boundary modifications were ongoing and difficult to maintain in real time updates. To compensate, likely areas contiguous to these city boundaries were added, labeled "Cable-Plus" in the operational data model. These additional polygons were determined using operator interpretation, road density, structures points from Info USA in Esri Business Analyst, speed test results, and in some instances NAIP imagery. In general areas were added that were immediately contiguous to existing city or town boundaries that represented likely areas where cable service existed. We were conservative in this approach and did not include populated areas near the cable plus boundaries unless they were directly contiguous to existing boundary areas.

Cable broadband providers primarily work under the structure of franchise agreements with municipalities. In the early rounds of broadband mapping updates, phone calls were made to the largest cities in the state in order to obtain that respective city's cable franchise agreement. They were all either unknown or a text agreement without maps.

The full set of potential cable areas were then passed through validation sources to determine if cable was provided. This included public sources, such as the Warren Communications Cable Fact book (http://www.warren-news.com/factbook.htm).

The second and most authoritative form of validation was data received from cable providers at the census tract, block, or coverage level of geography. A spatial join geoprocessing operation was performed on these datasets with the full set of potential cable coverage areas in order to further validate areas with cable coverage.

The third source of validation came from the public speed test site maintained throughout the project. Whenever user submitted speed tests identified cable modem broadband service near or adjacent to existing estimated cable areas, the cable-plus boundaries were expanded using the same method of digitizing outlined above.

It was not possible to differentiate between technology of transmission codes 40 and 41 using this indirect mapping method. The only authoritative way to determine this information was from data submitted by a provider. In all cases where the provider did not indicate the type of cable modem technology being used, the code for Cable Modem-Other (41) was assumed.

DSL Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for DSL providers who did not submit census block or coverage data (i.e., census tract providers). This model is based on typical DSL technology which can provide service up to 18,000 feet from a central office or remote terminal, unless otherwise specified by a provider.

Since DSL lines are typically buried alongside roadways, underneath roadbeds, or strung on aerial telephone lines which tend to run alongside a road, a GIS dataset of a state's road network were used as a surrogate to model DSL areas. In the initial rounds of broadband maintenance we purchased commercial (GeoTel) and publicly available data sources representing last points of aggregation (LPA) for DSL, including central offices and remote terminals. Each LPA was validated based on publicly available data, provider data, and independent measurements. LPAs were used in a DSL model only if they were supplied directly from a provider or could be verified by two or more sources. The actual geoprocessing model used the validated central office and remote terminal locations to generate a raster cost surface based on all of the available roads radiating out 18,000 feet from each active LPA point. The raster coverage was converted to a polygon feature class and a small back-buffer was applied to achieve the final DSL coverage polygon representing a provider's maximum possible DSL coverage area. The DSL coverage areas were then used to select intersecting census blocks and road segments.

Remote terminals were provided or publicly available for only a small number of providers, therefore this method may tend to underestimate the full DSL coverage for a provider.

It was not possible to differentiate between ADSL or SDSL based on the LPA data; the only authoritative way to determine this was from data submitted by a provider. In all cases where the provider did not indicate which type of DSL service was being provided, the technology code was assigned to 10 "Asymmetric xDSL".

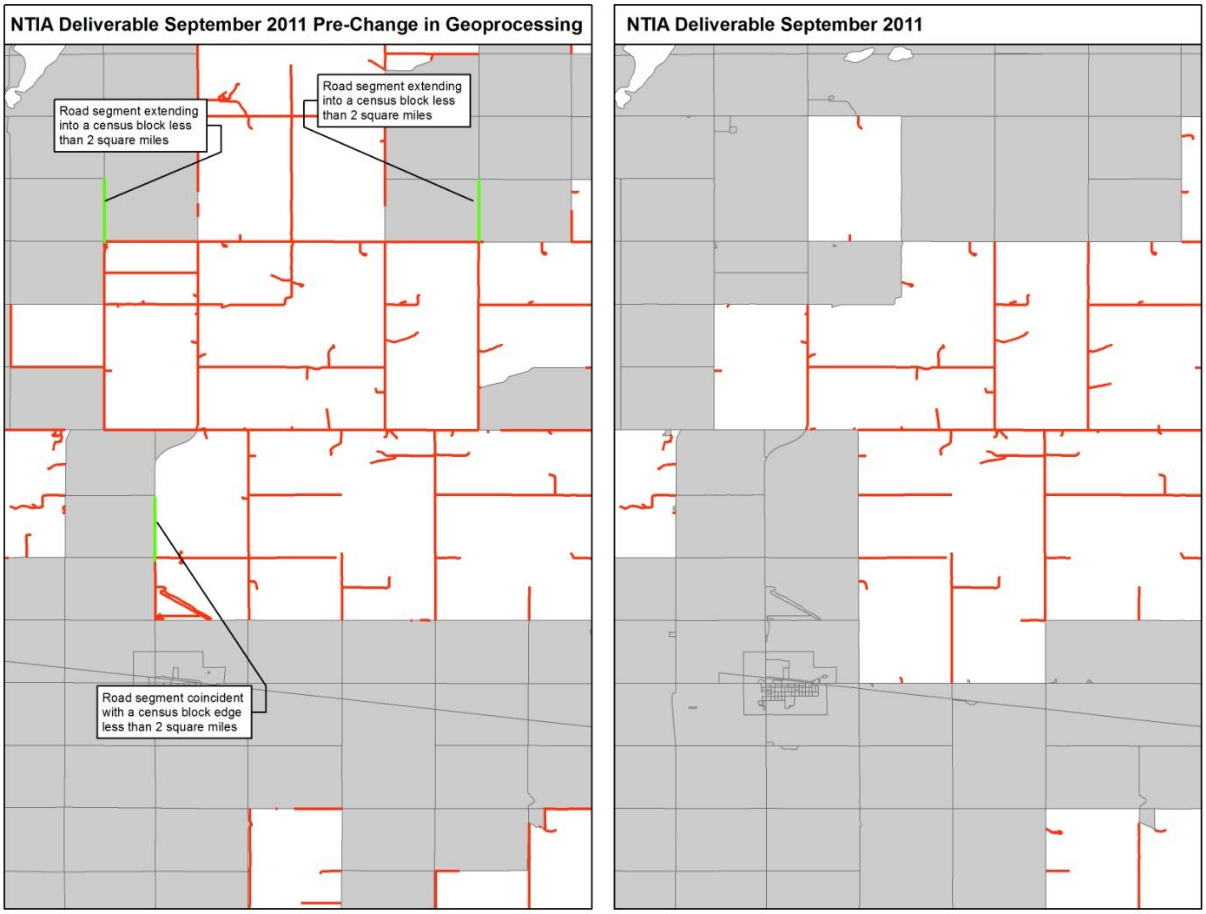
2000 T0 2010 Census Block Conversion

The September 2011 deliverable to NTIA required the transition from 2000 census data to 2010 census data, but the conversion process was dependent upon the type of data submitted by a provider. These providers fell into two categories, block providers or coverage providers. The conversion to 2010 census geography was a straightforward process for the coverage providers; the reference to the census block data in the geoprocessing model used to select census blocks and road segments was simply changed from the 2000 data to the 2010 data and each provider’s data was re-run. The conversion from 2000 census to 2010 census data for block providers required several geoprocessing steps due to the inability to simply match census block IDs across vintages. The census blocks for each provider were dissolved by type of technology to form a quasi-coverage area. The dissolved blocks were then used to select any 2010 census block whose centroid fell within the “coverage area.”

Road Segment Geoprocessing Change

Prior to the September 2011 NTIA data submission, road segments in census blocks greater than 2 square miles were selected with a straight intersect. This resulted in road segments being selected that were coincident with census block edges in blocks less than or equal to 2 square miles. Using this same geoprocessing methodology combined with the new 2010 census blocks and TIGER roads, road segments were selected that were coincident with census block edges and that extended into census block less than or equal to 2 square miles. We believe this “error” occurred due to the improvements in the spatial accuracy of both the 2010 census blocks and road segments for 2010 where features were now coincident. For the September 2011 submittal a small negative buffer (-0.5 feet) was applied to the intersect to avoid selecting roads that were coincident with census block edges and/or those that extended into census blocks less than 2 square miles. This resulted in a significant decrease in the number of road segments reported but overall we believe this method more accurately portrays each provider’s coverage area.

Figure 10 Road Segment Geoprocessing Change Example



Community Anchor Institutions

Lists were obtained from the state and affiliated processional organizations for anchor institutions to be included in the broadband mapping in each of the community anchor institution community code categories.   These were sorted and cross referenced and an initial round of elimination of duplication was accomplished.

All institutions on the initial draft spreadsheets used for the first two submittals were geocoded using ESRI Business Analyst Desktop with the USA Geocoding engine using TeleAtlas premium road features. This was judged to be the best available geocoding source for batch processing of addresses. No commercial source is 100% accurate in a primarily rural state such as this with low population numbers compared to other states and no large cities or metropolitan statistical areas. In subsequent rounds of updates since the first two submittals, we have used the same geocoding engine from Esri Business Analyst, but the geocoding locator switched to NavTech geocode locator.   In every round of geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode.

All geocoding is dependent on accurate road locations and complete and accurate street segment attribution. The GIS road layers available from the state were not judged as complete as the premium commercial sources. The Tiger 2009 road files, while spatially comparable to the commercial sources, have a large percentage of null values in the database attribution and street segment address ranges necessary for accurate geocoding. As in most parts of the country, geocoding is more accurate in urban settings than in rural routes. Complicating the process in a rural state for anchor institutions are the situation where some anchor institutions, such as public safety anchors are often staffed by volunteer staff and a post office box is the only valid address, and the physical address is wherever the public safety equipment is parked or stored at any given point in time.

Category codes were assigned based on the original source list and from keywords in the name of the institution and independent research. Technology of transmission and advertised speeds were obtained when possible, which initially was entirely based on the anchor institutions maintained by the state for consortiums providing state service contracts. Two iterations were accomplished with these state maintained lists, and all available attributes were obtained with assistance of the state analysts.

After initial data collection, analysts worked on researching, calling and improving the addresses for those below an 80% match criteria. Many on the 70 percent matching range were fairly accurately located. The difference between a 70% and 80% match typically occurred when an address lacked a prefix or suffix cardinal direction on a street that had two cardinal directions (example 101 1st Street, on a street segment with 101 N. 1st Street and 101 S. 1st

Street). Analysts were also able to obtain physical addresses for some lists supplied by the state with only a P.O. Box.

The lists with updated and corrected addresses were re-geocoded for the final mapping effort, and any anchor with any level of geocoding was included on the final map. The operational database identifies the type of match, so future maintenance cycles can be prioritized and targeted to those matching only zip codes or with address changes.

From the results of the previous step some attribution of database attributes for attributes with null values was accomplished. This step was rule based. The attribute of whether an anchor institution subscribes to broadband service could only authoritatively be answered yes, if the information was provided by the state, or a confirmation from an anchor speed test could be matched. Those anchors that were located within an area covered by a DSL, cable, other copper or fixed wireless were also assumed to have the ability to subscribe to broadband coverage and were also estimated to be subscribers. Assigning the technology of transmission and the advertised speeds (which required identifying a provider for the anchor institution) was only possible on a subset of all coverage in those areas where only one provider/technology of transmission was present. This allowed a few hundred more anchors to be identified, but typically only occurred in rural settings. Most urban settings had multiple providers. In addition many providers submitted multiple technology options, so identifying one provider/technology of transmission combination was not possible even if there was only one provider possible for the anchor institution.

It is likely that in some instances in the rural settings and small towns an anchor institution may rely on mobile wireless broadband. This is common in public safety mobile equipment such as vehicles, but likely less common in anchor facilities. For the purpose of assigning attribution to anchor institutions with remaining null attributes, we took a conservative approach and did not overlay anchor institutions on mobile wireless coverages to assign attributes.

Maximum advertised downstream and upstream speeds were not available or collected for any of the CAIsA new domain value of “U” for Unknown was added to the data model for the current submission, and all values formerly coded as 0, were changed to “U”.

A new optional attribute was requested by NTIA requesting knowledge about the presence or absence of WIFI at the CAI location. This was not researched and attributed by the state in the current submission. All records were set to “Unknown” for the attribute, Public Wi-Fi.

In the first two submission processes for geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode.

A new optional attribute was requested by NTIA after the initial maintenance updates requesting a CAI unique identification number for K-12 schools, libraries and colleges and universities. The following steps were completed for this request: Added CAIID for the Library category using the NCESID from http://nces.ed.gov/surveys/libraries/librarysearch/ ; Added CAIID for the University, college, other post-secondary category using the IPEDS ID from http://nces.ed.gov/collegenavigator/ ; Added CAIID for the School – K through 12 category for public schools using the NCES ID from http://nces.ed.gov/ccd/schoolsearch/ ; Added CAIID for the School – K through 12 category for private schools using the PSS_SCHOOL_ID from http://nces.ed.gov/surveys/pss/privateschoolsearch/

A new optional attribute for the URL for each anchor institution was requested by NTIA. Assigned URLs to CAI records: for the University, college, other post-secondary category assigned the URL from http://nces.ed.gov/collegenavigator/; for the Library category added the URL from http://nces.ed.gov/surveys/libraries/librarysearch/

Wireless Coverage

Three forms of wireless coverage were provided in this table, fixed point to point wireless, mobile wireless and satellite. No public data was located on fixed wireless infrastructure points, except notification of availability on provider's web pages, and in some instances, specific towns, recreation or commercial locations where wireless service was provided. No modeling was attempted on fixed wireless coverage. All coverage came directly from providers or was mapped from locations provided on a provider web page. We did not attempt any propagation modeling on fixed wireless, since that can be influenced by local structures and vegetation in the vicinity. A few providers did provide coverage that appeared to be derived from propagation modeling.

Most of the public data research focused on mobile wireless providers using cellular service spectrums. The Federal Communications Commission (FCC) Universal Licensing System (ULS) is the consolidated database and application filing system for most Wireless Radio Services. ULS supports electronic filing and provides public access to licensing information, weekly Public Notices, FCC rulemakings, processing utilities, a telecommunications glossary, and much more." The FCC ULS Advanced Licensing Search was queried for all FCC licenses filed in the state; a relational database was built from the results. Information from the database was extracted in order to perform the cellular tower propagation modeling for wireless broadband.

The FCC ALS and ULS reporting systems were the source for most of the tower locations. Towers were required to be licensed when they meet specific published criteria. These included some variables that could be modeled with GIS statewide, such as varying proximity to airports and heliports, combined with specific local level criteria not easily obtained or modeled statewide such as the grade construction within proximity of these, and any structure over 200 ft in height. A number of cell towers providing broadband were likely not located in the FCC database. None of the mobile wireless providers were willing to provide infrastructure such as tower locations and parameters, and the coverage provided were very generalized.

Any fixed or mobile wireless antenna or tower location submitted by a provider, or obtained from the FCC that was used in the final processing for wireless broadband coverage was maintained in the operational database for last point of aggregation, and subsequently transferred to Table 3 backhaul and middle mile points.

Providers submitted coverage data in a wide variety of formats, levels of completeness, and at varying geographic scales. All types of data was accommodated and processed whenever possible. An open structure process for submittals was allowed, accepting any data, and attempting to work with the provider when questions arose. If data was submitted by a provider in a format that did not allow a direct coverage to be mapped, such as a coarse level of geography such as a census tract, or county, feedback was provided to the providers in the form of standardized spreadsheets in an attempt to standardize the inputs, and increase the geographic granularity of the provider data submission. Although each provider had individual characteristics and nuances in their data submissions, some data patterns can be described generalizing the typical types of submissions. In general, for fixed wireless to be mapped it was necessary to receive data from a provider, since there were no public sources available on point to point wireless tower locations in public form, except as depicted on providers web pages in a few instances.

Providers Submitting FCC Form 477 Report or Similar Format

Geographically, these were lists of census tracts of coverage, accompanied by additional documentation on technology of transmission, speed tiers, and number of customers. Providers submit these twice a year to the FCC and recent submissions have been done using a structured web site maintained by the FCC. A few providers submitted printouts that appeared to be from this web format and were typically complete and standardized. More providers submitted spreadsheets roughly in the F477 format, but with modified and generalized data.

How They Were Processed

If the providers identified specific coverage areas as census blocks, or direct coverage area, or as infrastructure tower locations, they were processed and mapped. Providers identifying census blocks were processed by dissolving the census blocks into single coverage polygons by speed tier. Providers identifying a direct coverage area were converted directly to GIS polygon files and attributed. Providers submitting tower locations were mapped as circular polygons centered on the tower with a radius averaging 10 miles measured as Euclidian (straight line) distance from the tower. Providers that specified variable radius were mapped as circles at the radius they submitted.

Providers Submitting Census Block Coverage

A few providers submitted coverage as census blocks, either through a tabular listing of census blocks or spreadsheet, or in map format. It was common that a provider where public data indicated multiple technologies of transmission only submitted some of the technologies of transmission.

How They Were Processed

These were loaded directly into the master Census 2000 block coverage by provider and attributed with available data submitted by the provider. In instances where some data attributes were missing, such as advertised or typical speed tiers, or subscriber data, the data attributes were left blank or null. Providers identifying census blocks were processed by dissolving the census blocks into single coverage polygons by speed tier. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Actual Coverage Maps

Coverage maps were submitted by several providers, or coverages were derived from public sources or from other indirect indicators of coverage such as customer point maps or tabular lists in text or spreadsheet format. These were differentiated from the other types of geographic submission coarser than a census block since they represented the full and explicit range of coverage.

How They Were Processed

Coverage maps were treated as explicit coverage and all census blocks intersecting any portion of a coverage were selected and attributed with the provider coverage by technology of transmission, and all related attributes were transferred to the census block representation. The method of creating the coverage varied by source. Providers who supplied broadband coverage as a GIS polygon or CAD feature were converted to polygons. Some providers, including non-responsive providers who did not submit anything to the project, had published coverage maps of various forms on their web sites or submitted an image in jpg, tiff, pdf or other graphic format. These were georectified to base map layers, typically roads, but sometimes other features such as state or county boundaries or towns, and subsequently converted to polygon features. Then they were intersected and transferred to census block feature classes like the digital GIS submissions. Providers who submitted customer locations typically fell into four categories. Some were submitted as AutoCAD files where the points could be transferred to the GIS, then spatially joined to the census blocks they were located within. Others submitted maps in image format that were georectified in the same manner as other images, then census blocks were selected by an operator viewing the customer point images underlying the census blocks. When customer lists were submitted, they were loaded in a database and geocoded using ESRI Business Analyst USA Geocoding engine based on TeleAtlas road features. The geocoded points were subsequently treated identically to customer locations submitted in GIS or CAD format, and spatially joined to the census block template file. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common was as telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. The problem with these submissions was that often a given polygon overlapped a census block or multiple blocks, and in most cases, they were much larger geographic entities than a census block.

How They Were Processed
Our operating rules established early in the project did not allow final provider coverage to significantly over represent provider coverage. Those providers that submitted coverage area by coarse geographic features and did not specifically identify coverage as a coverage layer or census blocks were not able to be processed. No interpolated data was used to calculate these data, if the data was not provided by a provider in a format capable of processing; the data was not calculated for that provider.

Satellite

Satellite coverage for the entire state was included for the three satellite providers: HNS License Sub, LLC, StarBand Communications Inc., and WildBlue Communications, Inc.

Middle Mile

Middle mile and backhaul points were included for all public data and provider submitted infrastructure judged to be reliable and valid. A systematic reliability (geographic scale and authority of the source) rating and a validity rating (cross referencing between multiple sources) were developed and used throughout the project, both on a scale of 1-10, along with feature level metadata to maintain the last point of aggregation. A persistent unique identifier was used to track each point and each instance of a point as they moved through the system and improved in quality. Old points were retired but were not deleted from the operational database. Only active records were used in the final processing.

A feature class labeled "Last point of aggregation" (LPA) in the operational database was created to hold point locations of broadband infrastructure (examples include central offices, remote terminals, head ends, etc.). Addresses purchased or obtained at any level of geography were geocoded to a street address (using ESRI Business Analyst and TeleAtlas data) or located more generally to the center of a town (snapped to the USGS Geographic Names Information System location) when no address information was available. and All mobile wireless locations obtained from public sources or commercial sources that were not already validated were confirmed using NAIP aerial imagery and Google Street View (when available). All FCC tower locations included a latitude and longitude, however all towers were validated and moved to the NAIP aerial imagery location.

A reliability code indicating the source and geographic scale represented as an integer from 1 (low) to 10 (high) was assigned. Validity codes were assigned cross-referencing public and provider data submissions; it was also rated on a scale of 1-10. A point with a validity code of 7 that fell within a provider's coverage for DSL, mobile or fixed wireless, or was used in a final modeled coverage was included in this table. In addition, backhaul points identified by the state, by providers and consortiums providing services to the state and anchor institutions, were included in the table. Providers were typically reluctant or unwilling to provide infrastructure data, and often unwilling to confirm data obtained through public sources. The methods used in the state allowed a significant level of identification and mapping of infrastructure locations and feature level metadata on reliability and validity of point locations, but data on owned or leased characteristics, serving facility codes, and for elevation of infrastructure was confirmed by few providers who responded directly in a spreadsheet provided to them to list infrastructure.

Speed Test Data Processing

A public facing website was created in the spring of 2010 asking internet users in the state to complete a brief survey regarding their internet connection and run a speed test on their connection using the Ookla speed test. The speed test site asked that a user enter their location as an address on a Google map interface. If the address did not geocode to their satisfaction, the user could choose to move the place mark to their desired location. Next, users were asked to select their technology of transmission from a list, enter their provider in a free form text field, complete an optional questionnaire, and run a standard speed test on their connection. The date and time, and IP address of the user were captured during the speed test.

All speed tests were geocoded, and the IP address was looked up in batch mode in the WHOIS database returning one or two providers registered with WHOIS. All speed tests were cleaned and analyzed against provider submissions and models. For the first two submissions a final provider assignment was assigned by examining the WHOIS fields, and the provider submitted by users. Consistent rules were not always possible, but generally when two WHOIS records were returned, the second more specific WHOIS provider was selected. In some instances, where the WHOIS providers were backhaul or other and were not providers meeting the NOFA criteria, the user submitted provider designation was cleaned and standardized and assigned as the final provider

There was considerable variation between the user reported technology of transmission (TOT) and the known technologies for any given provider. Records were divided on unique provider/ TOT combinations for the first and second submissions, which limited the record count in many instances. For the current submission the records were divided only by provider, not taking TOT into consideration.

For the first two submissions, the speed test records were used in two ways for the final processing.

1) As an independent measurement to validate the presence/absence of a provider coverage for DSL and/or Cable technologies.

In the first submission a few providers were identified as DSL broadband providers based primarily on speed tests. In these instances, DSL models were executed for both providers based on verified central office locations. Some speed tests with an identified technology of transmission of Cable Modem were used to expand “likely” cable areas which were typically adjacent to incorporated and urban areas. These “cable-plus” areas were created to supplement submissions from Cable Modem providers who did not provide detailed coverage or census blocks. No new DSL providers or Cable providers were identified using speed tests in the current submission.

2) As an independent measurement for typical upload and download speeds.

Once data were cleaned and final provider and technology of transmission assigned, these fields were concatenated. In the first two submissions, if the remaining records exceeded 10 for the combination of provider and technology, and the speed test was successfully completed (values > 0) the average value and standard deviation of the download speed were calculated. Any values exceeding 1 standard deviation were removed as outliers, and the mean of the remaining records within 1 standard deviation was calculated for the download and upload speed. This value was reported for each provider/technology of transmission record as the typical speeds for that provider. In some instances the typical speed was lower than that required to meet the definition of broadband by NTIA, but that did not preclude the records from being included in the broadband map in the first two submissions as it did in the current submission.

For the current submission, these procedures were modified and all records were re-run. The steps of the current processing are provided below. The primary procedural change was to drop the validation of the presence/absence of provider coverage for DSL and/or Cable technologies, since providers had been validated in the first two submissions and potential new providers identified through additional speed tests were determined to not meet the NOFA criteria for being considered a broadband provider. The use of the speed test data for determining typical speeds was implemented with similar rules as the first two submissions with the exception of the use of the technology of transfer, and raising the minimum number of speed tests to 15, after removing outliers, to be used in typical speed calculations. Procedurally, the process was also automated with a Python script to improve processing performance and minimize quality control/quality assurance testing.

Typical upload and download speeds for all providers with less than 15 processed speed test records were coded as null values. In addition, based on telephone communication with NTIA on March 9, 2011, all typical speeds less than minimum NOFA upload of download speed criteria were also ignored and reported as null. Based on a related request in the same communication, the typical speeds greater than the advertised speeds were ignored and reported as null. Processing steps for the current submission are provided below:

1. Speed test records were imported into a SQL Server data file, adding fields Final Provider and IPGroup to the initial records.
2. IPGroup attribute was set by extracting the left three nodes of the IP Address of the speed test (e.g. 161.7.1.236 had 161.7.1) moved to the IPGroup attribute.
3. An IPGroup to Final Provider cross reference table was created to determine the final provider from the unique three part IPGroup.
4. Each IPGroup was reviewed with the data in the who is 1 provider, who is 2 provider and then the user specified provider to determine the most authoritative final provider from the official list of providers. None of the WHOIS or user submitted fields were absolutely authoritative in all instances, so expert opinion by technicians knowledgable of the providers was used in some instances to assign the IPGroups, and subsequently the Final Provider attribute.
5. Run a python script to remove outliers and calculate summary statistics for each Final Provider assignment. The rationale for removing outliers was to mitigate the many variables that effect a typical speeed test, such as the time of day, others on the network, etc. The script implemented the following work flow rules:
    a. Use all records for each unique FinalProv attribute value with D_kbps greater than 0 or U_kbps greater than 0 , then:
    b. Calculate a mean for the unique provider group for each D_kbps and U_kbps.

c. Calculate a standard deviation for the unique provider group for each D_kbps and U_kbps. Each speed attribute was calculated independently of the other.

d. Subtract the outliers (if any) higher or lower than one standard deviation from the mean.

e. Calculate the median value of the remaining non-outliers for each provider D_kbps and U_kbps respectively.

f. Create a summary table with the final calculated assignment of FinalProv, D_kbps and U_kbps.

6. Post process the summary table in the following sub steps:

   a. Join the summary tables by provider for the upload and download speeds into one summary file including the number of records or frequencies for up and down speeds for each provider after removing the outliers, and the mean up and down speeds in kilobits per second for each provider.

   b. Select "FreqDown" < 15 AND "FreqUp" < 15 then delete the resulting selection set from the joined table. The FreqDown/Up fields counted the number of speed test records for a provider after the outliers more or less than one standard deviation from the mean value were removed from consideration.

   c. Select "D2_kbps" <= 768 kbps AND "U2_kbps" <= 200 kbps. then delete the resulting selection set from the joined table.

7. Import the remaining valid mean values for each provider into the appropriate broadband coverage feature classes.

8. Select any typical speeds greater than advertised speeds either up or down, and make the resulting records null in the final broadband coverage feature classes (as per NTIA request 3/9/2011).

Quality Assurance Testing

A separate analyst checked each provider submission. Due to the variety of provider submissions, the analyst originally doing the work and the analyst checking discussed the interpretations when the criteria were subject to interpretation.

Coverage, technology of transmission, and speed tier were checked completely for each provider.

Many of the models and block, tract and coverage level processes were completed with ESRI Modelbuilder and Python scripts, and these methods were tested for quality assurance in the preliminary mapping stages and in the initial sample data submissions to NTIA.

All providers who submitted geographic coverage coarser than a census block were provided a data checking package to assess for accuracy and completeness. Any comments received from providers were processed.

1. QA/QC Checks prior to Individual Data Processing (i.e., block or coverage geoprocessing model). [Automated Modelbuilder tools and follow-up by an analyst]
    a. Check for inconsistencies within the Provider Name, DBA Name, FRN
    b. Check for duplicate census blocks or coverage areas
    c. Check the Provider Name, DBA Name, FRN against the "Official Provider Table"

2. For each provider after initial data processing is completed [Review by an analyst that did not process the original data]
    a. Review correspondence log
        i. Review recent correspondence, since previous NTIA submission
        ii. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, subscriber weighted nominal speeds (SWNS)
    b. Review wiki data processing page (current metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    c. Review individual Provider Wiki page (historic metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    d. Check Provider Data Folder
        i. Review recent data submissions, since previous NTIA submission
    e. Check Working Data Folder
        i. Review current update feature class geography
        ii. Review coverage with provider's submissions
        iii. Review technology of transmissions (TOTs) with provider's submissions

iv. Review Max Adv Speeds: Down/Up with provider's submissions

3. For each provider after final data processing is completed [Review by an analyst that did not process the original data]
   a. Check PROVCOV_Master geodatabase:Provider Blocks feature class and/or Provider Coverage feature class
      i. Review geography
      ii. Review TOTS
      iii. Review Max Adv Speeds: Down/Up

4. Check Infrastructure feature class [Review by an analyst that did not process the original data]
   a. Review recent submissions, since previous NTIA submission

5. Check SWNS feature class [Review by an analyst that did not process the original data]
   a. Determine if provider submission is valid

6. For each provider after speed tests are processed [Review by an analyst that did not process the original data]
   a. Check PROVCOV_Master geodatabase for Typical Speeds: Down/Up

7. QA/QC Checks and Reports on the Final NTIA Deliverable [Automated Modelbuilder tools and follow-up by an analyst]
   a. Check the Provider Name, DBA Name, FRN against the "Official Provider Table" for each NTIA feature class (i.e., BB_Service_CensusBlock, BB_Service_RoadSegment, BB_Service_Wireless, etc.). NTIA_Provider_Name_DBA_FRN_Errors_Sample.xls, looks at each NTIA feature class (i.e., census blocks, road segments, wireless, etc…) and checks to see if there is an identical match in the "Official Provider Table." If an identical match does not exist for that Provider Name, DBA Name, FRN concatenation it is written to a geodatabase table along with the NTIA feature class where the "error" occurred. When an "error" does occur it then has to be checked by an analyst and corrected if necessary.
   b. Change Detection Report – This geoprocessing model compares and reports any changes in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. The user needs to supply the feature classes for each NTIA version as well as the name of the final change detection table. NTIA_Change_Detection_Example.xls,

compares and reports any changes (limited to Provider Name, DBA Name, FRN, TOT combinations) in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. If the final change detection table has no records, then no changes were detected between the two databases. If a Provider Name, DBA Name, FRN, TOT combination does not have a "pair" in either direction (the current or previous NTIA database) then it is written to a geodatabase table along with the NTIA feature class and version where the "error" occurred. This report does not change any data in either database but rather acts as a flag, requiring an analyst to check if the "error" is valid.

c. Check for duplicate census blocks or road segments or wireless coverage areas.
d. Check for duplicate anchor institution points.

8. Review Final NTIA deliverables [Review by an analyst that did not process the original data]
    a. Review BB_ConnectionPoint_MiddleMile
    b. Review BB_Service_CAInstitutions
    c. Review BB_Service_Census Block
    d. Review BB_Service_Overview
    e. Review BB_Service_RoadSegment
    f. Review BB_Service_Wireless

9. Run the NTIA Check submission tool and python tool to confirm that all possible records passed the NTIA data checks. The only items that failed in the checking process were those where inconsistencies in the final NTIA NSGIC data model did not agree with the final documentation and rules established by NTIA and FCC in the final webinar and documentation presented March 17, 2011. These exceptions were documented along with the submission.

Appendix A

Potential providers researched but subsequently identified as not providing broadband service.

Company Name	Filing Company DBA	FRN	URL
5LINX Enterprises Inc. dba Globalinx	5LINX Enterprises, Inc.	0015304645	5linx.com/products
8x8, Inc.	8x8, Inc.	0007099773	www.8x8.com
Ablaze Technologies			none
ACN Communication Services, Inc.	ACN Communication Services, Inc.		www.myacn.com/index.html
Alltel Wireless	Alltel Wireless		na
American Fiber Network, Inc.	MobilePro Corp.	0006801583	none
AT&T Corp.	AT&T Inc.	0004496774	www.att.com
AxisInternet, Inc.	AxisInternet, Inc.	0019609254	www.axint.net
Badlands Cellular of North Dakota Cellular Partnership	Verizon Communications Inc.	0018535716	none
Bandwidth.com, Inc.	Bandwidth.com, Inc.	0015443773	bandwidth.com
BroadvoxGo!, LLC	BroadvoxGo!, LLC	0017679523	www.broadvox.com
Broadwing Communications, LLC	Level 3 Communications, LLC	0008599706	www.level3.com
BullsEye Telecom, Inc.	BullsEye Telecom, Inc.	0004350930	www.bullseyetelecom.com
Call Catchers Inc.	Call Catchers Inc.	0016109803	none
Callsmart	Callsmart		http://www.getcallsmart.com/
Cause Based Commerce Incorporated	Cause Based Commerce Incorporated	0015173503	causebasedcommerce.com
CierraCom Systems	CierraCom Systems		www.cierracom.com
Citizens Communications	Citizens Communications		none
CommPartners, LLC	CommPartners, LLC		www.commpartnersconnect.com
Consolidated Communications Networks, Inc.	Consolidated Telcom	0003740396	www.ctctel.com
Covad Communications Company	Covad Communications Company		www.covad.com/
CrossConnect	CrossConnect		www.crossconnectsolutions.com/
CVC CLEC, LLC	CVC CLEC, LLC		www.cvcclec.com
Cypress Communications, Inc.	Cypress Communications, Inc.	0005038930	cypresscom.net
Daktel Communications, LLC	Dakota Central Telecommunications	0007266703	www.daktel.com

	Cooperative		
DIECA Communications, Inc.	DIECA Communications, Inc.		www.covad.com
Digital Telecommunications, Inc.	Digital Telecommunications, Inc.		digitaltel.com
DSLnet Communications, LLC	DSLnet Communications, LLC		www.megapath.com
Enventis Telecom Inc.	Hickory Tech Corporation	0008394322	www.enventis.com
Ernest Communications, Inc.	Ernest Communications, Inc.	0004948642	www.ernestgroup.com
Ethos Communications Group, Inc.	Ethos Communications Group, Inc.		www.ethoscommunications.net
Exit Mobile	Exit Mobile		www.exitmobile.com
Faith Communications, Inc.	Faith Communications, Inc.		www.faith-inc.com
First Communications, LLC	First Communications, LLC	0003764487	www.firstcommunications.org
France Telecom Corporate Solutions L.L.C.	France Telecom Corporate Solutions L.L.C.		www.francetelecom.com
Frontier Informatics LLC	Frontier Informatics LLC		www.frontiertelco.com
Frontier Telco	Frontier Telco		www.frontiertelco.com
Global Crossing Telecommunications, Inc.	Global Crossing North America, Inc.	0002850519	www.globalcrossing.com
Grand Forks Wireless	Grand Forks Wireless		www.grandforkswireless.com
Granite Telecommunications LLC	Granite Telecommunications LLC	0008676975	www.granitenet.com
Great Western Network	Great Western Network		www.greatwesternnetwork.com
GreatCall, Inc.	GreatCall, Inc.	0018554386	www.greatcall.com
Greenfly Networks, Inc.	Greenfly Networks, Inc.	0015808736	www.clearfly.net
Harris Corporation	Harris Corporation		www.harris.com
Hypercube Telecom, LLC	Hypercube Telecom, LLC		www.h3net.com
iCore Networks, Inc.	iCore Networks, Inc.	0015340326	www.icore.com
InPhonex.com, LLC	InPhonex.com, LLC	0010488351	www.inphonex.com
Integra Telecom of North Dakota, Inc.	Integra Telecom Holdings, Inc.	0005071014	www.integratelecom.com
Ionex Communications North, Inc.	Birch Communications Inc.	0005027305	www.birch.com/about/
IP Networked Services, Inc.	IP Networked Services, Inc.	0016088882	none
KDDI America, Inc.	KDDI America, Inc.		www.kdd.com

Kentucky Data Link, Inc.	Kentucky Data Link, Inc.		www.kdlinc.com
Kotana Communications, Inc.	Kotana Communications, Inc.		kotana.com
Level 3 Communications, LLC	Level 3 Communications, LLC	0003723822	www.Level3.com
LightEdge Solutions, Inc.	LightEdge Solutions, Inc.	0015546443	www.lightedge.com
LightSquared LP	LightSquared LP	0007705742	www.lightsquared.com
Lightyear Network Solutions, LLC	Lightyear Network Solutions, LLC		www.lightyear.net
Loretel Systems, Inc.	Hector Communications Corporation	0002650828	www.loretel.com
Matrix Telecom, Inc.	Matrix Telecom, Inc.	0004333068	www.matrixbt.com
MCImetro Access Transmission Services LLC	MCImetro Access Transmission Services LLC		www.verizon.com
McKenzie Consolidated Telcom, LLC	McKenzie Consolidated Telcom, LLC		none
McLeodUSA Telecommunications Services, Inc.	PaeTec Corporation	0003716073	www.mcleodusa.com
Metropolitan Telecommunications of North Dakota, Inc.	Metropolitan Telecommunications Holding Company	0009806019	www.mettel.net
Millicorp	Millicorp	0018930511	www.millicorp.com
Missouri Valley Communications, Inc.	Nemont Telephone Cooperative, Inc.	0008326787	www.nemont.net
Mix Networks, Inc.	Mix Networks, Inc.	0014166573	www.mixnetworks.com
Mobile ESPN, LLC	Mobile ESPN, LLC		www.espn.com
NB Internet LLC	NB Internet LLC		www.nbinternet.com/
Network Innovations, Inc.	Network Innovations, Inc.		www.nitelecom.com
Neutral Tandem-North Dakota, LLC	Neutral Tandem-North Dakota, LLC		www.neutraltandem.com
New Edge Network, Inc.	New Edge Holding Company	0003720471	www.newedgenetworks.com
nexVortex,Inc.	nexVortex,Inc.	0015282155	www.nexvortex.com
Noonan Farmers Tel Co	Noonan Farmers Tel Co		
Norlight Telecommunications, Inc.	Norlight Telecommunications, Inc.		www.norlight.com
Norlight, Inc.	Norlight, Inc.		www.norlight.com
Northern Red River ITV	Northern Red River ITV		www.nrritv.k12.nd.us
Northstar Telecom, Inc.	Midwest Marketing	0011412905	www.northstartelecom.us

	Group, Inc.		
NOSVA Limited Partnership	NOSVA Limited Partnership		nosva.com
OnWav, Inc	OnWav, Inc	0018007898	www.onwav.com/home
PAETEC Communications	PAETEC Communications		www.paetec.com
Phone.com, LLC	Phone.com, LLC	0016845190	www.phone.com
PNG Telecommunications, Inc.	PNG Telecommunications, Inc.		www.powernetglobal.com
PowerNet Global Communications	PowerNet Global Communications		www.powernetglobal.com
Proximiti Technologies, Inc.	Proximiti Technologies, Inc.	0016431603	www.proximiti.com/default.aspx
Qwest Communications Company, LLC	Qwest Communications International, Inc.	0003605953	centurylink.com
Qwest Corporation	Qwest Corporation		centurylink.com
RNK, Inc.	Wave2Wave Communications, Inc.	0004343737	www.wave2wave.com
Rural Cellular Corp. DBA RCC Network Inc	Rural Cellular Corp. DBA RCC Network Inc		www.unicel.com
Sage Telecom, Inc.	Sage Telecom, Inc.		www.sagetelecom.net
Sagebrush Cellular, Inc.	Nemont Telephone Cooperative, Inc.	0001608645	www.nemont.net
SDN Communications	SDN Communications		www.sdncommunications.com
Skyland Technologies, Inc.	Skyland Technologies, Inc.		none
Smartnet, Inc.	Smartnet, Inc.		www.getcallsmart.com
South Dakota Network, LLC	South Dakota Network, LLC		www.sdncommunications.com
TDS Telecommunications Corporation	Telephone and Data Systems, Inc.	0004948105	www.teldta.com
TeleCommunication Systems Corporation of Maryland	TeleCommunication Systems Corporation of Maryland		www.telecomsys.com
Telesphere Networks Ltd.	Telesphere Networks Ltd.	0015328032	www.telesphere.com
The Neighborhood, Built by MCI	The Neighborhood, Built by MCI		www.verizon.com
Time-Warner	Time-Warner		www.timewarner.com
T-Mobile	T-Mobile		www.t-mobile.com
Trans National Communications International, Inc.	Trans National Communications International, Inc.	0004337846	www.tncii.com

Trinsic Communications, Inc.	Trinsic Communications, Inc.		www.matrixbt.com
tw telecom holdings inc.	tw telecom inc.	0014942668	www.twtelecom.com
U.S. Link, Inc.	U.S. Link, Inc.		www.tdstelecom.com
UC	UC		www.integratelecom.com
Venture Communications Cooperative, Inc.	Venture Communications Cooperative, Inc.		www.venturecomm.net
Venture Communications Cooperative, Inc.	Venture Communications Cooperative, Inc./Western T	0003784477	www.venturecomm.net
verizon business global llc dba verizon business	Verizon Communications Inc.	0010856284	www.verizon.com
Vision Systems	Vision Systems		www.vision-systems.com
VoIP360, Inc.	VoIP360, Inc.	0016868317	none
VoIPStreet, Inc.	VoIPStreet, Inc.	0016266157	www.voipstreet.com
Vonage Holdings Corp.	Vonage Holdings Corp.	0018401844	www.vonage.com
WDIG Mobile, LLC	WDIG Mobile, LLC		www.dig.com
Western CLEC Corporation	Western CLEC Corporation		none
Western Wireless Corporation	Western Wireless Corporation		none
Wherify Wireless, Inc.	Wherify Wireless, Inc.		none
Wireless Alliance LLC	Wireless Alliance LLC		none
WWC Holding Co. - Cellular One (Western Wireless)	WWC Holding Co. - Cellular One (Western Wireless)		none
XE Mobile 55, LLC	XE Mobile 55, LLC		www.xemobile.com
YMAX Communications Corp.	YMAX Communications Corp.		www.ymaxcorp.com

Nebraska Broadband Mapping Project: Product Release White Paper

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Product Specification:	Spring 2012 NTIA Data Model
Product/Process:	NTIA—April 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	168
Total Valid Broadband Providers	80
Providers in Research Phase	11
Non-Responsive Providers	0
Non-Cooperative Providers	1
Number of Providers - Supplied Updates for this Submission	63
Number of Providers - Confirmed No Updates	5

- New Providers Since Last Data Submission
  - Cable One, Inc.
  - Nebraska Technology & Telecommunications, Inc. (NT&T)
  - Skycasters
  - StarBand Communications Inc.
  - Telebeep Wireless
  - US Cellular
  - WildBlue Communications Inc.

- Non-Responsive/Non-Cooperative Providers
  - Wire Free Nebraska, Inc./Community Internet Systems, Inc.

- Providers that Supplied Coverage Updates

AIS	Gryphon Wireless, L.L.C.	Rural Telephone Service Company, Inc.
Allo Communications	Hamilton Telephone Company/Nedelco	Skycasters
Arapahoe Telephone Company	Hartelco	Southeast Nebraska Communications
AT&T Corp.	Hartman Telephone Exchanges, Inc.	Sprint Nextel Corporation
Blue Valley Telecommunications, Inc.	Hershey Cooperative Telephone Company	Stanton Telecom, Inc.
BWTelcom	Huntel, Inc.	StarBand Communications Inc.
C and R Electronics / Action Communications	Internet Nebraska Corporation	Ste Wireless, Inc.
Cable One, Inc.	K & M Telephone Company, Inc.	Superior Inet
Century Link	Key Art Comm., Inc	Swiftel Communications
Charter Communications	Long Lines Siouxland, LLC	Telebeep Wireless
Consolidated Telco, Inc.	Mainstay Communications	Three River Telco
Cozad Telephone Company	Mobius Communications Company	Time Warner Cable
Cricket Communications, Inc.	Nebraska Central Telephone Co. (NCTC)	Unite Private Networks, LLC
Dalton Telephone Company, Inc.	Nebraska Link	US Cellular
Diode Communications/Diller	Nebraska Technology & Telecommunications, Inc. (NT&T)	USA Communications, L.L.C.
Fibercomm L.C.	Northeast Nebraska Telephone Company	Verizon Wireless
Fort Randall Cable Systems, Inc	Orbitcom, Inc.	Vistabeam
Frontier Communications Of Nebraska	PC Telcom	Wauneta Telephone Company
Glenwood Telephone	Pierce Telephone Co Inc	Westel Systems/Hooper
Golden West Telecommunications Cooperative, Inc.	Pinpoint Communications Inc.	WildBlue Communications Inc.
Great Plains Communications, Inc.	Plainview Tel Co.	Zayo Bandwidth Northwest Inc

- Existing Providers – No Updates
  - ABS Computer Headquarters LLC
  - Cox Communications
  - Level 3
  - New Edge Networks (EarthLink)
  - Windstream

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

PROCESS CHANGES

For this data submission, there was a broadband mapping partner change that naturally led to overall process changes. Below are some bullet points on the process changes, as well as some detail on the benefits of these changes:

- Removal of Address Point Layer
  - You will notice in this data submission that there is the absence of address points as opposed to previously deliverables. ***This is by design*** and largely due to the many complaints regarding the quality and accuracy of the coverage maps. These complaints have been coming from the service provider community, internal planning teams, as well as the general public. We believe the

process in which the address points were collected and presented had serious limitations which limited the accurate representation of the appropriate coverage areas that our service providers can provision broadband services to. To that end, we have engaged with our new vendor (BroadMap) for this round and are utilizing a polygonal approach to the mapping of broadband service provider coverage areas. These in turn are being represented in the census block and wirelesses coverage areas per the latest data model. We believe this will yield the most accurate results and set the baseline for our mapping effort going forward. Once we have stabilized the coverage areas, we will again look to potentially incorporate address points in future deliverables when and where appropriate.

- Introduced Provider Catalog (PCat) web application
  - This application allows all members of the team (both State and BroadMap) to review the detailed information that tracks all provider interactions, including dates on both the outreach efforts and the completion of data collection, validation and verification. This information is especially helpful when there may be more than a one-to-one relationship with a provider and the team.

- Provider Portal Deployment
  - Introducing the Provider Portal allowed each provider to review their service area coverage as it existed for the fall 2011 data submission, and then request modifications through a graphical interface. Since the previous coverage was represented as the fall 2011 data model, census blocks and streets, we worked with each provider to enhance their coverage representation to a more granular level that would then be stored within the internal core model.
  - As evidenced by provider feedback and participation the providers have certainly embraced the portal as it supplies them with the capability to review their coverage at a granular level using an interactive map. They can easily identify where expansion or refinement is required to ensure the representation of their service areas is accurate.
  - Of the 63 providers that provided new data for the spring 2012 submittal, 52 received training on the provider portal and 44 providers actively used the portal to review their coverage, supply updates and validate the final aggregated coverage.

- Implementation of Internal Core Data Model
  - As mentioned above, the internal model allows for a more granular depiction of a provider's coverage area by aggregating the data they supplied into polygonal representing their full coverage. This data can then be refined or increased, where needed, using the provider portal to reflect their accurate coverage and then extracted into the NTIA data model for data submission.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement -
  - Allo Communications (TT-50)
  - Applied Communications Technology, Inc (TT-41)
  - Atcjet.net LLC (TT-70)
  - CenturyLink (TT-10)
  - Diode Communications (TT-70)
  - Superior Inet (TT-70)
  - Fibercomm L.C. (TT-71)
  - Glenwood Telecommunications Inc (TT-70 and TT-71)
  - Great Plains Broadband, Inc. (TT-41)
  - Great Plains Communications, Inc. (TT-10)
  - Fort Randall Cable Systems, Inc (TT-10)
  - Hartelco (TT-50)
  - Mainstay Communications (TT-10 and TT-50)
  - Huntel Cablevision (TT-41)
  - Huntel Communications (TT-41)
  - K & M Telephone Company, Inc. (TT-10)
  - Cricket Communications, Inc. (TT-80)
  - Mobius Communications Company (TT-10 and TT-41)
  - Hamilton.net, Inc. (TT-10, TT-70 and TT-71)
  - Clarks Telecom (TT-50)
  - Northeast Nebraska Telephone Company (TT-10)
  - Orbitcom, Inc. (TT-10)
  - Pinpoint Communications Inc. (TT-10 and TT-41)
  - Nebraska Central Telephone Co. (TT-10)
  - Three River Communications, LLC (TT-10)
  - Three River Digital (TT-41)

- Technology Changes/Additions -
  - Charter Communications Inc. and Time Warner Cable – Upgraded some of their TT-41 coverage to TT-40

- Coverage Footprint Expansion –
  - AT&T Mobility LLC (TT-80)
  - ATC Communications (TT-10)
  - BWTelcom (TT-10 and TT-50)
  - Verizon Wireles (TT-80)
  - Charter Communications (TT-40)
  - Frontier Communications Of Nebraska (TT-10)
  - Consolidated Telco, Inc. (TT-10)
  - Consolidated Telecom, Inc. (TT-10)
  - Consolidated Telephone Company (TT-10 and TT-50)
  - Curtis Telephone Company, Inc. (TT-10)

- Cozad Telephone Company (TT-10)
- Diode Communications (TT-10 and TT-41)
- Fibercomm L.C. (TT-10)
- Glenwood Telecommunications Inc (TT-41)
- Glenwood Telephone (TT-50)
- Golden West Telecommunications Cooperative, Inc. (TT-10 and TT-50)
- Great Plains Communications, Inc. (TT-50)
- Hartelco (TT-10)
- Hartman Telephone Exchanges, Inc. (TT-10 and TT-50)
- Hershey Cooperative Telephone Company (TT-10)
- Westel Systems (TT-10)
- Huntel Cablevision (TT-70)
- Huntel, Inc. (TT-10)
- Vistabeam (TT-70)
- K & M Telephone Company, Inc. (TT-20 and TT-50)
- Key Art Comm., Inc (TT-10)
- Long Lines Siouxland, LLC (TT-50)
- Mobius Communications Company (TT-50)
- Dalton Telecommunications Inc. (TT-10)
- Pierce Telephone Co Inc (TT-10)
- Cambridge Telephone Company (TT-50)
- Rural Telephone Service Company, Inc. (TT-10)
- STE Wireless, Inc. (TT-70)
- Southeast Nebraska Communications (TT-10)
- Stanton Telecom, Inc. (TT-50)
- Three River Telco (TT-10 and TT-50)
- Unite Private Networks, LLC (TT-50)
- Wauneta Telephone Company (TT-10 and TT-50)

DATA CORRECTIONS

- Per NTIA's guidance on 02/21/12, we updated all Verizon speed data to support the business rules they laid out.

  ~~

  All grantees should then apply the following business rule, as some of the speed ranges fall into two tiers:

  3G Speeds:
  Maximum <u>and</u> Typical download speed: 600 kbps to 1.4 Mbps (Speed Tier 3: 768 kbps – 1.5 Mbps)
  Maximum <u>and</u> Typical upload speed: 500 kbps to 800 kbps (Speed Tier 2: 200 – 768 kbps)

  4G LTE Speeds:
  Max Adv Download Speed: 12 Mbps (Speed Tier 7: 10 Mbps – 25 Mbps)
  Max Adv Upload Speed: 5 Mbps (Speed Tier 5: 3 Mbps – 6 Mbps)

  Typical download speed: 8.5 Mbps (Speed Tier 6: 6 Mbps – 10 Mbps)
  Typical upload speed: 2 Mbps to 5 Mbps (Speed Tier 5: 3 Mbps – 6 Mbps)

- The NTIA 3rd Party data review and summary were also compared to the product prior data submission and no changes were required. The Technology/Speed tier differences highlighted were reviewed with the providers and corrected, where needed.

COMMUNITY ANCHOR INSTITUTION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	Broadband Subscriber (Yes)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	1497	1114	1119	1120	1117
Category 2 - Library	93	91	92	92	92
Category 3 - Medical/Healthcare	162	155	155	155	155
Category 4 - Public Safety	130	124	130	130	130
Category 5 - Universities/Colleges	162	136	131	136	136
Category 6 - Other: Government	349	330	348	348	348
Category 7 - Other: Non-Government	134	132	134	134	134
Total	**2,527**	**2,082**	**2,109**	**2,115**	**2,112**

CAI CHANGES

- The amount of CAI's and broadband information increased since the last data submission based on information supplied directly from providers stating they specifically supply service to that individual CAI.

- There were 1,725 CAI's within the following categories, that were reviewed against the below-mentioned databases to identify if any CAIID's need to be updated or added.

  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**

  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**

  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

NE_2012_04_01.txt

- Error Report
    - The only items flagged in the submission receipt output are as follows, which has been verified as correct entries within the data submission. Please see the ReadMe text file for more details.
    - The exceptions NTIA noted during the 03/27/12 webinar are as follows:
        - Middle Mile Elevation Fails
        - Middle Mile Latitude/Longitude Fails
        - Middle Mile Ownership Fails
        - Address SpeetTier Fails
        - CAI Transtech Fail

Hyperlinks to Grantee Workspace in which the same issues were identified by other Grantees:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

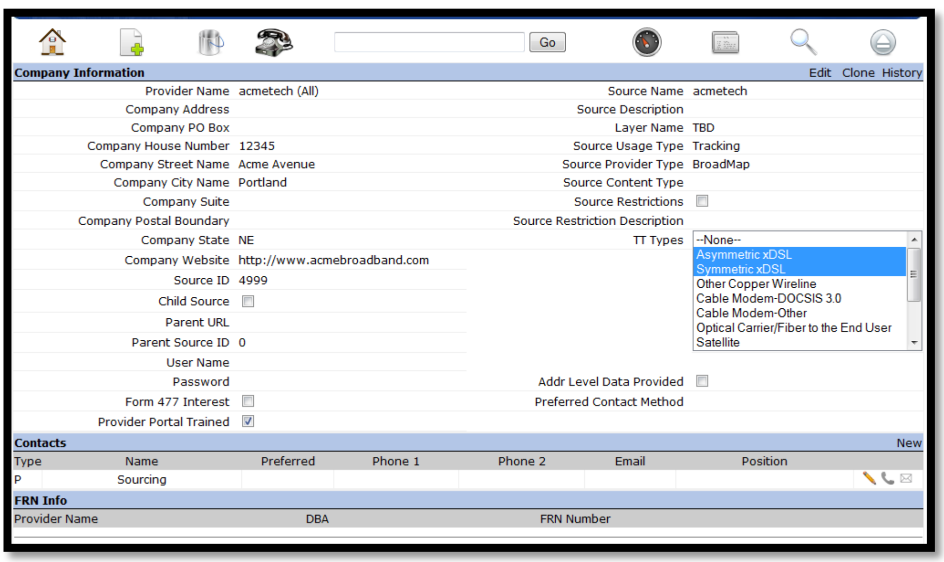
HIGH-LEVEL SUMMARY

DATA GATHERING

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

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

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



Confidence New

TT Type	Confidence	Last Modified	Comment

Status Tracking

Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐

Service Provider Details

BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	

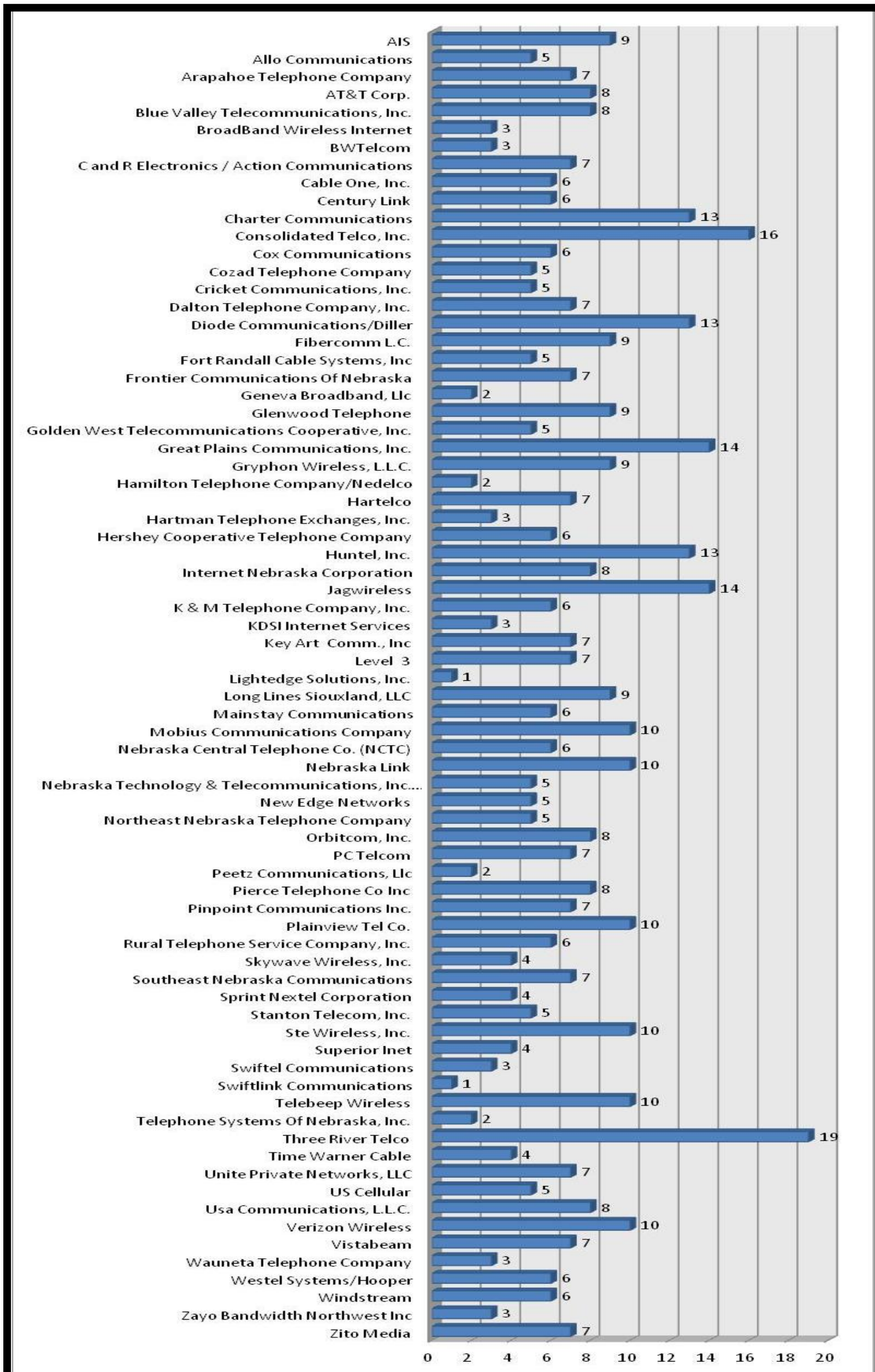
BDIA Delivery 0412 Edit

Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- To encourage participation throughout the life of the program, we feel it's important to foster relationships with providers and encourage a collaborative team effort between all parties for each data submission. The following table represents the number of times each provider was contacted via e-mail or phone for this data submission.



- Update provider material that describes the data requirements and logistics for data transfer.

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

COMMUNITY ANCHOR INSTITUTION (CAI)

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

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.
- In the upcoming months, one of the statewide semi-monthly webinars produced by the Planning team is scheduled and will focus on CAI engagement, education on the program, and use of the CAI Portal. The broadband planning and mapping teams are working together to present material on the overall broadband program, benefits, and importance on CAI involvement.

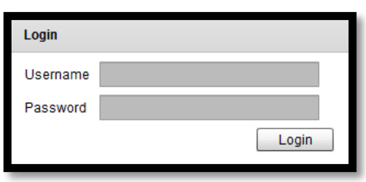
DATA INTEGRATION PROCESS

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

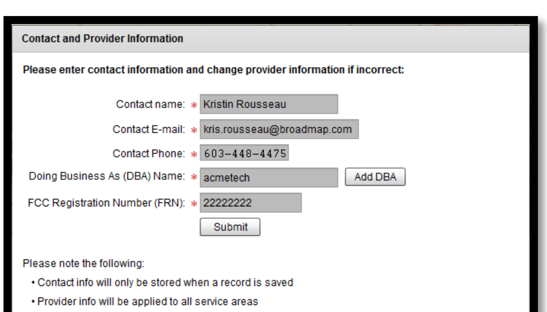
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type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

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

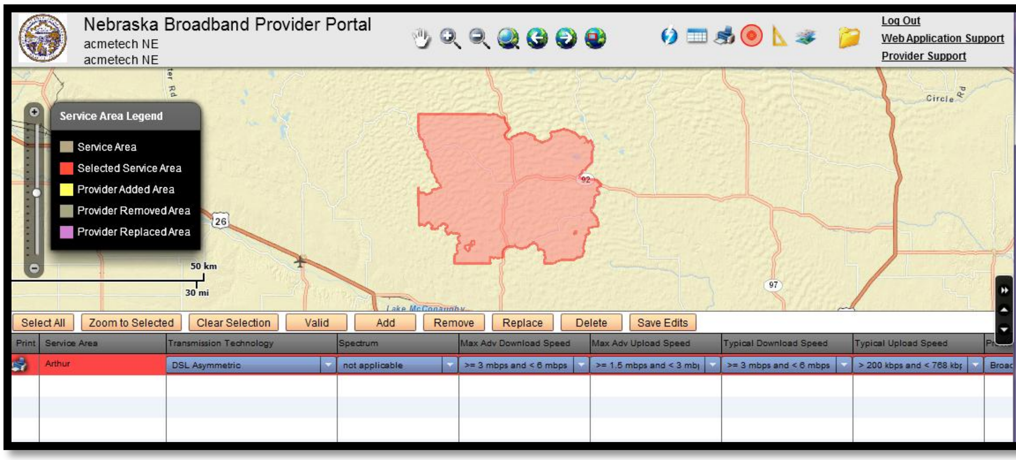
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



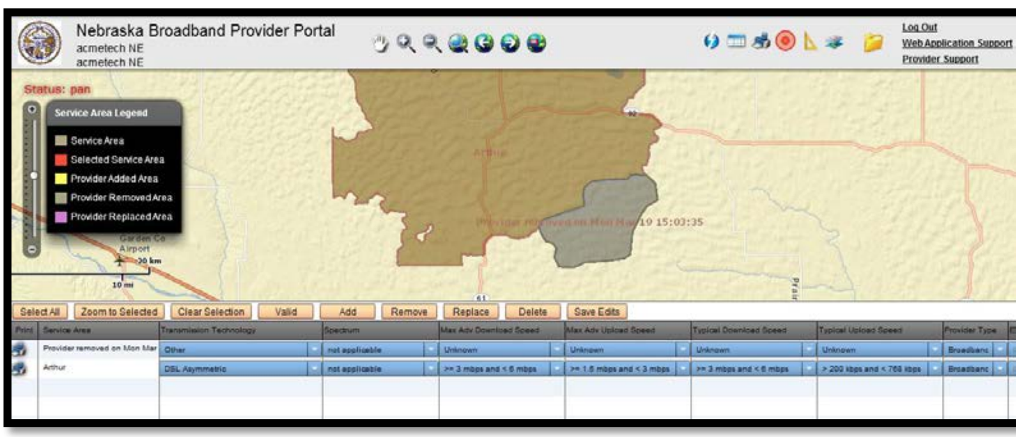
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



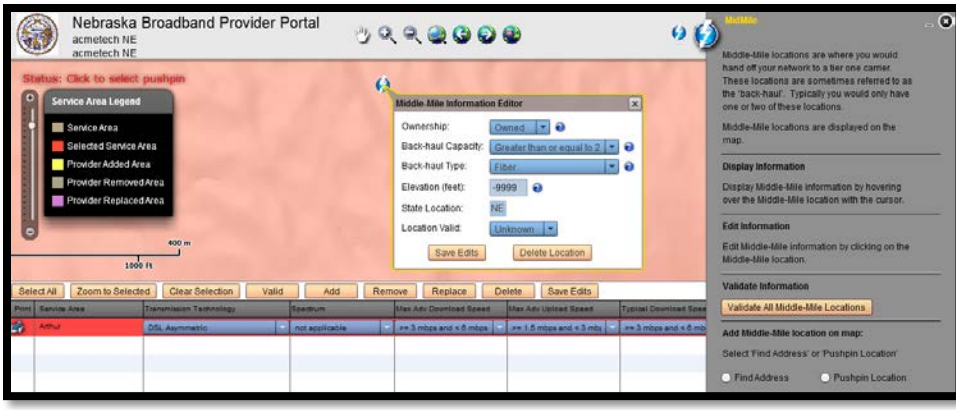
- Capability to review and request changes to the coverage footprint

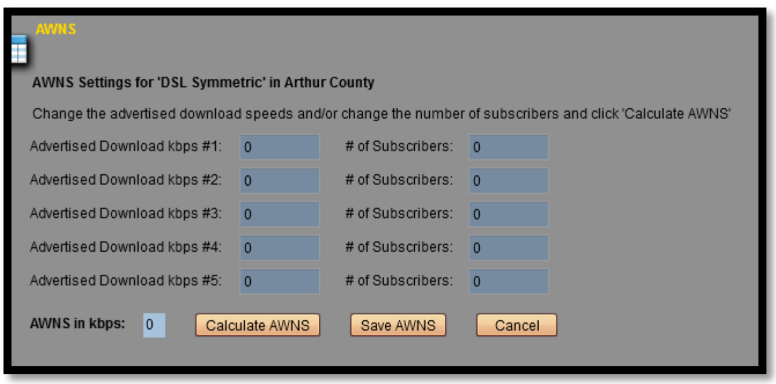


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

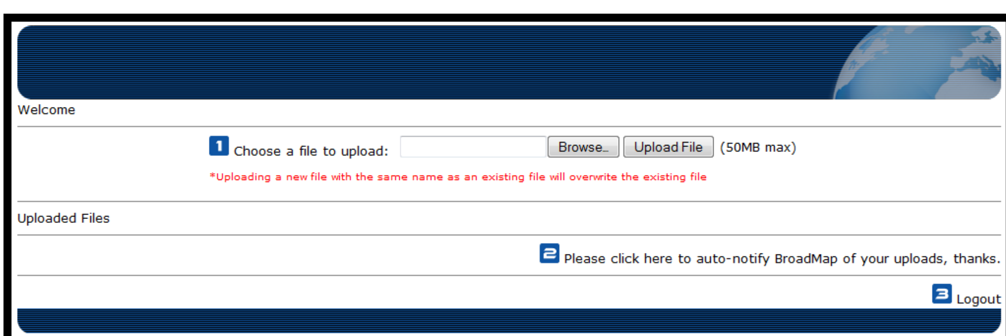


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





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



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

DATA VALIDATION AND VERIFICATION

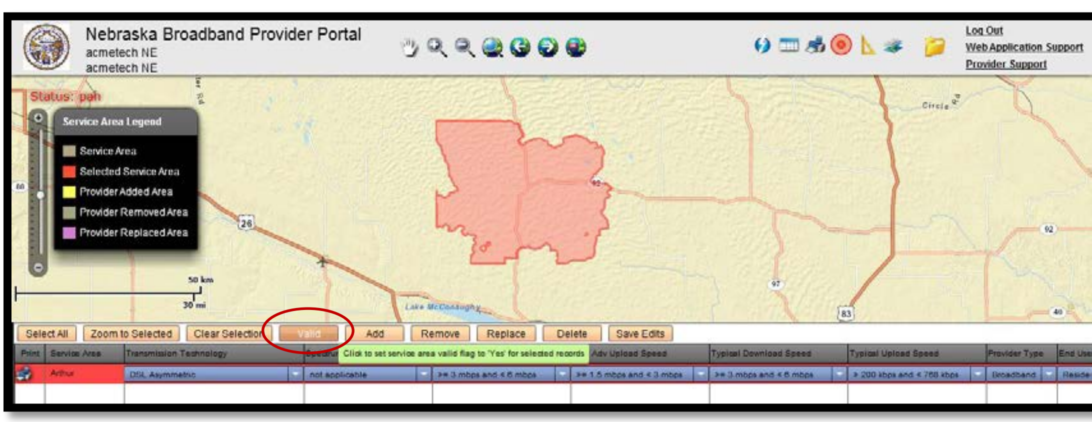
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage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

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

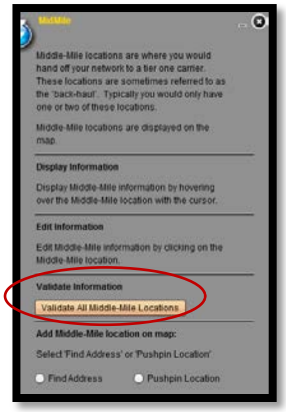
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process**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

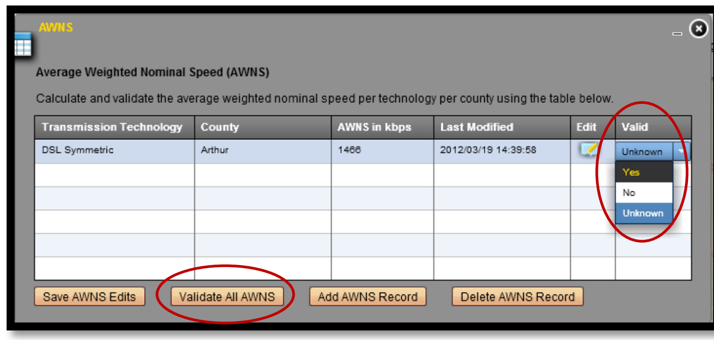
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

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



- Middle Mile & AWNS Validation





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

THIRD-PARTY DATA VERIFICATION

Due to a change in mapping partners, the focus for this data submission was placed on implementing an improved process methodology and integrating provider's coverage areas into a new internal model. Included in these efforts was educating the providers on the new process, encouraging continued participation and supporting their validation prior to the data submission.

For this submission, the NTIA 3rd Party Data summary was reviewed to ensure any corrections required were represented in the final product and the supporting documentation.

This submission was also compared to the previous data submission, fall 2011, as a quality check to identify and resolve any potential erroneous discrepancies between the two products. Since they originated from two different processes, we wanted to ensure there were no unexpected changes or regression.

PUBLIC VERIFICATION – CROWD SOURCING

The collection and use of public feedback on provider coverage areas is planned for deployment soon after the spring data submission. An updated version of the State public interactive map will be released with enhanced feedback capability, which can then be brought to the provider for potential map refinement.

CONFIDENCE VALUES

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

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

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

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

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

List of errors within the script, which will be listed as exceptions, can be found on PB Works – Grantee Workspace at the following link:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

DETAILED PROCESS REVIEW

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

BMap_ProcessDetails
_20120401.pdf

PROVIDERS RESEARCHED

Below is a list of providers we are still in the process of researching or closing NDA and data collection efforts:

- BroadBand Wireless Internet
- Geneva Broadband, Llc
- Jagwireless
- KDSI Internet Services
- Kentec Communications, Inc
- Lightedge Solutions, Inc.
- Peetz Communications, Llc
- Skywave Wireless, Inc.
- Swiftlink Communications
- Telephone Systems Of Nebraska, Inc.
- Zito Media

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

ACN Communication Services, Inc.	Mcleodusa Telecommunications Services, Inc.
ACN Digital Phone Service Llc	Mettel
Airnex Communications	MilliCorp
Antilles Wireless Llc	Mobius Communications Compnay
Antilles Wireless, LLC	Nebraska Supercomm, L.L.C.
Arlington Telephone Company	Network Innovations, Inc.
Blair Telephone Company	New Cingular Wireless Services Inc.
BT Communications Sales, L.L.C.	New Global Telecom, Inc.
C & R Electronics	Nextel Boost West, Llc
Cable Nebraska Llc	Nextel Partners
Cable Nebraska, LLC.	NYECom Teleservices
Cable USA III Dba RCOM, L.L.C.	Rcom, LLC
Chase 3000, Inc.	Rcom, LLC
Citistream Communications, Inc.	Rivtel Networks Inc.
Computer Concepts, Inc.	Rock County Telephone Company
Connecting Point	Sdn Communications
Consolidated Telecom Inc	Sioux City Msa Limited Partnership
Consolidated Telephone Company	Skytel
Cricket Communications, Inc.	Speakerbus Networks, Inc.
Dark Fiber Solutions, Inc.	Sprint Communications Company L.P.
Deltathree, Inc.	Sprint Pcs
Digital Isp Group, Inc.	Swifttel Communications
Dslnet Communications, Llc	TCG Omaha
Eastern Nebraska Telephone Company	Three River Communications, LLC
Embarq, Centurylink	Three River Digital Cable, L.L.C.
Flying J Communications	Total Call Mobile, Inc.

Flying J Communications	Tracfone Wireless, Inc.
Future Technologies	Tracy Corporation II
Global Connection Inc. Of America	Tracy Corporation II
Global Crossing Telecommunications, Inc.	Tw Telecom Holdings Inc.
Globalstar Usa, LLC	United American Technology, Inc.
Granite Telecommunications, L.L.C.	V-Global Communications, LLC
Indigo Wireless	Verizon Wireless
Indigo Wireless	Westel Systems
Inventive Wireless of Nebraska, LLC	Wholesale Carrier Services, Inc.
It Communications, LLC	Wiltel Communications, LLC.
Kentucky Data Link, Inc.	Windbreak Cable
LH Telecom	Wire Free Nebraska, Inc/Community Internet
Mainstay Communications	WWC License LLC
Matrix Business Technologies	Ztar Mobile, Inc.
McLeodUSA Telecommunications Services Inc.	

Methodology Support Documentation

Detailed Process

Contact Name Manager: Kristin Rousseau
Contact Phone Number: 603-448-4475
Contact E-mail: **kristin.rousseau@broadmap.com**

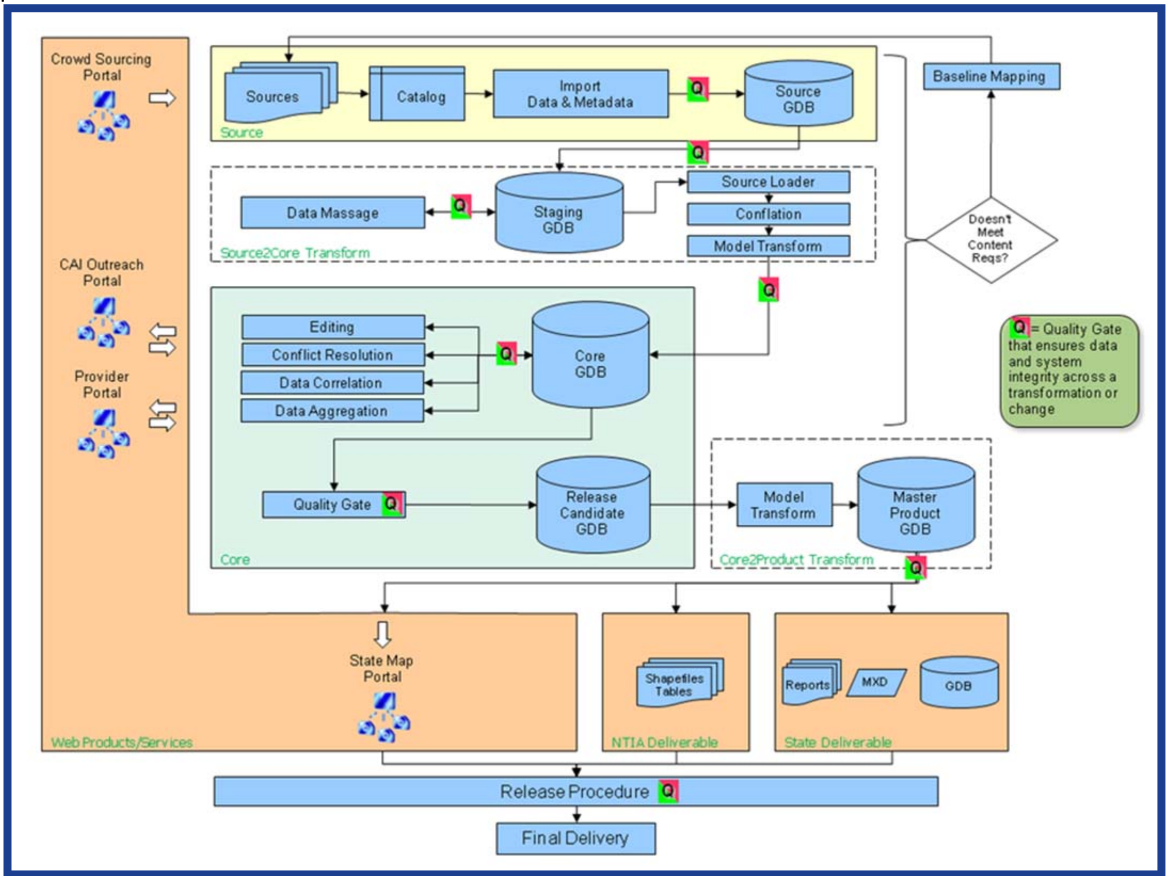
Contact Name Manager: Brian Scaffidi
Contact Phone Number: 603-448-1114
Contact E-mail: **brian.scaffidi@broadmap.com**

Product Specification: Spring 2012 NTIA Data Model
Product/Process: NTIA—April 1, 2012 Data Deliverable
Dataset Submission QC: NTIA—SBDD_CheckSubmission.py

Table of Contents

DETAILED PROCESS REVIEW

A detailed review of the data collection, integration and quality control points within the broadband data gathering and mapping process are discussed in the subsections that follow. In addition, a diagram showing the overall process can be seen below.



PROVIDER OUTREACH

For the each data submission, an e-mail notification is sent to all providers with supporting deliverable dates. The providers mainly used the Provider Portal web application to submit changes to and/or validate their current coverage area(s).

In support of the data collection effort, providers that did not respond timely to the outreach were contacted by phone.

OUTREACH MATERIALS

The original provider packet sent via e-mail to the providers included the following documents and files:

- Letter from the State inviting them to participate in the program;
- Copy of the Non-Disclosure Agreement (NDA);
- Copy of the Mapping NOFA from the NTIA;
- Copy of the NOFA Clarification from the NTIA;
- Broadband service address example file in CSV format;
- Word document describing service address example file;
- Broadband service block example file in CSV format;
- Word document describing service block example file;
- Broadband service street example file in CSV format;
- Word document describing service street example file;
- Broadband subscriber example file in CSV format;
- Word document describing subscriber example file;
- Broadband wireless coverage area sample shapefile;
- Word document describing wireless coverage area sample shapefile;
- Instructions for downloading, installing and using the WinSCP SFTP application.

OUTREACH PROCESS

The provider outreach process is comprised of the following general steps:

- Send the provider package and introduction letter to the main point of contact for the provider.
- Follow up with e-mail and telephone to verify that the main point of contact is correct.
- If necessary, discuss the NDA further and resolve any redlines.
- Once the correct primary contact is established, set up a telephone call, if necessary, to learn more about the provider's offerings and direct them to the appropriate outreach materials.
- If providers are unable to be contacted (non-responsive) or indicate that they are not interested in participating (non-cooperative), mark them as such on the provider tracking sheet. These providers will be escalated to the State for further action.
- As the providers are collecting the required data, provide instructions on downloading, installing and using the WinSCP SFTP application, if required.
- Arrange with the providers to transfer the data in whatever way they are comfortable: some providers will find regular email acceptable; others will want to use the SFTP application.
- After data is received and reviewed, it may be necessary to contact a provider for clarification or to address incomplete datasets. In the interest of building and maintaining relationships, care is given not to push the provider but to work with it to obtain accurate data in the best possible format.

DATA COLLECTION

DATA TRANSFER PROCEDURES

There are three primary ways data is collected from providers. These are:

- Secure FTP (SFTP) using the WinSCP application;
- Regular e-mail;
- Mail.

INITIAL DATA REVIEW AND QUALITY ASSURANCE

The initial data review and quality assurance process consists of the following general steps:

1) Access the data from the SFTP site or e-mail.
   a. If e-mailed, place copy of original dataset in the appropriate provider folder on the SFTP site.
2) Place copy of raw data on local computer in a working directory.
3) Review data and determine course of action based on type of data received.
4) Ensure data is complete and contact provider to address any gaps.

NOTE:
The goal is to get as many providers as possible to provide subscriber address data in the correct format. Obviously, this will not be possible with all providers so we will continue to have to process various types of provider-supplied data.

DATA INGESTION

DATA INGESTION OVERVIEW

The following subsections outline the process steps taken based on the type of input supplied by the data provider:

- **Point Data**:
  - Subscriber location;
  - DSLAM location;
  - Central Office location;
  - Broadcast Tower location.
- **Linear Data**:
  - TIGER® street segments.
- **Polygonal Data**:
  - Census Blocks;
  - Coverage Area.

Overall, the process is geared toward taking the provider data supplied and creating polygon shapes to append to the bb_cov feature class. The bb_cov feature class is the interim dataset that is then processed using the makeDeliverable.py Python script to create the MapConnect™ data layers that will be delivered to the State and, ultimately, to the NTIA. Detailed instructions used in this process can be found in the subsections below.

POINT DATA

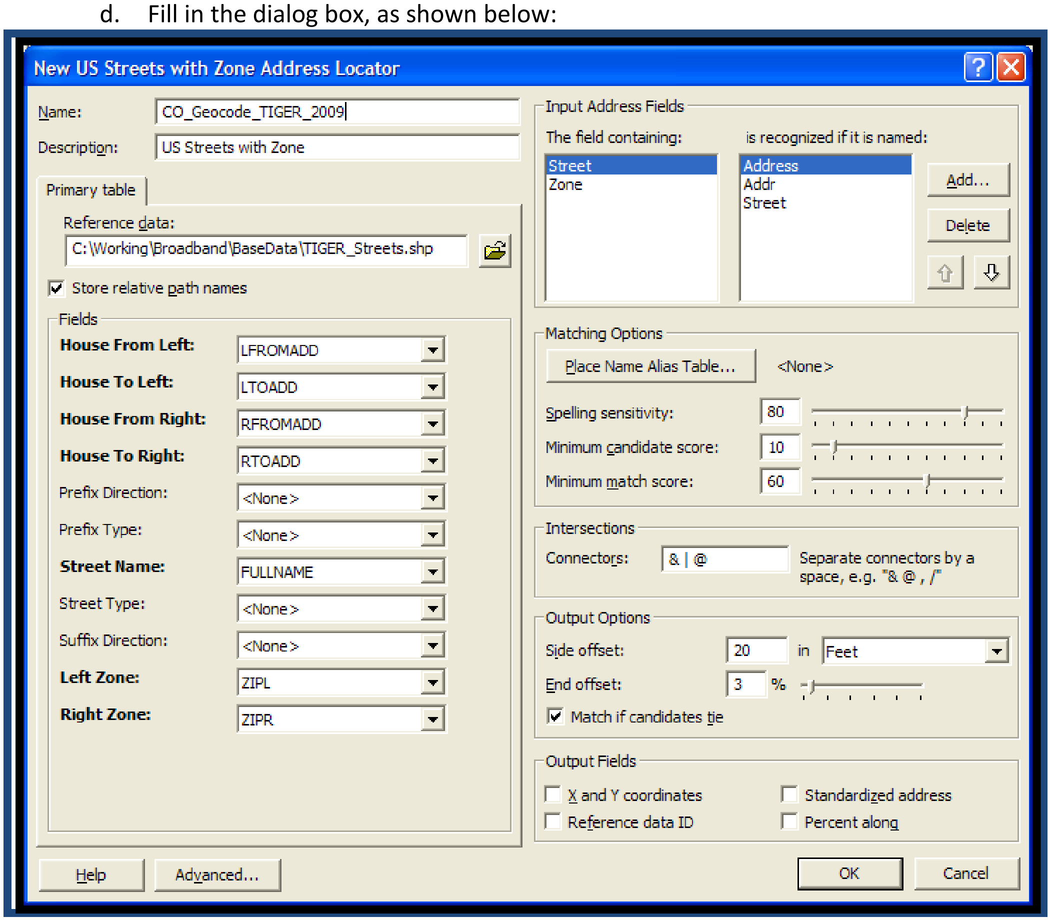
SUBSCRIBER LOCATION—ADDRESS DATA

In the event that the data provider supplies subscriber address data, the steps are as follows:

1) First, convert the address data to a clean Excel spreadsheet in an appropriate address data format.
    a. Usually, this has the following columns: street address (number, pre-directional, pre-modifier, street name, street type, post-directional and post-modifier concatenated), city, state, ZIP.
2) Configure the ArcGIS® geocoding tool to use the TIGER® 2010 streets dataset.
    a. In ArcCatalog®, create a new Address Locater by right-clicking in the white space of the appropriate directory and selecting **New>Address Locater** from the dropdown menu.
    b. Select **US Streets with Zone** and click **OK**.

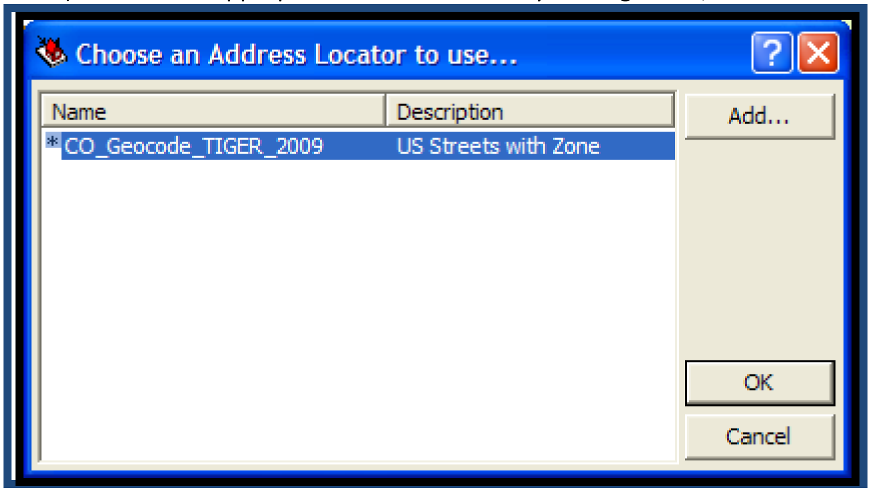
NOTE:
It is likely that multiple Address Locators will have to be set up to handle the variety of provider address data received.

    c. Navigate to the **TIGER Streets 2010 file** and click **OK**.
    d. Fill in the dialog box, as shown below:

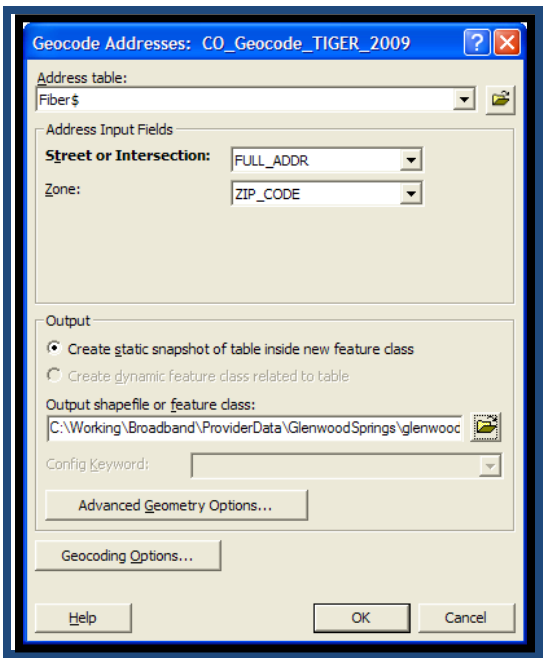


e. Click **OK**.

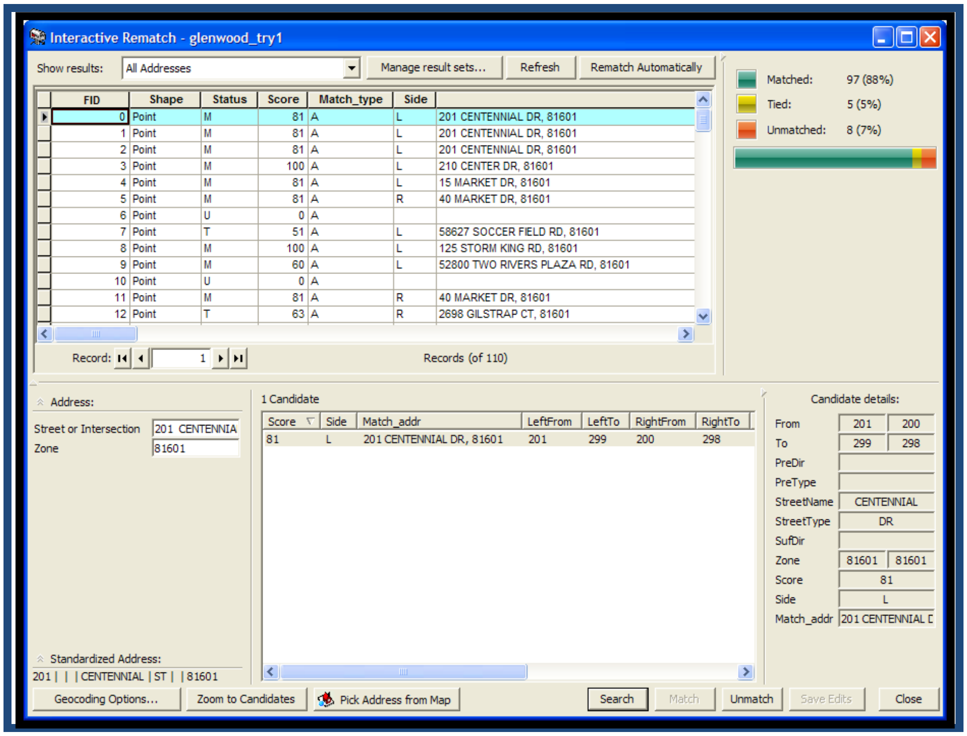
3) Open ArcMap® and add the Excel spreadsheet with the address information.
4) Right-click on the Excel spreadsheet and select **Geocode Addresses** from the dropdown menu.
5) Select the appropriate address locator by clicking **Add…**, then **OK**.



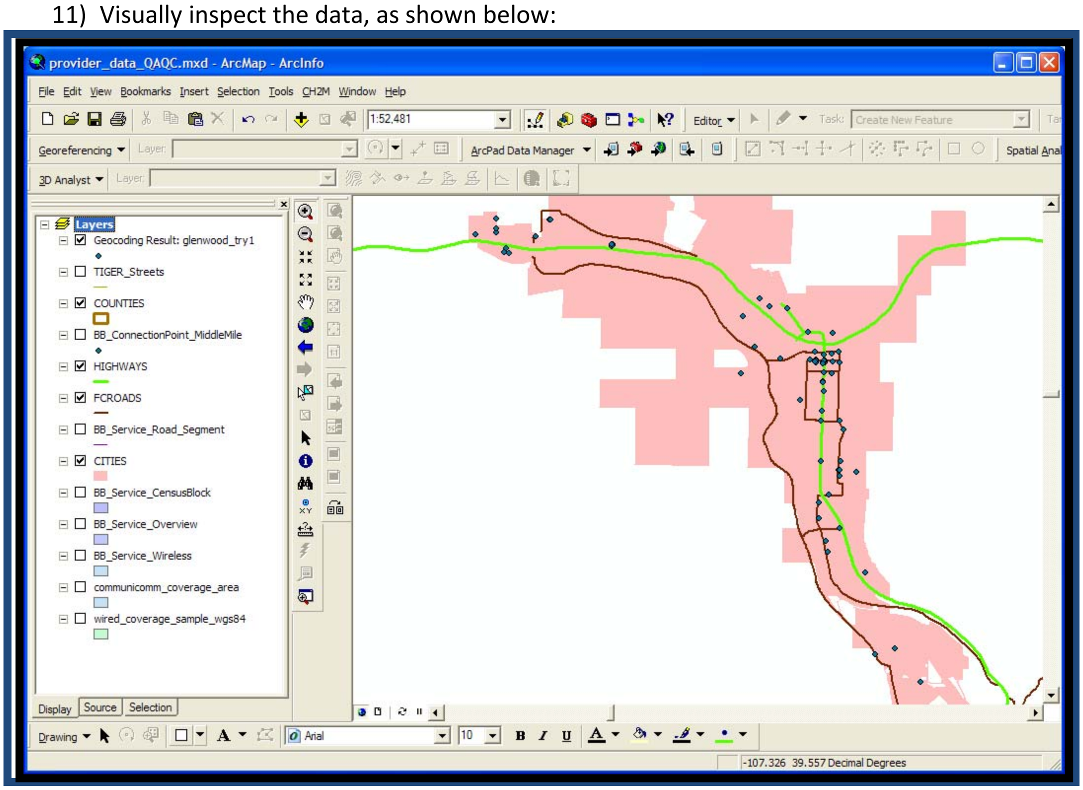
6) Fill out the **Geocode Addresses** dialog box, as shown below:



7) Geocode the list in batch mode using the geocode service set up in **Step 2** above, accepting all the default parameters.
8) Review results. See example below.



9) Adjust geocoding parameters accordingly and repeat batch to resolve issues.
10) Manually geocode unmatched addresses until target hit rate achieved, generally 90%.
11) Visually inspect the data, as shown below:



12) Follow the steps detailed in **Subscriber Location—GIS Data** below.

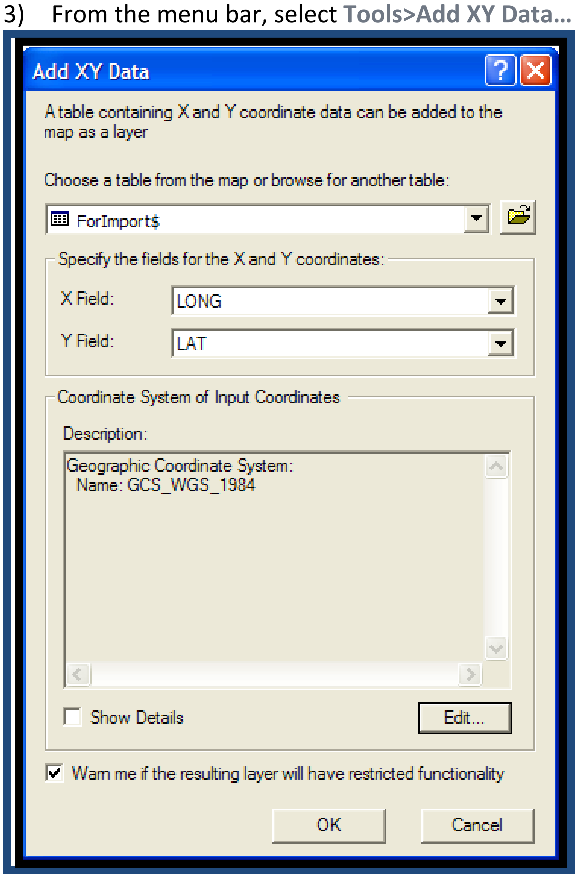
SUBSCRIBER LOCATION—XY DATA

If the provider supplies a list of subscriber data with accompanying XY data such as latitude and longitude, the steps are as follows:

1) Refine the format in Excel so that the data can be opened easily using ArcMap®.
   a. Remove all font color, highlighting, cell colors and borders, clean up column headers and make certain there are no merged cells.
   b. Make certain that XY locations are in decimal degrees.
      (i.) To convert from degrees, minutes, seconds (39º 26' 45.67") to decimal degrees, use the following formula: DD + (MM/60) + (SS.SSS/3600).

NOTE:
If XY locations from some other coordinate system are provided, you can use those in the process below but you must know what the coordinate system is.

2) Open the Excel worksheet in ArcMap®.
3) From the menu bar, select **Tools>Add XY Data…**

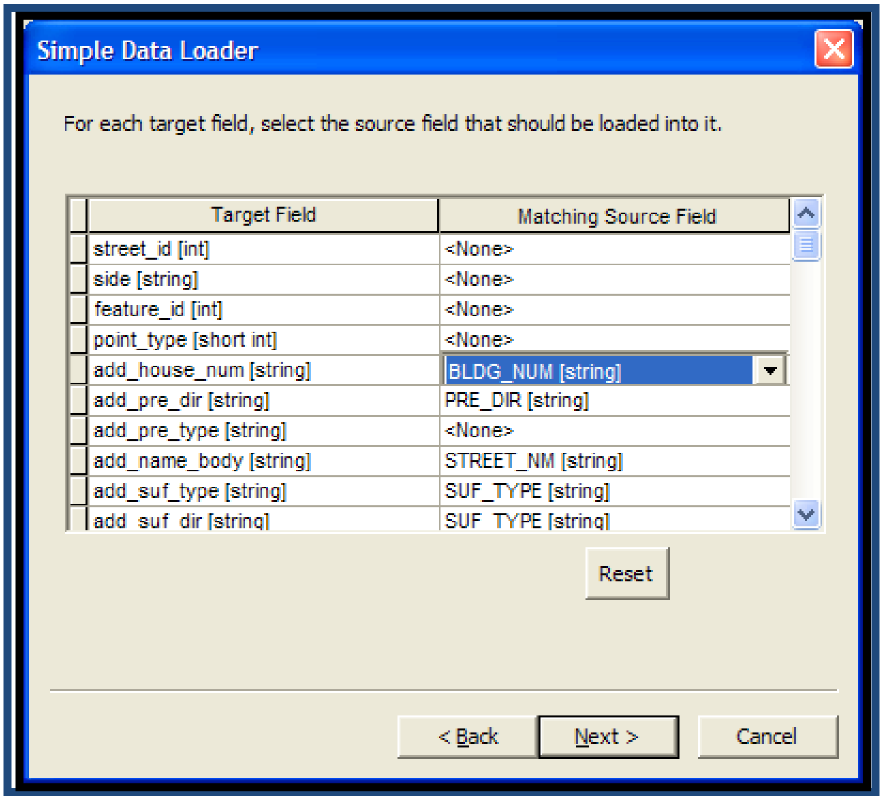


4) Supply the appropriate fields for the X and Y coordinates, choose the appropriate coordinate system and click **OK**.
5) Results are an event layer, not a true spatial layer. Export the data by right-clicking the event layer and selecting **Data>Export Data…** from the dropdown menu.
6) Follow the steps detailed in **Subscriber Location—GIS Data below**.

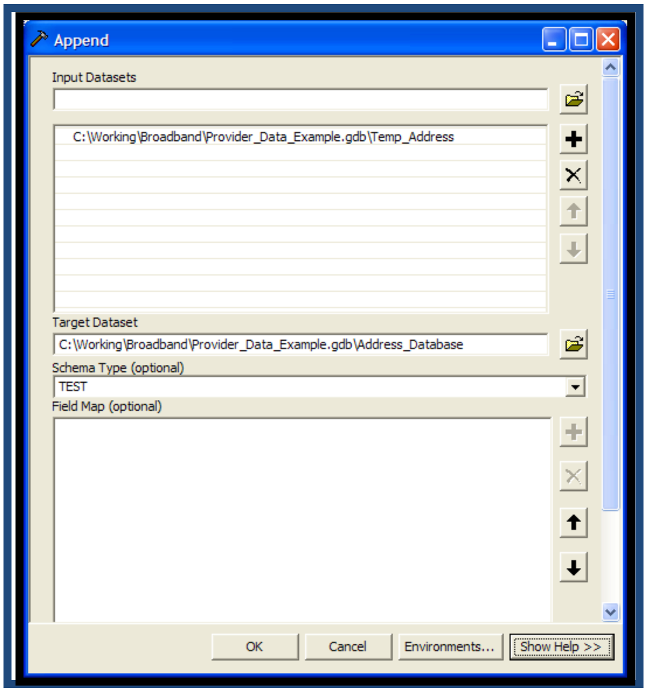
SUBSCRIBER LOCATION—GIS DATA

If the provider supplies subscriber location in GIS format, the only process step is to load that data into the appropriate data schema and it will be ready for processing.

1) First, load the data into the Point Address database schema using an empty feature class in that schema.
2) In ArcCatalog®, right-click on the empty feature class and select **Load** from the dropdown menu.
3) Navigate to the provider address GIS dataset and then map the attribute fields accordingly, as shown below:



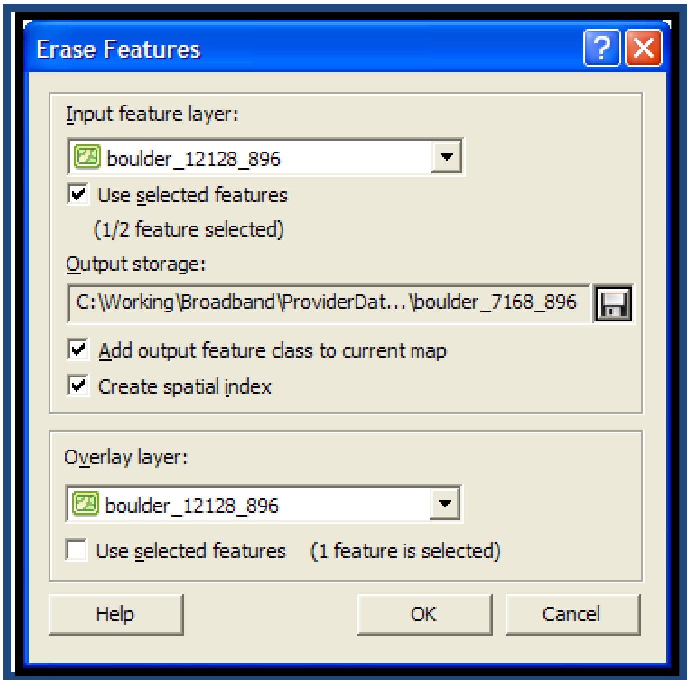
4) Once you have successfully loaded the provider address data into the temporary database with the correct schema, you now will append that data to the overall Point Address database.
5) In ArcToolbox®, use the **Append** command (**Data Management Tools>General> Append***)* to add the features into the overall Point Address database, as shown below:



6) Since the data is already in the Point Address database schema, there is no need to alter the Field Map in the Append tool.
7) After appending, calculate metadata reflecting geometry source and representation values.
8) Break provider-specific points into separate county feature classes and perform the following steps per county feature class:
   a. Within ArcGIS®:
      (i.) Summarize download and upload speeds [first,last] to determine all speeds available for county.
         (1) This will save as a DBF table. Keep track of location for future reference.
      (ii.) Buffer county address point featureclass to 150’.
         (1) During buffer command, dissolve on ad_down; ad_up; provider; dba; frn; tt; all metadata fields; stctyfips. Save as…. county_fastestdown_fastestup.
         (2) Example using Qwest data: boulder_40128_20128, where boulder=county; 40128=ad_down; 20128=ad_up.

NOTE:
These attribute fields are specific to the Point Address database.

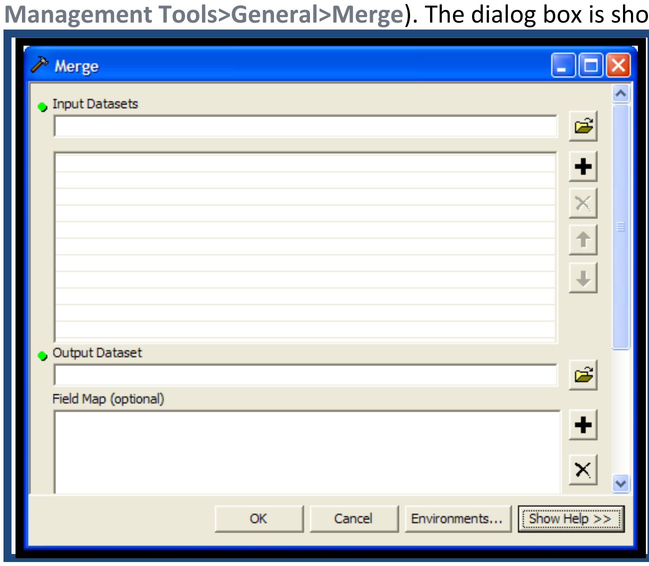
      (iii.) Select the features that represent the lowest speeds.
   b. Using XtoolsPro (*http://www.xtoolspro.com/*):
      (i.) In the XTools Pro toolbar, select **XTools Pro>Layer Operations>Erase Features.**
      (ii.) Use the same feature class for Input and Overlay.
      (iii.) Check **Use selected features** on the **Input** feature, as shown below.
      (iv.) Repeat and erase slowest speeds one speed at a time. Save each new feature class as the next slowest speed, using the same naming convention as shown in **a.(ii.)(1)** above. A general example is shown below:



c. <u>Return to ArcGIS®</u>:

(i.) Edit/delete speeds from the attribution table of each feature class, so each remaining feature class has only one speed value.

(ii.) Merge individual speed feature classes using the **Merge** command in ArcToolbox® (**Data Management Tools>General>Merge**). The dialog box is shown below:



(iii.) Merge individual county feature classes using the **Merge** command in ArcToolbox (**Data Management Tools>General>Merge**).

(iv.) Since the county files are all in the same schema, DO NOT alter the Field Map portion of the command interface.

(v.) When all the county files are merged into one dataset, use the **Append** command in ArcToolbox® *(***Data Management Tools>General>Append**) to add the features to the bb_cov interim dataset. Use the **Field Map** portion of the **Append** tool to map the appropriate field values to their corresponding fields in the bb_cov feature class.

DSLAM OR CENTRAL OFFICE LOCATION—ADDRESS DATA

In the event that the provider supplies DSLAM (digital subscriber line access multiplexer) or Central Office address data, the steps are as follows:

1) Follow the process for geocoding points in **Subscriber Location—Address Data** above.
2) Follow the steps detailed in **DSLAM or Central Office Location—GIS Data** below.

DSLAM OR CENTRAL OFFICE LOCATION—XY DATA

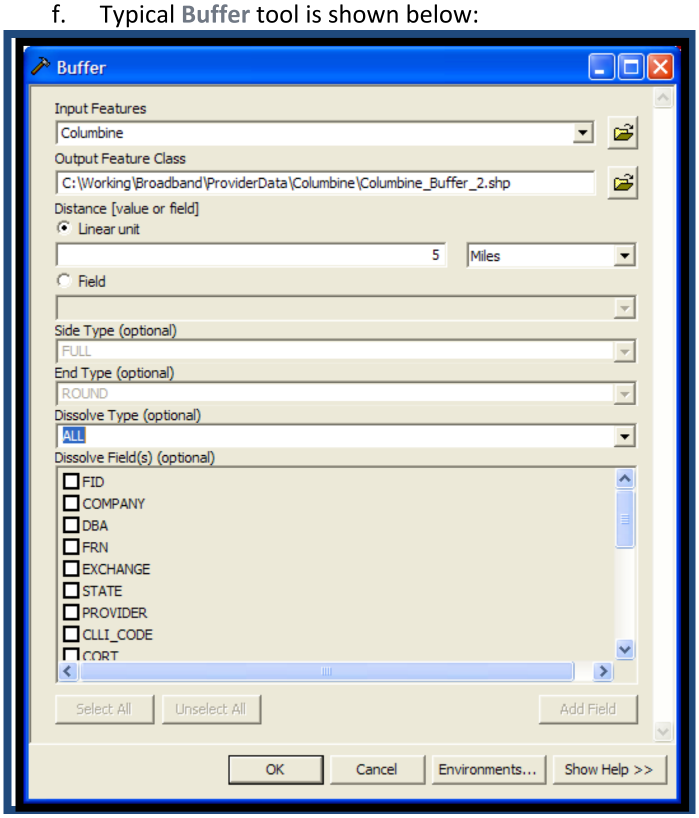
In the event that the provider supplies DSLAM (digital subscriber line access multiplexer) or Central Office XY data, the steps are as follows:

1) Follow the process for creating points from XY data in **Subscriber Location—XY Data** above.
2) Follow the steps detailed in **DSLAM or Central Office Location—GIS Data** below.

DSLAM OR CENTRAL OFFICE LOCATION—GIS DATA

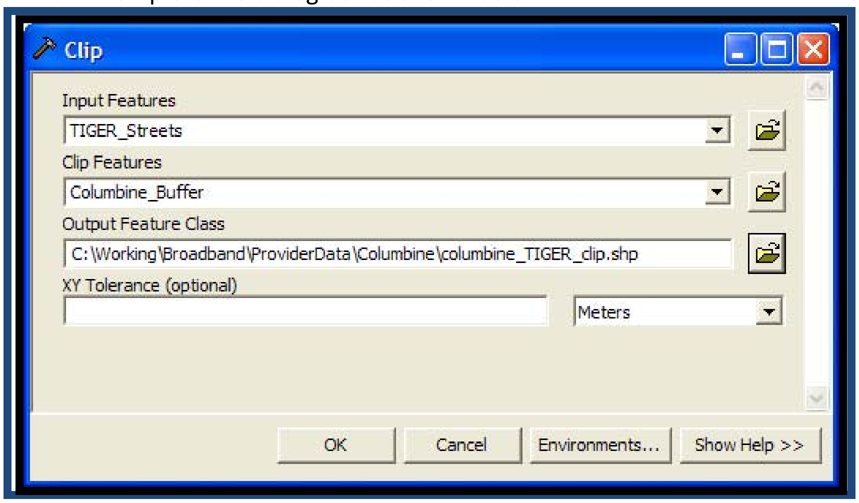
In the event that the provider supplies DSLAM (digital subscriber line access multiplexer) or Central Office GIS data, the steps are as follows:

1) Buffer the DSLAM/Central Office points feature class.
   a. Add the point feature class to ArcMap®.
   b. Open the ArcToolbox® and go to **Analysis Tools>Proximity>Buffer**.
   c. Set the buffer distance to 5 miles.
   d. Set the dissolve type to **ALL**.
   e. Name the output feature class.
   f. Typical **Buffer** tool is shown below:



   g. Click **OK**.

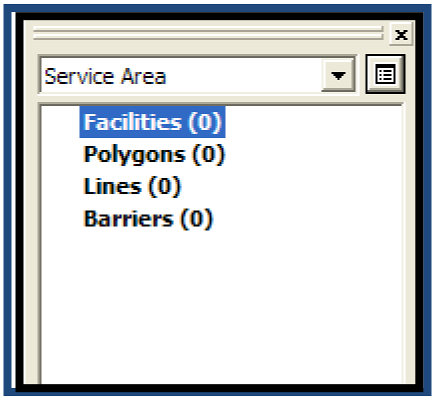
2) Use the resulting buffer feature class to clip the TIGER® street layer:
   a. Add TIGER® street layer to ArcMap®.
   b. Open the ArcToolbox® and go to **Analysis Tools>Extract>Clip**.
   c. Complete the dialog box as shown below:



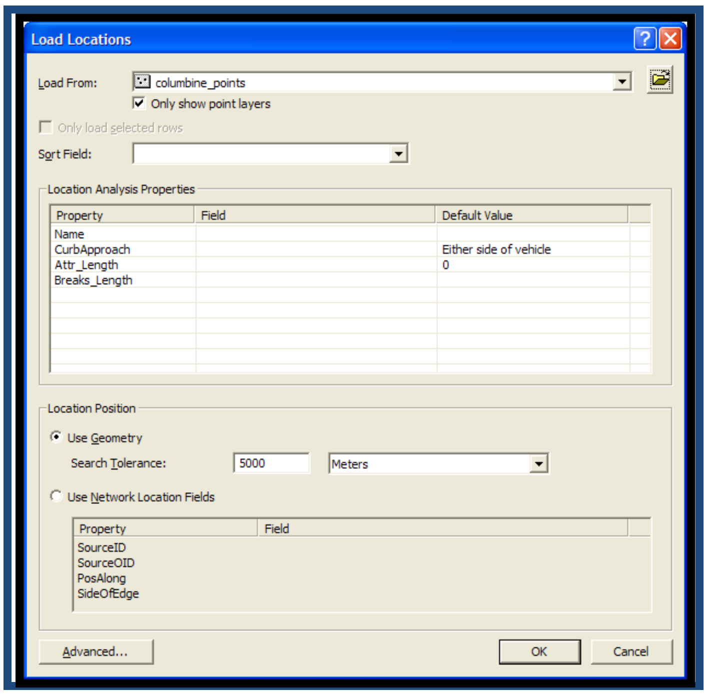
   d. Click **OK**.
3) Using ArcCatalog® and within the file geodatabase:
   a. Right-click and create a new Feature Dataset.
      (i.) For the Feature Dataset settings:
         (1) Name the feature dataset accordingly.
         (2) Select horizontal coordinate system by importing the coordinate system associated with the clipped TIGER® street layer by selecting **Import** and navigating to the location of that feature class.
         (3) No vertical coordinate system needed.
         (4) Leave all x,y,z,m values at default.
         (5) Click **Finish**.
4) Import previously created street feature class into new **Feature Dataset**.
5) Right-click **Feature Dataset** and create new Network Dataset—accept all default setting for the Network Dataset.

NOTE:
The Network Analyst extension must be turned on.

6) In ArcMap® turn on the **Network Analyst Toolbar** by going to **View>Toolbars>Network Analyst**.
7) Add the Network Dataset created in **Step 5** to ArcMap.
8) Using the **Network Analyst Toolbar** dropdown, create **New Service Area**.
9) Open the **Network Analyst Window** by selecting the button. See below.



10) Right-click **Facilities** layer, select **Load Locations** and navigate to the DSLAM/Central Office facilities feature class.



11) Click **OK**.

12) Click the **Service Area Properties** button .

13) For the following tabs, change the following properties:

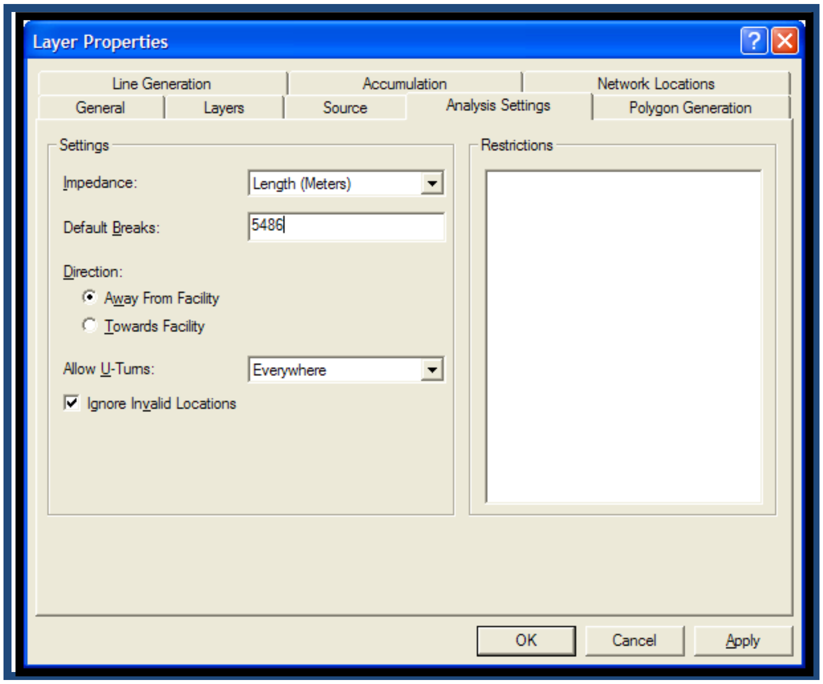
   a. **Polygon Generation** tab:

      (i.) Select **Merge by break value**.

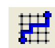
      (ii.) Also disable the **Trim Polygons** option.

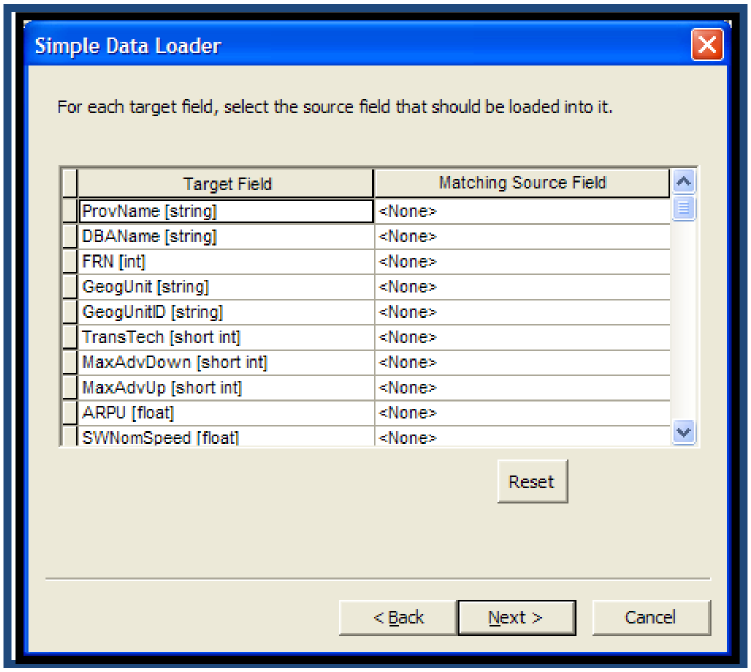
   b. **Analysis Settings** tab—using and converting the specified DSLAM buffer distance from feet to meters—input buffer distance value in meters into the **Default Breaks** location.

      (i.) Generally, 18,000 feet (5486 meters) from DSLAM or Central Office location is used as the buffer distance. See below.



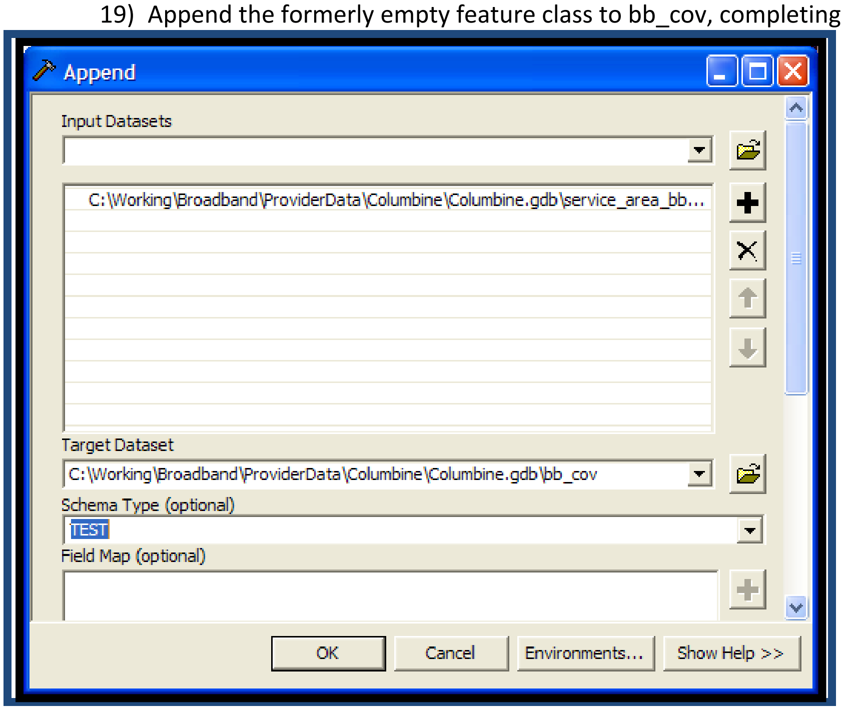
   c. Click **OK**.

14) On the **Network Analyst Toolbar**, click the **Solve** button  to create service area polygons.
15) Right-click on the created service area polygon in the layer list, and select **Data>Export Data** from the dropdown list.
16) Export to a feature class in the file geodatabase you created earlier.
17) In ArcCatalog®, create an empty feature class with the schema of the bb_cov feature class and load the feature class created in **Step 16** into it.
   a. Right-click on the empty feature class, select **Load>Load Data** from the dropdown menu and navigate to the location of the service area feature class.
   b. Click the **Add** button, then click **Next**.
   c. Accept the defaults and click **Next**.
   d. DO NOT attempt to map any fields, as shown below:



e. Click **Next**, then **Next** again, then **Finish**.

18) In ArcToolbox®, go to **Data Management Tools>General>Append**.
19) Append the formerly empty feature class to bb_cov, completing the dialog box, as shown below:



20) Leave the **Schema Type** as TEST.
21) Click **OK**.
22) In ArcMap®, open bb_cov for editing and manually input associated attribution.

BROADCAST TOWER LOCATION—ADDRESS DATA

In the event that the provider supplies wireless broadcast tower location address data, the steps are as follows:

1) Follow the process for geocoding points in **Subscriber Location—Address Data** above.
2) Follow the steps detailed in **Broadcast Tower Location—GIS Data** below.

BROADCAST TOWER LOCATION—XY DATA

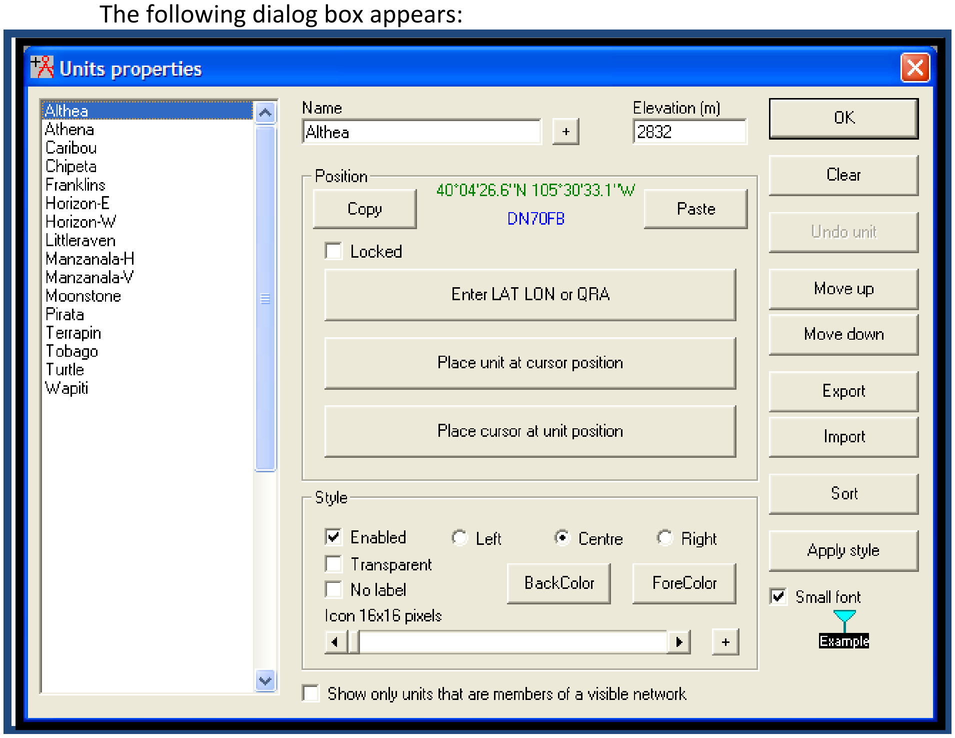
In the event that the provider supplies wireless broadcast tower location XY data, the steps are as follows:

1) Follow the process for creating points from XY data in **Subscriber Location—XY Data** above.
2) Follow the steps detailed in **Broadcast Tower Location—GIS Data** below.

BROADCAST TOWER LOCATION—GIS DATA

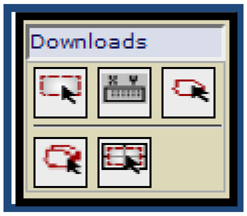
In the event that the provider supplies wireless broadcast tower location GIS data, the steps are as follows:

1) Download the required software (Radio Mobile) from the website: **http://www.cplus.org/rmw/english1.html**
2) Install the software according to the standard directions, found here: **http://www.cplus.org/rmw/download/download.php?S=1**
3) Open the application.
4) Load the broadcast tower location and elevation information by selecting **File>Unit properties**. The following dialog box appears:

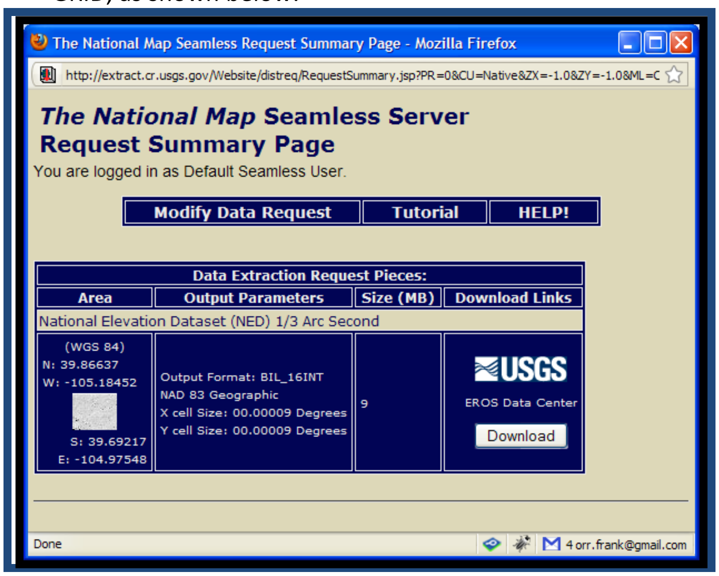


5) Add the information for all the towers supplied by the WISP data provider, including the elevation. If provider does not supply elevation, this information can be obtained from Google Earth.
   a. If available, use the **Import** button to import a Google Earth KML of the tower locations.
6) Go to the National Map Seamless Server (**http://seamless.usgs.gov/**) and download elevation data sufficient to contain the tower locations.
   a. At least the 1/3" NED data is needed. Select this by clicking the **Download** button in the upper right of the website and checking the box next to **1/3" NED**.

b. Zoom to the area of interest and use the **Download** tools to define the area to download:

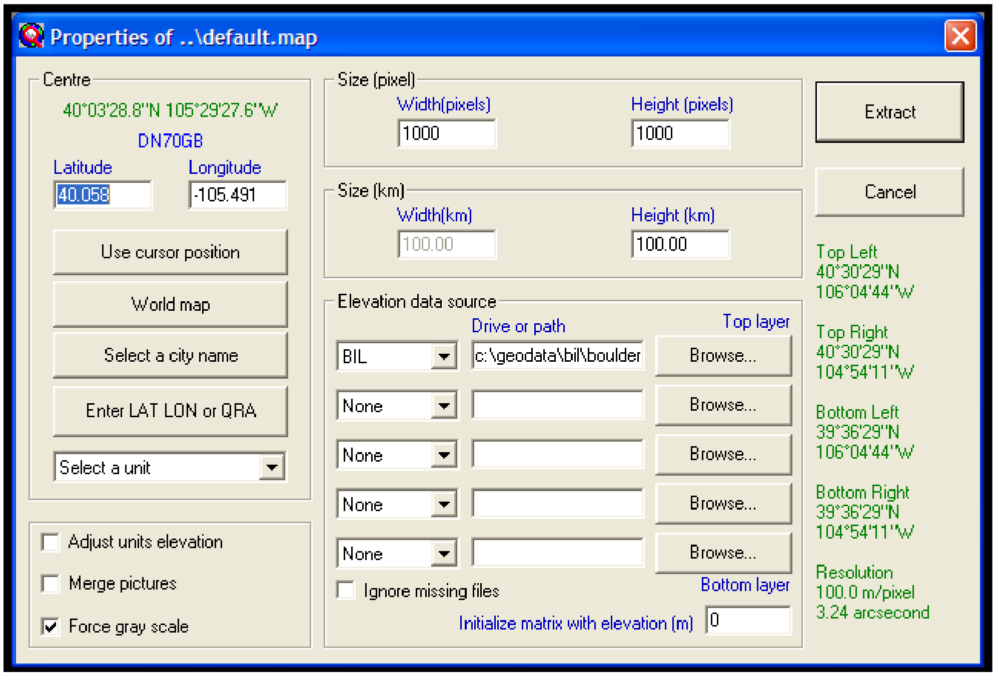


c. Click the **Modify Data Request** button to request the data in BIL_16INT format, not ESRI GRID, as shown below:

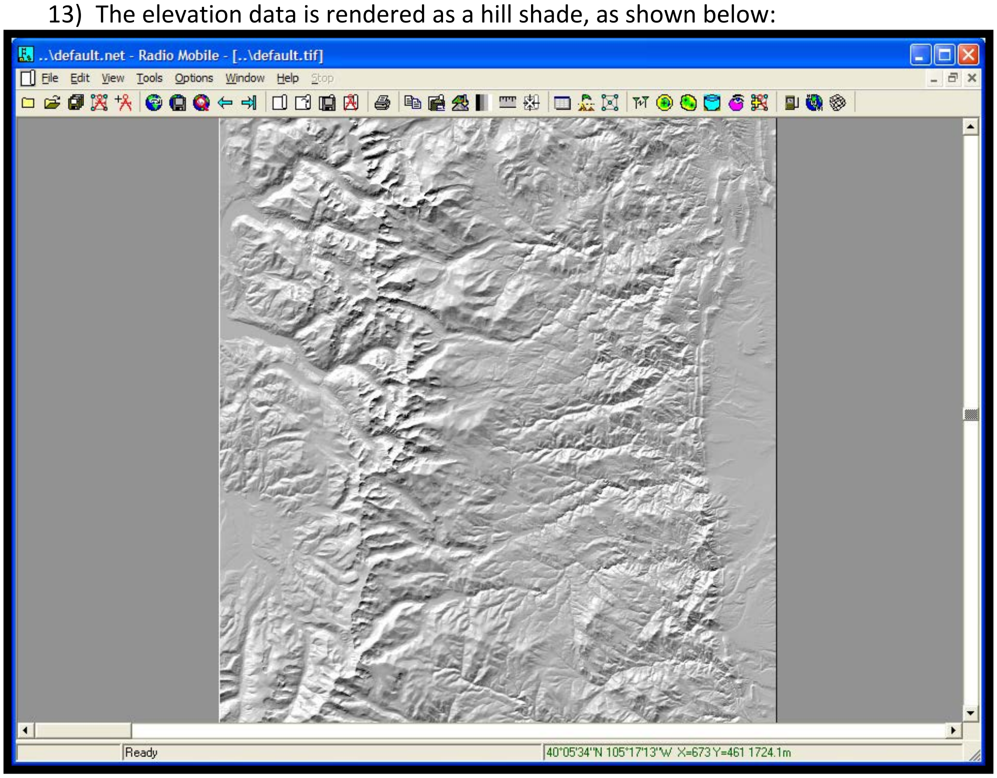


d. Download the data and unzip it.

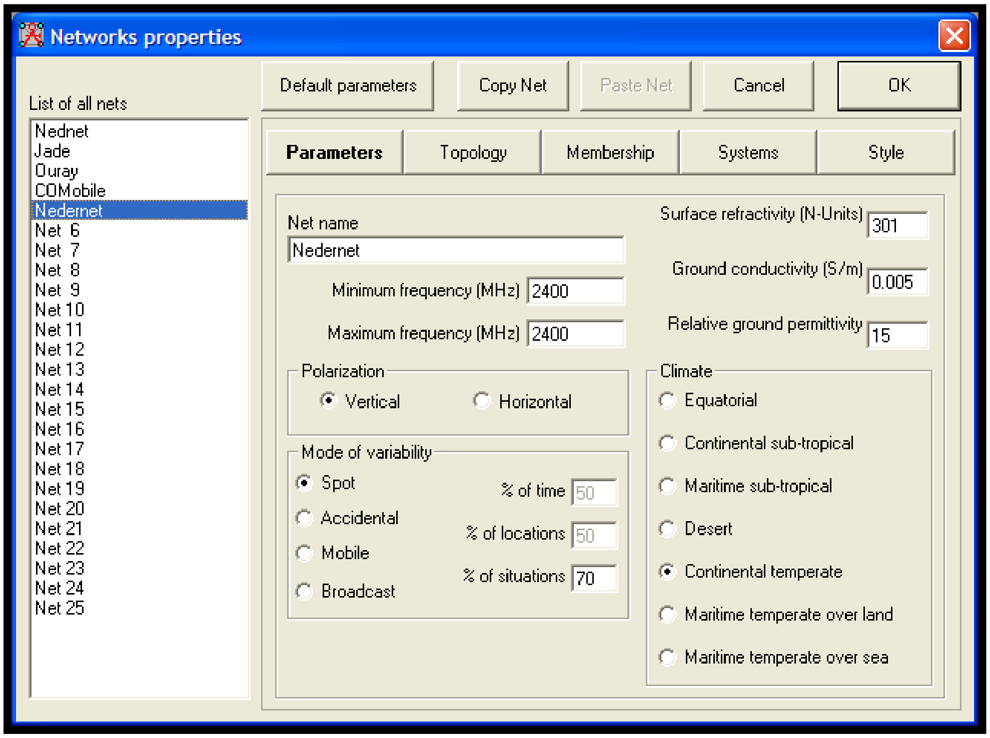
7) Select **File>Map Properties** to define the map.
8) Enter a latitude and longitude in the center of the tower locations.
9) Set the size (in pixels) and the size (in kilometers) of the map.
10) Set the directory path leading to the BIL elevation data just downloaded.
11) The dialog box is shown below:



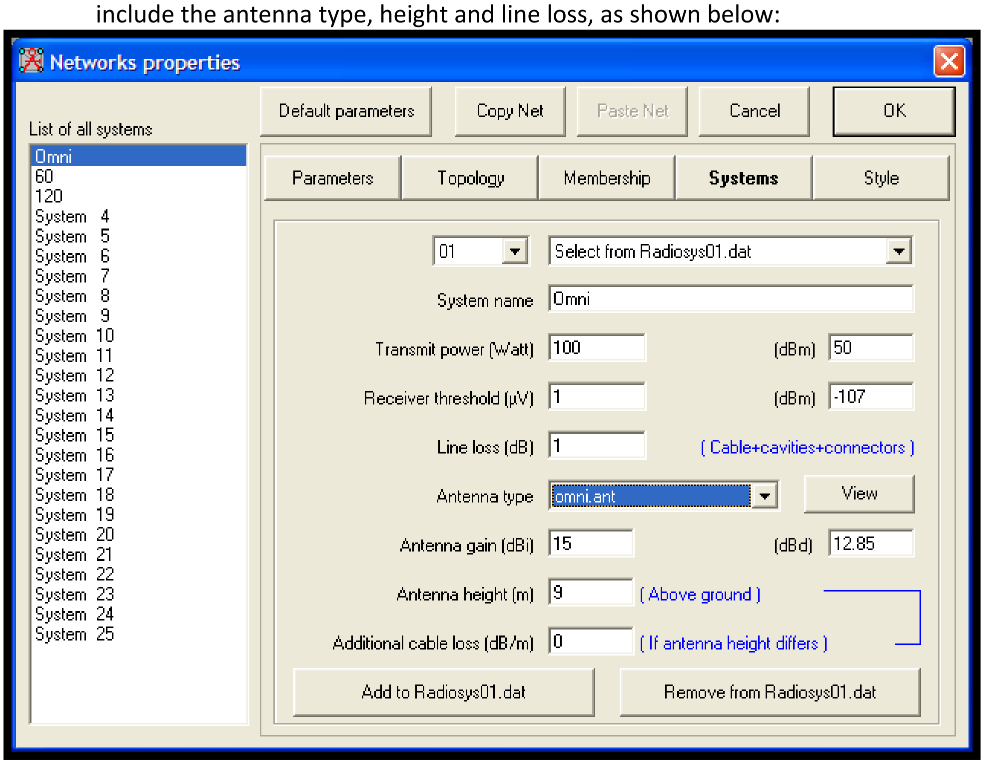
12) Click **Extract**.
13) The elevation data is rendered as a hill shade, as shown below:



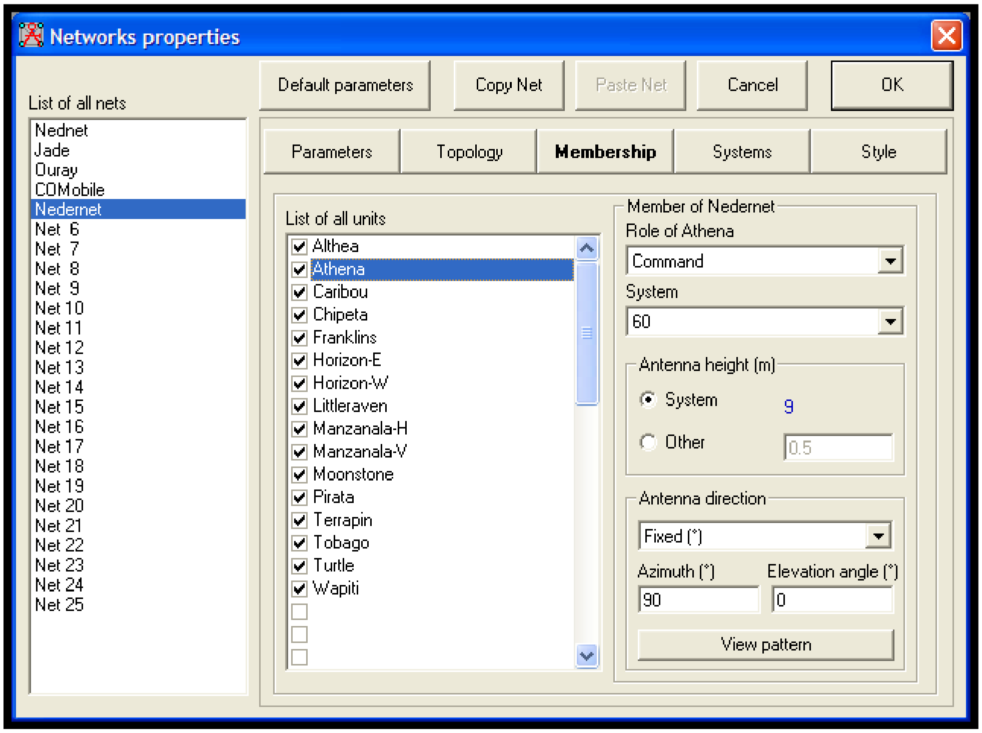
14) Select **File>Network properties** from the main menu.
15) Create a new network and enter in the frequency range under the **Parameters** tab, as shown below:



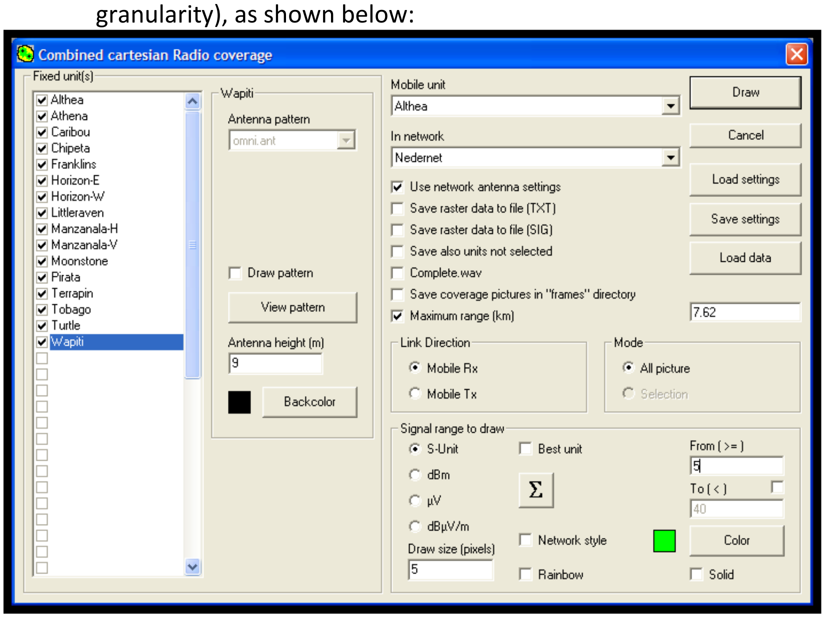
16) Leave all the other values as they appear, and select the **Systems** tab.
17) Create enough systems to cover all the varieties of equipment in the provider network. This will include the antenna type, height and line loss, as shown below:



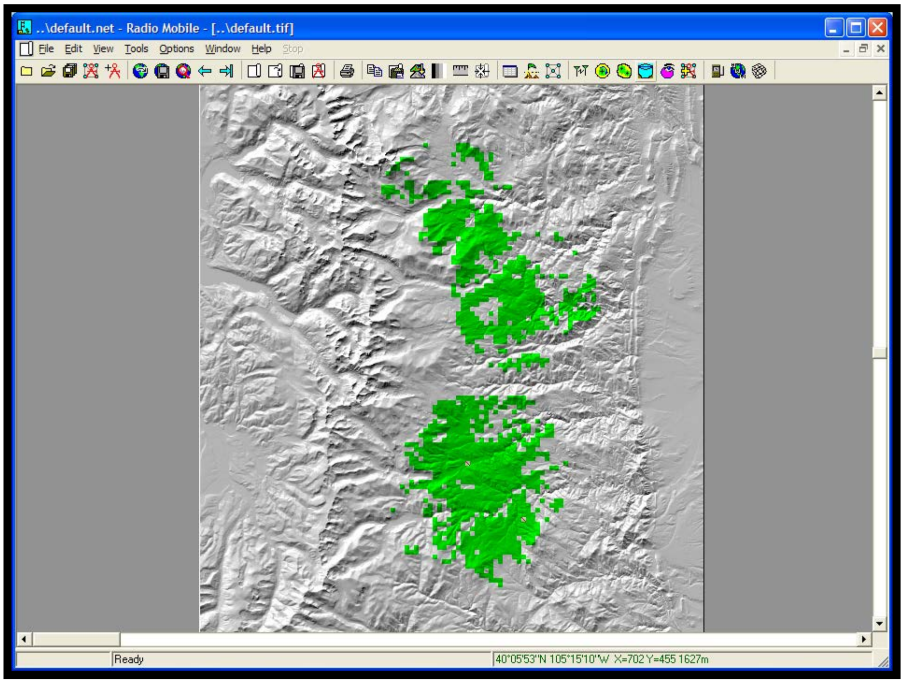
18) Now click on the **Membership** tab, and assign the individual towers to their respective systems, providing the azimuth for non-omnidirectional antennas, as shown below:



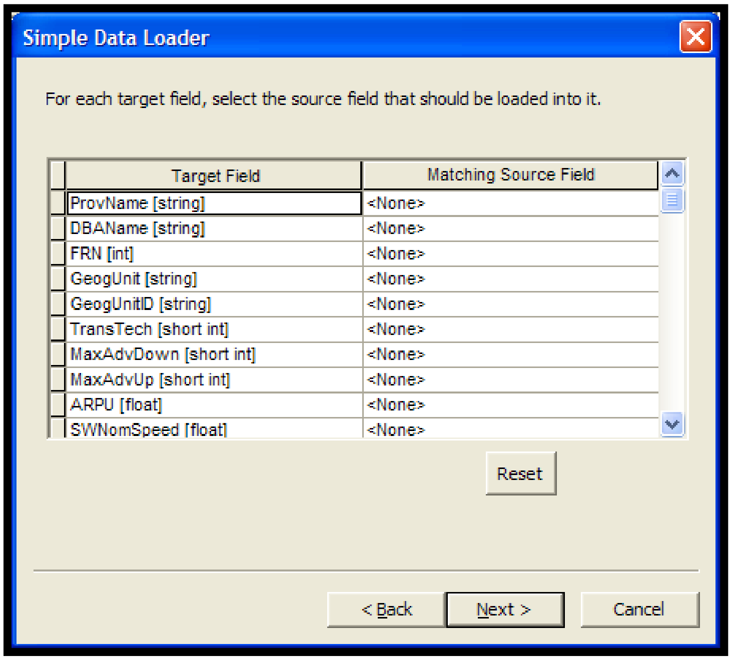
19) Click **OK**.
20) Select **Tools>Radio Coverage>Combined Cartesian** from the main menu.
21) Complete the dialog box as shown below, providing the **Maximum Range** from the highest tower beam radius supplied by the provider.
22) Set the **Pixel Size** at 5 (experiment depending on the area covered to get the right level of granularity), as shown below:



23) Set the **Signal range to draw** to S-Unit and type 5 in the **From (>=)** box.
24) Click on **Draw**. See below.



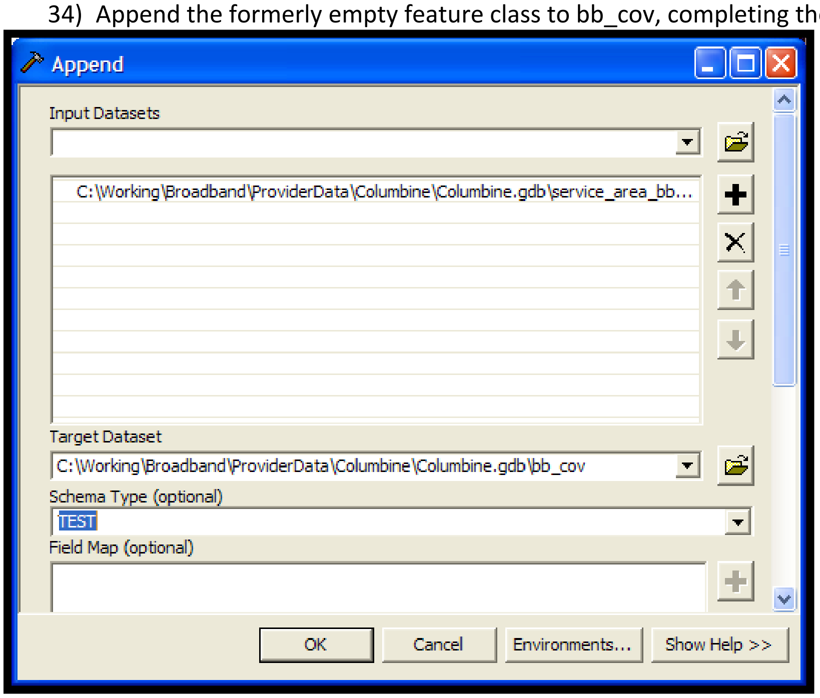
25) Save the resulting image as a TIF by selecting **File>Save Picture as**.
26) Open ArcMap® and load the BIL elevation data you used in Radio Mobile.
27) Load the TIF image you created and georeference it using the corners of the BIL data.
    a. The corners of the data can be seen in the TIF image.
28) Follow the georeferencing directions from the **Coverage Area—PDF/JPG/Other Image Format** section below.
29) Use the **Georeferencing Toolbar** to **Update the Georeferencing** for the TIF dataset.
30) In ArcToolbox®, select **Data Transformations>From Raster>Raster to Polygon** and input the georeferenced TIF you just created.
31) Open the resulting polygon feature class for editing using the **Editing** toolbar in ArcMap® and clean up as necessary.
32) In ArcCatalog®, create an empty feature class with the schema of the bb_cov feature class and load the feature class created above into it.
    a. Right-click on the empty feature class, select **Load>Load Data** from the dropdown menu and navigate to the location of the service area feature class.
    b. Click the **Add** button, then click **Next**.
    c. Accept the defaults and click **Next**.
    d. DO NOT attempt to map any fields, as shown below:



e. Click **Next**, then **Next** again, then **Finish**.

33) In ArcToolbox®, go to **Data Management Tools>General>Append**.

34) Append the formerly empty feature class to bb_cov, completing the dialog box, as shown below:



35) Leave the **Schema Type** as TEST.

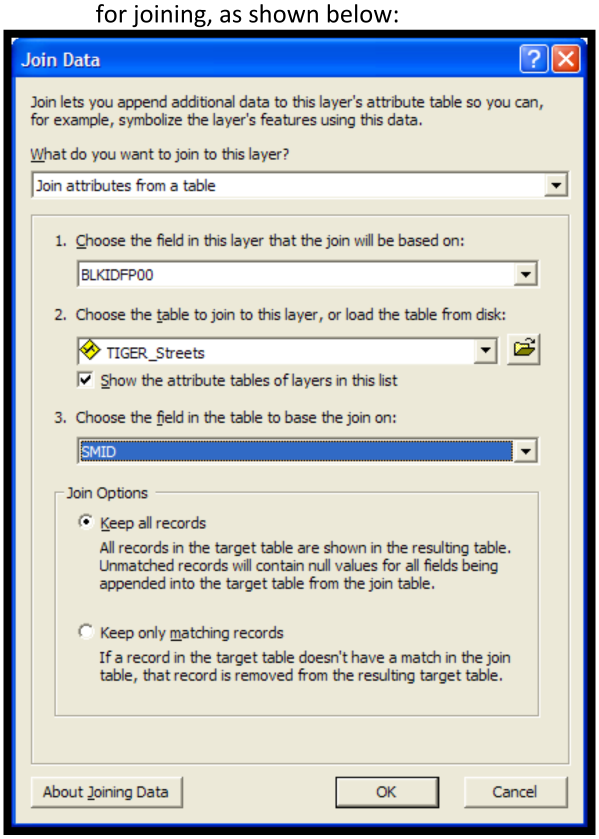
36) Click **OK**.

37) In ArcMap®, open bb_cov for editing and manually input associated attribution.

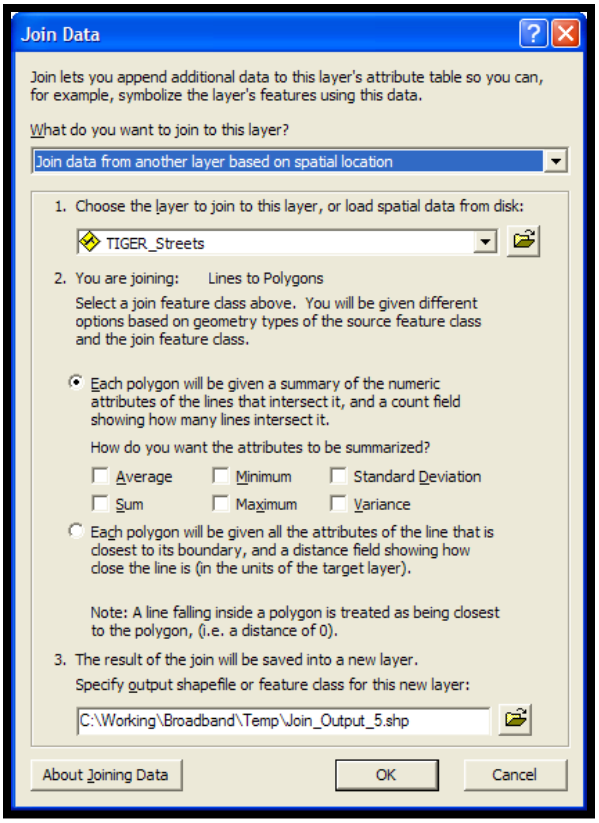
TIGER® STREET SEGMENTS—LIST, SPREADSHEET OR GIS DATA

In the event that the provider supplies TIGER® street segments in list or spreadsheet format, the steps are as follows:

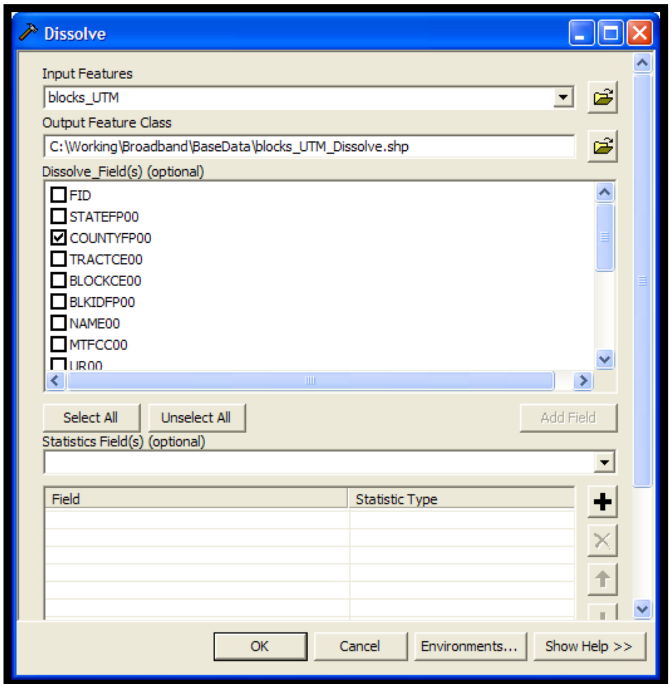
1) Join TIGER® road segments to 2000 census blocks feature class using one of two methods based on how the data is provided:
   a. If the TIGER® data is provided with a Census Block ID, then join the segments to the Census Block geometry based on that ID:
      (i.) Load both datasets into ArcMap®;
      (ii.) In the layer list, right-click on the 2000 census block feature class and select **Joins and Relates>Join**;
      (iii.) In the dialog box, select the TIGER® road segments data and the proper attribute fields for joining, as shown below:



      (iv.) Click **OK**.
   b. If the data provided is a list containing TLIDs, then join to the TIGER®/Line data using the TLID, and use a spatial join to associate the TIGER® segment with the coterminous block based on the block ID:
      (i.) Load both datasets into ArcMap®;
      (ii.) In the layer list, right-click on the 2000 census block feature class and select **Joins and Relates>Join**;
      (iii.) Select **Join data from another layer based on spatial location** from the dropdown menu;
      (iv.) Complete the dialog box, as shown below and click **OK**.

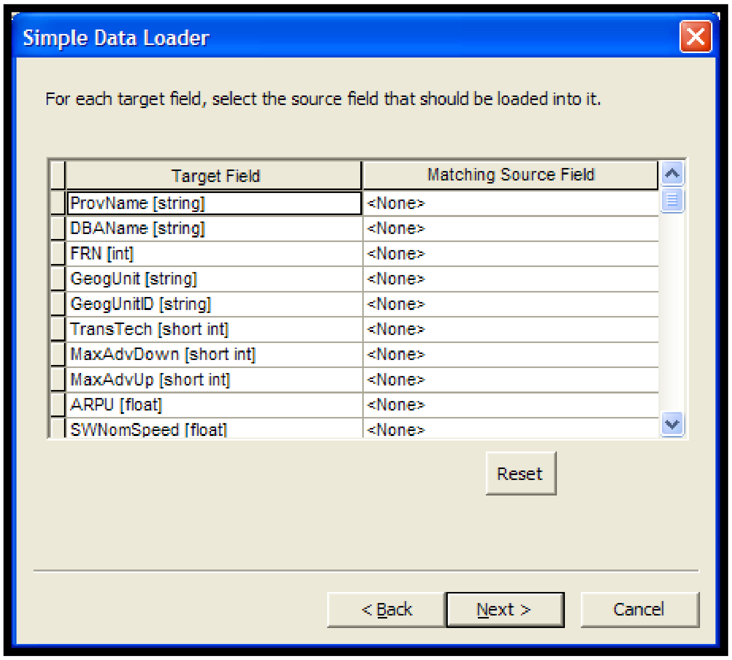


2) Export joined records into a temporary feature class.
3) If joined Census Block geometry is confined to one specific area, then dissolve blocks into one record. If joined Census Block geometry is distributed throughout a particular State, then dissolve sub-selections of census blocks for each county.
   a. Use the County FIPS code to dissolve by county.
   b. In ArcToolbox®, select **Data Management Tools>Generalization>Dissolve**.
   c. Complete the **Dissolve** dialog box, as shown below:



   d. Click **OK**.

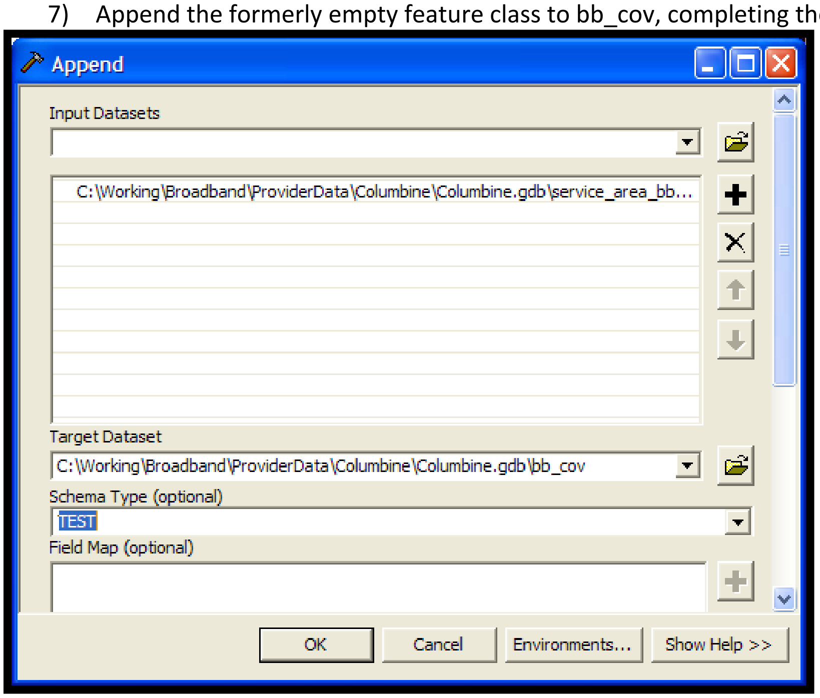
4) For each dissolved region, open the feature class for editing using the **Editing** tool in ArcMap® and remove unnecessary slivers and other small holes. For general guidance on editing features in ArcMap®, see **http://webhelp.esri.com/arcgisdesktop/9.3/pdf/Editing_Tutorial.pdf**
5) In ArcCatalog®, create an empty feature class with the schema of the bb_cov feature class and load the feature class created above into it.
   a. Right-click on the empty feature class, select **Load>Load Data** from the dropdown menu and navigate to the location of the service area feature class.
   b. Click on the **Add** button, then click **Next**.
   c. Accept the defaults and click **Next**.
   d. DO NOT attempt to map any fields, as shown below:



e. Click **Next**, then **Next** again, then **Finish**.

6) In ArcToolbox®, go to **Data Management Tools>General>Append**.

7) Append the formerly empty feature class to bb_cov, completing the dialog box, as shown below:



8) Leave the **Schema Type** as TEST.

9) Click **OK**.

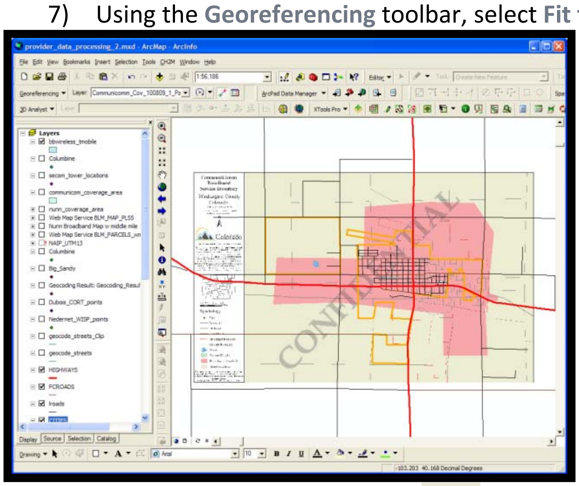
10) In ArcMap®, open bb_cov for editing and manually input associated attribution if necessary.

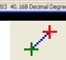
POLYGONAL DATA

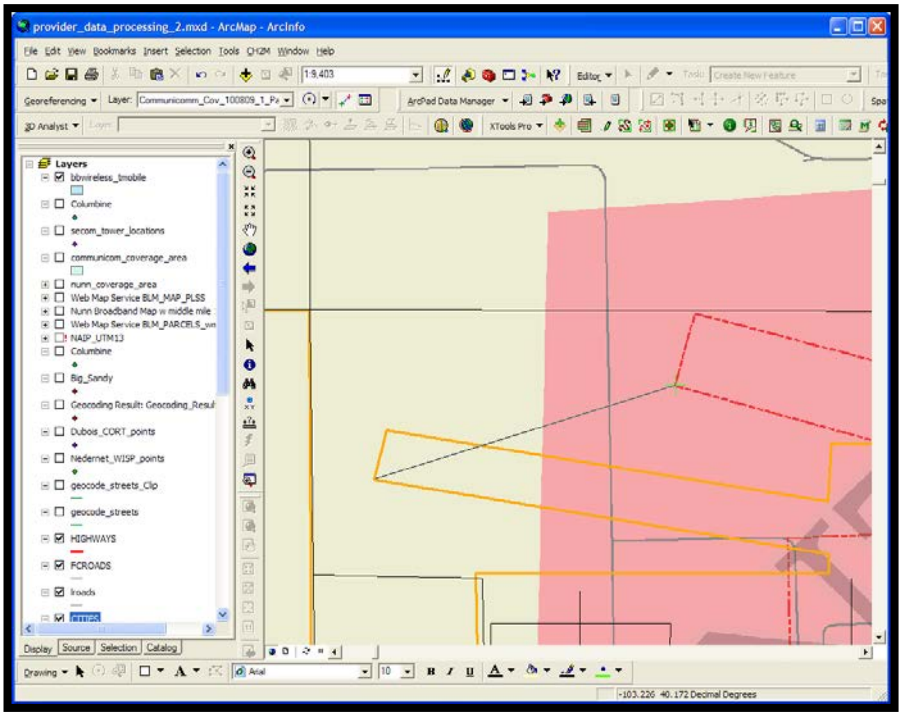
COVERAGE AREA—PDF/JPG/OTHER IMAGE FORMAT

In the event that the provider supplies coverage area data in some image format such as PDF or JPG format, the steps are as follows:

1) If in PDF format, open in Adobe Acrobat and **Save As…** JPG format.
2) Open the JPG image in ArcMap®.
3) Add the required base map vector data for georeferencing.
    a. This generally will be either the CDOT data or TIGER® data.
4) Change the coordinate system of the data frame to the desired end coordinate system.
5) Zoom to the general location of the JPG map image.
    a. This is the location based on the vector data, not the JPG image itself. For example, if you know that the JPG image represents an area around the town of Limon, zoom to the town of Limon in your vector data.
6) Open the **Georeferencing** toolbar by selecting **View>Toolbars>Georeferencing** from the main menu bar.
7) Using the **Georeferencing** toolbar, select **Fit to Display**; results are shown below:



8) Use the **Control Point** button  to add control points to the map.
9) Use common points in the base dataset and the JPG image.
    a. For example, find major street intersections, county/city boundaries, etc.
    b. Try to distribute the points more or less in the four corners on the image for the best transformation.
10) Click on the location on the image first, then click on the corresponding location on the vector database map, as shown in the image below:



11) After placing each control point, the image transformation will update automatically.
12) Repeat until satisfied with the transformation.

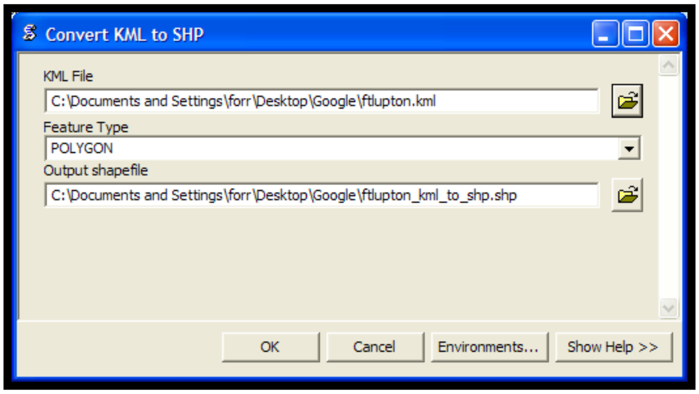
NOTE:
The transformation may take up to four points, although sometimes only two are necessary.

13) When satisfied with the transformation, select **Update Georeferencing** from the **Georeferencing** toolbar dropdown.
    a. This will create a "world" file (.jgw in the case of JPGs) in the same directory as the image file.
14) In ArcCatalog®, create a new polygon shapefile with the appropriate data schema for a provider coverage area.
15) Add the shapefile to ArcMap®.
16) Using the **Editor** toolbar, select **Start Editing**. Set the **Task** to **Create New Feature**.
17) Use the **Sketch Tool**  to digitize a new coverage polygon using the coverage area outline from the georeferenced JPG and add the required attributes manually.
18) Repeat the above steps for all subscriber speed coverage areas provided.
19) Follow the steps detailed in **Coverage Area—GIS Data** below.

COVERAGE AREA—KML/KMZ

In the event that the provider supplies coverage area data in Google Earth KML or KMZ format, the steps are as follows:

1) Use a KML to SHP converter to translate file into an Esri® format.
2) **http://arcscripts.esri.com/details.asp?dbid=15603**
3) Download the script and follow the provided instructions for installing it in ArcToolbox®.
4) Double-click on the script in ArcToolbox® and navigate to the location of the KML file, as shown below:



5) Add the new shapefile to ArcMap®. Repeat for all KML files provided.
6) Follow the steps detailed in **Coverage Area—GIS Data** below.

COVERAGE AREA—CAD DATA

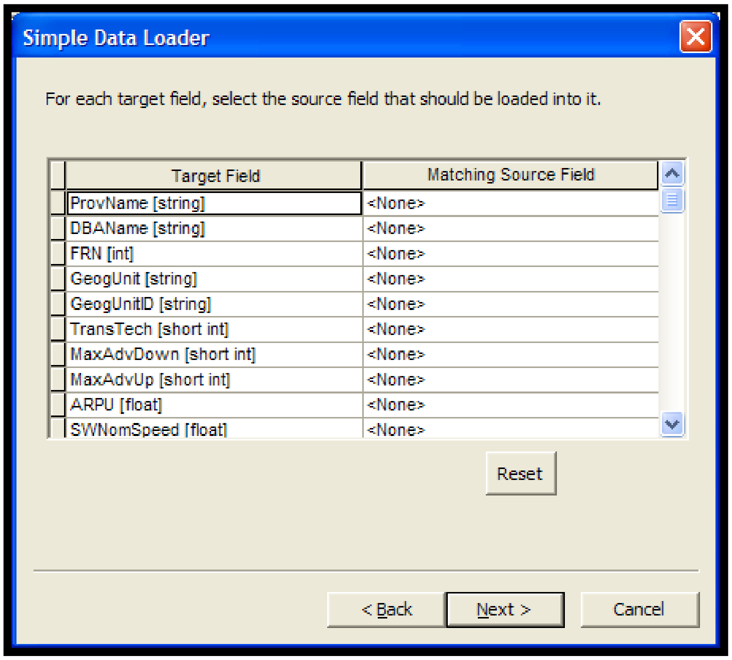
In the event that the provider supplies coverage area data in GIS format, the steps are as follows:

1) Transform the CAD dataset into an Esri® format.
2) **http://webhelp.esri.com/arcgisdesktop/9.2/index.cfm?TopicName=Transforming_CAD_datasets**
3) It may be necessary to contact the provider first to determine the coordinate system of the CAD data.
4) If the CAD data is not in a standard coordinate system, it may be necessary first to use ArcMap® to georeference the CAD data to a known coordinate system.
a) To do so, follow the instructions provided above in **Coverage Area—PDF/JPG/Other Image Format**.
5) In ArcCatalog®, create a new polygon shapefile with the appropriate data schema for a provider coverage area.
6) Add the shapefile to ArcMap®.
7) Using the **Editor Toolbar**, select **Start Editing**. Set the **Task** to **Create New Feature**.
8) Use the **Sketch Tool**  to digitize a new coverage polygon using the coverage area outline from the georeferenced CAD file and add the required attributes manually.
9) Follow the steps detailed in **Coverage Area—GIS Data** below.

COVERAGE AREA—GIS DATA

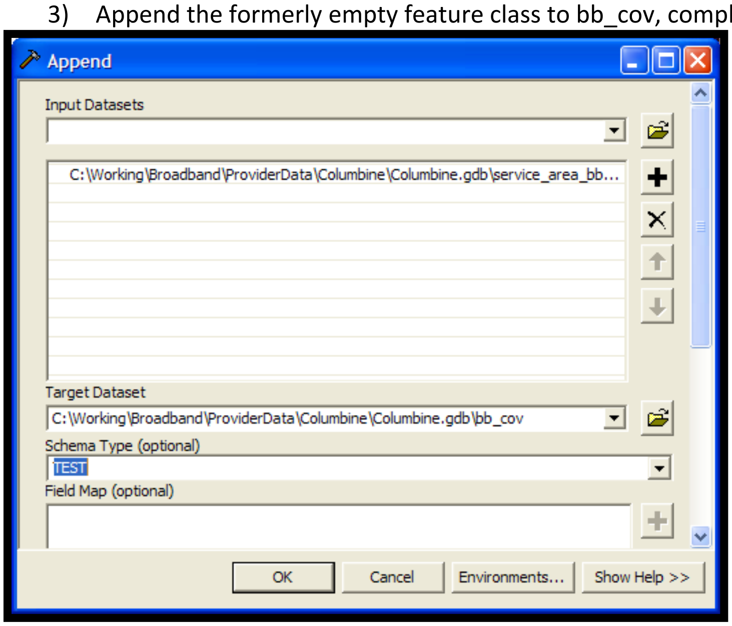
In the event that the provider supplies coverage area data in GIS format, the steps are as follows:

1) In ArcCatalog®, create an empty feature class with the schema of the bb_cov feature class and load the GIS feature class either created above or supplied by the provider into it.
    a. Right-click on the empty feature class, select **Load>Load Data** from the dropdown menu and navigate to the location of the service area feature class.
    b. Click on the **Add** button, then click **Next**.
    c. Accept the defaults and click **Next**.
    d. DO NOT attempt to map any fields, as shown below:



e. Click **Next**, then **Next** again, then **Finish**.

2) In ArcToolbox®, go to **Data Management Tools>General>Append**.
3) Append the formerly empty feature class to bb_cov, completing the dialog box, as shown below:



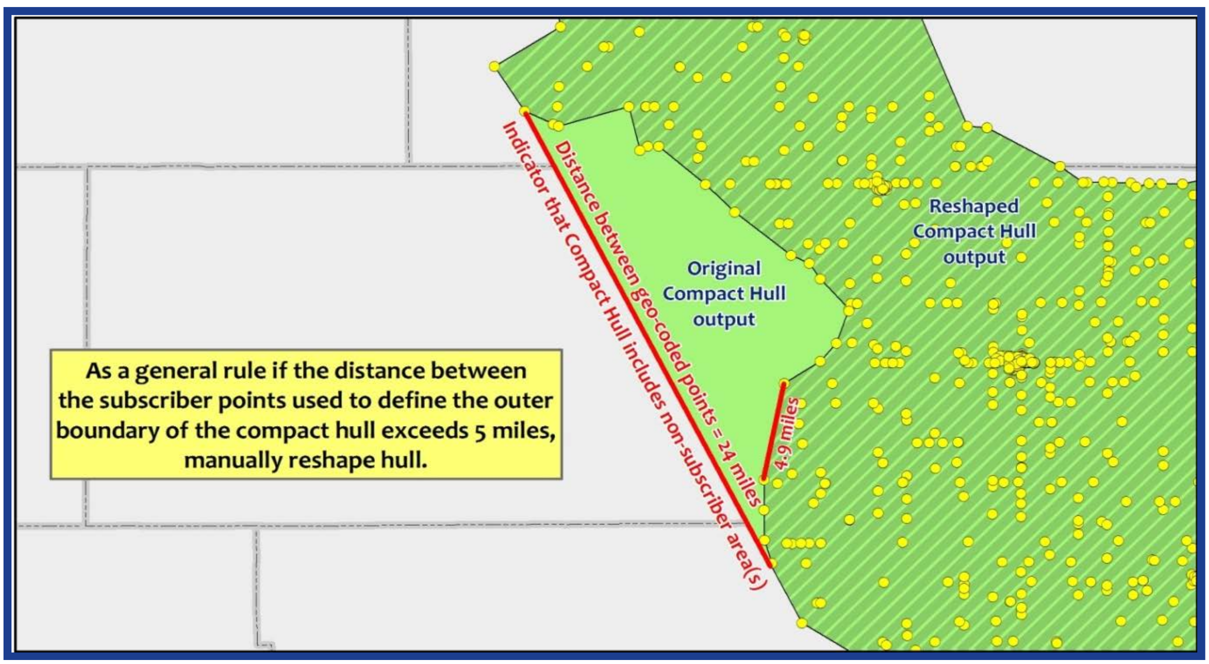
4) Leave the **Schema Type** as TEST.
5) Click **OK**.
6) In ArcMap®, open bb_cov for editing and manually input associated attribution, if necessary.

COMPACT POLYGON FROM SUBSCRIBER POINTS

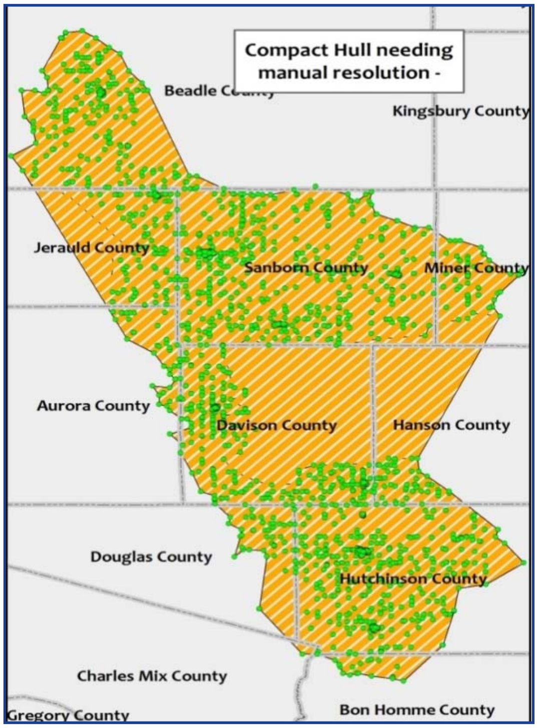
1) Geocode address list using latest **State Composite Locator**.
2) Verify that your geocoded file has only one TT (Technology Type). If not, export individual geocoded layers for each Technology Type.
3) For each TT, check for differences in speed values or speed tiers and create separate layers for each speed value/tier.

4) Clean your geocoding results: remove any points that geocode to accuracy levels below ZIP+4 (ZIP centroids, carrier route centroids, etc). Also, verify that outliers with acceptable accuracy levels are legitimate, i.e., fall in correct city and Zip.
5) Perform spatial join between county polygons (using stcnyfips field) and the cleaned geocoded subscriber points in order to carry the county name and stcnty fips.
6) Summarize the number of subscribers by county and use the subscriber counts by county to populate the Rate Tier table.
7) Un-join the county data from the geocode subscribers list.
8) Create Compact Polygon using cleaned geocoded layer or sub-selection of XtoolsPro—ConvexHull-DetailedHull option. A sub-selection of geocoded points will be used in areas where more than one polygon will need to be created for one provider's service area.
9) Evaluate output Hull carefully, looking for areas that should not be covered by hull polygon.
    a. If it is determined that an area or areas should not be represented in coverage area, manually reshape hull polygon until coverage area is adequate.
    b. When not obvious and as a general rule, manually resolve compact polygon when the distance between the subscriber points used to define the outer boundary of the compact polygon exceeds 5 miles . When reshaping the hull polygon, snap to the outermost geocoded points. See the three figures below for examples.

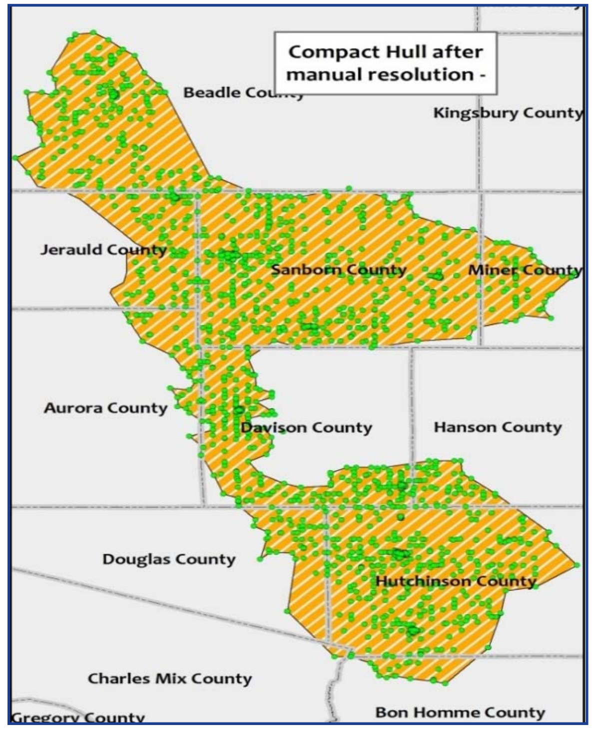
Compact Hull: Manual Resolution Required



Compact Hull: Manual Resolution Required



Compact Hull: After Manual Resolution



10) To attribute the compact polygon, perform a spatial join where your Target Feature Class is the compact polygon and the Join Feature Class is your geocoded point layer. Export compact hull with joined attributes and name file appropriately.
11) Append attributed compact polygon to Broadband TT template Feature Class and, if required, manually input any provider attribution that may not have carried over in the append process.
12) Intersect compact polygon with county boundaries to create unique records by county and use the state-county-fips field to populate stcty_fips field. Also use the county name field to populate the BBCov_Name field.
    a. Exception: where a provider's coverage is distributed throughout more than one area of any given county where the BBcov_Name should be populated using an appropriate city or other logical name based on geographical location.
13) Export/load into appropriate BB TT model dataset.

CENSUS BLOCKS—LIST OR SPREADSHEET

In the event that the provider supplies census block data in a list or spreadsheet, the steps are as follows:

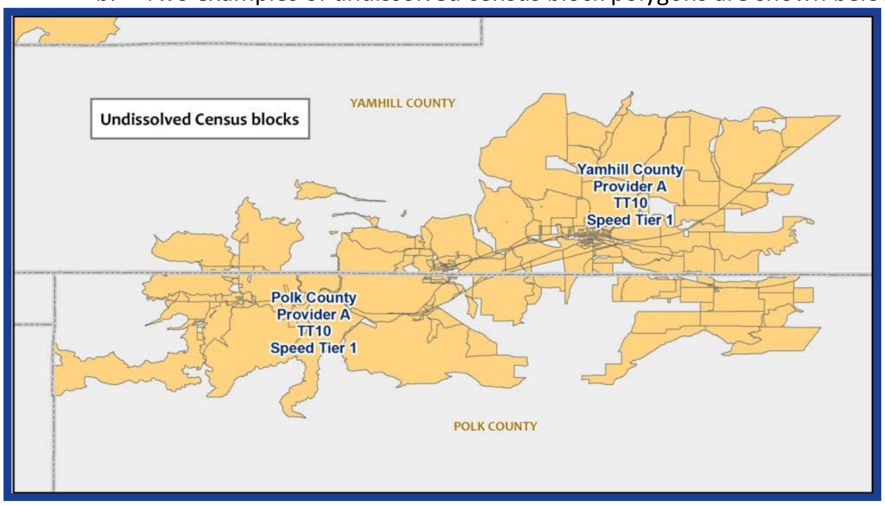
1) Ensure block polygons supplied by the provider are 2000 currency.
2) If other currency, convert to 2000 currency before proceeding.
    a. To do this, remove the trailing letter (a, b, etc.) from the block ID.
    b. You will now have two blocks that equate to one block in the 2000 block geometry.
    c. Delete duplicate block IDs, retaining the higher service tier in each case.
3) Prepare the block list in clean Excel format, removing all Excel-only formatting, merged cells, colors, borders, etc.
4) Import the spreadsheet into ArcMap®.
5) Right-click on the 2000 census block feature class in the layer list in ArcMap® and select **Joins and Relates>Join** from the dropdown menu. Join the census block list to the 2000 census blocks feature class using the block ID and export joined records in a new feature class. The **Join** dialog box and process can be seen above in the **TIGER® Street Segments—List, Spreadsheet or GIS Data** subsection.

6) Follow the steps in **Census Blocks—GIS Data** below.

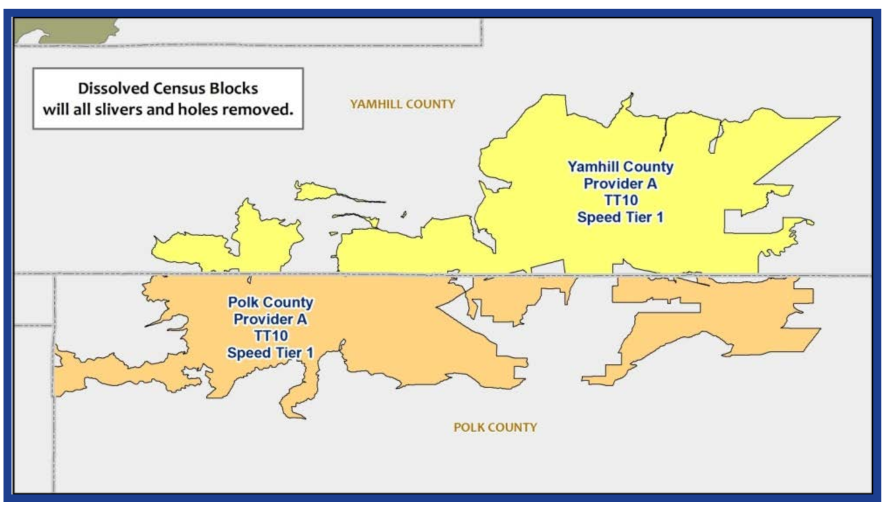
CENSUS BLOCKS—GIS DATA

In the event that the provider supplies census block GIS data, the steps are as follows:

1) Ensure that the blocks supplied by the provider are in the required data schema and are complete as far as required attribution.
    a. If not, manually enter the required attribution or contact the provider to fill gaps.
2) If census block geometry is distributed throughout more than one county, then select **Data Management Tools>Generalization>Dissolve** in ArcToolbox® and dissolve based on County/Provider/TT/Speed Tier so that unique records are created for each unique combination.
    a. The **Dissolve** dialog box is shown above in the **TIGER® Street Segments—List, Spreadsheet or GIS Data** section.
    b. Two examples of undissolved census block polygons are shown below:



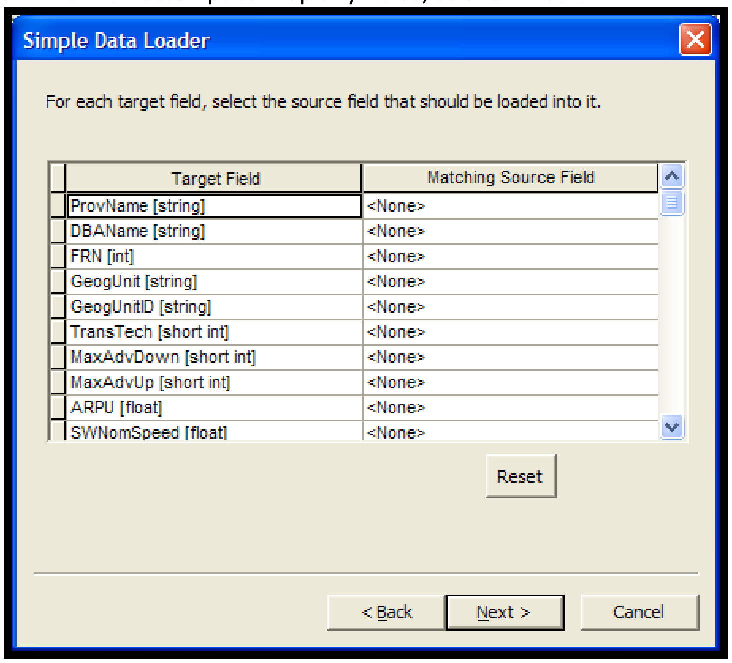
Undissolved census block polygons



Census block polygons dissolved by county

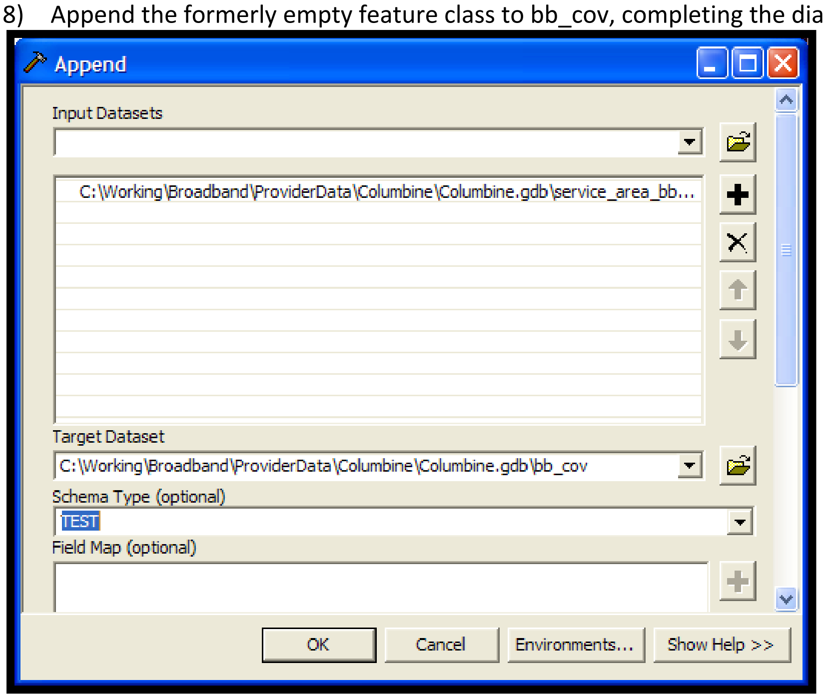
3) For each dissolved region use the **Editing** toolbar in ArcMap® to remove unnecessary slivers and other small holes.
4) In ArcToolbox®, select **Data Management Tools>General>Merge** and merge the processed polygons into a single layer.
5) The merged census blocks will need to have the subscriber's frn field added and populated.

6) In ArcCatalog®, create an empty feature class with the schema of the bb_cov feature class and load the GIS feature class either created above or supplied by the provider into it.
   a. Right-click on the empty feature class, select **Load>Load Data** from the dropdown menu and navigate to the location of the service area feature class.
   b. Click the **Add** button, the click **Next.**
   c. Accept the defaults and click **Next.**
   d. DO NOT attempt to map any fields, as shown below:



   e. Click **Next**, then **Next** again, then **Finish**.

7) In ArcToolbox®, go to **Data Management Tools>General>Append**.
8) Append the formerly empty feature class to bb_cov, completing the dialog box, as shown below:



9) Leave the **Schema Type** as TEST.
10) Click **OK**.

11) In ArcMap®, open bb_cov for editing and manually input associated attribution, if necessary.

METADATA TRANSACTIONS

Following any updates or changes completed within the file geodatabase (fGDB) stored on the GIS-Analysts staging environment, the GIS-Analyst runs transactions to compare that fGDB with the one stored on the Core server to ensure metadata on all changes is recorded.

The steps taken to run transactions on the updated Core database are outlined below:

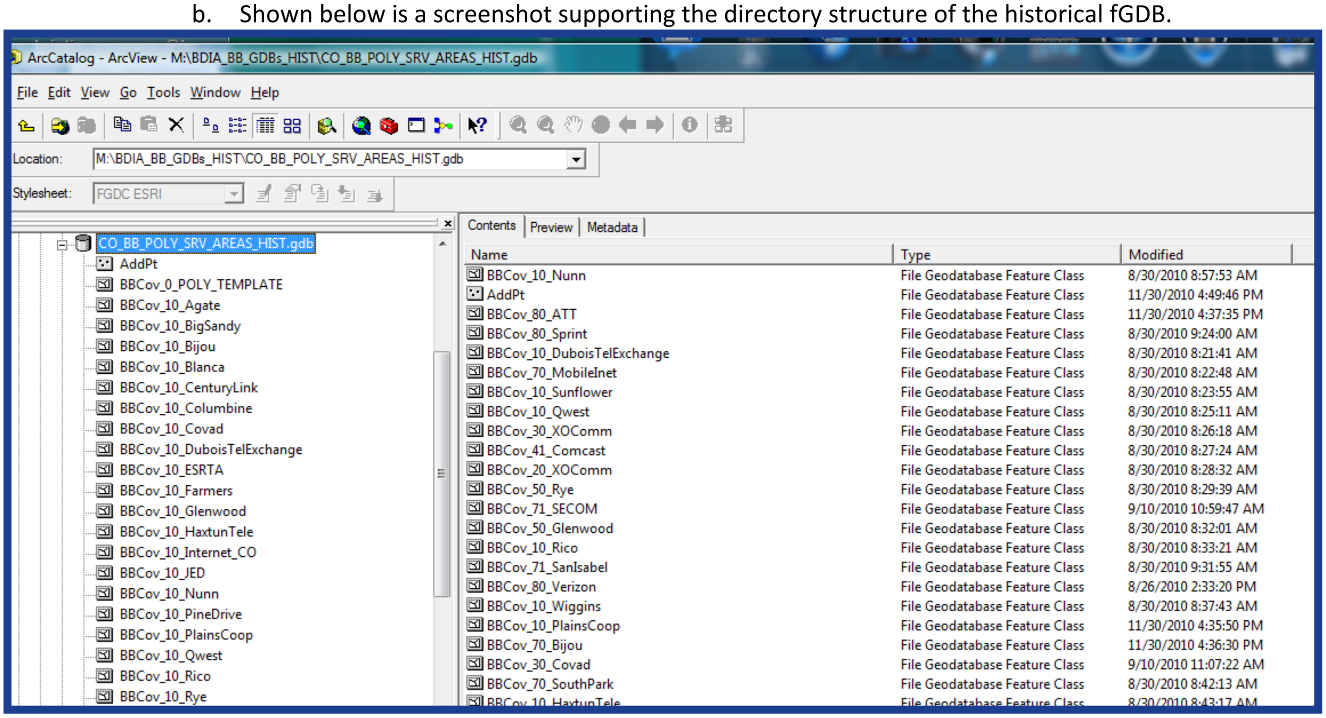
1) Open a command line window and run generateTransactions.py:
    a. Usage: **generateTransactions.py [Core fGDB] [Staging Environment fGDB]**
    b. Example of command line:

<path>**generateTransactions.py** <path>**ST_BB_POLY_SRV_AREAS.gdb** <path>**ST_BB_POLY_SRV_AREAS.gdb**

2) Shown below is an example of the output screen that will be displayed:

```
----------  Collecting Transactions  ---------------

Calculating rec_id field for BBCov_0_BB_POLY_TEMPLATE
value can not be 0 or less
Trouble creating the progress meter

Calculating rec_id field for BBCov_10_CenturyLink

%   10   20   30   40   50   60   70   80   90   100

----|----|----|----|----|----|----|----|----|----|     Goal = 8

Merging change: X:\BDIA_BB_GDBs\MS_BB_POLY_SRV_AREAS.gdb\AddPt
Calculating Transaction fields for AddPt

%   10   20   30   40   50   60   70   80   90   100

----|----|----|----|----|----|----|----|----|----|     Goal = 1
**************************************************
X:\BDIA_BB_GDBs\MS_BB_POLY_SRV_AREAS.gdb\AddPt...changes is complete.

Your transaction FeatureClasses are in:
\\michigan\AllAccess\BDIA_BB_GDBs_HIST\MS_BB_POLY_SRV_AREAS_HIST.gdb
--------------------------------------------------------------------------------
------------
elapsed time = 2994.4 seconds
```

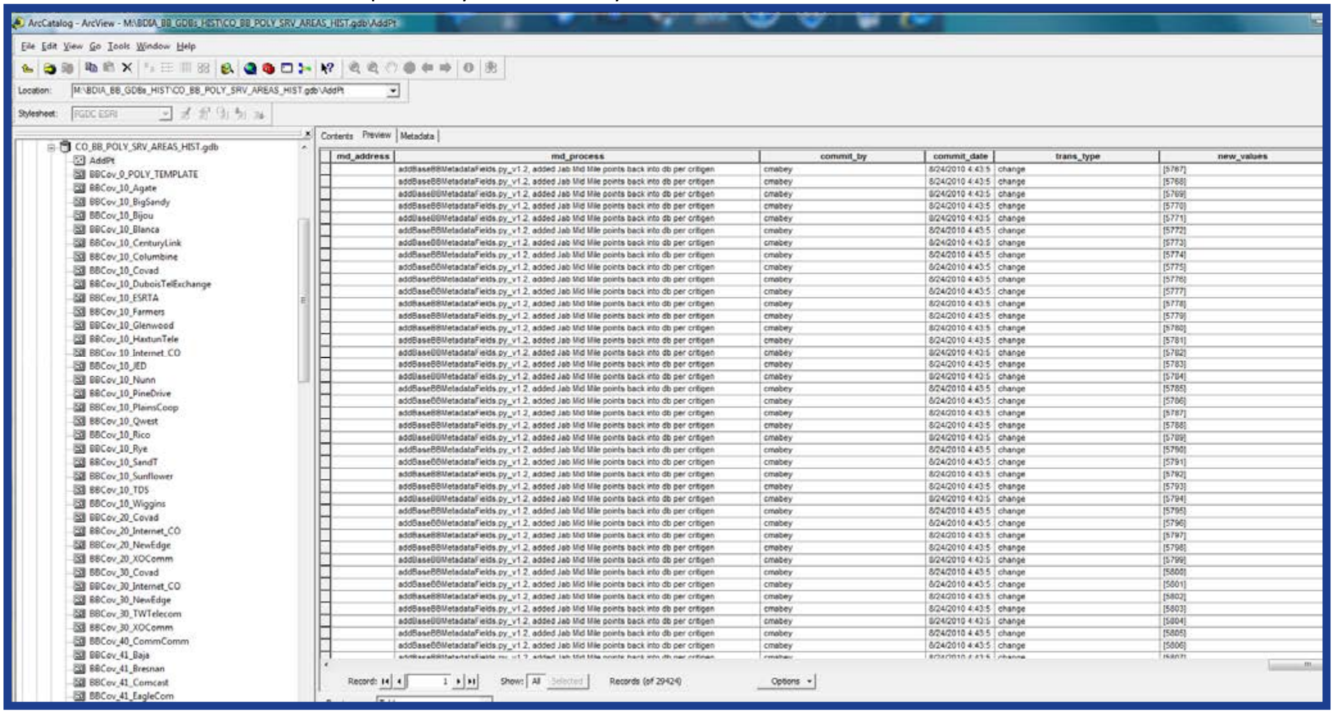
3) After the process has completed, results can be found in the ST_BB_POLY_SRV_AREAS_HIST.gdb:
   a. The transactions scripts records changes at a feature level.
   b. Shown below is a screenshot supporting the directory structure of the historical fGDB.



   c. Attribution associated with each added/removed/changed feature is tracked, including the following additional columns appended to the end of each:
      (i.) Commit_by
         (1) Records the GIS-Analyst who committed the changes to the historical fGDB.
      (ii.) Commit_date
         (1) Records the date and time stamp on which the changes were committed.
      (iii.) Trans_type
         (1) This field reflects the type of change recorded;
         (2) Categorized by: Adds/Change/Deletes.
      (iv.) New_values

(1) Records the new values when a change was completed on a feature. Example: Name or speed change.

d. MD_Process also is transferred from the edited fGDB to the historical fGDB, which states the actions completed by the GIS-Analyst.



DATA PROCESSING

DATA PROCESSING OVERVIEW

The following subsections detail the steps and layout required to process the service provider data further to meet NTIA requirements:

- **Weighted Nominal Speed**;
- **Middle Mile**;
- **Broadband Coverage Template**.

WEIGHTED NOMINAL SPEED

The weighted nominal speed is populated in one of the following two ways: **subscriber data supplied by provider** or **value supplied by provider**.

SUBSCRIBER DATA SUPPLIED BY PROVIDER

Where the data provider supplies subscriber speed information, the following formula from the NOFA is used:

$$\frac{(\text{speed tier-1 in kbps} \times \text{no. of tier-1 subscribers}) + (\text{speed tier-2 in kbps} \times \text{no. of tier-2 subscribers}) + (\text{etc.})}{\text{Total average monthly subscribers}}$$

Data is initially broken up in the following order:

1) Stcty_fips;

2) Transmission technology type;
3) Subscriber tiers.

VALUE SUPPLIED BY PROVIDER

Some providers will supply their weighted nominal speed. In these cases, the data supplied will be populated instead of using the NOFA formula. These obtained or calculated values are used to update the service overview layer.

This can be done manually or by creating a table with the provider's FRN and average weighted speed and joining it to the service overview table in ArcMap®.

1) To join, right-click on the layer to join to and select **Joins and Relates>Join** from the dropdown menu.
2) Then navigate to the table to join to and select the join fields from the dropdown list.
3) Then open the source table (the table in ArcMap®) and right-click on the header of the **Average Weighted Speed** field and select **Calculate Field** from the dropdown menu.
4) Use the value of the average weighted speed from the joined table.

MIDDLE MILE

Middle mile information generally is provided in spreadsheet or text file format. The process is to take what is supplied by the provider and translate it into the required data schema.

1) If the data is supplied with address information, follow the process outlined above in **Subscriber Location—Address Data**.
2) If the data is supplied with associated XY coordinates, follow the process outlined above in **Subscriber Location—XY Data**.
3) Once the data is in GIS format, use the **Append** (**Data Management Tools>General>Append**) command in ArcToolbox® to append the data to the overall middle mile dataset.
4) Set the schema type to NO_TEST and use the Field Map to map the attribute fields from the source to the target dataset.

BROADBAND COVERAGE TEMPLATE

The table below lists descriptions of the fields within the bb_cov layer, which is the interim dataset used to create the final product deliverable.

ALIAS	DESCRIPTION
SHAPE	Internal Shape storage
OBJECTID	Internal Object ID
RECORD_ID	Unique ID for this record, and is required for Transactional updates to function properly.
STATE_COUNTY_FIPS	State/County FIPS code
PROVIDER_ID	Unique numeric identifier for each provider (Parent Source ID)
PROVIDER_NAME	Unique name for each provider
DOING_BUSINESS_AS	An alternative "Doing-Business-As" name for the provider
TYPE_OF_PROVIDER	Type of Provider (1:Broadband provider as described in the NOFA, 2:Reseller, 3:Unknown, 4:Business Only)
FCC_REGISTRATION_NUMBER	Provider FCC Registration Number
BBCOV_NAME	BroadMap Broadband Coverage name (usually Place or County name)
TECHNOLOGY_OF_TRANSMISSION	Unique code for the transmission technology type described by this layer
SPECTRUM_CODE	Unique code for the spectrum [WIRELESS ONLY]
MAXIMUM_ADVERTISED_DOWNSTREAM_SPEED	Maximum advertised downstream speed available within given area (speed tier)
MAXIMUM_ADVERTISED_UPSTREAM_SPEED	Maximum advertised upstream speed available within given area (speed tier)
TYPICAL_DOWNSTREAM_SPEED	Typical downstream speed available within given area (speed tier)
TYPICAL_UPSTREAM_SPEED	Typical upstream speed available within given area (speed tier)
MD_GEOMETRY	Metadata: Comma separated list of source id's from which the polygon extent was produced
MD_EXISTS	Metadata: Comma separated list of source id's used in understanding and editing this feature
MD_WHO	Metadata: Name of the editor who last edited this feature at the time in md_when
MD_WHEN	Metadata: Date/time that this feature was last edited
MD_PROCESS	Metadata: Comma separated list of processed used to create and/or modify this layer
SHAPE_AREA	Area in square decimal degrees
SHAPE_LENGTH	Length in decimal degrees

VERIFICATION AND VALIDATION

PROVIDER VALIDATION—PROVIDER PORTAL

Following the collection and aggregation of provider data, the aggregated data is validated by the provider to ensure it is an accurate representation of their coverage area and supporting broadband information.

- This validation is completed through the Provider Portal web application, which is a secure interactive map that displays the provider's coverage areas and allows the provider to validate, submit feedback or request changes.
    - If changes are requested, then the features on the portal are updated and an automatic request is sent to the provider to complete the validation process.
- Providers that did not use the Provider Portal are asked to validate a PDF map displaying their coverage area(s). This is accomplished via e-mail notification.

PROVIDER VERIFICATION—THIRD PARTY SOURCE REVIEW

After the provider has validated its coverage areas, a third-party source comparison and analysis is performed.

- Where anomalies or discrepancies are identified, a "SCAN" point is dropped and descriptive comments are applied to be reviewed later with the provider.
- During the provider review, the map is displayed along with the "SCAN" points and potential refinement is completed based on input from the provider.

The table below shows third-party sources used:

THIRD-PARTY SOURCE NAME	SOURCE TYPE	VERIFICATION TYPE
InfoUSA	Consumer and Business Listings	Community Anchor Institutions; Can also be used for demographic information supporting the State websites.
Pitney Bowes (PBBI)	Exchange Info Plus (Central Office Locations)	Exchange datasets are used to verify the following Transmission Technologies (TT): Asymmetric xDSL (10), Symmetric xDSL (20), Other Copper Wireline (30), and Optical Carrier/Fiber to the End User (50).
Media Prints	Cable Boundaries	Used to verify the following TT: Cable Modem—DOCSIS 3.0 (40) and Cable Modem—Other (41).
American Roamer	Wireless Coverage Patterns (EVDO, GPRS, WISP, HSPA)	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80).
ComSearch	Wireless Spectrum Holdings and Tower Data	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80).

ASSIGNING CONFIDENCE VALUES

All findings and results from the abovementioned **validation and verification activities**, plus internal peer quality reviews, are captured and tracked in a **Validation table** (see example on the following page) and form the basis of the confidence value assigned for each provider and then each technology.

CONFIDENCE VALUE	DESCRIPTION
0	Coverage area has not been reviewed.
10	Extremely Low: Single Source QC.
20	Very Low: Needs additional validation\verification.
30	Low: Even with validation\verification, coverage still is suspect.
40	Acceptable: Confirm with State prior to shipment.
50	Meets requirements to be included in shipment.
60	Moderate: Meets NTIA/State's standards, representative of Technology Type (TT).
70	High: Accurate representation of coverage based upon TT.
80	Very High: Multiple validation\verification with most third-party sources.
90	Extremely High: Multiple validation\verification sources.
100	Perfect: Multiple validation\verification sources, with complete alignment with sources and ground truth verification activities.

The **Validation table** is maintained as updates or changes occur for each provider, down to technology type, with the overall goal to improve the confidence values and overall map representation.

COMMUNITY ANCHOR INSTITUTION (CAI) DATA

DATA COLLECTION

The CAI data was initially collected from the State to create the baseline inventory. All location information and broadband coverage data supplied also was ingested into the data deliverable. Additional collection of CAI information was done via data mining and/or webscraping to build out the inventory further. For example: Collection of additional CAIs and location information.

The State-agency-provided CAI inventory was comprehensive but the challenge is collecting broadband related data: service provider(s), technology and speed data for each CAI. Availability of the CAI portal has not significantly increased submission of this data. Additional promotion to CAIs to use the CAI portal will be needed to increase this data for subsequent deliverables.

INSTITUTION DATA

Institution data is obtained from a variety of sources and almost always provided in Excel spreadsheet format. The general process for incorporating this data is as follows:

1) If the data is provided in Excel or some similar format:

a. Clean and standardize the Excel spreadsheet, removing any cell formats, merged cells, etc.
b. Standardize the address format as defined in the staging CAI database.
c. If the spreadsheet includes X and Y values, such as latitude and longitude, use the **Add XY Data** tool in ArcMap® to create a spatial data layer.
d. If there are only addresses, then follow the geocoding steps outlined above to create spatial data points for each of the institutions.
   (i.) Institutions that do not geocode based on the TIGER® 2010 dataset will have to be located manually using Google Maps, Google Earth or some other information source.

2) If the CAI source data is in GIS format, add the Latitude and Longitude fields and use the **Calculate Geometry** tool to populate them, using the WGS 84 coordinate system.
3) Using ArcCatalog®, load the new data into the staging CAI database.
4) This database is ready for the makeDeliverable.py script to process the information into the final State and NTIA deliverables.

COMMUNITY ANCHOR INSTITUTION (CAI) PORTAL UPDATES

A web application has been released to allow for further data collection and validation of anchor institution location information, broadband coverage and speed test data. Information collected from the CAI Portal is then ingested into the overall inventory and will be compared later against the provider coverage areas mapped to locate any potential discrepancies.

PRODUCT EXTRACT

PYTHON SCRIPTS

The following subsections make use of Python scripts. In general, to use a Python script you must have Python installed on your computer. To download the latest version of Python, go to **http://www.python.org/download/** and download the latest stable version. As of August 2010, this was version 2.7. Once this is installed, the general way to run a script is to type the following at a command prompt: C:\Python27\python.exe C:\<location of script>. Many of the scripts provided have environment variables that must be set before they can be run.

The Python code for BroadMap's product extract has been incorporated into a Hudson CI System, which is detailed in the **Process Operation and Monitoring** section of this document. This was a process improvement activity so that all processes can be monitored, controlled and will contain historical tracking on each process.

PRODUCT EXTRACT PROCESS

NOTE:
Specific Python scripts are called out in **red** font in the subsections below.

The MapConnect™ product extract process, BDIACreateSBDDOutputMigratedBBCov.py, uses our internal BB_Cov model to create the following layers rolled up to NATL_Broadband_Map in accordnace to the current NTIA data model specifications.

- BB_Service_RoadSegment
  - This layer contains all broadband services associated with specific street segments for census blocks larger in area than two square miles.
- BB_Service_CensusBlock
  - Contains all broadband services associated with census blocks of no greater than two square miles.

- BB_Service_Wireless
    - This layer contains all wireless services not associated with specific addresses.
- BB_Service_Overview
    - This layer contains subscriber-weighted nominal speed for each provider's service area at a county level and is meant to act as a summarized view.
- BB_ConnectionPoint_MiddleMile
    - This layer contains middle-mile and backbone interconnection points.
- BB_Service_CAInstitutions
    - Broadband Service at Community Anchor Institutions (CAI).
    - Community Anchor Institutions consist of schools, libraries, medical and healthcare providers, public safety entities, community colleges and other institutions of higher education as well as other community support organizations and entities.
- BB_ConnectionPoint_LastMile
    - This layer contains last mile infrastructure points, which is populated only if data cannot be provided at a more granular level.
- BB_Service_Address
    - Represents broadband availability for service address points. Address Point availability refers to those individual addresses at which each facilities-based provider of broadband service can provide broadband services of minimal characteristics within 7-10 business days.
- State_Boundary
    - State boundary supporting topological validation of point feature classes.
- NATL_Broadband_Topology
    - Supports basic topology quality checking. Example: No CAIs or Middle Mile points outside of the State boundary.

PRODUCT STATISTICS

Following the completion of a product extract, the product statistics script (BDIA_ReleaseNotesStats.py) extracts the following information supporting that product deliverable.

- Provider Statistics:
    - Collects all provider information, listing by Provider Name.
    - Provides output of FRN.
    - Counts the number of features supported within the following layers:
        - Census Block;
        - Street Segment;
        - Max Upstream;
        - Wireless Services;
        - Infrastructure Points.
    - These updates were made to support the Data Package required to accompany every NTIA product deliverable.
- Community Anchor Institution (CAI) Statistics:
    - Breaks down CAI to the eight categories:
        - 1: School: K through 12;
        - 2: Library;
        - 3: Medical/Healthcare;
        - 4: Public Safety;
        - 5: University/College;
        - 6: Other Government;
        - 7: Other Community non-government;

- None: Unknown Category. In cases where this occurs, further investigation is completed prior to product shipment to ensure all CAIs are categorized accurately.
  - Reports out the following counts:
    - Total CAIs within that category;
    - Total CAIs that contain partial BB coverage. Contains any of the following information for a given CAI: BB Subscriber, Transmission Technology, Speed Down Speed Up;
    - Total CAIs that contain full BB coverage. Contains all of the abovementioned BB information for a given CAI.

The output of this script is two CSV files: AnchorInstitutions.csv and Providers.csv. These files then can be inspected to ensure that there are the expected number of CAIs and providers for every release.

QUALITY ASSURANCE

Quality assurance is supported manually and algorithmically on the interim data, BB_Cov file geodatabase and on the final product. For scheduled product releases, a test product extract and subsequent manual and algorithmic QC run is completed along with a release review. The product specifications, project status reports and previous product release notes are used as references throughout this review.

The following parameters are tested using the methodology listed below each:

- Product Deliverable Format:
  - Correct names and format of data deliverables.
    - BDIA_QC_SUITES.
  - Correct Projections/Datum.
    - Manual interaction with product.
  - Metadata Present and Correct.
    - Manual interaction with product.
- Table Structure:
  - All required tables included.
    - BDIA_QC_SUITES.
  - Extraneous tables identified.
    - BDIA_QC_SUITES.
- Field Structure:
  - All fields included.
    - BDIA_QC_SUITES.
  - Extraneous fields identified.
    - BDIA_QC_SUITES.
  - Correct field names, types and widths.
    - BDIA_QC_SUITES.
- Field Domains:
  - Values in all tables are constrained to the specified values specified:
    - This action is accomplished via BDIA_QC_SUITES and manual review of the product;
    - This tends to identify project completeness issues as fields with a null value are identified.
- Geometric Representation:
  - Identify if all layers have the correct geometric representation:
    - Manual review of the BB_ServiceOverview layer;
    - Dependent on NTIA and client requirements.
- Geographic Extent:
  - Product includes the necessary Geography associated with Product?
    - Manual Review—ArcGIS®.
  - Is there extraneous geography included in Product?
    - Manual Review—ArcGIS®.

- Completeness:
  - Products contain the expected amount of data?
    - Manual review of product statistics relative to weekly State reports and defined expectations.
- Accuracy:
  - Product meets the stated accuracy requirements for the deliverable?
    - Sampling procedure to manually review source material to resulting product;
    - Provider Validation;
    - Verification using Third-Party Data;
    - Verification against reality, where applicable.
- Data Regression:
  - Any unexplainable data loss or change?
    - This action is accomplished by comparing results within product statistics script (BDIA_ReleaseNotesStats.py) from previous releases, as well as manual review of the product.
- Confidentiality:
  - Any unauthorized confidential information included in the delivery?
    - Review of NDAs and delivery expectations.
- Prior Issues Resolved:
  - Have expected internal issues been resolved?
    - Manual review of data against previous product release notes.
  - Have agreed-upon customer issues been resolved?
    - Manual review of data against previous product release notes, status report and client feedback.
- Delivery Medium:
  - Has the product medium been verified?
    - Manual review.
  - All files present.
    - Manual review of SFTP site is done to ensure all files are copied correctly, including file/directory size.
  - Correct location.
    - Manual review—confirmation of SFTP link, username and password.

QC SUITE

The BDIA_QC_SUITES consists of four main types of scripts supporting the overall QC process. These scripts are all run in concert and are called from the test_runner script and the test_BDIAProductGDB script.

CONFIGURATION

These scripts establish the configuration for the test_BDIAProductGDB script, which is the core of the QC Suite.

update_test_config
active_config
config_PROCESS01_automated
config_PROCESS01_manual
set_active_config

LIBRARIES

These scripts provide additional functionality that is called from with the test_BDIAProductGDB script.

bb_unittest_fixture
bbcov_structure
BC_XmlWriter
file_folder

search_and_replace
unittst_fixture
validate_BB_DB
validate_BB_GDB
xmlrunner_gui

QC SUITE

This is the core script for performing automated QA/QC on the interim and final data deliverables.
test_BDIAProductGDB

OTHER

These scripts perform other functions detailed below:
test_runner—this is the main script that runs all the other QC scripts and imports all the necessary scripts and libraries.
which_build—this determines the current build and passes information to the configuration scripts.

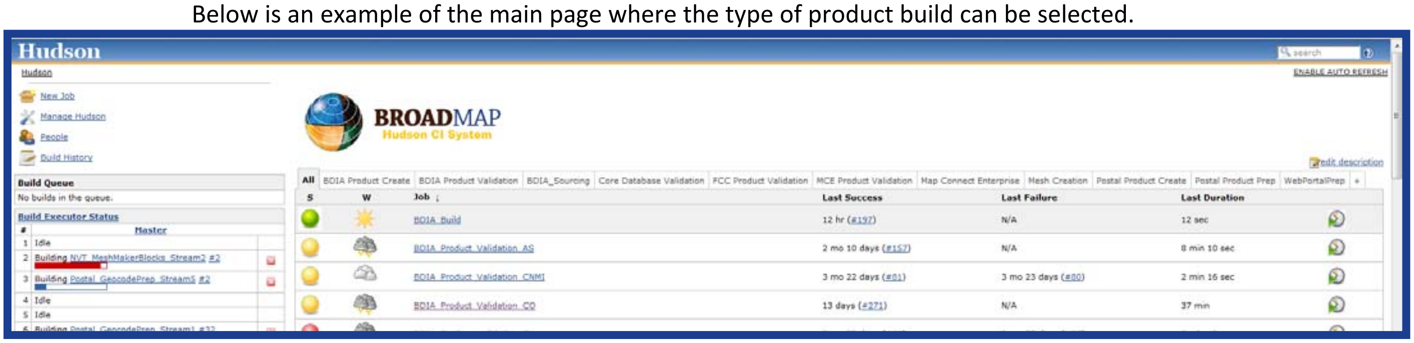
PROCESS OPERATION AND MONITORING

Product Extract, BDIACreateSBDDOutputMigratedBBCov.py, is run within BroadMap using a platform called Hudson that has been enhanced to support BDIA product extraction, process monitoring, as well as product validation. The same platform can be planned for implementation for the State, if desired.

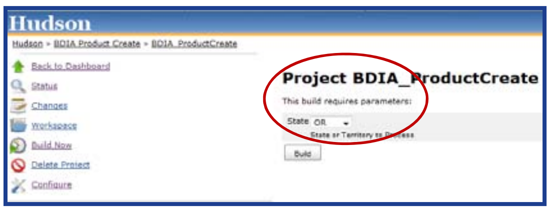
Below are previous examples of the product create, product validation, product statistics and monitoring processes that are managed within the BroadMap Hudson CI-System. All of the above-mentioned Python scripts, with the exception of metadata transactions script, are run via this system.

BDIA PRODUCT CREATE

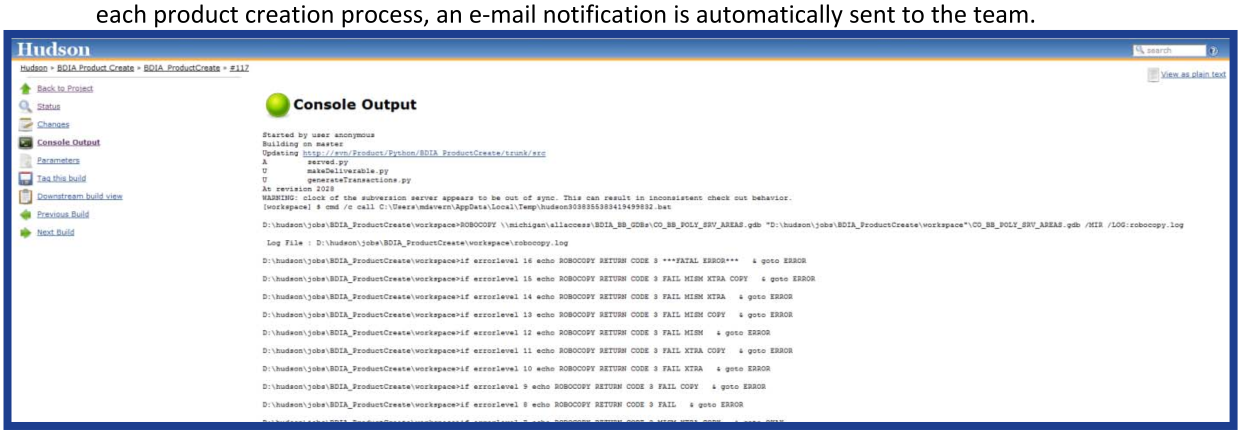
Below is an example of the main page where the type of product build can be selected.



Selecting based on the type of process that will be initiated is shown below:



The Console Output can be reviewed to see the progress of product create. Following the completion of each product creation process, an e-mail notification is automatically sent to the team.



All processes run via the BroadMap Hudson CI-System are stored for historical reporting. Each process can be reviewed, including the Console Output and Build Artifacts from that run.

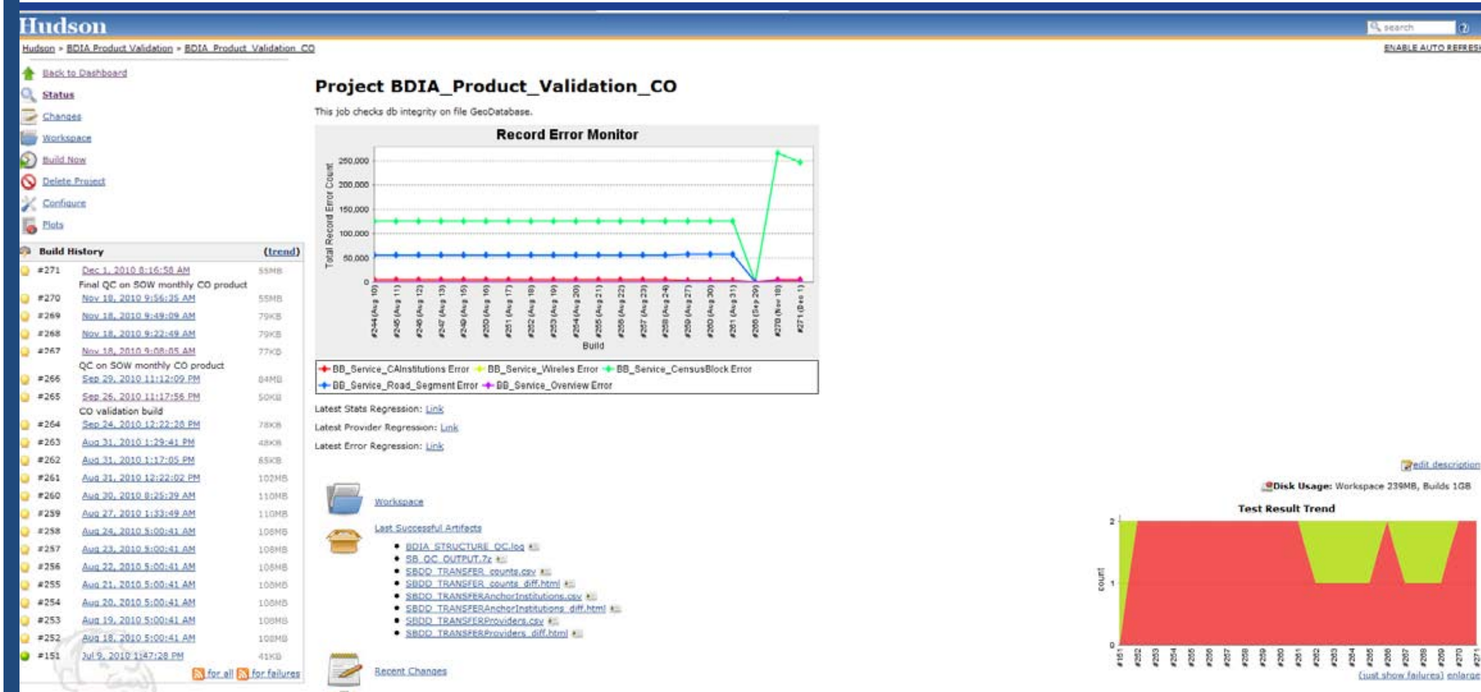

Hudson
Hudson » BDIA Product Create » BDIA_ProductCreate » #161
Back to Project
Status
Changes
Console Output
Parameters
Tag this build
Downstream build view
Previous Build
Next Build
Build #161 (Mar 28, 2011 9:44:40 PM)
OR Pre-Release Build
Build Artifacts
bdia2ntia.log
makeDeliverable.log
robocopy.log
Revision: 3099
No changes.
Started by user anonymous
ENABLE AUTO REFRESH
Delete this build
Started 1 day 1 hr ago
Took 3 hr 31 min on Alaska
edit description

PRODUCT VALIDATION AND STATISTICS

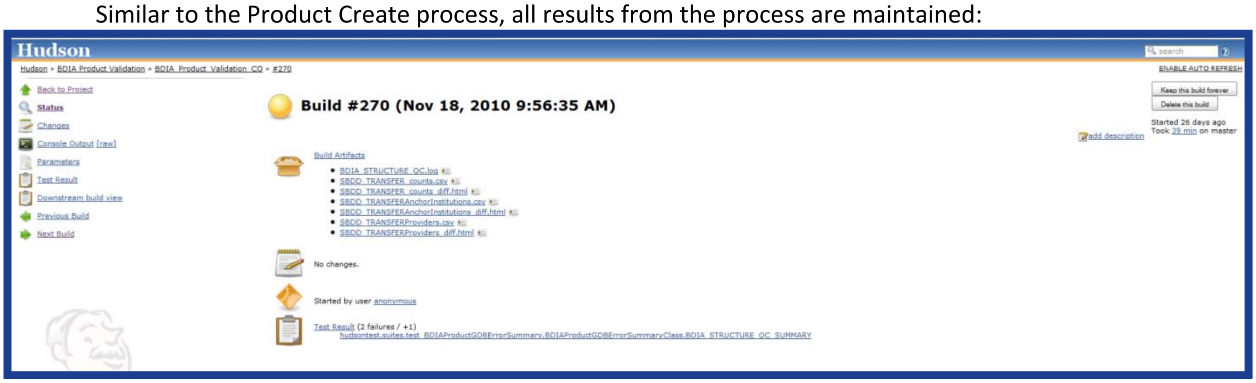
Once the product creation process is complete, Product Validation and Statistics are then initiated. These support the BDIA_BBCovStats_NEWvOLD.py script and the BDIA_QC_SUITES scripts detailed above.

All statistics and reports are stored for historical review with the capability to place violation criticality on each quality control check, allowing the identification of errors because of project status/completeness verses project correctness. Example: Typical Speeds populated.

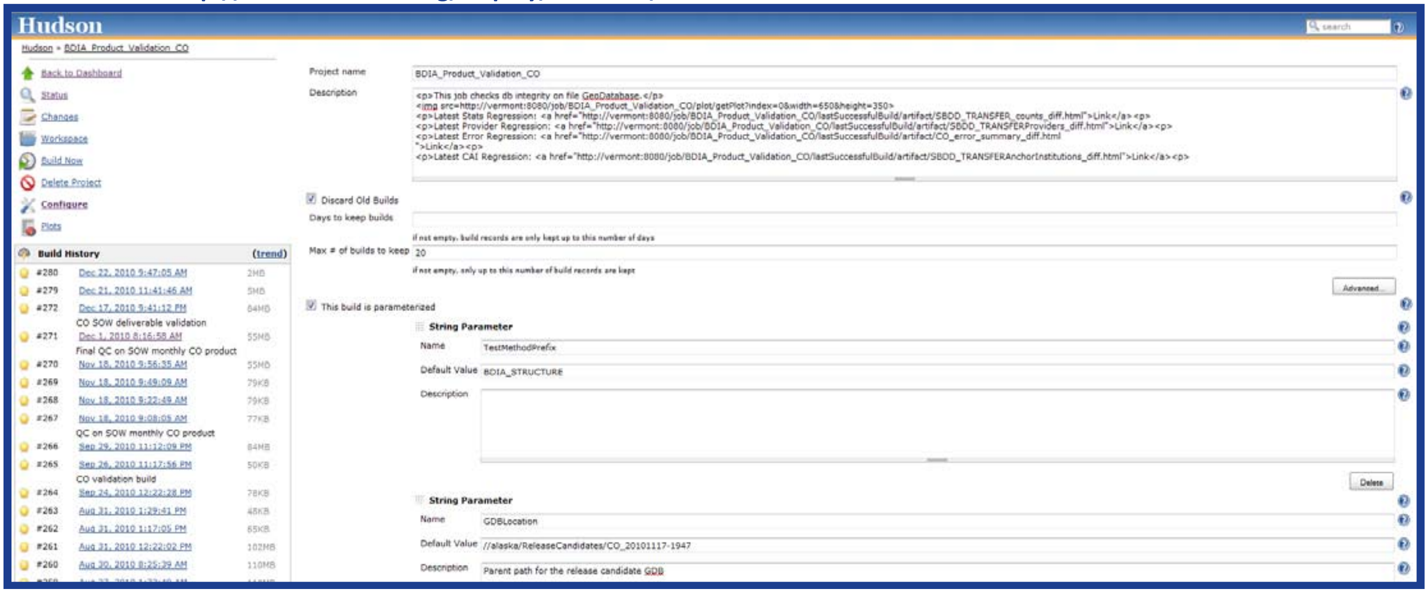
Below is an example of the report provided based on various control points running over a specified period:



Similar to the Product Create process, all results from the process are maintained:



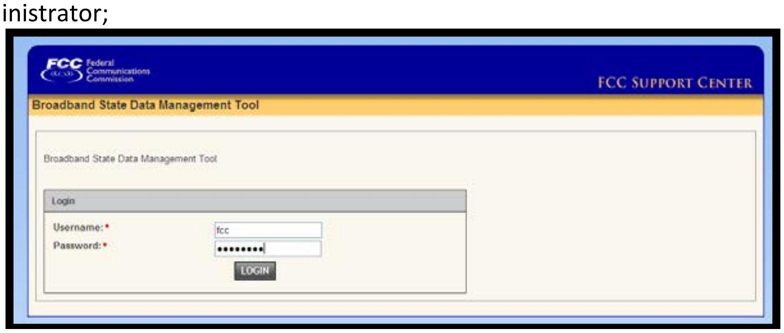
Results are then reviewed manually to ensure no errors reported are critical or in violation of the NTIA data model or project completion statements. Any errors of concern are communicated ahead of product delivery and included within the product release notes. Further detail on the Hudson-CI System environment can be found by navigating to the following link:
http://wiki.hudson-ci.org/display/HUDSON/Meet+Hudson



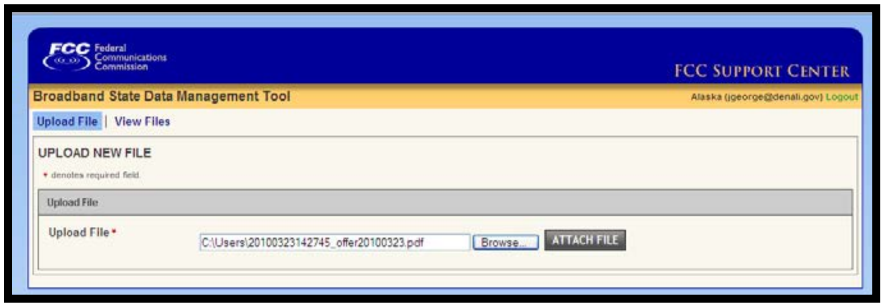
PRODUCT EXTRACT DATA DELIVERY

Product delivery for MapConnect™ Broadband is handled two ways, depending on client requirements:

1) State Submittal:
   a. Data is submitted via SFTP site;
   b. Product Release Notes and QC Test Report accompany the delivery.
2) NTIA Submittal:
   a. Directions for using the NTIA State Broadband Data file submission tool:
      (i.) Go to the following website: **https://esupport.fcc.gov/statedata**;
      (ii.) Enter your **username and password** as provided to you from the NTIA program administrator;



      (iii.) Click in **Upload a file** field;
      (iv.) Browse to local file for submission using the **Browse** button. Select file, then select **ATTACH FILE**. See example below.



(v.) **Logout/Receipt** using the **Logout** button in the top right of the screen;
(vi.) A receipt of submission is e-mailed to username e-mail address.

New Hampshire Broadband Mapping and Planning Program
University of New Hampshire
April 2012 Data Submission

I. Data Description

In accordance with the effective NTIA guidance for Round 5 data submissions, the New Hampshire Broadband Mapping and Planning Program (NHBMPP) submitted the data set described below and associated documents to NTIA in April of 2012.

NH_SBDD_2012_04_01.gdb – file geodatabase containing feature classes for:

Feature Class	Number of Records
BB_ConnectionPoint_LastMile	0
BB_ConnectionPoint_MiddleMile	91
BB_Service_Address	0
BB_Service_CAInstitutions	3,914
BB_Service_CensusBlock	99.437
BB_Service_Overview	0
BB_Service_RoadSegment	38,890
BB_Service_Wireless	39
State_Boundary	1

In total, over 138,400 individual data records on broadband availability were submitted by New Hampshire. Collectively, these records describe availability as reported by 37 broadband providers in the state. In addition, the NHBMPP submitted data on 3,914 community anchor institutions, an increase of 136 records from the prior submission.

To achieve this level of reporting, the NHBMPP relied on a number of sources to identify potential providers in the state. The following table details the disposition of the initial set of providers:

Description	Number of Records
Potential providers identified in NH	90
Providers confirmed as delivering service in NH	60
Providers represented in the NHBMPP submission	37

II. Provider Participation

The NHBMPP has identified 60 broadband providers in the state. As noted above, 37 of these providers actively participated in the program for the Spring 2012 cycle. This number represents a decline of two providers from our prior submission – one national provider opted out of the program due to data quality issues, and a second provider was purchased by a larger national provider. The current participating providers include:

Provider Name	Technology
1. Argent Communications, LLC*	Cable, Fixed Wireless
2. AT&T Mobility LLC	Mobile Wireless
3. Charter Communications Inc.	Cable
4. Comcast Cable Communications, LLC.	Cable
5. Covad Communications Company	DSL, Other Copper Wireline, Middle Mile
6. Cyberpine Cooperative, Inc.	Fixed Wireless
7. Dunbarton Telephone Company, Inc.*	DSL
8. FairPoint Communications, Inc.*	DSL
9. Freedom Ring Communications, LLC. (dba BayRing Communications)*	Middle Mile
10. G4 Communications	DSL, Middle Mile
11. Granite State Communications (aka Granite State Telephone)*	DSL, Fiber
12. Great Auk Wireless (dba GAW High-Speed Internet Inc.)*,**	Fixed Wireless
13. GWI (aka Biddeford Internet Corporation)	DSL, Other Copper Wireline
14. HughesNet*	Satellite
15. IAMNOW.net*	Fixed Wireless
16. Lakes Region Wireless	Fixed Wireless
17. Level 3 Communications*	Fiber, Middle Mile
18. Lightower Fiber Networks*	Middle Mile
19. MetroCast*	Cable
20. OTT Communications*	DSL, Middle Mile
21. Oxford Networks*	Middle Mile
22. Sidera Networks, LLC	Middle Mile
23. Sovernet Communications*	DSL
24. Spectra Access*	Fixed Wireless
25. Sprint	Mobile Wireless
26. StarBand Communications, Inc.*	Satellite
27. Tamworth Wireless Cooperative	Fixed Wireless
28. TDS Telecom	DSL, Fiber, Middle Mile
29. Time Warner Cable	Cable
30. T-Mobile	Mobile Wireless
31. Topsham Communications*,**	Fiber
32. U.S. Cellular*	Mobile Wireless
33. Verizon Wireless	Mobile Wireless
34. Wave Comm, LLC	Fixed Wireless
35. WildBlue Communications, Inc.	Satellite
36. Wireless LINC of NH and VT (f/k/a NCIC)	Fixed Wireless
37. WiValley	Fixed Wireless

* Provider did not submit revised data for this round. Data collected for the September, 2011 submission was reported as still being effective. However, in most cases, data were reprocessed based on refined methodologies introduced during this round and described further below. In some cases, the reprocessing yielded a reduced coverage footprint.

** Provider's data submission was incomplete. Data included in NHBMPP submission represents only part of their coverage footprint.

The following 23 providers have remained unresponsive to multiple and ongoing requests to participate in the NHBMPP, or have dropped out of the program after initially providing data.

Provider Name	
1. Boston Telephone	2. Broadview Networks
3. CityVoice	4. Cogent Communications
5. DESTEK	6. Dixville Telephone
7. DSCI	8. EarthLink Business (aka One Communications
9. The Granite Connection	10. Grolen Communications
11. ITLLC (f/k/a Russet Communications)	12. Met Tel
13. MV Communications	14. NCIA
15. NHvt	16. Qwest Communications
17. RadiusNorth	18. segTel, Inc.
19. SkyWire Wifi (f/k/a Akers Pond)	20. TelJet
21. Turnpike Technologies	22. USAi.net
23. WindStream	

The 7 providers listed below were identified from analysis of the FCC Form 477 data (filings through February, 2011). The NHBMPP has contacted these providers, but to this date they have either been unresponsive or data has not been received so we cannot confirm their status in NH.

Provider Name	
1. Airespring, Inc.	2. BergNet
3. Global Crossing North America, Inc.	4. Hickory Tech
5. NewEdge Network, Inc.	6. NextWave Wireless, Inc.
7. Telovations, Inc.	

Finally, the NHBMPP identified a number of providers during previous rounds that we no longer maintain on the active list because they have either ceased providing service, have merged with other providers, or were never an active provider in NH.

Provider Name	
1. Access Communications	2. All Media, Inc.
3. Alterracom Networks	4. BIT-NET
5. CheshireNet	6. Cooperative Resources
7. Equal Access Networks	8. FCG Networks
9. Finowen	10. First Bridge
11. GreenNet	12. Green Wave Wireless
13. JLC	14. Level One Communications
15. Mainstream EIS	16. Mason Coop

17. Megapath	18. RNK Communications
19. TTLC.net	20. Vermont Telephone
21. WaveGuide	22. Wireless Horizon
23. Worldpath	

The initial master list of providers was extracted from the "New Hampshire Broadband Action Plan", 2008, NH Telecommunications Advisory Board (TAB) and NH Department of Resources and Economic Development (DRED). This listing was cross-referenced against a statewide cell tower inventory maintained by the NH Office of Energy and Planning. NHBMPP staff maintains an ongoing effort to identify additional active service providers in the state based on continuing interactions with TAB and DRED, review of speed test results, updated FCC data when published, and other sources as available.

III. Data Collection and Integration

A. Primary Data Collection

Data Acquisition
Primary data was collected directly from the service providers. The NHBMPP first developed a set of guidance documents based on NTIA specifications, and distributed those to the individual providers. Once the guidance was disseminated, NHBMPP staff followed up with providers via phone/email to encourage participation and address questions, as required. Typically, multiple communications were required to ensure a complete data submission was received.

Data Pre-Processing
To support the data mapping and integration efforts, the following base data sets were acquired and/or retrieved from the NH GRANIT state GIS clearinghouse archives:

- State and town boundaries (based on 1:24,000 USGS DLG files);
- 2001 Land Cover data set (derived from Landsat TM imagery);
- 2010 TIGER Census Blocks;
- 2010 Census MAF/TIGER Road Segments; and
- 2009 USGS National Elevation Data set (NED).

All required NTIA fields were added to the census block and road segment data sets. In addition, the road segments were processed against the census blocks to populate two fields used internally – the left block ID and the right block ID associated with each road segment.

Data Processing and Integration
The broadband availability data was processed and integrated using a suite of GIS tools and procedures, depending upon the format and content of the data submitted by the individual providers. Generally, the processing involved executing one or more of the following steps:

- Scanning and georeferencing paper maps and using the results as a visual reference to select out corresponding features from the project base data sets.

- Geocoding addresses using both an internal locator based on the TIGER road segments, and where required, the ESRI TA_BatchAddress_US subscription service; where NDAs were in place, geocoded points were then used to identify the host census block (if <= 2 sq. mi.), or the TIGER road segment in closest proximity but within 500' (if the host census block was > 2 sq. mi.). Related note(s):
  - In some cases, the selection of the TIGER road segment in closest proximity to the geocoded point yielded a pattern of disconnected road segments with broadband service.
- Using ArcGIS Network Analyst to select road segments within a cumulative distance of 3,000 and/or 18,000 lineal feet from central office locations, depending upon data submitted by the provider. The selected segments were subsequently used to identify adjacent census blocks <= 2 sq. mi. or used as features to quantify coverage along census blocks > 2 sq. mi. Note that in previous rounds, adjacent census blocks were flagged based on road segments intersecting those blocks. In this round, we refined our approach to define adjacency as blocks sharing a boundary with the road segment. This more conservative approach resulted in some blocks dropping out of provider coverage footprints.
- Processing KMZ image files, using the bounding rectangle to establish interior georeferencing, and then converting the georeferenced image to polygons.
- Utilizing Cellular Expert ArcGIS extension to generate a signal prediction surface for wireless providers submitting antenna locations (and associated data). Related note(s):
  - The statewide cell tower inventory provided the starting point for the signal propagation modeling efforts.
  - Subsequently, working with UNC-Raleigh and a NH-based fixed-wireless provider, the data processing models were refined to take into consideration visibility parameters (in addition to vegetation and topography).
  - During the current processing round, program staff participated in additional Cellular Expert training sessions to further enhance the signal propagation models. As a result, some provider coverage footprints have been reduced from previous submissions.
  - A -90 DB threshhold was used to define service areas of fixed-wireless providers.
  - In processing the fixed-wireless polygon data, exterior polygons, e.g. those outside of the main coverage footprint, that were < .125 sq. mi. were eliminated. Interior non-coverage polygons were not eliminated.
- Processing satellite coverage footprints to incorporate the Utah shadow analysis (as posted on PBWorks).

The NHBMPP maintains a record of all specific processing steps applied to each provider's data submission in each round. We review that methodology with each provider as part of the verification process to ensure appropriate processing steps are followed.

Data Processing Issues

The NHBMPP encountered a number of issues in processing the broadband data for the state. These include:

- Most providers submitted data only on areas that are currently served, and not on areas that could be served following the NTIA guidance. This contributed to the pattern of occasional disconnected rural road segments with broadband service.
- Reliance on the TIGER road segments likely yielded overstated broadband coverage in rural areas. A single rural customer address, when geocoded, could result in a long street segment being selected as part of a provider's coverage area.
- Most providers did not submit typical speed data. As the volume of our speed test data set grows, we will explore using this information to estimate typical speeds.
- Fixed wireless providers frequently did not deliver the full set of antenna parameters required for the signal propagation software, and required multiple requests for data followed by requests for clarification of those data submitted. While the submissions this round were more complete than in previous rounds, this remains an issue.
- Elevation data submitted by middle mile providers was typically reported relative to sea level, not relative to grade.
- Providers who are knowledgeable and experienced with the original 2009 NTIA NOFA and corresponding clarification documentation provided information appropriate to that data schema / model, and modifications to these in June 2011 resulted in additional follow-up required to achieve a complete data submission.
- As a result of reprocessing data to incorporate enhanced methodologies, there are some instances of reduced provider footprints being reported.
- For providers who submitted address records, the first process was to geocode those addresses to the 2010 TIGER road segments. For any ungeocoded addresses, the program next utilized ESRI's online geocoding services. Any remaining, ungeocoded records were geocoded manually using Bing. In some instances, records continued to remain uncoded after this three-phase approach. We have identified a number of issues with some of the resulting geocoded data:
  - In reviewing addresses geocoded against ESRI services, we discovered a small number of records that did not appear to be correctly positioned. The incorrect positioning was confirmed by viewing the geocoded points relative to both TIGER road data and by referencing Bing. In some instances, the geocoded points were positioned a significant distance away from any mapped road segment. A proximity analysis with a 500' distance constraint was used to identify the closest road in these instances.
  - Finally, some geocoded results were mapped in a town other than the town identified by the provider in their address records. In most instances the geocoded result was to a neighboring town and was within .1 miles of the recorded town. The NHBMPP retained the geocoded locations and notified the provider of these discrepancies.
- For speeds reported by providers in ranges, e.g. 4G LTE, the speed tier reported was selected to include the upper end of the range.
- Some fixed wireless providers continue to report minimum download speeds < 768 kbps, e.g. outside of the NTIA domain, but maximum download speeds within NTIA

speed tier domain values. In these instances, the NHBMPP reported the data based on the maximum speed reported.

B. Community Anchor Institutions

Data was submitted for 3,914 Community Anchor Institutions (CAIs) in the state covering the full range of categories established by NTIA, as follows:

Category	Number of CAIs	Percent of Total
1. School – K through 12	765	19.5%
2. Library	769	19.6%
3. Medical/health care	807	20.6%
4. Public safety	565	14.4%
5. University, college, other post-secondary	64	1.6%
6. Other community support – government	745	19.0%
7. Other community support – non governmental	199	5.1%
TOTAL	3,914	100.0%

In this data collection and maintenance round, the collection was largely accomplished by the nine regional planning commissions in New Hampshire, with the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC) & NHBMPP staff at the University responsible for developing guidance, for overseeing collection, and for compiling the resulting regional data sets into a standardized statewide layer. The primary steps in the process included:

- Develop a master list of CAIs by category that were not inventoried in previous rounds through review of updated statewide lists (schools, libraries, health care facilities), existing GIS data sets (largely from local hazard mitigation plans), and local knowledge;
- Develop a list of previously identified CAIs with incomplete broadband information;
- Contact those entities to collect their broadband details using an email outreach methodology, as well as phone surveys;
- Map the location of each unmapped CAI, using existing GIS data sets, reference to aerial imagery, property boundaries, web research, and field data collection where necessary;
- Verify data (see verification section below).

IV. Validation

A. Primary Data Collection

The NHBMPP utilized multiple processes to verify the broadband provider data collected during the current round. These processes, each of which is described further below, included:

- Internal verification
- Provider verification

- Ground infrastructure checks
- Use of orthophotography
- Use of parcel data
- Use of FCC filing data
- Crowdsourced data – including speed tests and surveys
- Satellite dish inventory

First, the NHBMPP continued to use local knowledge to conduct an internal analysis of the reasonableness and consistency of our mapping results. Significant overstatements or understatements of service areas resulting from internal processing issues were readily identified and addressed. The NHBMPP also verified the "reasonableness" of data by comparing current coverage footprints to those reported during the prior round. This allowed us to identify areas where service areas changed substantively, and to communicate these findings to the provider for verification.

Secondly, the Spring, 2012 feedback loop with providers was more robust than prior rounds, largely due to increased effort on the part of program staff to solicit comment and the strong relationship now established between the providers and program staff. This round's efforts engaged all providers, including those who did not submit new data but whose prior data was reprocessed according to new guidelines (described above). The NHBMPP returned maps (.pdf files) to each provider for review and correction. Where providers delivered addresses or road segments, the product returned was a geographically referenced version of the data that was submitted. For wireless providers who delivered antenna locations and specifications, the program provided maps that displayed the modeled coverage area generated from the Cellular Expert signal propagation modeling software. Some providers requested the data verification information be provided in shapefile and/or Google Earth (.kmz) format. The provider verifications yielded a number of requests for modifications, all of which are represented in the data submission.

Thirdly, the NHBMPP performed a round of ground infrastructure checks, primarily to confirm central office locations.

Orthophotography was utilized to support a number of mapping activities. Among other applications, it assisted in verifying tower locations and mapping results for the wireless signal propagation modeling, was used as an important reference layer in the verification maps delivered to providers, and contributed extensively to the mapping and verification of Community Anchor Institutions.

Community Anchor Institution mapping was supported by two other substantive data sets – parcel data and "community destination" data. The parcel data was used to map and/or verify locations. (Note that it also was used to assist in verifying the positional accuracy of address data submitted by providers.) The statewide community destinations inventory served as a starting point for compiling and mapping municipal facilities.

The NHBMPP utilized FCC Form 477 filings (through February, 2011) to support the verification of provider coverage areas. Analysis of tracts reported as being served by each provider against those developed from the provider's submission allowed for verification and validation of service areas. There were some instances where a provider's FCC report indicated a greater footprint than indicated by their data submission, and this information was relayed back to the provider during the data review period. In two cases to date, providers identified that their FCC Form 477 was incorrect and would require updating due to the NHBMPP mapping and verification efforts.

Other verification measures included:

- Speed test – The NHBMPP program has posted a customized speed test on the project web site (iwantbroadbandnh.org). To date, over 4,500 records have been submitted. We have processed those data to generate speed result summaries and the locations from which the tests were conducted. Through further analysis of the speed tests focusing on reported providers, the program will compare the service identified to the provider's reported coverage area to ensure there are not areas unreported, and/or areas where speed test results represent a significant deviation from the reported speed tier.

- Broadband survey – The NHBMPP website also hosts an online broadband survey, encouraging users to report their broadband access (or lack thereof) at the address level. The address submitted is then geocoded, which delivers a means of verifying provider coverage data at specific locations. (The survey is also linked to the speed test, so that users completing the form are asked to take the speed test as well.) To date, 405 surveys have been completed.

- Satellite dish survey – The NHBMPP has completed a drive-by inventory of satellite dishes in selected rural areas of the state, under the premise that a cluster of buildings with satellite broadband dishes signifies an area with no other broadband options available.   This information has been utilized as part of the internal data review cycle.

B. Community Anchor Institutions

The CAI data has been subjected to several rounds of verification during this and previous data submission cycles. An initial round of verification was completed in May, 2010 by re-interviewing a randomly selected subset of CAI contacts (20% of the entities within each of the 7 data categories). Subsequent verification rounds, including one conducted during July/August of 2011, were accomplished by generating a broadband profile sheet for each CAI, emailing that to each CAI contact for review, and modifying the CAI record based on any updates returned.

During the current round, we modified our verification methodology to better leverage web technologies. We created an interface for CAI contacts to review and modify their individual records via the NHBMPP website. This yielded a significant increase in the number of records that were verified and updated, as almost 33% of the records were reviewed (as compared to < 10% in prior rounds).

New Jersey Broadband Mapping Project:

Methodology Report on Data Integration and Validation Procedures
For April 2012 Submission

March 30, 2012

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Data Processing: Collection, Reception, Loading, Validation

This document describes the process used by the New Jersey Office of Information Technology (OIT) and Applied Communication Sciences to collect, receive, load, validate and verify broadband availability and usage data submitted to us by wireless and wireline service providers, CAIs, and other sources and organizations for the State of New Jersey. Individual provider data reports attached hereto provide details on the processing of each provider's submission and explain how the policies presented in this document were applied to the data. The CAI summary report, also attached, provides details on the CAI data processing. This report also describes some of the complexities and challenges we have encountered to date in this project.

1 Structure of this Report

This methodology report consists of the following

- Section 2 summarizes our outreach efforts to collect data
  - This section also describes some of the challenges in determining what service providers are in and out of scope for this work and our approach to service provider categorization, in addition to summarizing our efforts to engage CAI constituencies
- Section 3 provides an overview of our process for Service Provider Data Reception
- Section 4 provides an overview of our process for Service Provider Data Loading
- Section 5 provides an overview of our process for Data Validation
  - This section includes a table of business rules and how they were implemented.
- Section 6 describes our handling of special cases, including verification procedure, validation warnings and handling of fixed wireless providers
- Appendix A: NJ Provider Data Reports
  - This appendix concatenates 31 files, one for each provider whose data is included in the submission. Each report describes the steps involved in collecting, verifying, loading, and validating the provider data, including a log of the interactions with the provider.
- Appendix B: CAI Processing Report
  - This appendix describes the CAI processing for this submission, broken down by CAI category.

2 Data Outreach

2.1 Provider Data Outreach

Applied Communication Sciences and OIT have conducted further outreach to identify additional potential providers not previously participating. We attempted to contact every company with an FRN active in the state of New Jersey. We conducted Internet searches and used information provided by NTIA to identify wireless information service providers in the state and reached out to them. When contacting these providers, we described the potential benefits of participation and included instructions on data requirements, including how to submit via our custom-designed Web site found at http://connectingnj.state.nj.us/.

Most providers who had participated in the past were willing to participate again, although several have expressed concerns about the burdens of the data collection process. One provider – Hotwire Communications – previously declined to devote any effort to submitting data. The large national providers clearly have processes in place to collect and submit data, while the small local providers require greater assistance. Applied Communication Sciences offers assistance where possible, allowing providers to submit whatever data they have available in any convenient format. This increases the complexity of the data collection and processing operations, but enables greater coverage of providers. As examples, some smaller wireline providers simply submitted a list of addresses where they offer service and some small cable operators submitted the names of the municipalities they cover.

- In this round, we are submitting data from 31 providers. Of those, 30 had submitted data in previous rounds and 1 is a new provider (Jersey Shore Wireless).

- We contacted the 70 providers, via email, postings to their Web site and/or telephone calls, broken down as follows:
  - 35 facilities based providers who had contributed data previously;
  - 24 other providers with FRNs associated with the state of New Jersey;
  - 9 service providers reported to offer wireless data services in NJ;
  - 2 potential providers we identified through Internet searches.
- Of the 35 providers who contributed data in the previous round, we are submitting data from 30 of them this round.
  - We had 23 providers submit revised data for this round.
  - Four providers instructed us to use previously submitted data.
  - Three providers failed to respond to repeated contact attempts via email and phone, but had submitted data during the last round. We elected to submit the fall data from the following providers again:
    - Advanza
    - Network Billing Systems
    - New Edge/Earthlink
  - Two providers indicated that they would not submit data:
    - OneCommunications sent an email saying they did not believe the data they had was complete or accurate enough for submission;
    - Sidera responded to our request with an email message stating that they no longer had any customers in New Jersey and would not be submitting data.
  - Three other providers who had participated in prior rounds failed to respond to repeated contact attempts via email and phone. These providers had not submitted new data during the last round. Information obtained in our attempts to contact them and investigations into the state of the companies led us to believe that there might be substantive changes in their coverage or in their viability as companies. We thus did not submit data from these providers:
    - Broadview: Outgoing voice mail messages indicated a change in personnel, but we received no response to multiple email and voice mail messages.
    - Cavalier Telephone: Outgoing voice mail message indicated that they are involved in a merger with Windstream. We received no response to multiple email and voice mail messages.
    - Wave2Wave: Published reports indicate they are in bankruptcy proceedings. We received no response to multiple email and voice mail messages.
- We contacted 25 other providers who have FRNs associated with New Jersey. We contacted these providers via email, telephone and/or through postings on their Web sites. Of these, we had direct interactions with only two, listed below. The remaining 23 did not reply to any of our requests.
  - Reliance Global Communications: They expressed interest in the program but did not respond to subsequent inquiries and offers to help.
  - Airband Communications: Responded saying they had only a single point-to-point link in New Jersey and did not offer service to any other areas.
- We investigated nine companies identified as wireless information service providers in New Jersey.
  - Jersey Shore Wireless: They responded with pointers to image-based coverage maps that we converted to shape files and **included in this submission**.
  - Reynwood Communications: They expressed interest in the program but did not respond to subsequent inquiries and offers to help.
  - For five entities, we determined that they were out of business entirely (Web site unavailable, email returned, etc.) or they specifically indicated they were no longer in the wireless business.
  - We received no response from two other providers.
- We contacted two providers that we discovered in Web searches as offering broadband service in New Jersey:
  - Atlantech Online indicated that they do not meet the 7-10 delivery window

- CTI Networks did not respond to our requests.

2.1.1 Service Provider Classification

We have classified Service Providers into the four categories as follows:

Type 1 = Broadband
These are broadband providers that meet the NOFA definition of a facilities-based provider with a 7-10 service provision time frame.

Type 2 = Reseller
These are broadband providers who do not meet the NOFA definition of a facilities-based provider because they resell facilities that belong to another service provider.

Type 3= Other
These are broadband providers who are known not to be of Type 1 or Type 2. Typically this is either because they cannot meet the 7-10 day service provision time frame or because their service architecture is complex and is neither facilities-based nor a reseller.

Type 4 = N/A
We used this classification for providers who did not respond to our requests, because we did not have sufficient information to assign them to another class.

Since it is only Type 1 providers who are squarely in scope for this program, these are the only ones for whom we have ensured that the NDA, provider_ind and submit_ind columns in the service_provider_info spreadsheet are completed. Our rationale for this is the following -- we would not want to categorize a non-Type-1 organization as “will not provide data” or “non-responsive” under provider_ind, as this may appear pejorative.

In our ongoing efforts to reach out to the full set of broadband service providers in New Jersey, we work to identify potential providers and screen them to determine if they are providing or reselling broadband services in the state. We maintain a commented list of those organizations that we have determined not to be New Jersey broadband providers or resellers and of those organizations that remain under investigation. Some of these organizations are no longer active business concerns; some are no longer independent organizations, but have been acquired by other entities; some offer or resell broadband service in other locations but not in New Jersey; some are companies that provide engineering or consulting support around broadband, but do not provide or resell service; and some are firms for which further interaction is needed to definitely determine their situation.

2.2 CAI Data Outreach and Processing

Applied Communication Sciences and OIT used a variety of means to collect Community Anchor institution data. We collected reference data with lists of CAIs of various types in the state and we collected broadband data from individual institutions via our website and from aggregated sources. For healthcare institutions we had previously obtained a reference list of hospitals from the New Jersey Hospital Association and we augmented this with information parsed from the New Jersey Department of Health and Senior Services (NJ HSS) which maintains on-line records of all licensed health care facilities. For K-12 education we augmented our broadband records with information extracted from NJ applications to the federal e-Rate program. For the e-Rate program, we obtained public information on all New Jersey applications from the USAC website. There are five funding categories established in the e-Rate program, plus a Miscellaneous category. We selected applications that requested funding for the Internet Access category. The available information allowed us to identify these schools as having broadband access

For each CAI category, the following table provides the number of records we obtained from the reference source, the number of broadband access records we obtained, the total number of records we submitted to the NTIA and the number of complete records, with verified address information and broadband access information.

Table 1: CAI Processing Results

CAI Category	Reference Records	Broadband Records	Total Records Identified	Complete Records Created	CAI Category
School K-12 (Public)	2603	796 (Web) 478 (eRate)	2598	227	School K-12 (Public)
School K-12 (Private)	1260 (NCES)		1267	169	School K-12 (Private)
Libraries	465 (IMLS)	89	472	50	Libraries
Medical/Healthcare	1139 (NJHA + NJ HHS)	5	1139	5	Medical/Healthcare
Public Safety	343 (NJ 911 Comm.)	120	349	95	Public Safety
University	158 (NCES IPEDS)	39 (NJEdge)	160	36	University
Other – State Government		2007	1692	1692	Other – State Government
Other – Local Government	0	54	54	54	Other – Local Government
Other – Non Government	0	8	7	7	Other – Non Government

Abbreviations and Acronyms

911 Comm	New Jersey 9-1-1 Commission
IMLS	Institute of Museum and Library Services
IPEDS	Integrated Postsecondary Education Data System
NCES	National Center for Education Statistics
NJHA	New Jersey Hospital Association
NJ-DHHS	New Jersey Department of Health and Human Services

After these records were generated, we applied additional validations while loading the NTIA Transfer model. We discarded 86 records for failing these validations. In the end, we loaded 7549 records.

2.2.1 CAI Data Issues

New Jersey has a strong tradition of home rule and, like many eastern states, a plethora of small governance entities – towns, townships, boroughs, cities, and other local municipalities. Among the major challenges we face in collecting broadband CAI data in the state are the dearth of strong, state-level organizations that might compel members to provide data (as opposed to comparatively weaker coordinating bodies) and the lack of existing broadband data sources. NJEdge's data on the higher education institutions to which they provide service is one of the very few such resources in the state.

NJ OIT executives worked through state-level contacts in public safety, education and libraries, etc., to encourage their constituencies to participate and submit data through the website. While some groups were more responsive than others, many expressed concerns about placing additional burdens in a time of shrinking budgets and cutbacks.

We encountered a few issues with collection, interpretation and processing of CAI data:

- Some institutions provide information on multiple connections to the internet, each with its own technology of transmission and maximum speeds. These may represent separate redundant connections for a large institution that provides critical services or separate facilities for different classes of users (e.g., staff and clients). Our policy has been to submit a single entry for each institution, using the highest available download speed, but this policy may be a candidate for refinement.
- Satellite institutions such as branch libraries or campus outreach centers can complicate the CAI picture. Our policy is to attempt to collect data for each separate geographic location as a separate CAI.
- Sometimes multiple government offices are co-located in one geographic location; e.g., a large building or complex that may include county government offices, court, jail, and/or other government offices. Here the challenge is avoid incorrectly overstating broadband capability or understating the need for broadband services.
- It remains challenging to convince busy employees at CAIs to take the time to provide this data.
- The CAI transfer model requires a street number and for some CAIs this is not readily available as institutions may use a cross street for directions, a PO box for paper mail, etc.

NJ OIT has initiated an effort in cooperation with the New Jersey Department of Education to collect Internet access information from public K-12 schools. DOE will be conducting a survey of schools this spring to provide information they need to determine the ability of schools to meet on-line testing requirements. DOE will require schools to respond to the survey, so the response rate should be high. DOE has agreed to augment their survey with requests for the data necessary for the NTIA CAI submission. The survey is scheduled to go out to schools in May. Thus, we expect a substantial increase in complete CAI records for the fall submission.

3 Service Provider Data Reception

Applied Communication Sciences defined a process for handling provider data upon receipt. Given the need to provide explanations for NTIA validation errors, the process was modified from previous rounds in order to load the data into the transfer model as quickly as possible. This ensured that there was sufficient time to interact with providers on any discrepancies.

These steps must be performed upon receipt of provider data. These steps set up the file system and database for later processing, including both the initial assessment and load, and protect the confidentiality of the information.

1. Update the provider interaction log spreadsheet with the date of receipt and other metadata.
2. Copy the email or decrypt the uploaded files to individual directory on dedicated and secure server.
3. Test that the files can be opened, read, etc. This may require using ESRI ArcCatalog to check a shapefile or file geodatabase.
4. Send an acknowledgement to the provider of receipt of readable submission, or request re-send as needed.
5. Create empty provider data report into the new folder, using the appropriate wireless or wireline template**.**
6. Connect to the PostgreSQL database and instantiate a schema for the provider

7. Perform an evaluation on the submitted data, evaluating the completeness of the submission and the validity and reasonableness of the included values.
8. Process the data and load it into the NTIA transfer model
9. Run the NTIA validations against the submitted data to determine if there are any errors or warnings. Interact with provider to address any questions or issues.

4 Service Provider Data Loading

The provider data submissions vary in form, format and content and in the ease versus complexity of the processing and loading tasks.

In general, the most straightforward data to process are shape files submitted by wireless providers. Wireline providers who submit census block data are a step up in terms of complexity. Some cable providers simply list the municipalities which they serve. A number of smaller providers submit a list of addresses corresponding to locations where they provide service. These are much more challenging to process as we must first manipulate the address information and then geo-code the locations; these operations can be time consuming and subject to inaccuracies.

The service provider reports attached in Appendix A give the full details per provider on all steps taken to extract, transform, and load the contents of the provider tables into the NTIA tables. Note that every NTIA table has a "shape" column where a geographic feature such as a point, line (e.g., road segment) or area (e.g., census block) must be submitted.

Here is a summary of some of our key policies and challenges:

- All non-disclosure agreements executed with providers prohibit us from disclosing customer addresses. Although some providers have not executed NDAs, we have chosen to treat all providers similarly. We have chosen to obfuscate the address data by transforming it to census blocks or street segments. This carries a slight risk of overstating coverage, but that seems more appropriate than simply dropping the data because it is sensitive.
- Speeds associated with address data from some providers represent the price plan chosen by the customer; they are definitely neither the max advertised speed nor the typical speed. Our decision was to keep the maximum speeds encountered in the census block and report them in the maximum advertised fields and to report typical as null. If customers' selections in neighboring census blocks were vastly different, we would use the highest speed in a (subjectively defined) area as the maximum advertised speed.
- Maximum advertised speed, combined with the 7-10 day availability requirement, results in vagaries in interpretation. In particular, the concept of advertised speed is well suited for providers who offer services to extended areas, such as large telephone and cable television companies. Its application is less clear for providers who offer service to defined set of specific addresses. They deliver services to those specific addresses, and could offer the same service to a new tenant within the time limit. In some cases, they could increase the speed within that time period as well. They could not easily deliver service to any neighboring location with a two-week period. We have operationalized the notion of maximum advertised speed by determining the maximum speed a provider could offer on the facilities they have in place at customer locations, then reporting that speed for census blocks or street segments.
- After initial poor results in geo-coding the customer address lists provided by some cable providers who had no geo-spatial capabilities, we identified an alternate approach that leveraged the franchise-nature of cable television service in the state. We asked those cable TV providers to send us the list of municipalities that they are licensed to serve. We build the submission by locating the municipality shapes and using those shapes to find all census blocks contained within them. For large census blocks, we report all the TigerLine street segments that are contained within those blocks.
- For middle mile data, the exact definition of a connection point remains open to interpretation and requires further development. We are not completely sure that all providers interpret middle mile in the same fashion and do not have a clear enough picture ourselves to provide appropriate guidance or validation. Despite this, we have submitted the middle mile information that we received.

- All but one provider submitted 2010 Census Blocks (CBs). On satellite provider submitted data using 2000 CBs. Given that we had to convert this to a single shape, rather than map to Y2010 census blocks, this was not an issue.

5 Validation and Verification Operations

5.1 Custom Data Verification and Validation

Incoming data was subjected to a number of validation checks. When incoming data failed a validation check, we first investigated our process to ensure that we were not inadvertently creating an issue. If the problem was determined to be with the submitted data, we notified the provider concerned and recorded the interaction in the provider data report as provided in Appendix A. Where possible, we impute missing data.

We have observed a few issues that arose when processing the current submission:

- New Jersey placenames can be difficult. We validate against data from the following sources: State of New Jersey geographic information (https://njgin.state.nj.us/NJ_NJGINExplorer/DataDownloads.jsp), the Federal Government placename information (http://geonames.usgs.gov/domestic/download_data.htm), and the US Postal Service data (available for a fee).
- A survey of 3100 New Jersey households was conducted in November and December by Rutgers University as Applied Communication Sciences's subcontractor under this program. Householders who responded that they were broadband users were asked who their service provider was and this was compared against service provider serving areas. 95% of the responses aligned with service provider information. In the remaining 63 cases, the survey respondents reported being served by a provider whose coverage area did not appear to cover that location. Through these cases we have identified an area for additional investigation which may lead to improvements in service provider coverage. The technique, based on geo-spatial analysis of neighboring CBs is briefly described in Section 6.2.
- T-Mobile submitted wireless coverage data that provided one of the more interesting validation issues. T-Mobile provided separate information about three different varieties of 3GPP-based wireless technology, each of which supports broadband data services through mobile terrestrial wireless service capability; namely: UMTS, HSPA21 (i.e., HSPA) and HSPA42 (i.e., HSPA+)[1]. In order to avoid duplicates – that is, rows of T-Mobile data with identical shapes and the same technology and spectrum codes, differing only in maximum speed, we performed spatial joins separately for each of UMTS, HSPA21 and HSPA42. We then submitted one shape for each technology.
- The End_User_Category for Census Blocks or Road Segments is an optional field for designating the geography as being primarily Residential, Non-Residential, or Other (primarily neither Residential nor Non-Residential). We have elected not to complete this field as we do not have a trusted data source for this information.

We applied the business rules in the script supplied by the NTIA and other data-specific validations after the data were loaded into the tables. These were applied as a check on both the data supplied by the providers and on the process we used for data collections, reception and loading.

The following business rules were applied above and beyond those in the NTIA script:

We checked uniqueness of the entries in each table, using the definitions shown in Table 2.

[1] Here are a few more technical details. UMTS is based upon 3GPP release 99 and is the oldest and slowest of the three varieties. HSPA (HSPA21) is 3GPP R6 which supports HSDPA and HSDPU for downlink and uplink high-speed packet access and offers intermediate speeds. HSPA+ (HSPA42) is 3GPP R7. It is the most advanced of the three and supports high-speed packet access evolution with peak data rate increases from MIMO and higher-order modulation, among other technical advances.

Table 2: Uniqueness Definitions used in Duplicate Removal Process

Layer	Unique key	Notes
Middle Mile	frn, latitude, longitude	
CAI	anchorname, address, transtech	
Census Block	frn, fullfipsid, transtech	
Street Segment	frn, tlid, transtech	tlid is an internal column.
Wireless	frn,transtech, spectrum, shape	

We also performed the additional validations described in Table 3.

Table 3: Customized Data Validations

Layer	Validation Rules
Middle Mile	• Check (dbaname, provname, frn) against our FRN reference table • Valid census block id within the state of New Jersey • Check latitude not between 38.7 and 41.4 • Check longitude not between -75.6 and -73.8 • Shape should not be empty • All check_submission rules
CAI	• Valid zip code • Check latitude not between 38.7 and 41.4 • Check longitude not between -75.6 and -73.8 • Shape should not be empty • All check_submission rules
Census Block	• Check (dbaname, provname, frn) against our FRN reference table • Valid census block id within the state of New Jersey • The area of a census block should be less than < 2 square Mile • Shape should not be empty • All check_submission rule
Street Segment	• Check (dbaname, provname, frn) against our FRN reference table • Street segment is present in a census block >= 2 square miles • Shape should not be empty • All check_submission rule
Wireless	• Check (dbaname, provname, frn) against our FRN reference table • Shape should not be empty • All check_submission_rule

5.2 Verification through Gap Analysis of Neighboring Census Blocks

The analysis of the survey data identified some instances where a survey respondent specified their service provider and then the service provider's data did not show coverage in that respondent's Census Block. Further analysis indicated that a number of these instances occurred in 'gaps' or 'holes' in submitted provider coverage data. One way to define a simple hole is that it is a single CB that is not in the stated provider coverage area when all neighboring CBs are in the stated coverage area. Our investigations of these simple holes showed that some are associated with zero-population census blocks – e.g., a census block that comprises a strip of land neighboring a major roadway. Other simple holes, however, appear to be anomalies in service provider data as we find examples of a residential census block, surrounded by other residential census blocks, and no clear rationale to explain why the initial (middle) census block would not have coverage when all neighboring census blocks do have coverage.

The figure below illustrates a few simple holes in Comcast data from Cranbury Township.

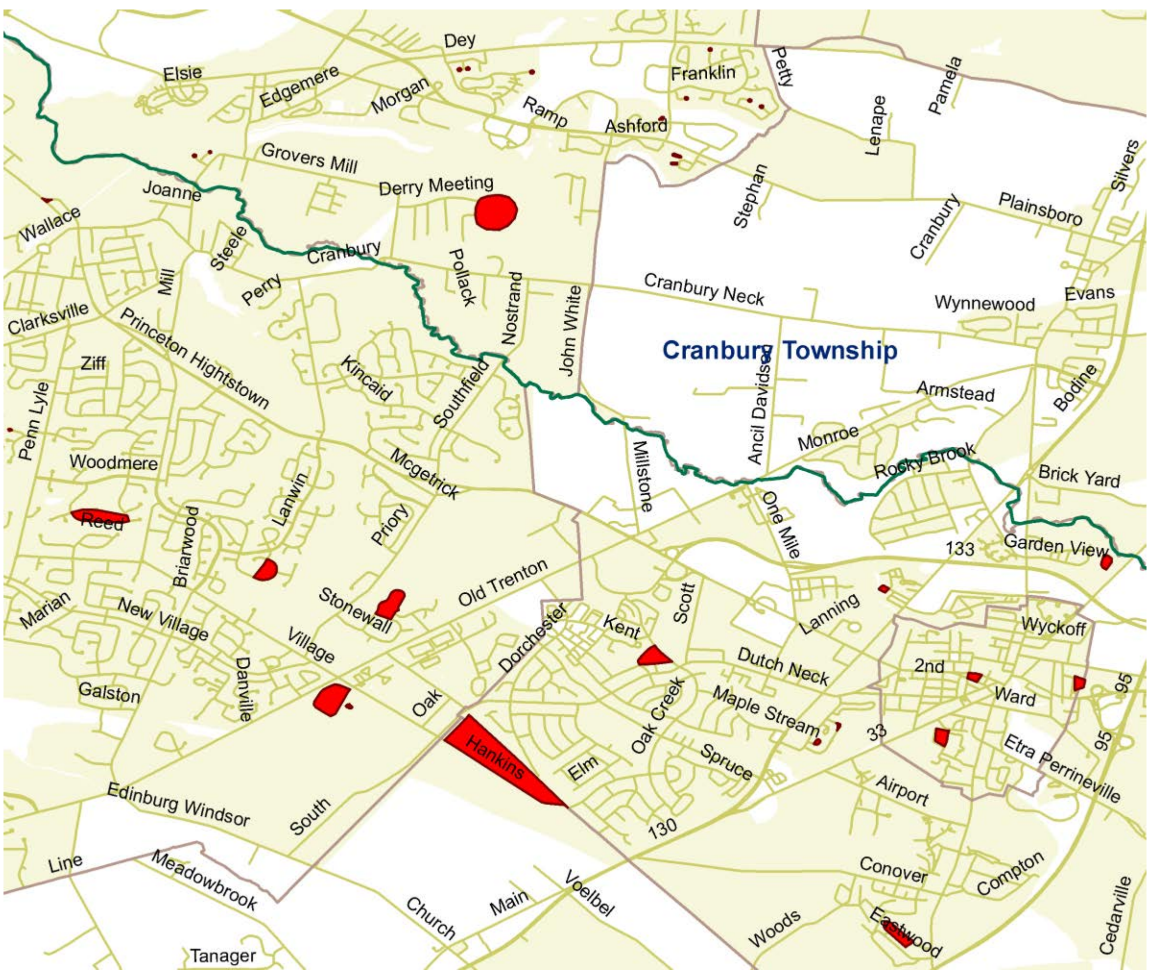


Figure 1: Detailed view of "Doughnut Holes" in coverage

Our analysis of the simple holes shows that some are anomalies that may provide a way to improve the accuracy of provider data. To pursue such possible improvements, we developed software that automates the identification of simple holes. Somewhat to our surprise, when we ran this software on the data for this submission, we found rather sizeable numbers of holes for some of the providers. For example, we identified almost 250 simple holes for Cablevision (including Lightpath) and over 1400 for Comcast.

For the providers where we identified such holes in the data they submitted for the Fall 2011 round, we generated a complete listing of the holes and a document containing a description of the process of identifying the holes and a detailed analysis of a few sample holes that appear in the provider's coverage. This information was sent to the providers along with the request for revised data for this round. The table below lists the providers where we identified holes and counts of the holes that we discovered.

Table 4: Counts of Isolated Census Blocks not Reported as Covered

Provider	Holes Identified in Oct 2011 Data	Holes Identified in Apr 2012 Data
Advanza	3	3
Broadview	79	N/A
Cablevision	199	286
Cablevision - Lightpath	50	65
Cavalier	2	N/A
CenturyLink	90	82
Comcast	1439	1823
Dieca/Covad	14	12
Hometown Online	28	28
Monmouth Telecom	67	54
OneCommunications	20	N/A

To ensure that the doughnut holes identified in this manner were, at least in some cases, truly a mis-representation of the providers' coverage, we selected a sample of the doughnut holes census blocks for each provider and identified an address within that census block using a spatial join with the available parcel maps for in the state. For providers who offered on-line service availability search functionality, we then searched for those addresses.[2] In each case, we were able to find addresses in doughnut hole census blocks where the providers were reporting coverage through their Web sites.[3] We noted that this was not universally true, however, so a process of automatically extending coverage to the doughnut holes would overstate coverage. For the providers where we could confirm coverage within identified doughnut holes, we sent the detailed information describing the process and the results. We are considering constructing an automated inquiry tool that would allow us to check availability of all the identified doughnut holes. We will work with the other providers in the coming months, hoping to address these issues before the next round.

We have begun applying the process to the recently submitted data, as shown in the right hand column of Table 4. An initial comparison shows that in many cases the number of holes have increased, rather than decreased. We

[2] The providers with doughnut holes who had these capabilities were: Cablevision, CenturyLink and Comcast.

[3] As a control, we also searched using addresses known to be outside the provider's coverage to verify the operation of the availability search capability.

are still investigating the issue, but our initial analysis found multiple cases where providers added census blocks to their coverage area, subsequently converting an area that had multiple uncovered blocks into a single-block that we consider as a hole. This effect is illustrated in Figure 2.

(A) October 2011 Submission

(B) April 2012 Submission

Figure 2: Increase in number of doughnut holes because of increasing coverage. (A) Portion of coverage map from Oct 2011 submission. (B) Same portion of coverage map from April 2012 submission. Note that darker green census block in middle of picture was added to coverage, leaving yellow census block below that as a single-block hole.

We do note that in the course developing the tools for this analysis, we observed that Verizon made changes in their process for generating data for submission, because while such holes had been present in the data they submitted previously, their current data has no such holes.

5.3 Processing of Fixed Wireless Coverage

NTIA had questioned us about the coverage areas associated with two providers who offer fixed-wireless service in New Jersey. In one case, the provider, Global Online Electronic Services, uses fixed wireless links as a substitute for wired connections and serves a single location with each link. We therefore generated a "coverage area" by using the census block that contains the address. This is clearly not the result of propagation model analysis, but due to the nature of the service they provide accurately reflects their capabilities, while protecting the provider's proprietary data about the customers they serve.

We used the same approach in our fall submission with the second provider, Wave2Wave. The approach was less applicable here, because they do cover a broader area with a fixed wireless infrastructure. We were hoping to assist Wave2Wave in generating a coverage area using a propagation model, but they did not submit data due to their bankruptcy proceedings.

We also receive information from a new fixed wireless provider, Jersey Shore Wireless. They provided us with image files (e.g., jpegs) with coverage maps that had been hand-drawn based on drive testing they had conducted in 2008. Given the method used to collect the information, the shapes tend to align with major roadways. Jersey Shore Wireless did not have the resources available for propagation modeling and we did not have sufficient time to assist them in performing this task. For this round, we manually converted their images into shape files. It was clear that these shapes would understate, rather than overstate coverage, and thus it seemed reasonable to include them.

5.4 Process Assessment

We instituted a thorough review of our processing rules for each provider. The review involved investigation of each process step by a person other than the individual who had created the process or executed it in the past. As a result of this review, we were able to correct several errors and omissions, and implement multiple process improvements. The corrections and improvements include:

- For CenturyLink, altered Census Block process to allow provider's speed values, with validation-related adjustments, rather than setting all values the same.
- For Hometown Online, adjusted Census Block process to account for the fact that provider reported different transtech and speed values in one census tract.
- For Service Electric – Sparta, set middle mile capacity and type values, which had inadvertently been left null in the previous submission. Adjusted technology and speed values to reflect DOCSIS 3.0.
- For WildBlue, corrected spectrum value to reflect that they offer satellite service.
- For Verizon, corrected the ownership value of the middle mile locations, which had been inadvertently left as null in previous rounds
- For Xchange Telecom, set provider type to "reseller", based on interaction with provider that indicated that they lease facilities from Verizon.
- Corrected error in processing rules for CAI that was omitting broadband technology and speed information for NJ state offices
- Revised CAI processing rules to insert "NA" for building number when no value was available.
- Made multiple improvements to CAI address processing to enhance the automated address extraction and mapping to reference data.

5.5 Validation Warnings

We received warning messages from the NTIA data validation tool when processing submission data from several providers. The details of these warnings and our response to them are included in the individual provider reports later in this document. Here we provide a summary of those warnings that are still present in the submitted data.

5.5.1 Provider Warnings

The following table describes the warnings we received from the validation script and provides our explanations for submitting these values.

Table 5: Warning Messages Produced by NTIA Validation Tool and Explanations

Century Link	We received warnings on 7096 census blocks and 1404 street segments for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). The provider had originally reported speeds exceeding 25 Mbps, or a speed code of 8. When we questioned these, the provider could not confirm those values, but asserted that all areas were covered with speeds exceeding 10 Mbps.
Covad	We received warnings on 15576 census blocks for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). Note that the provider confirmed that they support 15 Mbps with their ADSL2+ service in limited regions in the state.
Hometown Online	We received warnings on 393 census blocks for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). We searched the provider's Web site for speed information. We only found one reference to speed packages, and these values and the Web page seemed out of date. We sent a request for clarification to the provider. The provider acknowledged the validation requirements, indicated that the Web page found by our search was in error and confirmed the submitted speed values. The president of the company also indicated that they would be launching a new Web site with corrected speed information in the near future.
Xchange Telecom	We received warnings on 1012 census blocks for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). Note that the provider confirmed, and we validated via their Web site that they advertise, 10 Mbps, which is just at the bottom of the range for code 7.
Service Electric Broadband Cable	We received warnings on 5265 census blocks and 985 street segments for the combination of a downstream speed code of 8 (25-50 Mbps) with a transtech code of 40 (DOCSIS 3.1). The provider was not willing to commit that they offered anything faster. A search of their Web site confirmed that the fastest speed they advertise is 35 Mbps down and 3 Mbps up.
GOES	We received warnings on the wireless shape record for the combination of upstream and downstream speed codes of 7 (10-25 Mbps) with a transtech code of 70 (Fixed Wireless - Unlicensed). The provider has only a single fixed wireless site, and it is used for point-to-point links, rather than to provide a coverage area. The provider confirmed that the speed is 10 Mbps.
T-Mobile	We received a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless). Investigation of the T-Mobile Web site showed that they are advertising average speeds "approaching 10 Mbps" and peak speeds of 27 Mbps. Sent a note to the provider to verify the value. Provider confirmed that those values are correct.
Verizon	We received a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless). The maximum advertised speeds provided in the cover letter that came with the provider's submission are 600 - 9.99 mbps down and 3.00 - 5.99 mbps up. The typical speeds are provided as ranges: 5 - 12 Mbps down and 2 - 5 Mbps up. For max adv speeds we had

	originally encoded the submitted down speed as value 6 (range 6-10Mbps) and encoded the submitted up speed as value 5 (range 3-6mbps). Based on the email from Anne Neville data 2/21/2012, we modified the downstream speed to code 7.

5.5.2 CAI Warnings

We received 5464 warnings for our CAI data for records with a technology code of 0. These warnings are a result of our decision to include all the CAI locations that we were able to identify, even those for whom we have not yet been able to determine the broadband access. This full list provides us with a target for our outreach efforts to these institutions. The set of "complete records", which include full broadband access information, is a key metric we are using to track progress in obtaining information about the broadband access. The counts of these records by category are included in the table above and in the CAI data processing section in Appendix B.

6 Appendix A: Individual Provider Process Descriptions

6.1 Advanza

Connecting New Jersey - Broadband Provider Data Report

Provider: Advanza

Received: August 2011

Submission date: April 2012

This report presents details on processing of broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Advanza states that NONE is required.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA – RECEIVED AUGUST, 2010</th></tr>
<tr><td rowspan="5">ID</td><td>Provider name</td><td>Advanza Telecom Inc</td></tr>
<tr><td>“Doing business as” name</td><td>Advanza</td></tr>
<tr><td>FRN</td><td>0017029141</td></tr>
<tr><td>Holding Company Name</td><td>Advanza Telecom, Inc.</td></tr>
<tr><td>Holding Company Number</td><td>180002</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">1 xlsx spreadsheet</td></tr>
<tr><td>File size</td><td colspan="2">NJBB_0017029141_AddressLevelAvailability-20110630.xls file has 47 records</td></tr>
<tr><td>Speeds</td><td>(see table below)</td><td>All provided speeds have code 4 (1.5 mbps ≤ BW < 3.0 mbps) for all records, which would make sense if all service is T1</td></tr>
</table>

Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)
Typical-upstream	X	address
Typical-downstream	X	address
Advertised-upstream	X	address
Advertised-	X	address

	downstream			
	Subscriber-weighted-up	☐	Not provided	
	Subscriber-weighted-down	☐	Not provided	
Technology Type	Code 30 (= Other Copper Wireline) given for all records			
End-user specification	Values 2, 3 or 4 (Government, Small Business or Enterprises).			
Comments: Data was submitted for Fall 2011 submission. Provider did not respond to requests for revised data. Confirmed via Web site that they offer these services (T1 and NxT1). Web site lists possibility of higher speeds as well. Based on this information, it was determined that the data is likely still accurate and decision was made to re-use prior data.				
INTERCONNECTION DATA – NO DATA PROVIDED				
ID				
File size				
Ownership				
Transport Type				
Data Rates/Capacity				
Location				
Comments:				

Section 3: Submission File Details

Received one file by secure upload to the connectingnj web site.

Size **Name**

71,168 NJBB_0017029141_AddressLevelAvailability-20110630.xls

The addresses in this file appear to be for individual customers (as opposed to addresses of multi-tenant buildings in a central business district).

Section 4: Data Validation, Transformation and Loading

The standard NDA prohibits us from submitting address-level data to the NTIA. Instead, we discover the census block for each customer address, and then report the census block shape drawn from Census Bureau TigerLine reference data.

NTIA Table BB_Service_CensusBlock

Loaded from the file mentioned above. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to " Advanza Telecom Inc" (no trailing period)
DBANAME	Not supplied; set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to "0017029141"
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column Tehcnology of Transmission (sic)
MAXADDOWN	As supplied in column Maximum Advertised Downstream Speed
MAXADUP	As supplied in column Maximum Advertised Upstream Speed
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null (see below)
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes.

1. Following steps were performed for Fall 2011 submission
    a. Geocoded the addresses using an Arroyo flow and the Yahoo geocoder, leaving the result with address and lat, long data in an Excel spreadsheet. All addresses were successfully geo-coded.
    b. Imported the spreadsheet to a simple ESRI geodatabase table
    c. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option

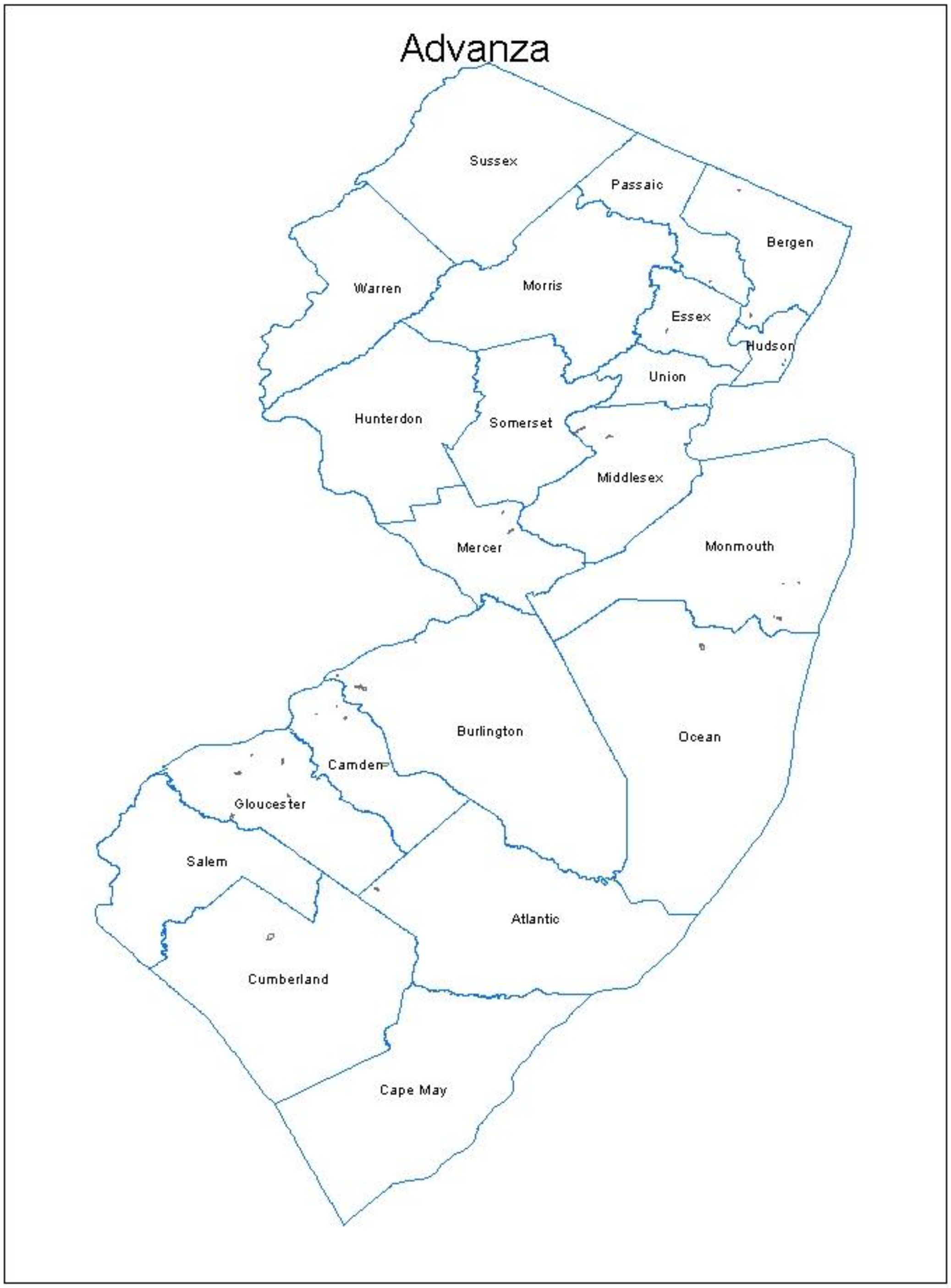
d. Added a column containing the ID of the containing year 2010 census block using ArcCatalog's spatial join feature. The newly created point shapes are joined against census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
e. Discarded typical speeds since they were in all cases identical to maximum advertised speeds, not measured values.
f. The end user category value as originally supplied applied to an address, but we must anonymize the addresses and report census blocks. The NTIA directs us to report the “predominant” end-user category, which is not supplied here.
g. Copied contents to the target data model table with the transformations specified above. Discarded 15 rows with duplicate census blocks.

2. Copied prior data into new BB_Service_CensusBlock table.
3. All data passed NTIA validations.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.2 AT&T Mobility

Connecting New Jersey - Broadband Provider Data Report

Provider: AT&T Mobility LLC

Received: February 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA was executed with NJ OIT.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name "Doing business as" name FRN	AT&T Mobility LLC AT&T Mobility LLC 0004979233 for mobility NB: "AT&T Corporation, Inc." with FRN 0004979244 for middle mile
FOR WIRELESS		
Filetypes	shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.	Spreadsheet (XLSX) and shapefile that uses projection GCS_WGS_1984

Speeds

Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)	
Upstream max adv	State	
Downstream max adv	State	
Upstream typical	Not provided	
Downstream typical	Not provided	
Subscriber-	Not provided	

	weighted	
Technology Type	Spectrum (Mhz, FCC code)	Cellular (code 1) and PCS (code 3)
Comments:		

INTERCONNECTION DATA	
ID	
File size	Single row
Ownership	Code 0
Transport Type	Code 1
Data Rates/Capacity	Code 6
Location	Newark, NJ
Comments: Single location provided	

Data overview:

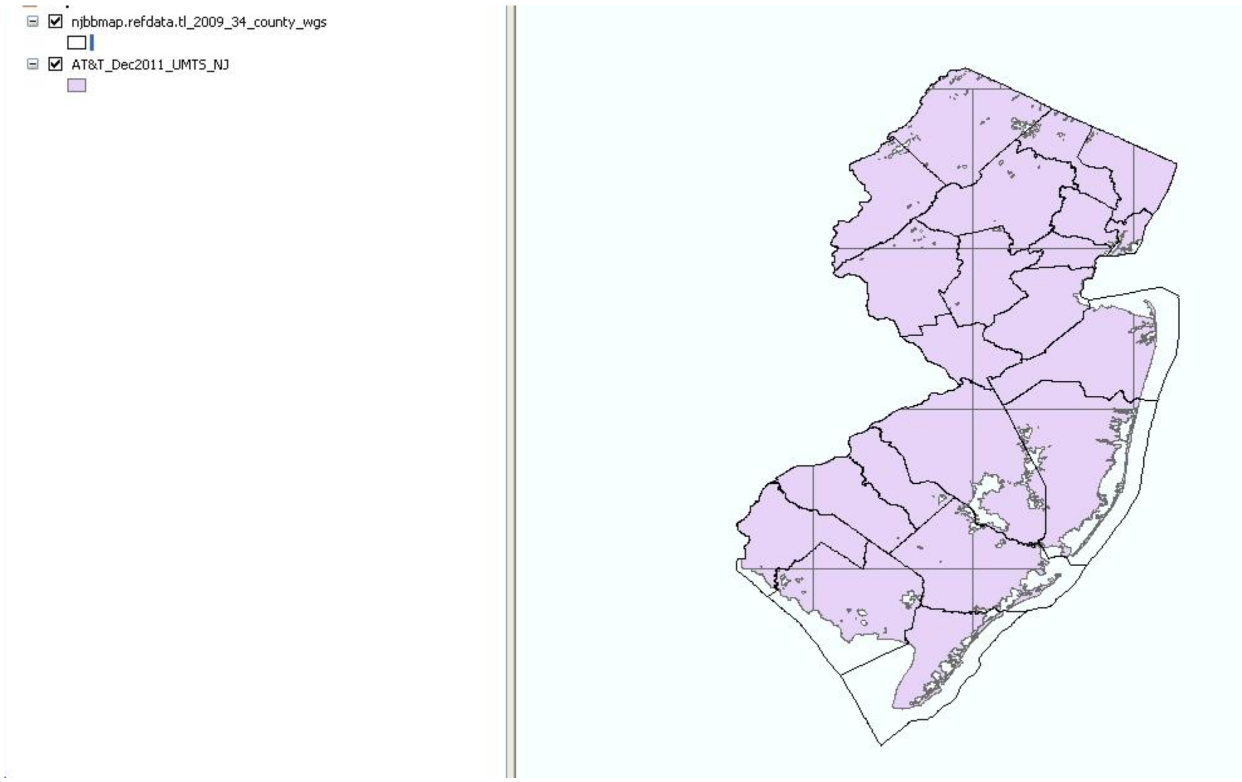


Figure. Quick load of data into ArcMap

Section 3: Submission File Details

Received six (6) files by SECURE UPLOAD:

Name	**Size**
AT&T_Dec2011_UMTS_NJ.DBF	2 KB
AT&T_Dec2011_UMTS_NJ.PRJ	1 KB
AT&T_Dec2011_UMTS_NJ.shp	434 KB
AT&T_Dec2011_UMTS_NJ.SHX	1 KB
ATT Router Locations NJ Dec 2011.xlsx	8 KB
Mobility Response NJ Dec 2011.xlsx	9 KB

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from supplied Excel Spreadsheet "ATT Router Locations NJ Dec 2011.xlsx" (1 row). Data is identical to that included in previous submission. The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied
DBANAME	As supplied
FRN	Added leading zeroes to read 0004496774 (see below)
OWNERSHIP	As provided in column "Ownership"
BHCAPACITY	As provided in column "Serving Facility Capacity"
BHTYPE	As provided in column "Serving Facility Type"
LATITUDE	As provided in column "Latitude_geo"
LONGITUDE	As provided in column "Longitude_geo"
ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

1. Used the provider name, DBA name, and FRN as supplied, after adding back leading zeros to the FRN. Note that the middle-mile entity is different than the mobility entity and per clarification from AT&T during the October 2010 submission round, should indeed be reported differently.
2. Imported the excel sheet to a geo-database table.
3. Added point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
4. Mapped to separate shape file to correct tolerance.
5. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_Wireless

Loaded from the supplied shapefile "AT&T_Dec2011_UMTS_NJ". The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "AT&T Mobility LLC"
DBANAME	As supplied in file Mobility Response NJ June 2011.xlsx
FRN	Set to 0004979233
TRANSTECH	As supplied in file Mobility Response NJ June 2010.xlsx
SPECTRUM	Set to "3" per translation shown below
MAXADDOWN	Set to "4", see below.
MAXADUP	Set to "3", see below.
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to "NJ"
SHAPE	As supplied.

Internal notes on processing:

1. File "Mobility Response NJ Dec 2011.xlsx" (same as the previous submission) contains a single row with provider name, DBA name, FRN, technology of transmission, a specification of the spectrum bands used, and the maximum advertised up/down speeds. The FRN is missing the leading zeros. The TechTrans code is valid. The max speed values are plausible.
2. Shapefile "AT&T_Dec2011_UMTS_NJ" (DBF, PRJ, SHP, and SHX file extensions) contains 24 rows representing a multiple polygons. No text attributes are associated with the row. The coverage area is most of the State of New Jersey, broken into separate shapes by various horizontal and vertical lines. The map strongly resembles the map shown at www.wireless.att.com.
3. The supplied shape uses geographic coordinate system name GCS_WGS_1984 The NTIA data model requires the same coordinate system. No geographic transformation was required, but the XY Tolerance value differs from the required value. Imported shape then mapped to separate shape with proper tolerance which resulted in a new feature class with the suffix "_tol".
4. Coalesced the single-part polygons into one multi-part polygon using the ArcGIS "Dissolve" tool, which resulted in a new feature class with the suffix "_dissolved".
5. Spectrum: AT&T Mobility provided multiple columns of data about their spectrum use. Searching on the web suggests that AT&T 3G uses frequencies 850MHz and 1900Mhz. The NTIA data model has a single column for spectrum. No mapping is provided for frequency 850MHz. Frequency 1900MHz corresponds to NTIA "SPECTRUM USED" code value 3.
6. Speeds: The maximum advertised speeds provided in the spreadsheet are 1.7 Mbps down and 1.2 Mbps up. For max adv speeds we encoded the submitted down speed as value 4 (range 1.5-3 Mbps) and encoded the submitted up speed as value 3 (range 768 Kbps – 1.5 Mbps).

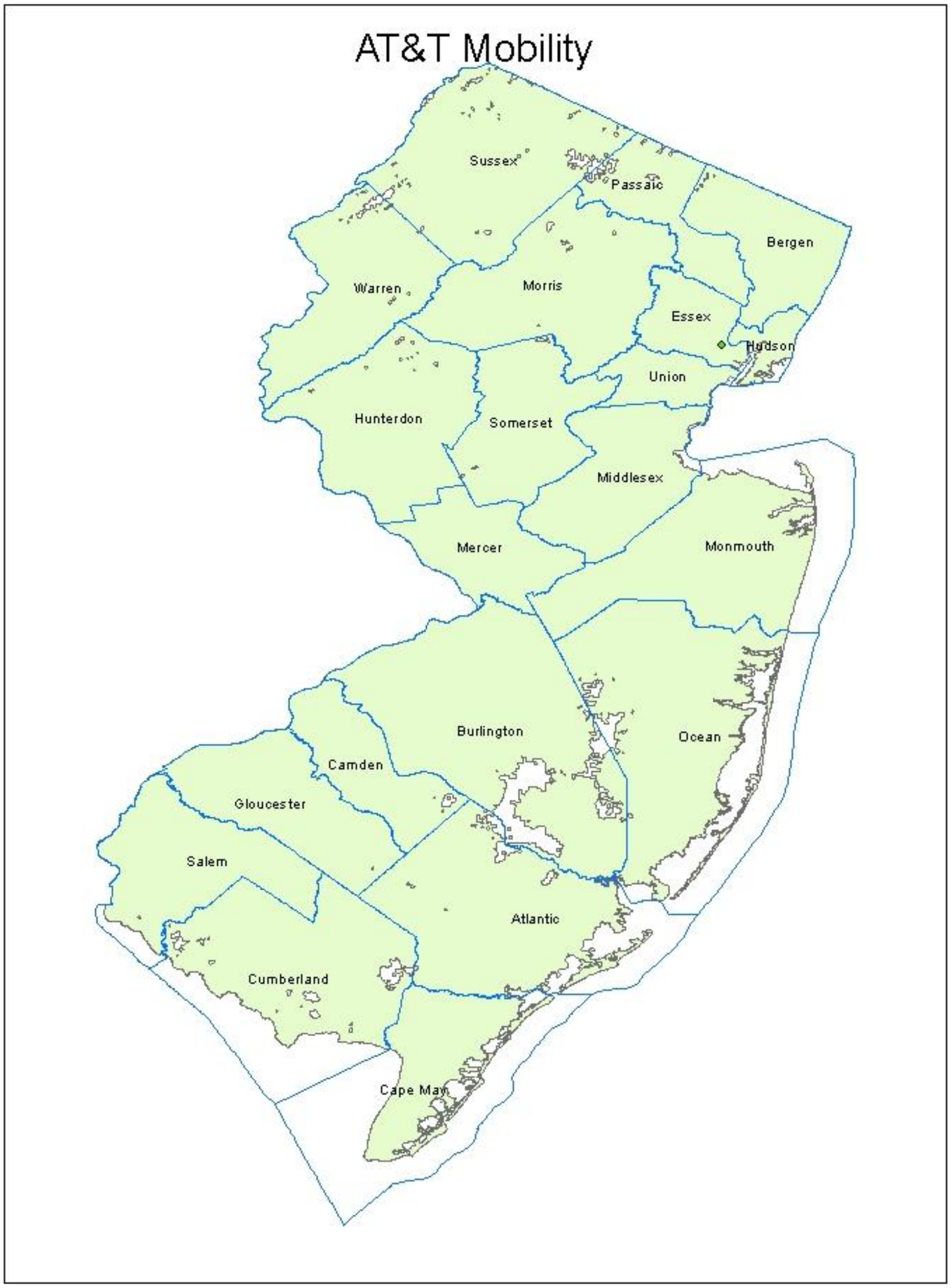
7. The only data imputed was the state abbreviation.

Section 5: Clarification Questions and Responses

None

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.3 CenturyLink

Connecting New Jersey - Broadband Provider Data Report

Provider: CenturyTel DBA Century Link

Received: March 2012

Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Century Link executed an NDA with NJ OIT; the data files refer to the NDA.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name "Doing business as" name FRN	CenturyLink, Inc. (per email) Century Link 0018626853
FOR WIRELINE		
Filetypes	Shapefiles "CTL_NJ_2011_12_polyline" and "CTL_NJ_2011_12_region"	
File size		
Speeds	(see table below)	

Speeds

Type		Spatial Resolution: county
Typical-upstream		Census block and street segment
Typical-downstream		Census block and street segment
Advertised-upstream		Census block
Advertised-downstream		Census block
Subscriber-weighted-up		Not provided
Subscriber-weighted-down		

Technology Type	10 (ADSL)
End-user specification	Not provided
Comments:	
INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: Middle-mile data was not provided this submission.	

Figure1. Quick load test results

Section 3: Submission File Details

Name	Size
CTL_NJ_030512.ZIP	7,769 KB
CTL_NJ_2011_12_polyline.dbf	976 KB
CTL_NJ_2011_12_polyline.prj	1 KB
CTL_NJ_2011_12_polyline.shp	557 KB
CTL_NJ_2011_12_polyline.shx	23 KB
CTL_NJ_2011_12_region.dbf	2,475 KB
CTL_NJ_2011_12_region.prj	1 KB
CTL_NJ_2011_12_region.shp	11,403 KB
CTL_NJ_2011_12_region.shx	58 KB

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "CenturyLink, Inc." per email
DBANAME	As supplied in DbaName
FRN	As supplied in FRN
OWNERSHIP	As supplied in Own
BHCAPACITY	As supplied in BHCap
BHTYPE	As supplied in BHType
LATITUDE	As supplied in Lat
LONGITUDE	As supplied in Long
ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference

	data
SHAPE	Point shape created using ESRI ArcDesktop

Internal notes on processing:

1. Loaded 1 row of data from Excel Spreadsheet “middlemile_NJ.txt” (1 row) that was supplied for the April 2011 submission. Data in that table had previously been spatially joined to find containing census block.

NTIA Table BB_Service_CensusBlock

Loaded from supplied shapefile feature “CTL_NJ_2011_12_region”. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “CenturyLink, Inc.” per email
DBANAME	As supplied in column “dba_name”
PROVIDER_TYPE	Set to 1
FRN	Set to "0018626853"
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from census_blo (digits 3-5)
TRACT	Populated from census_blo (digits 6-11)
BLOCKID	Populated from census_blo (digits 12-15)
BLOCKSUBGROUP	Set to null
FULLFIPSID	As supplied in column census_blo
TRANSTECH	As supplied in column technology
MAXADDOWN	Set to 7 for all records
MAXADUP	Set to 4 for all records
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	As supplied

Internal notes on processing

1. The supplied feature class uses XY coordinate system name GCS_WGS_1984.
2. We had to create a new feature class and reload the data so that the tolerance value matches the NTIA transfer model’s tolerance value exactly, resulting in a feature class with a suffix of “_tol”.

3. Shapefile (feature class) CTL_NJ_2011_12 _region provides coverage data for census blocks with an area less than or equal to 2 square miles. It contains 7,385 records. All of the IDs shown in the shapefile correspond to valid Year 2010 Census Block IDs and all are smaller than 2 square miles.
4. The feature class "region" has 289 rows with duplicate census block IDs and identical technology codes (confusingly the speeds are different for the some of these duplicates). We discarded these to avoid creating duplicate shapes in the table.
5. The feature class has 11 rows with technology 10 and downstream speed code 8. This combination produced a validation warning. The provider could not confirm that these values were correct, but asserted that all areas were covered with speed tiers 7 down and 4 up. We changed the speed tiers on these values to 7/4.
6. We loaded 7096 records into the bb table.

NTIA Table BB_Service_RoadSegment

Loaded from supplied shapefile feature “CTL_NJ_2011_12_polyline”. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “CenturyLink, Inc.” per email
DBANAME	As supplied in column “dba_name”
PROVIDER_TYPE	Set to 1
FRN	Set to "0018626853"
ADDMIN	Set to the least of the non-empty address numbers
ADDMAX	Set to the greatest of the non-empty address numbers
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to “NJ”
ZIP5	Set to null (no value supplied)
ZIP4	Set to null (no value supplied)
TRANSTECH	As supplied
MAXADDOWN	Set to 7
MAXADUP	Set to 4

TYPICDOWN	Set to null
TYPICUP	Set to null
TLID	Set to Null – not supplied
SHAPE	As supplied

Internal notes on processing:

1. Shapefile (feature class) CTL_NJ_2011_12 _polyline shows street segments for census blocks larger than 2 square miles. In contained 2910 records.
2. The supplied feature class uses XY coordinate system name GCS_WGS_1984.
3. We had to create a new feature class and reload the data so that the tolerance value matches the NTIA transfer model's tolerance value exactly, resulting in a feature class with a suffix of "_tol".
4. We discarded 868 records with no street name (field empty), leaving 2042 full records. These entries typically had no min/max address information as well.
5. We checked for uniqueness using the county number, street name, min and max address and the string portion of the shape object. Including the string description of the shape object had the effect of including the number of points in the shape as part of the uniqueness test. We discarded 638 records as duplicates using this method. There is a chance that this discarded some non-duplicates, but our manual inspection of the data made it appear valid.
6. Based on provider instructions that they have 10 Mbps coverage in all their NJ exchanges, we set all down/up advertised speeds to 7/4.
7. We loaded 1404 rows.

Section 5: Questions

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 09, 2012 6:42 AM
To: Flurer, Gerry F
Cc: NJ Broadband Data Collection
Subject: NJBB Data Clarification - CenturyLink

Gerry,

We have reviewed the data you submitted and have a few questions:

1. The NTIA wants us to verify cases where speeds over 10 Mbps are reported for DSL. You reported instances of download speeds in the 10-25 Mbps and 25-50 Mbps for your DSL service. Are these correct values?
2. In previous rounds, you had submitted a single middle mile point. Do you have updated information, or should we use that same data for this round?
3. In prior submissions, your street-segment data included the TigerLine ID of each segment. Is it possible for you to include that information this round?

We appreciate your participation in the program.

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Flurer, Gerry F [mailto:Gerald.F.Flurer@CenturyLink.com]
Sent: Friday, March 09, 2012 10:59 AM
To: NJ Broadband Data Collection
Cc: Bonsick, David
Subject: RE: NJBB Data Clarification - CenturyLink

John: See response inserted, below.

Gerry Flurer

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 09, 2012 6:42 AM
To: Flurer, Gerry F
Cc: NJ Broadband Data Collection
Subject: NJBB Data Clarification - CenturyLink

Gerry,

We have reviewed the data you submitted and have a few questions:

1. The NTIA wants us to verify cases where speeds over 10 Mbps are reported for DSL. You reported instances of download speeds in the 10-25 Mbps and 25-50 Mbps for your DSL service. Are these correct values?

[G. Flurer] Yes. CTL uses ADSL2 and VDSL2 in certain areas to achieve those speeds.

2. In previous rounds, you had submitted a single middle mile point. Do you have updated information, or should we use that same data for this round?

[G. Flurer] No updates for that data.

3. In prior submissions, your street-segment data included the TigerLine ID of each segment. Is it possible for you to include that information this round?

[G. Flurer] In several other states we found Tiger ID data from Pitney Bowes to be invalid. For this round we adopted the use of the TIGER street data. I'm looking at possibly including the TIGER ID in future submissions.

We appreciate your participation in the program.

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 09, 2012 10:08 AM
To: Flurer, Gerry F
Cc: NJ Broadband Data Collection
Subject: RE: NJBB Data Clarification - CenturyLink

Gerry,

Thanks for the quick response. Can you give us any sense of where you have the ADSL2/VDSL2 operational? The NTIA would prefer not to overstate capabilities.

Thanks,

John

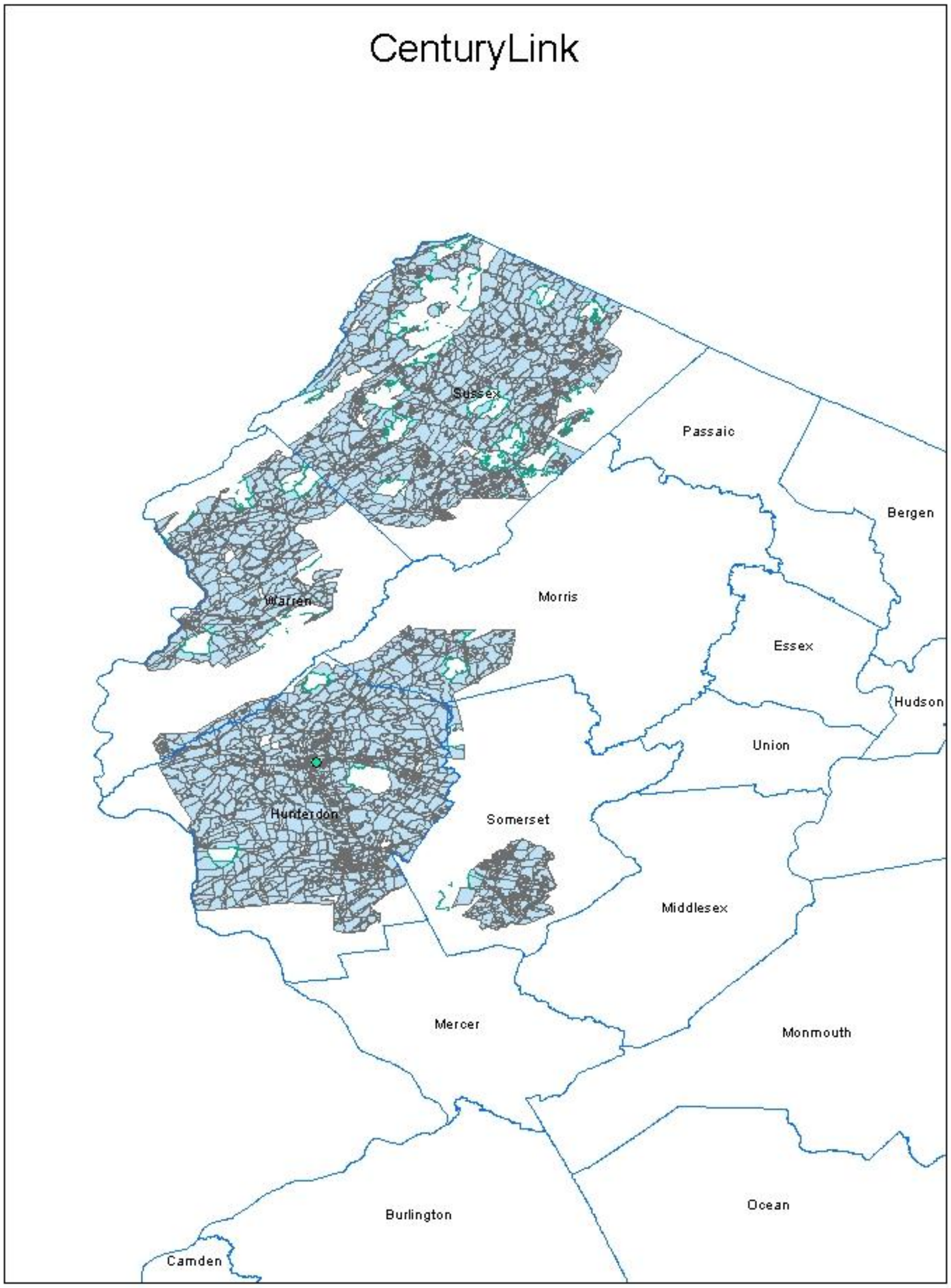
From: Flurer, Gerry F [mailto:Gerald.F.Flurer@CenturyLink.com]
Sent: Friday, March 09, 2012 11:58 AM
To: NJ Broadband Data Collection
Subject: RE: NJBB Data Clarification - CenturyLink

John: We have 10 mbps service available in all our NJ exchanges. The few spots we have listed as Speed Tier 8 look pretty remote to me. I'll have to check into them more specifically. For now, though, can we consider them as a lower speed tier for this round? Let's make them tier 7 and I'll look into them for the next round.

Gerry Flurer

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.4 Clearwire

Connecting New Jersey - Broadband Provider Data Report

Provider: Clearwire

Received: January 2012

Submission date: April 2012

This report presents details on processing of broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Unknown

Section 2: Submission Overview

AVAILABILITY DATA			
ID	PROVIDER NAME	Clearwire Corporation	
	DBA NAME	Clearwire Corporation	
	FRN	0017775628	
	Holding company name:		
	Holding company number:		
FOR WIRELESS			
Filetypes	shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.		The shape file contains 521 polygon shapes, as well as an attribute, ID_UNIQUE (6 digit number)
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)	**This data was not included with submitted shape file, but advertised speed, technology and spectrum data from prior rounds was verified with provider.**
	Upstream max adv	no.	
	Downstream max adv	no.	
	Upstream typical	no.	
	Downstream typical	no.	

	Subscriber-weighted	no.	
Technology Type	Spectrum : no		
Comments:			
INTERCONNECTION DATA			
ID			
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments: no IC data provided.			

Section 3: Submission File Details

1 zip file containing 4 files:

Size kb	**Name**
14kb	NJ_WiMAX_123111_region.dbf
1	NJ_WiMAX_123111_region.prj
5402	NJ_WiMAX_123111_region.shp
5	NJ_WiMAX_123111_region.shx

Section 4: Data Validation,Transformation and Loading

NTIA Table BB_Service_Wireless

Loaded from the supplied shapefiles as augmented by email and phone conversations. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “Clearwire Corporation” per email
DBANAME	Set to “Clearwire Corporation” per email
FRN	Set to “0017775628”
TRANSTECH	Set to “80” (terrestrial mobile wireless) based on statement of WiMAX
SPECTRUM	Set to “5” per email
MAXADDOWN	Set to “5” (code for range of 3-6Mbps) per email
MAXADUP	Set to “3” (code for range that includes 1Mbps) per email
TYPICDOWN	Set to null
TYPICUP	Set to null
STATEABBR	Set to “NJ”
SHAPE	As supplied.

Internal notes on processing:

1. The shape file contains 521 polygon shapes, as well as an attribute, ID_UNIQUE (a 6 digit number).
2. The supplied shape file uses geographic coordinate system name GCS_WGS_1984. The NTIA data model requires the same coordinate system. No geographic transformation was required. Loaded into our geo-database to feature class name NJ_WiMAX_123111_region.
3. The XY Tolerance value differs on the supplied data from the required NTIA model. Imported the table schema and the table data in two separate operations, thereby ensuring perfect compatibility with the NTIA data model. The table has the suffix “_tol”.
4. The shape extends beyond the NJ State boundary. Clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class ntia_apr2012.State_Boundary. The feature class has the suffix "_clip". 272 rows are left after clip operation.
5. Coalesced the single-part polygons into one multi-part polygon using the ArcGIS “Dissolve” tool, which resulted in a new feature class with the suffix “_dissolved” with a single row.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 15, 2012 5:23 PM
To: Tajit Mehta

Cc: ConnectingNJ@groups.appcomsci.com
Subject: RE: NJ Broadband Data Collection - Spring 2012

Taj,

A few additional questions regarding the service you deliver over the covered area. From your previous submissions, we have the following information:

Provider Name = Clearwire Corporation

FRN = "0017775628"

Transmission technology = 80 (wireless)

spectrum = 5 (Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz))

Maximum Advertised Download Speed = "5" (Greater than or equal to 3 mbps and less than 6 mbps)

Maximum Advertised Upload Speed = "3" (Greater than or equal to 768 kbps and less than 1.5 mbps)

Are these values still accurate?

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Tajit Mehta [mailto:tajit.mehta@clearwire.com]
Sent: Wednesday, February 15, 2012 5:24 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Hi John,

Yes the date stays the same.

Regards,

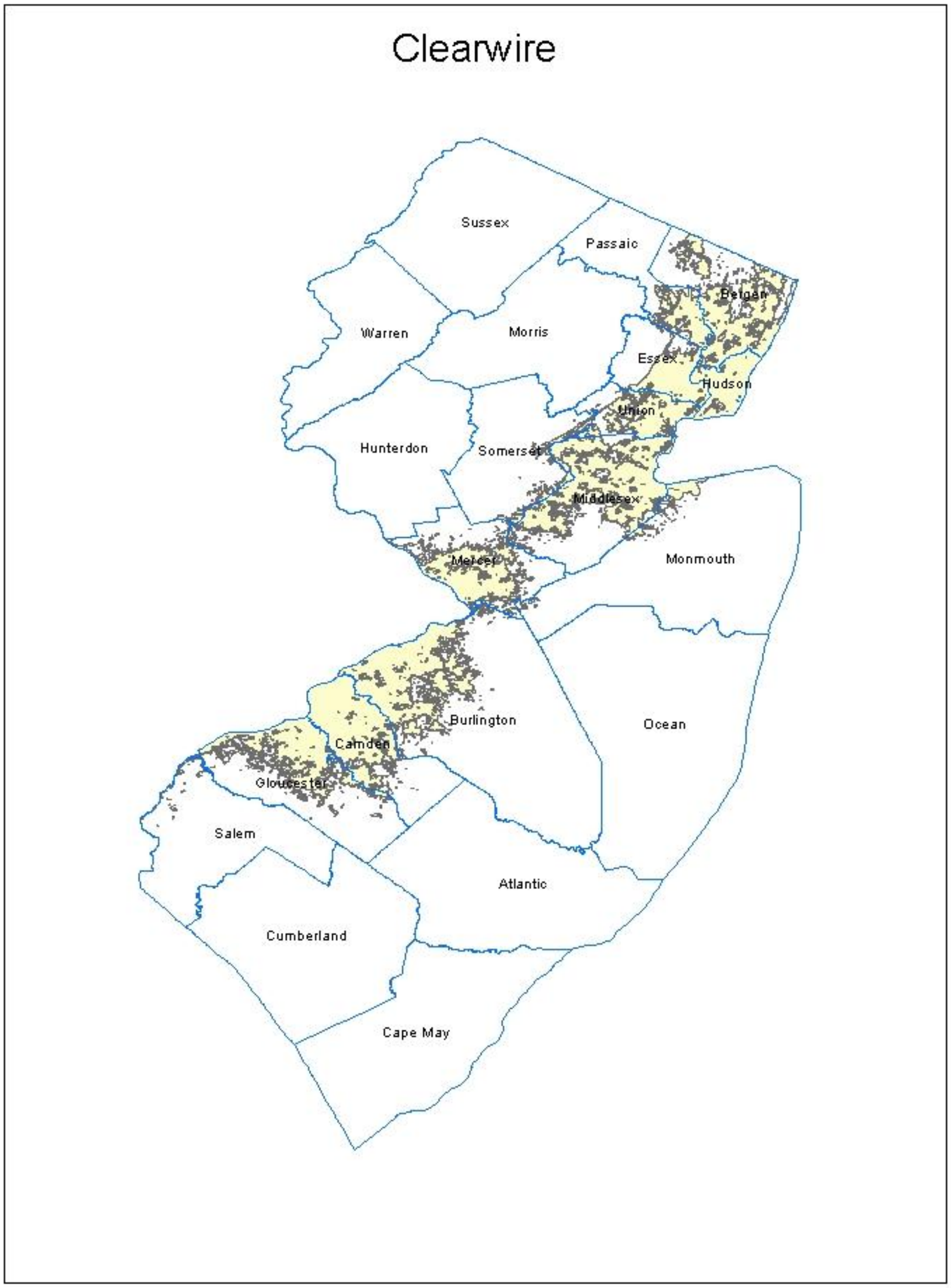
Taj

CLEAR

Taj Mehta – clearwire - Spectrum Development
593 Herndon Parkway, Herndon, VA 20170 - Office 571-490-8577 - Mobile 571-220-4657 – Fax 571-490-8491

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.5 Cogent

Connecting New Jersey - Broadband Provider Data Report

Provider: Cogent

Received: February 2012

Submission date: April 2012

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

Section 1: NDA Status

No NDA was executed. All data were taken from the provider's public web site, FCC filings and/or information supplied by the provider via email

Section 2: Submission Overview

<table>
<tr><th colspan="4">MAPPING DATA - RECEIVED MARCH 1, 2011</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
"Doing business as" name
FRN</td><td>Cogent Communications, Inc.
Not provided
0019898303</td></tr>
<tr><th colspan="4">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Txt, xls, pdf, etc.</td><td>Email and pointers to Web site</td></tr>
<tr><td>File size</td><td colspan="2">Number of records, data elements</td><td>List of 20 addresses where they offer service</td></tr>
<tr><td rowspan="6">Speeds</td><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</td><td rowspan="6">Provided building addresses. Adver down and up are 10/11, very fast.</td></tr>
<tr><td>Adver down</td><td>Address</td></tr>
<tr><td>Adver up</td><td>Address</td></tr>
<tr><td>Typical down</td><td>Not provided</td></tr>
<tr><td>Typical up</td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted</td><td>Not provided</td></tr>
<tr><td>Technology Type</td><td colspan="2">DOCSIS, xDSL, fiber, etc.</td><td>Fiber</td></tr>
</table>

End-user specification	Business, consumer, gov't etc	Provider states Business
Comments: They offer service directly to businesses at the addresses they provided. They are a reseller of broadband access to businesses at other locations.		
INTERCONNECTION DATA		
ID	Provider name "Doing business as" name FRN	
File size	Number of records, data elements	
Ownership	Leased/owned	
Transport Type	Fiber, wireless, copper	
Data Rates/Capacity		
Location	Street address, lat/lon, elevation	
Comments: We had previously extracted data for Middle Mile sites, based on the assumption that Cogent's Data Centers were interconnection points. We were instructed by the provider that these sites did not meet the definition of Middle Mile sites and thus should be removed.		
DATA COMPLETENESS		
Data Validation/ Verification		

Section 3: Submission File Details

We received instructions via email from Ried Zulager on 26 January 2012 instructing us to retrieve location information from their public Web site. (http://www.cogentco.com/?lang=en&option=com_content&view=article&id=40&action=search). The email instructions also providing information on the technology (all fiber) and how to assign speed tiers to the locations, based on the Site Type information.

We invoked the search function on the Web site using: North America, United States, New Jersey as parameters. The search returned 20 entries. We performed some manual edits on the data to facilitate proper geo-coding (remove alternate addresses, remove some building and floor numbers). We then geo-coded the results using Yahoo and Google geo-coders.

Section 4: Data Validation, Transformation and Loading

The following describes the validation and transformation we performed on the provider data.

NTIA Table BB_Service_CensusBlock

We copied the information retrieved from the provider's Web site to a spreadsheet. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to "Cogent Communications, Inc."
DBANAME	Same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to "0019898303"
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 3-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code (next 4 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to "50"
MAXADDOWN	Populated from column "Maximum Advertised Speed Down"
MAXADUP	Populated from column "Maximum Advertised Speed Up
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes:

1. Geocoded the addresses using the Yahoo and Google geo-coders to obtain a Latitude, Longitude pair for each. Populated the speed value at each location using the following rules, based on provider instructions:

a. if Site_Type == "CDC" OR Site_Type == "CNDC"
b. set maxup = "11" and maxdown = "11";
c. otherwise
d. Set maxup = "10" and maxdown = "10";

2. Created an excel sheet and imported it to a geodatabase table.
3. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
4. Added a column, geoid10, containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data. Successfully matched each address to a census block.
5. Discarded 7 rows with duplicate census blocks.
6. Verified size of all census blocks – all of them are less than two square miles.
7. Loaded 13 rows

The mechanized procedure for the geocoding step is described in file GeoExcel_proc.txt.

Section 5: Clarification Questions and Responses

From: Zulager, Ried [mailto:RZulager@Cogentco.com]
Sent: Thursday, January 26, 2012 3:51 PM
To: ConnectingNJ@groups.appcomsci.com
Subject: NJ Broadband Data Collection - Spring 2012

Cogent has been directing the various parties accepting federal funds to create broadband maps to Cogent's website, where the street addresses where the list of buildings where Cogent provides IP transit services to customers. The State of New York PUC folks, as well as the contracted commercial vendors, have been quite able to create very accurate maps using Cogent's published lists as their starting point.

The appropriate url is
http://www.cogentco.com/?lang=en&option=com_content&view=article&id=40&action=search . As a guide for your office, I have run the search request at Cogent's website for all of New Jersey and pasted the results in the attachment, which contains a list of the addresses in New Jersey where Cogent provides service.

The data that you require for your project is at a location widely available to the general public. Only one supplemental comment is necessary to complement the list of addresses to answer the question of service speeds: Cogent's entire network is fiber-optics, which is a code 50 in the Technology section of data requests. Maximum Upload and Download speed for all Cogent PoP addresses is code 10 at a minimum, ***with the exception of*** the facilities identified as Cogent data centers (codes CDC CNDC), where the Maximum Upload and Download speed is code 11 (greater than 1 Gig; *all of the data centers where Cogent offers service are equipped for capacity several multiples of 1 Gig*).

Since Cogent has only one basic product – IP transit service [access to the Internet] – the service offering category for Cogent is relatively simple. Good old terrestrial; no wireless, no satellite. However, Cogent's IP transit product is different from most of the other vendors that you are working with inasmuch as Cogent's retail demographic purchase in the 100Mbps to 1Gbps+ zone of bandwidth.

I believe that all of the codes COB, CNDC & CDC apply, since Cogent has retail customers (by the NTIA definition) at each type of location. Cogent is content to be included in the map if only to demonstrate what we all know: If you live or work in or near an urban area, you probably have adequate access to broadband.

Since Cogent is one of the very few providers at the very core of the Internet, we focus on the high-consumption end of the broadband market. Cogent's retail customer demographic would be law firms and accounting firms in the modern 20 to 30 story office building, with 100 Mbps as our basic offering for any code "COB" Cogent lit building. All COB code buildings have a minimum of engineered infrastructure to permit at least 1 to 2 Gbps of total bandwidth. There is nearly always room to add additional capacity to 3 to 5 Gbps if we ever get close to the original constructed capacity. This is (as I recall) a 10 or 11 on the NTIA delivery level code system. These are delivery levels far in excess of the residential retail service levels for most of the providers on your map, which I believe is the true focus of the NITA survey. If a business customer wants only 10Mbps at a COB location, Cogent may elect to provision that customer (no customer too small, right), but that is a consumer decision concerning bandwidth need and not a matter of Cogent's engineered delivery capacity. So the COB code buildings can list all levels of service if you are starting to list "differentiated" products.

All of the data centers, whether Cogent's exclusive facility (CDC) or carrier neutral (code CNDC), all are generally engineered with something in the 5 to 20 multiple Gbps range of service and should probably be coded at the very highest service delivery code 11. Cogent has retail customers at the data centers, and some elect to buy only 100 Mbps, but the delivery capacity is always several multiples of that**.** Good examples of retail customers at data centers would include universities, libraries and local school districts, and a few scientific research labs, often buying a Gig or more of bandwidth access. But the data centers are also where Cogent's wholesale customers are concentrated, so there is a mix. Indeed, it will probably be these wholesale customers of Cogent that will probably be involved in the subsidized build-out and extension of local networks and backhauling the data to Cogent at a data center for access to its worldwide network.

Ried Zulager

Corporate Secretary

Cogent Communications Group, Inc.

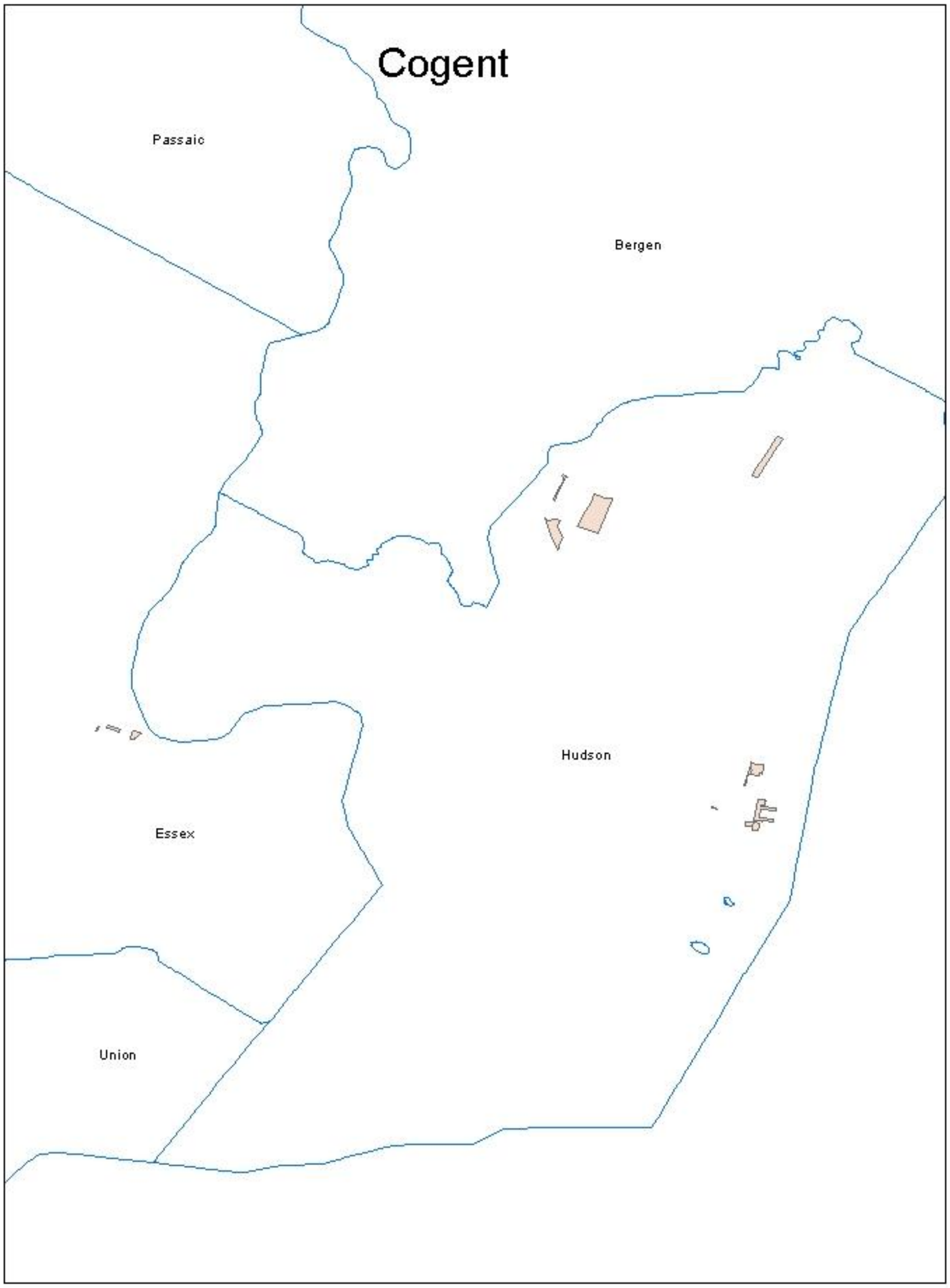
1015 31st St. NW

Washington, DC 20007

tel: +1-202-295-4274

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.6 Cablevision

Connecting New Jersey - Broadband Provider Data Report

Provider: Cablevision

Received: February 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Executed with NJ OIT.

Section 2: Submission Overview

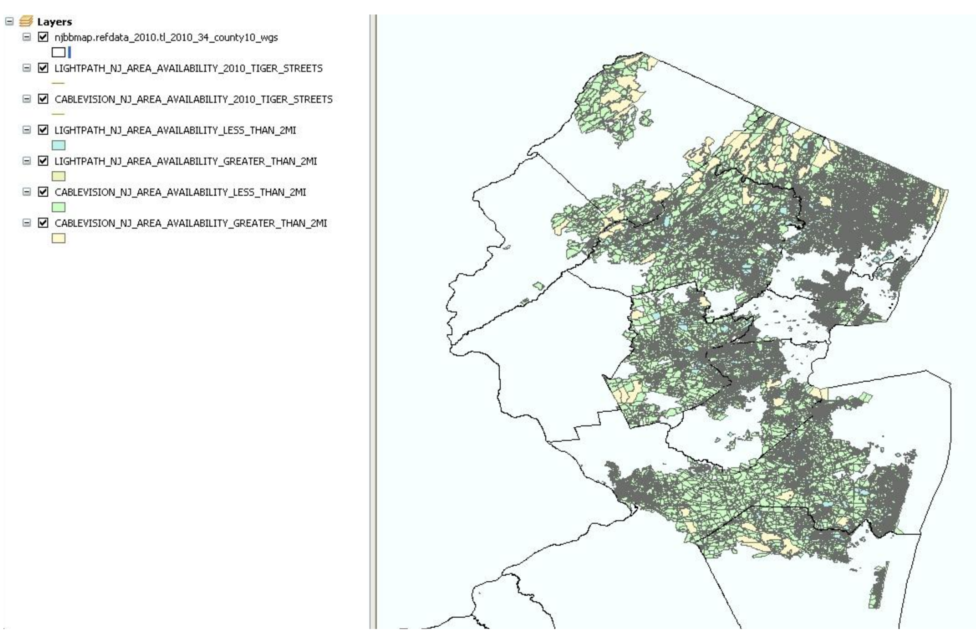
AVAILABILITY DATA		
ID	Provider name "Doing business as" name FRN Holding company name Holding company number	CSC HOLDINGS INC CABLEVISION / LIGHTPATH 0003735909, 0003510195 CSC Holdings, Inc. 130370
FOR WIRELINE		
Filetypes	Shapefile with Census Block Year 2010 data	
File size	Multiple tables and shapes, for cable modem and optical (Lightpath) technologies.	

Speeds

Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)
Typical-upstream		Not provided
Typical-downstream		Not provided
Advertised-upstream		Census block and street segment
Advertised-downstream		Census block and street segment
Subscriber-weighted-		Not provided

	up		
	Subscriber-weighted-down	Not provided	
Technology Type	40 (Cable Modem DOCSIS3.0), 41 (Cable Modem - Other), 50 (Optical carrier)		
End-user specification	Yes. Address data provided in 2 shape files (for both cable and optical) with street segment ID. (a field is called TLID, which is assumed means Tiger Line ID).		
Comments: Street data is comprised solely of polylines in the shapefile while the other files are polygons representing coverage. No subscriber weighted data found.			
INTERCONNECTION DATA: PROVIDED AFTER REQUEST			
ID			
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments: None.			

Figure 1. submitted data (quick preview)



Section 3: Submission File Details

Received one (1) file by SECURE UPLOAD. The zip archive contains six shapefiles: large census blocks (Cablevision and Lightpath), small census blocks (Cablevision and Lightpath), and one with roadsegments (Cablevision and Lightpath). The data and shapes appear to use Year 2010 Census Bureau geometry. The shapefiles use the XY Coordinate System GCS_North_American_1983.

Name	Size
CABLEVISION_AREA_AVAILABILITY_NEWJERSEY.zip	21,863 KB
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.dbf	1,186 KB
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.prj	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shp	462 KB
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shp.xml	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shx	11 KB
CABLEVISION_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.dbf	16 KB
CABLEVISION_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.prj	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.sbn	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.sbx	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.shp	419 KB
CABLEVISION_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.shp.xml	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.shx	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.dbf	16,615 KB
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.prj	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shp	33,984 KB
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shp.xml	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shx	489 KB
LIGHTPATH_AREA_AVAILABILITY_NEWJERSEY.zip	780 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.dbf	135 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.prj	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shp	49 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shp.xml	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shx	2 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.dbf	2 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.prj	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.shp	39 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.shp.xml	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_GREATER_THAN_2MI.shx	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.dbf	308 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.prj	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shp	1,113 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shp.xml	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shx	10 KB

Section 4: Data Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from data supplied in the XLS sheet. Only one row describes a connection point in New Jersey. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “CSC HOLDINGS INC”
DBANAME	Set to “CABLEVISION”
FRN	As supplied in column frn_name
OWNERSHIP	Set to code 1, leased
BHCAPACITY	Set to code 4; 1gbps falls in range 600mbps – 2.4gbps
BHTYPE	Set to code 1, fiber
LATITUDE	Obtained by geocoding the address
LONGITUDE	Obtained by geocoding the address
ELEVFEET	Set to “0” (zero)
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Point shape created using ESRI ArcDesktop

Internal notes on processing:

1. Reused the table created for the October 2010 submission, but mapped Lat/Long to 2010 census block.
2. Since the data was not provided for the April 212, the October 2010 data was reused.

NTIA Table BB_Service_CensusBlock

The table was loaded from the two supplied feature classes (shapefiles) with census blocks, one for Cablevision and one for LightPath. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column proname

DBANAME	As supplied in column dbaname
PROVIDER_TYPE	Set to 1
FRN	As supplied in column frn
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from cenblock (digits 3-5)
TRACT	Populated from cenblock (digits 6-11)
BLOCKID	Populated from cenblock (digits 12-15)
FULLFIPSID	As supplied in column cenblock
TRANSTECH	As supplied - For Cablevision: column trechtrans2 - For Lightpath: column techtrans
MAXADDOWN	As supplied in column maxaddnsp
MAXADUP	As supplied in column maxadupsp
TYPICDOWN	Set to null, not supplied
TYPICUP	Set to null, not supplied
ENDUSERCAT	Set to null, not supplied
SHAPE	As supplied in column shape

Internal processing notes:

1. Import the features with XY Coordinate System " GCS_North_American_1983" via the following three-step process. (A simple Import using ArcCatalog yields an incompatible tolerance value.)
    a. First, copy the data from the shapefiles to the geodatabase using a geographic transformation “NAD_1983_to_WGS_1984_5”. This yields feature classes with the required coordinate system but an incorrect tolerance value. Names are "cv_nj_ar_av_cb_lt_2mi" and "lp_nj_ar_av_db_lt_2mi".
    b. Second, create new feature classes with the same schema as the provided shapefile feature classes and the required coordinate reference system (GCS_WGS_1984) and tolerance (0.000000002 degrees). Names are " cv_nj_ar_av_cb_lt_2mi _tol" and "lp_nj_ar_av_db_lt_2mi _tol".
    c. Third, load the data into the newly created feature classes to ensure perfect compatibility with the required coordinate reference system and tolerance.
2. Ignored the column "techtrans1" in the Cablevision feature class. The presence of two transport technologies indicates that they can support both DOCSIS 3.0 and Other on the all lines.
3. All of the cenblock values correspond to valid Year 2010 Census Block IDs.
4. All census blocks were confirmed to be less than 2 square miles.
5. Removed 1252 records that were duplicates in terms of census block and transtech.

NTIA Table BB_Service_RoadSegment

Loaded from the two supplied features with line segments. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column prvd_name
DBANAME	As supplied in column dba_name
PROVIDER_TYPE	Set to 1
FRN	As supplied in column frn_name
ADDMIN	Set to the least of the non-empty address numbers
ADDMAX	Set to the greatest of the non-empty address numbers
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to “NJ”
ZIP5	Set to null (no value supplied)
ZIP4	Set to null (no value supplied)
TRANSTECH	As supplied in column tech_trans
MAXADDOWN	As supplied in column max_ad_dwn
MAXADUP	As supplied in column max_ad_up
TYPICDOWN	Set to null (no value supplied)
TYPICUP	Set to null (no value supplied)
SHAPE	As supplied

Internal processing notes:

1. Feature classes were imported exactly as discussed above for table BB_Service_CensusBlock.
2. Ignored the column "techtrans1" in the Cablevision feature class. The presence of two transport technologies indicates that they can support both DOCSIS 3.0 and Other on the all lines.
3. Three records in the Cablevision set were determined to be duplicates, in terms of county and Tiger Line ID. One record in the Lightpath set was found to be duplicate. These records were discarded.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 21, 2012 10:14 PM
To: 'tbaecher@cablevision.com'
Cc: 'NJ Broadband Data Collection'
Subject: NJ Broadband Clarification

Ted,

We have performed our initial review of the data you submitted and we have a clarification question. Your recent submission did not include any middle mile information. The last middle-mile data you submitted is from a year ago. Is that data still valid? If not, could you please supply us with revised information?

Thanks for your cooperation.

John Wullert

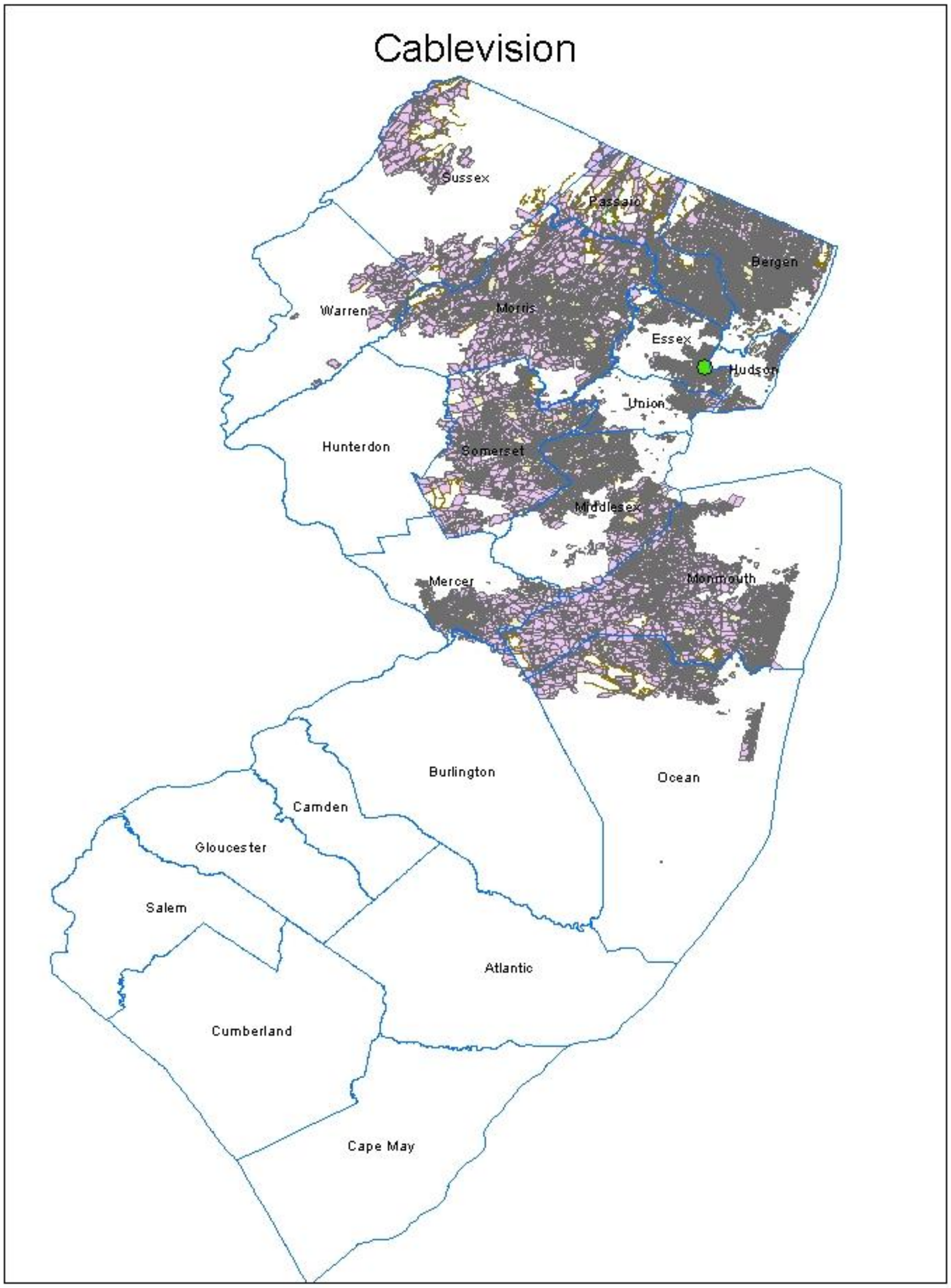
Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.7 Comcast

Connecting New Jersey - Broadband Provider Data Report

Provider: Comcast

Received: February 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Executed

Section 2: Submission Overview

AVAILABILITY DATA			
ID	Provider name "Doing business as" name FRN		COMCAST CABLE COMMUNICATIONS LLC COMCAST 0004-4416-63
FOR WIRELINE			
Filetypes	Excel files w. Census Block Year 2010 data. Street segment level and CB level availability tables for CB's less than and greater than 2 sq. mi.		
File size	see files		
Speeds	Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)
	Typical-upstream		Not provided
	Typical-downstream		Not provided
	Advertised-upstream		yes (CBSA/RSA level)
	Advertised-downstream		yes (CBSA/RSA level)
	Subscriber-weighted-up		no

	Subscriber-weighted-down		no.	
Technology Type	40 (Cable Modem DOCSIS3.0), 41			
End-user specification	Comcast provides availability at the Census Block and Street Segment level.			
INTERCONNECTION DATA: PROVIDED AFTER REQUEST				
ID				
File size				
Ownership				
Transport Type				
Data Rates/Capacity				
Location				
Comments:				

Section 3: Submission File Details

Received three (3) files by SECURE UPLOAD.

Size	**Name**
66KB	34-streets-NJ.xlsx
3161KB	34-blocks-NJ.xlsx
9KB	New Jersey Maximum Advertised Speeds 12 31 11.xlsx

Section 4: Validation, Data Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded 66,069 records from the supplied Excel file “34-streets-NJ.xlsx”. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “Provider_Name” but without trailing period
DBANAME	As supplied in column “DBA_NAme”
PROVIDER_TYPE	Set to 1
FRN	As supplied in column “FRN”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census_Block_FIPS_Code (first 3 digits)
TRACT	Populated from Census_Block_FIPS_Code (next 6 digits)
BLOCKID	Populated from Census_Block_FIPS_Code (last 4 digits)
FULLFIPSID	As supplied in column Census_Block_FIPS_Code
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	Set to “8”, “9” or “10” (see below)
MAXADUP	Set to “7” (see below)
TYPICDOWN	Set to null, not supplied
TYPICUP	Set to null, not supplied
SHAPE	Copied from Census Bureau TigerLine 2010, As matched by Census block 2010 ID

Processing notes:

1. File 34-blocks-NJ.xlsx contains 66,069 records. No shape was provided, but a Census Block ID is provided. Every ID is 15 digits long.
2. Census Blocks: Comcast supplied Census 2010 block IDs. We referenced the Census Bureau reference database for Year 2010 to extract and submit geographic features (i.e., shapes) for each census block based on the supplied Census_Block_FIPS_Code.
3. Speeds: Data for maximum advertised down and up speeds were taken from file “New Jersey Maximum Advertised Speeds 12 31 11.xlsx”. Comcast listed the same upload speed (7) and download speed (10) for all seven MSAs they serve. However, for records with a technology of transmission code 41, we reported a download speed to code 8.

NTIA Table BB_Service_RoadSegment

The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation

PROVNAME	Set to “Comcast Cable Communications, LLC”
DBANAME	Set to “Comcast”
PROVIDER_TYPE	Set to 1
FRN	Set to “0004441663”
ADDMIN	Set to the least of the non-empty address numbers for the line segment
ADDMAX	Set to the greatest of the non-empty address numbers for the line segment
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to “NJ”
ZIP5	Set to value of zipl column for the line segment
ZIP4	(no value supplied)
TRANSTECH	As supplied (40)
MAXADDOWN	See below
MAXADUP	Set to 7
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Census Bureau TigerLine 2010, As matched by County + Tiger Line ID

File 34-streets-NJ.xlsx contains 598 records. No shape is provided, and no reference ID such as Tiger Line ID is provided either. We cannot validate these segments against reference data, nor can we accurately generate shapes for these segments. Instead we gathered a list of segments in large census blocks based on the municipalities served by Comcast. We processed 3142 street segments.

For municipalities served in their entirety by Comcast, the following approach was used. (Note: steps 1-4 were performed previously and not repeated for this round.)

1. Adjusted the Municipality names provided by Comcast with the following rules to enable matching with official New Jersey Municipality reference data
    a. Changed to upper case
    b. Performed the following string replacements on the Municipality field
        i. TOWNSHIP -> TWP
        ii. BOROUGH -> BORO (only when preceded by a space)

    iii. MT. -> MOUNT
    iv. PT. -> POINT
    v. ORANGE CITY -> CITY OF ORANGE TWP (ORANGE at start of line)
  c. Removed any additional information in parentheses (I.e., appended county name)
2. Performed join between two data sources, using Municipality and County as keys
3. Dropped four military bases that did not match any municipality
4. Generated a file with Municipality, Type, County and Municipal Code
5. Joined this information with the large census blocks for each municipality, and then joined that result with the street segments for each large census block.
6. Loaded the resulting set of street segments and shapes after removing duplicates.

Download Speed

1. Speeds: Data for maximum advertised down and up speeds were taken from file “New Jersey Maximum Advertised Speeds 12 31 11.xlsx”. Comcast listed the same upload speed (7) and download speed (10) for all seven MSAs they serve so these values were used. (Note: all the streets included in the street-segment data submitted by Comcast had technology code of 40, so there was no need to insert a lower speed for code 41, as was done for census block data.)

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 22, 2012 6:51 AM
To: 'Ruger, Michael'
Subject: NJBB Clarification

Michael,

We wanted to verify that our processing strategy is still appropriate. During the previous rounds, we had difficulties in mapping the street-level data you provided for the large census blocks. The data is generally the same, so we anticipate similar issues. The approach we have taken was to assume Comcast offered full coverage for a set of municipalities (the list you provided is attached.) You also named three municipalities where that approach would not be advisable (Mount Olive Twp, Toms River, Berkeley Twp.). Can we use that same approach during this submission? Can you provide an updated list of municipalities or confirm that the attached list still applies?

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Ruger, Michael [mailto:Michael_Ruger@comcast.com]
Sent: Wednesday, February 22, 2012 6:53 AM
To: 'connectingnj@groups.appcomsci.com'
Subject: Re: NJBB Clarification

John--
We have not changed our communities served so the same list and logic apply. Would it help if we provided address data?
Thanks--
Michael

From: Wullert, John R II
Sent: Wednesday, February 22, 2012 6:58 AM
To: 'Ruger, Michael'; 'connectingnj@groups.appcomsci.com'
Subject: RE: NJBB Clarification

Michael,

The process we defined works well for the communities you serve completely. However, if it is still the case that you do not cover Mount Olive Twp, Toms River, Berkeley Twp completely, then address level data might be helpful there.

John

From: Ruger, Michael [mailto:Michael_Ruger@comcast.com]
Sent: Wednesday, February 22, 2012 9:15 AM
To: Wullert, John R II
Subject: RE: NJBB Clarification

John—

Let me know if this helps.

Thanks--

Michael

Michael Ruger

Senior Director, Government Affairs

Comcast Cable Communications, LLC

One Comcast Center

Philadelphia, Pennsylvania 19103

(215) 286-7586

Note: attachment was a list of 5284 addresses, all in large census blocks, including Technology of Transmission.

From: Ruger, Michael [mailto:Michael_Ruger@comcast.com]
Sent: Wednesday, February 22, 2012 1:25 PM
To: NJ Broadband Data Collection
Subject: RE: NJBB Clarification

John—

I took another look at what I sent…it's not sufficiently comprehensive to help you.

Thanks--

Michael

Michael Ruger

Senior Director, Government Affairs

Comcast Cable Communications, LLC

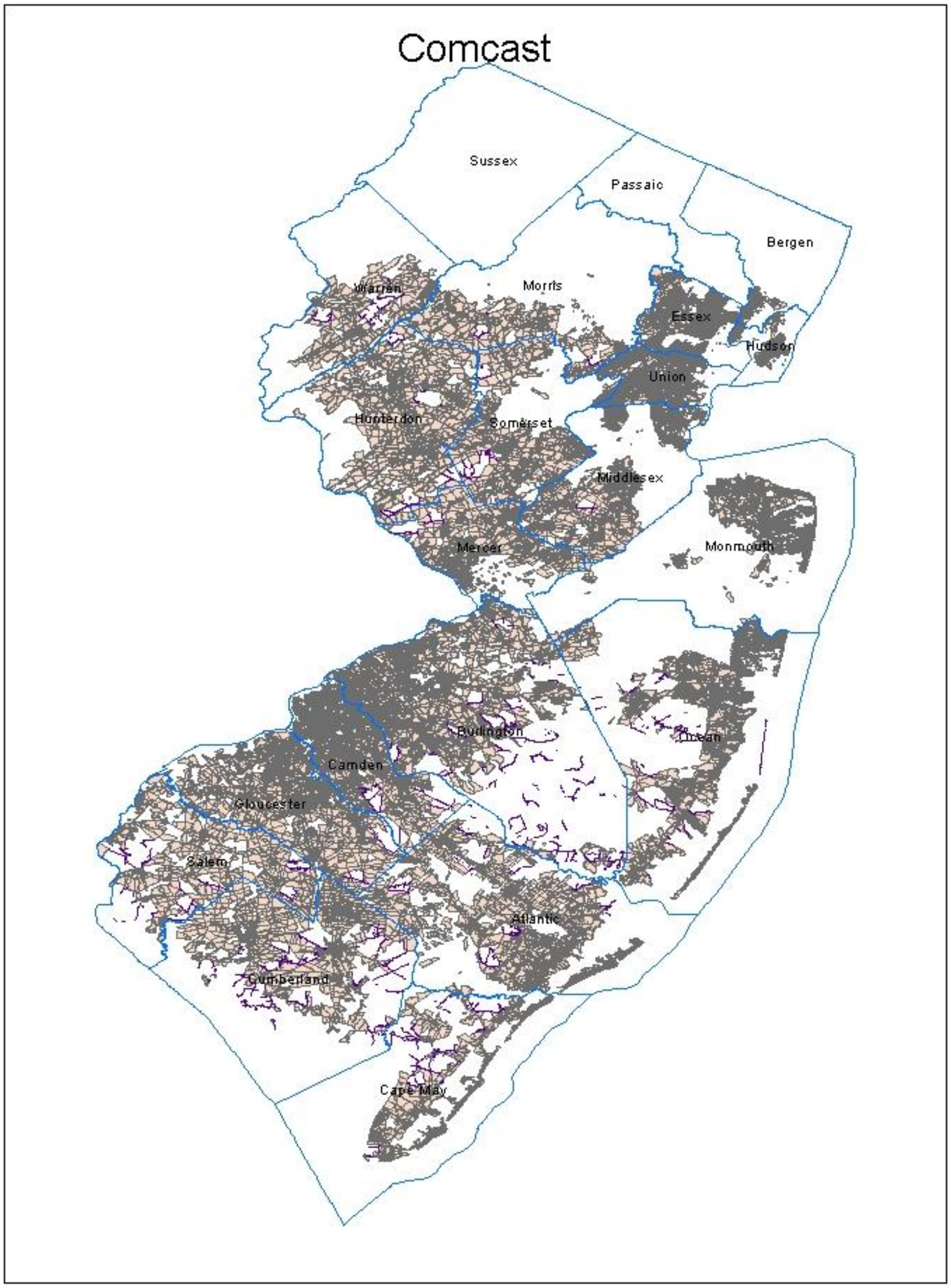
One Comcast Center

Philadelphia, Pennsylvania 19103

(215) 286-7586

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.8 Dieca-Covad

Connecting New Jersey - Broadband Provider Data Report

Provider: Dieca DBA Covad

Received: February 2012

Submission date: April 2012

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA was executed with NJ OIT.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td rowspan="3">ID</td><td>Provider name</td><td>DIECA Communications, Inc.</td></tr>
<tr><td>“Doing business as” name</td><td>Covad Communications Company</td></tr>
<tr><td>FRN</td><td>0003753753</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2"></td></tr>
<tr><td>File size</td><td colspan="2"></td></tr>
<tr><td>Speeds</td><td colspan="2">
<table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th><th></th></tr>
<tr><td>Typical-upstream</td><td></td><td>Address & block</td><td rowspan="6">Speeds are provided at address (line segment) and census block granularity.</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Address & block</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Address & block</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Address & block</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>county level</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>county level</td></tr>
</table>
</td></tr>
</table>

Technology Type	10 (ADS), 20 (SDSL), 30 (other copper)
End-user specification	Not provided
Comments:	
INTERCONNECTION DATA	
ID	File **MiddleMileConnection*.txt
File size	1kb
Ownership	1
Transport Type	
Data Rates/Capacity	4, 5
Location	6 locations
Comments: Six (6) data rows provided	

Section 3: Submission File Details

Received a zip file by SECURE UPLOAD in February 2012:

Size	Name
717739	DIECACommunicationsInc._NJ_CONFIDENTIAL.zip

The original archive contains the following five (5) files:

Size	Name
82717	NJBB_0003753753_AddressSegmentAvailability_DIECACommunicationsInc._CONFIDENTIAL.txt
20835019	NJBB_0003753753_CensusBlockAvailability_DIECACommunicationsInc._CONFIDENTIAL.txt
2509	NJBB_0003753753_CMAAdvertisedAvailability_DIECACommunicationsInc._CONFIDENTIAL.txt
728	NJBB_0003753753_MiddleMileConnection_DIECACommunicationsInc._CONFIDENTIAL.txt
2246	NJBB_0003753753_SubscriberWeightedNominalSpeed_DIECACommunicationsInc._CONFIDENTIAL.txt

Section 4: Data Validation, Transformation and Loading

The following describes the validations and transformations that were applied to the submitted data.

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from supplied file "..MiddleMileConnection..". The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column Provider Name
DBANAME	As supplied in column DBA Name
FRN	As supplied in column FRN
OWNERSHIP	As supplied in column Ownership
BHCAPACITY	As supplied in column Serving Facility Capacity
BHTYPE	As supplied in column Service Facility Type
LATITUDE	As supplied in column Latitude
LONGITUDE	As supplied in column Longitude
ELEVFEET	As supplied in column Elevation
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau reference data
SHAPE	Point shape created using ESRI

Internal notes on processing:

1. The data included the following fields:
    a. Provider Name
    b. DBA Name
    c. FRN
    d. Ownership
    e. Serving Facility Capacity
    f. Service Facility Type
    g. Latitude
    h. Longitude
    i. Street Address (blank)
    j. Elevation
2. There are 6 rows, different from the last submission. Viewing the data in ArcMap indicates that all points are in New Jersey.
3. Created an Excel sheet and imported to a geodatabase table.

(The column data format of the FRN should be Text, not General. Save the excel in the 97-2003 format)

4. Added a point shape to each row corresponding to the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option. Specify WGS84 for the coordinate system of the points. Result is feature class middlemile_point_tol.
5. Added a column "geoid10" with the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. Result is feature class middlemile_point_tol_cb.
6. Populated stateabbr and FRN column during data transformation and loaded table.
7. Execution of the validation rules identified 15,576 census blocks where ADSL was reported with a speed code of 10. This warning requires clarification, so we followed up with the provider.

NTIA Table BB_Service_CensusBlock

Loaded from supplied file "..CensusBlockAvailability..". The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column Provider_Name
DBANAME	As supplied in column DBA_Name
PROVIDER_TYPE	Set to 1
FRN	As supplied in column FRN
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census_Block_ID (digits 3 to 5)
TRACT	Populated from Census_Block_ID (next 6 digits)
BLOCKID	Populated from Census_Block_ID (remaining 4 digits)
FULLFIPSID	As supplied in column Census_Block_ID
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	As supplied in column Maximum_Advertised_Downstream_Speed
MAXADUP	As supplied in column Maximum_Advertised_Upstream_Speed
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null because not supplied
SHAPE	As found in Census Bureau year 2010 reference data

Internal processing notes:

1. Following data fields were supplied:
    a. Provider Name
    b. DBA Name
    c. FRN
    d. Census Block ID
    e. Street NameStreet Segment ID (TLID)
    f. Technology of Transmission
    g. Maximum Advertised Downstream Speed
    h. Maximum Advertised Upstream Speed
    i. Typical Downstream Speed
    j. Typical Upstream Speed
2. The supplied text file has 219,314 rows which exceeds number of census blocks in New Jersey because multiple technologies were submitted.
3. Discarded typical speeds since they were in all cases identical to maximum advertised speeds, not measured values.
4. We used Census Bureau reference data for Year 2010 to locate and submit geographic features (i.e., shapes) for each census block.
5. Total rows (shapes) loaded is 219,314.
6. Validation rules produced a warning on 15,576 census blocks that had a transtech of 10 (ADSL) and a download speed code of 7 (10-25 Mbps). We reported this to the provider, who confirmed the submitted data. The provider offers ADSL2+, with a download speed of 15 Mbps, in select areas in New Jersey.

NTIA Table BB_Service_RoadSegment

Loaded from supplied File "..AddressSegmentAvailability..". The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column Provider_Name
DBANAME	As supplied in column DBA_Name
PROVIDER_TYPE	Set to 1
FRN	As supplied in column FRN
ADDMIN	Set to the least of the non-empty address numbers from TigerLine
ADDMAX	Set to the greatest of the non-empty address numbers from TigerLine
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)

SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to "NJ"
ZIP5	Set to zipl from TigerLine
ZIP4	Set to null (no value available in reference data)
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	As supplied in column Maximum_Advertised_Downstream_Speed
MAXADUP	As supplied in column Maximum_Advertised_Upstream_Speed
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
SHAPE	Road segment shape from Year 2010 TigerLine reference data, as matched by TLID

Internal processing notes:

1. The following data fields were submitted
   a. Provider Name
   b. DBA Name
   c. FRN
   d. Census Block ID
   e. Technology of Transmission
   f. Maximum Advertised Downstream Speed
   g. Maximum Advertised Upstream Speed
   h. Typical Downstream Speed
   i. Typical Upstream Speed
2. There were 704 input rows. One was row was removed as a duplicate, in terms of county and Tiger Line ID. After a join against Census Bureau 2010 reference data, no rows were discarded based on compound key of county, TLID, and tech_transmission fields. Total rows (shapes) loaded is 703.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Thursday, February 23, 2012 9:00 PM
To: 'Stefanie Santa-Esparza'
Cc: NJ Broadband Data Collection
Subject: NJ Broadband Clarification

Stefanie,

The NTIA has provided additional validation rules for us to apply to the data during this round. One of these rules raises and warning, and requires additional clarification, in cases where ADSL is reported with a speed code of 7 (10-25 Mbps). In the data you supplied, there are about 15,000 census blocks that meet this condition. Can you please confirm that these values are correct? A few of the census blocks with this combination are listed below.

Thanks for your help,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

340030010005000

340030010005001

340030010005002

340030010005003

340030010005004

340030010005005

340030010005006

340030010005008

340030010005010

From: Stefanie Santa-Esparza [mailto:Stefanie.Santa-Esparza@megapath.com]
Sent: Friday, February 24, 2012 12:21 PM
To: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Clarification

John,

Our highest bandwidth asymmetric DSL is ADSL2+ for which we have a 15.0Mbps/1.0Mbps offering, in limited parts of the state. Actually, at the beginning of this month, we reduced our ADSL2+ deployment in NJ from 54 central offices down to 35 central offices, but the blocks specified in our Round 5 submission indeed represent our 2011 Year End coverage.

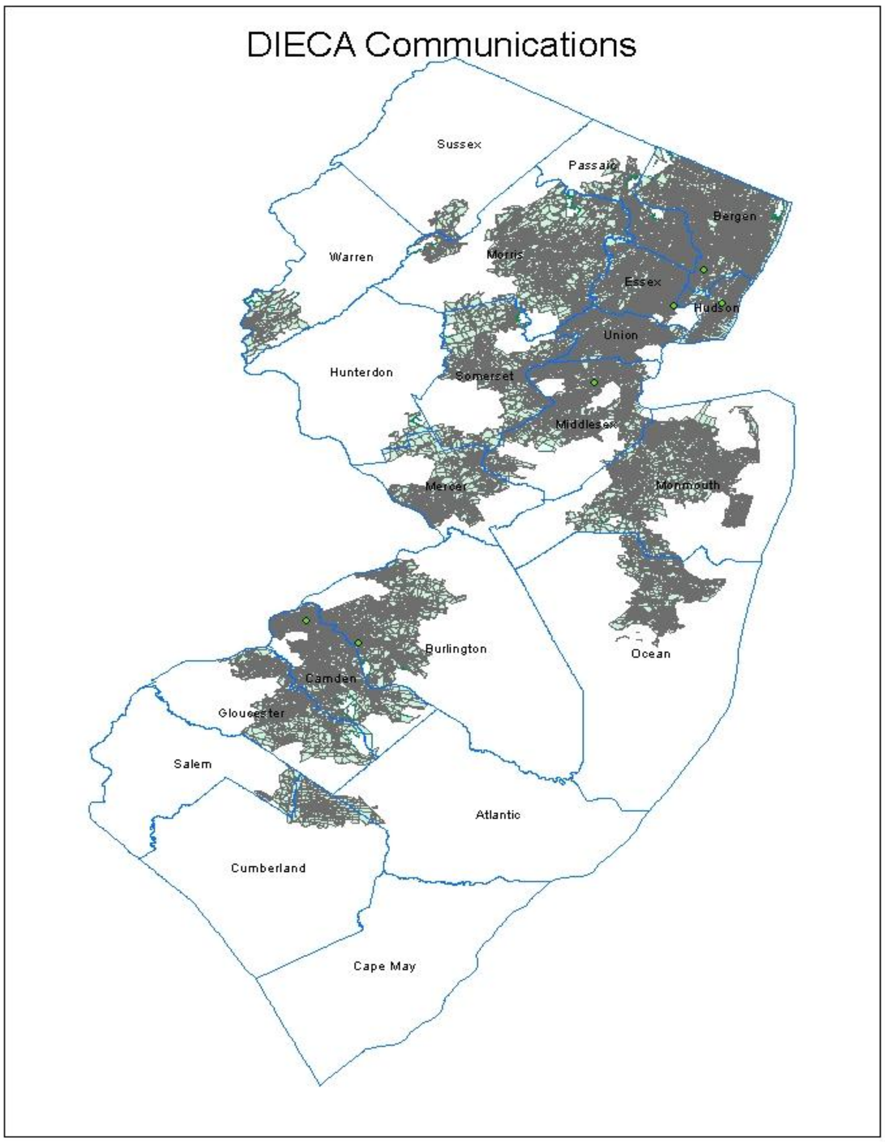
Thanks,

Stefanie

Section 6: Notes and Open Issues

The provider submitted the file "..CMAAdvertisedAvailability..", which provides three technology codes (10, 20, 30), MSA codes, and max advertised up and down speed codes. The max speed for a given technology is different for different MSAs. We did not use this data since max speed codes were provided on a row-by-row basis.

Section 7: Overview Map of Submitted Data



6.9 GOES

Broadband Provider Data Report

Provider: GOES Telecom

Received: July 2011

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

None

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td rowspan="5">ID</td><td>Provider name</td><td>GOES Telecom</td></tr>
<tr><td>“Doing business as” name</td><td>Not provided</td></tr>
<tr><td>FRN</td><td>0011437746</td></tr>
<tr><td>Holding company name</td><td>GOES</td></tr>
<tr><td>Holding company number</td><td>130548</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">1 Excel</td></tr>
<tr><td>File size</td><td colspan="2">worksheet 20 bytes, 23 data rows</td></tr>
<tr><td>Speeds</td><td><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-</td><td></td><td>Not provided</td></tr>
</table></td><td>Submitted 23 addresses with upload and download speeds (generally in kbps) for each address. These are delivered speeds to customers. We located advertised speeds on their Web site, and provider confirmed that those speeds were available at each location they served. We will use the data from Web site as advertised speeds.

Note that for two addresses,</td></tr>
</table>

	up		submitted speeds "10mpbh". They confirmed this should be 10Mbps. Note also that some speeds are listed as having faster upload speeds than download speeds. All of these values are less than broadband speeds, so are not relevant. No typical or subscriber weighted speeds were provided.
	Subscriber-weighted-down	Not provided	
Technology Type	10 (ADSL) and 70 (Terrestrial fixed wireless)		
End-user specification	None		
Comments: Provided a list of 28 customers and the speeds they are subscribed to. Most are 128K up, 512K down.			
INTERCONNECTION DATA			
ID	None provided		
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments:			

Section 3: Submission File Details

Received 1 file by email:

Size **Name**

20,000 20120228 Telcordia.xls

The file contains a list of addresses and max speeds; e.g., the "up-to" limit of their rate plan. The addresses in this file appear to be for individual customers (as opposed to addresses of multi-tenant buildings in a central business district).

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from supplied file "20120228 Telcordia_update.xls" (23 data rows). The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Global Online Electronic Services, Inc."
DBANAME	Not supplied; set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to "0011437746"
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 2-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column Technology Code
MAXADDOWN	Set to code 4 per March 2011 email response to questions
MAXADUP	Set to code 3 per March 2011 email response to questions
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau 2010, as matched by spatial join on geocoded address point

Internal processing notes:

1. Geocoded the addresses using the Google geocoder to obtain latitude, longitude value pairs.
2. Created point shapes using ESRI from lat, long value pairs.
3. Spatially joined the points with Census Bureau Year 2010 reference data to find the containing

census block. This yielded census-block attributes including the block ID ("geoid10").
4. Verified that all 23 records joined successfully with NJ census blocks
5. Dropped 14 records that did not have broadband speeds
6. Dropped 2 records because of duplicate census blocks (caused by multiple customer addresses in the same census block).
7. All remaining records were verified to be in small (< 2 square miles) census blocks.
8. Loaded the resulting data into an SDE feature class.
9. Of 23 original records, all were successfully geocoded; 9 have broadband speeds (rest are 512Kbps down); and 2 are duplicates, leaving 7 records; 6 use ADSL technology and were loaded into the BB_Service_CensusBlock table.

NTIA Table BB_Service_Wireless

Loaded using shapes from reference data for the 1 record that indicates wireless technology. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Global Online Electronic Services, Inc."
DBANAME	Not supplied; set same as PROVNAME
FRN	Set to "0011437746"
TRANSTECH	Set to 70 as supplied in XLS sheet
SPECTRUM	Set to 6
MAXADDOWN	Set to 7
MAXADUP	Set to 7
TYPICDOWN	Set to null
TYPICUP	Set to null
STATEABBR	Set to "NJ"
SHAPE	Year 2010 Census Block shape obtained from reference data.

Internal processing notes:
1. Geocoded the addresses using the Google geocoder to obtain latitude, longitude value pairs.
2. Created point shapes using ESRI from lat, long value pairs.
3. Spatially joined the points with Census Bureau Year 2010 reference data to find the containing census block. This yielded census-block attributes including the block ID ("geoid10").
4. Spectrum: Set to 6, Unlicensed
5. Speeds: The fixed-wireless link is reported with 10Mbph, which we confirmed with provider is actually 10Mbps in each direction (symmetric). That corresponds to NOFA speed code 7. Provider also noted that they only have one fixed-wireless site.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 02, 2012 7:15 AM
To: 'georgeb@tricaps.com'
Subject: RE: Goes Telecom Telicordia data

George,

I wanted to confirm the speed values you included in the data you submitted. I have three questions:

1. In the past, we had used the data from your Web site to determine your maximum advertised upload and download speeds. I still see 1536K Downstream/768K Upstream as the fastest DSL speed you deliver. Is that correct?
2. You report two fixed wireless sites as "10mpbh". Is that really mega-bits-per-hour? That comes to about 2.8 Mbps. Is that correct?
3. When we have spoken in the past, you reported that you use fixed wireless for point-to-point links, rather than to cover a wider area. Is that still correct?

Thanks for your participation,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

From: georgeb@tricaps.com [mailto:georgeb@tricaps.com]
Sent: Monday, March 05, 2012 11:08 AM
To: NJ Broadband Data Collection
Subject: Re: Goes Telecom Telicordia data

Hi John,

I got the answers. See blow.

Thanks,

George

George,

I wanted to confirm the speed values you included in the data you submitted. I have three questions:

1. In the past, we had used the data from your Web site to determine your maximum advertised upload and download speeds. I still see 1536K Downstream/768K Upstream as the fastest DSL speed you deliver. Is that correct?

   Yes

2. You report two fixed wireless sites as “10mpbh”. Is that really mega-bits-per-hour? That comes to about 2.8 Mbps. Is that correct?

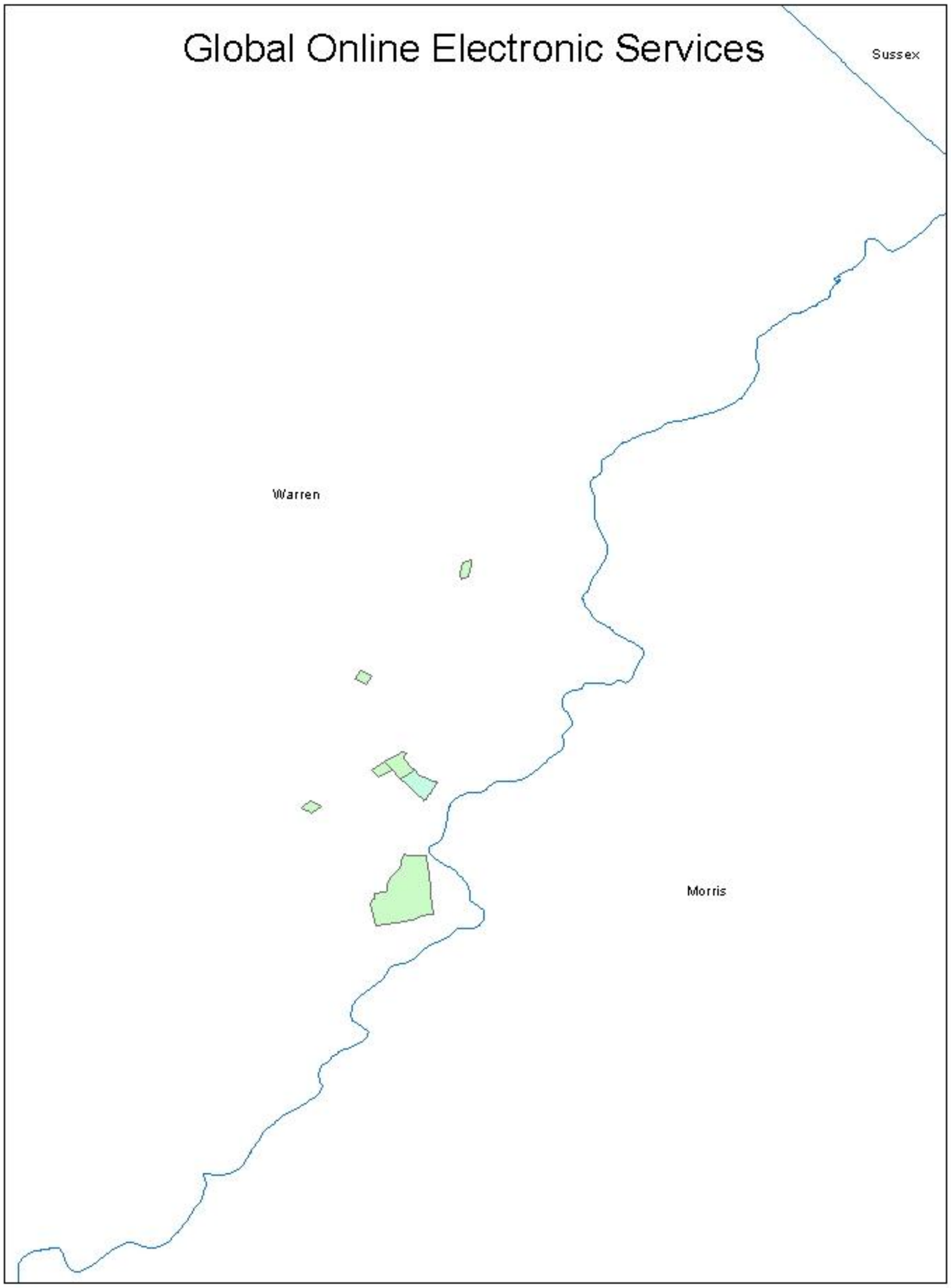
   No, the correct speeds are 10mbps and we now only have a single fixed wireless link instead of two.

3. When we have spoken in the past, your reported that you use fixed wireless for point-to-point links, rather than to cover a wider area. Is that still correct?

   Yes

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.10 Hometown Online

Connecting New Jersey - Broadband Provider Data Report

Provider: Hometown Online

Received: July 2011

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

No NDA in place.

Section 2: Submission Overview

This data was submitted in a the Fall 2011 round. We were informed by the provider that their engineering analysis indicated that nothing had changed in the intervening months.

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Hometown Online Inc.
Warwick Online
0006-6512-44</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Text</td></tr>
<tr><td>File size</td><td colspan="2">1,764,352 bytes; 6,778 rows</td></tr>
<tr><td>Speeds</td><td><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
</table></td><td>Provided list of customer locations with column “DSL speed avail”. This is probably downstream speed, but need to verify with provider.

Communications with provider and validation via their Web site resulted in clarification: Max advertised ADSL speeds are:
Downstream: 15 Mbps</td></tr>
</table>

	Subscriber-weighted-down		Not provided	Upstream: 800 Mbps.
Technology Type	DSL – Previous iinteractions with provider revealed that Census tract 3714 has SDSL, all others are ADSL			
End-user specification	Not provided			
Comments: Address data with some indications of qualification for different data services.				

INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: No connection-point data provided	

Section 3: Submission File Details

Received one (1) file by EMAIL:

Size	**Name**
1,761,280	M4 STRUCTURES - NJ 7-18-11.xls

The file contains 6778 rows of data. Each row has a street address. All rows have an indication of maximum possible DSL speed. Some indicate 5Mbps, some 15Mpbs and some 25Mbps. Also has information about TV qualification, which we will ignore.

Section 4: Data Validation, Transformation and Loading

This section details the validations and transformations we applied to the provider submitted data.

NTIA Table BB_Service_CensusBlock

Loaded from the supplied file after geocoding. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Hometown Online Inc.”
DBANAME	Set to “Warwick Online”
PROVIDER_TYPE	Set to 1
FRN	Set to “0006651244”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block 2010 (digits 2-5)
TRACT	Populated from Census Block 2010 (next 6 digits)
BLOCKID	Populated from Census Block 2010 Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block 2010 Code
TRANSTECH	Census blocks in census tracts starting with 3714 were set to code “20” (SDSL) All others set to code “10” (ADSL), (per provider email)
MAXADDOWN	Set to code “7” (range includes 15Mbps, per email)
MAXADUP	For ADSL: Set to code “3” (range includes 1Mbps, per email) For SDSL: Set to code “7” (range includes 15Mbps, per email)
TYPICDOWN	Set to null, not supplied
TYPICUP	Set to null, not supplied
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address point

Internal processing notes:

1. The following steps were performed when the data was submitted and the results were re-used for this round
    a. All addresses were successfully geocoded using Arroyo with the Yahoo geocoder. Four records failed to spatially join on 2010 NJ Census Block shapes.

   b. Created an excel sheet and imported to a geodatabase table.
   c. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
   d. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data.
2. Discarded 6321 rows with duplicate census blocks, leaving 449 unique census blocks.
3. Discarded 1 census block larger than 2 square miles (340312568021002). Note that only a single address mapped to this census block.
4. Loaded 451 blocks.
5. Validation rules run against this data produced a warning regarding speed code 10 for ADSL. We searched the provider's Web site for speed information. We only found one reference to speed packages, and these values and the Web page seemed out of date. We sent a request for clarification to the provider. The provider acknowledged the validation requirements, indicated that the Web page found by our search was in error and confirmed the submitted speed values. The president of the company also indicated that they would be launching a new Web site with corrected speed information in the near future.

Section 5: Clarification Questions and Responses

From: Scott Sommerer [mailto:s.sommerer@wvtcg.com]
Sent: Wednesday, February 22, 2012 7:21 PM
To: NJ Broadband Data Collection
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

Dear Sir or Madam:

I have investigated with technicians and engineers. Our data is totally unchanged from last year's submission

Have A GREAT DAY

J. Scott Sommerer

845 986 2250

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Thursday, February 23, 2012 8:11 PM
To: 'Scott Sommerer'

Cc: NJ Broadband Data Collection
Subject: RE: Reminder - NJ Broadband Data Collection

Scott,

As I mentioned, we have additional validations to perform. NTIA is questioning reported DSL speeds over 10 Mbps. In our previous interactions, you had given us the following speeds:

ADSL: 15 Mbps and uploads of 800 kbps.

SDSL: 15 Mbps up and down (available in Census tract 3714)

I see on your Web site now the packages you offer are at 512, 1 Mbps and 2 Mbps. Should we be using 2 Mbps as the download speed? Does this apply for both ADSL and SDSL?

Thanks in advance for the clarification.

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Scott Sommerer [mailto:s.sommerer@wvtcg.com]
Sent: Tuesday, February 28, 2012 10:35 AM
To: NJ Broadband Data Collection
Cc: Ginny Quackenbush
Subject: RE: Reminder - NJ Broadband Data Collection

John

I appreciate your validation requirements.

No, do not use 2 Mbps. Our website is inaccurate. Please use the submission from last year. With the higher speeds.

J. Scott Sommerer

From: Ginny Quackenbush [mailto:g.quackenbush@wvtc.com]
Sent: Tuesday, February 28, 2012 11:51 AM
To: Scott Sommerer; NJ Broadband Data Collection
Cc: Jean Beattie
Subject: RE: Reminder - NJ Broadband Data Collection

Good Afternoon,

FYI, we will be launching a new website by or before the end of March.

Our new website will have the correct information.

Thank you very much.

Virginia Quackenbush

President, Warwick Valley Telephone Company

47 Main Street - PO Box 592

Warwick, NY 10990

Section 6: Notes and Open Issues

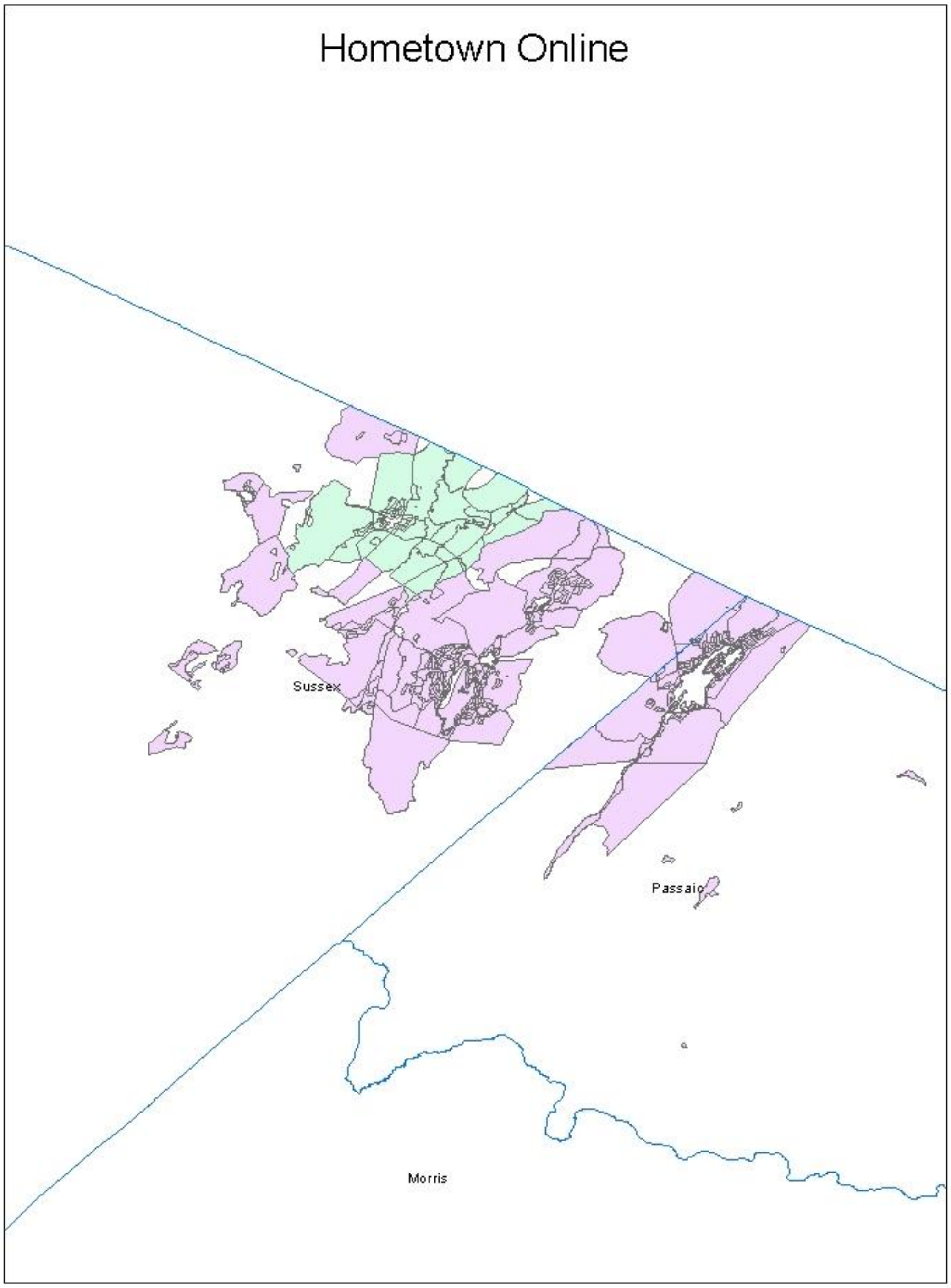
Provider had provided the following information via email in prior rounds and confirmed again this round:

Maximum advertised download speed is 15 Mbps for both ADSL and SDSL

Maximum upload speed for ADSL is 800 Kbps

SDSL is available in census tract 3714xx, all other locations are ADSL

Section 7: Overview Map of Submitted Data



6.11 Earthlink

Connecting New Jersey - Broadband Provider Data Report

Provider: Earthlink Business (previously New Edge Networks)

Received: October 2011

Submission date: April 2012

This report presents details on processing of broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

None

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>EarthLink Business
EarthLink Business
0003720471</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td>Txt, xls, pdf, etc.</td><td>xls</td></tr>
<tr><td>File size</td><td>Number of records, data elements</td><td>605 rows</td></tr>
<tr><td>Speeds</td><td><table><tr><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</td></tr><tr><td>Upstream</td><td>1 = < 200, 2 = 200-768, 3 = 768-1.5, 4 = 1.5-3</td></tr><tr><td>Downstream</td><td>3 = 768-1.5, 4 = 1.5-3, 5 = 3-6</td></tr><tr><td>Typical</td><td>Not given</td></tr><tr><td>Advertised</td><td>See above</td></tr></table></td><td>Existing customer addresses as unfielded data
No census blocks.</td></tr>
<tr><td>Technology Type</td><td>DOCSIS, xDSL, fiber, etc.</td><td>10 = ADSL, 20 = SDSL, 30 = copper</td></tr>
<tr><td>End-user specification</td><td>Business, consumer, gov’t etc</td><td>Not specified; looks like businesses</td></tr>
<tr><td>Comments</td><td colspan="2">Provider did not respond to requests for revised data for Spring 2012 submission. Web site indicates they offer DSL to 7 Mbps as well as T1. Based on this, it was decided to reuse the previously submitted data in the Spring 2012 round</td></tr>
</table>

INTERCONNECTION DATA		
ID	Provider name "Doing business as" name FRN	None
File size	Number of records, data elements	
Ownership	Leased/owned	
Transport Type	Fiber, wireless, copper	
Data Rates/Capacity		
Location	Street address, lat/lon, elevation	

Section 3: Submission File Details

Received 1 file by a CD

Size	**Name**
184320	NJ_Service_Address.xls

Address data has 605 records.

Section 4: Data Validation, Transformation and Loading

The following describes process for loading tables.

NTIA Table BB_Service_CensusBlock

The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "EarthLink Business"
DBANAME	Set to "EarthLink Business"

PROVIDER_TYPE	Set to “2”
FRN	As supplied in column
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column technology, but see below
MAXADDOWN	As supplied
MAXADUP	As supplied
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null (see below)
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes:

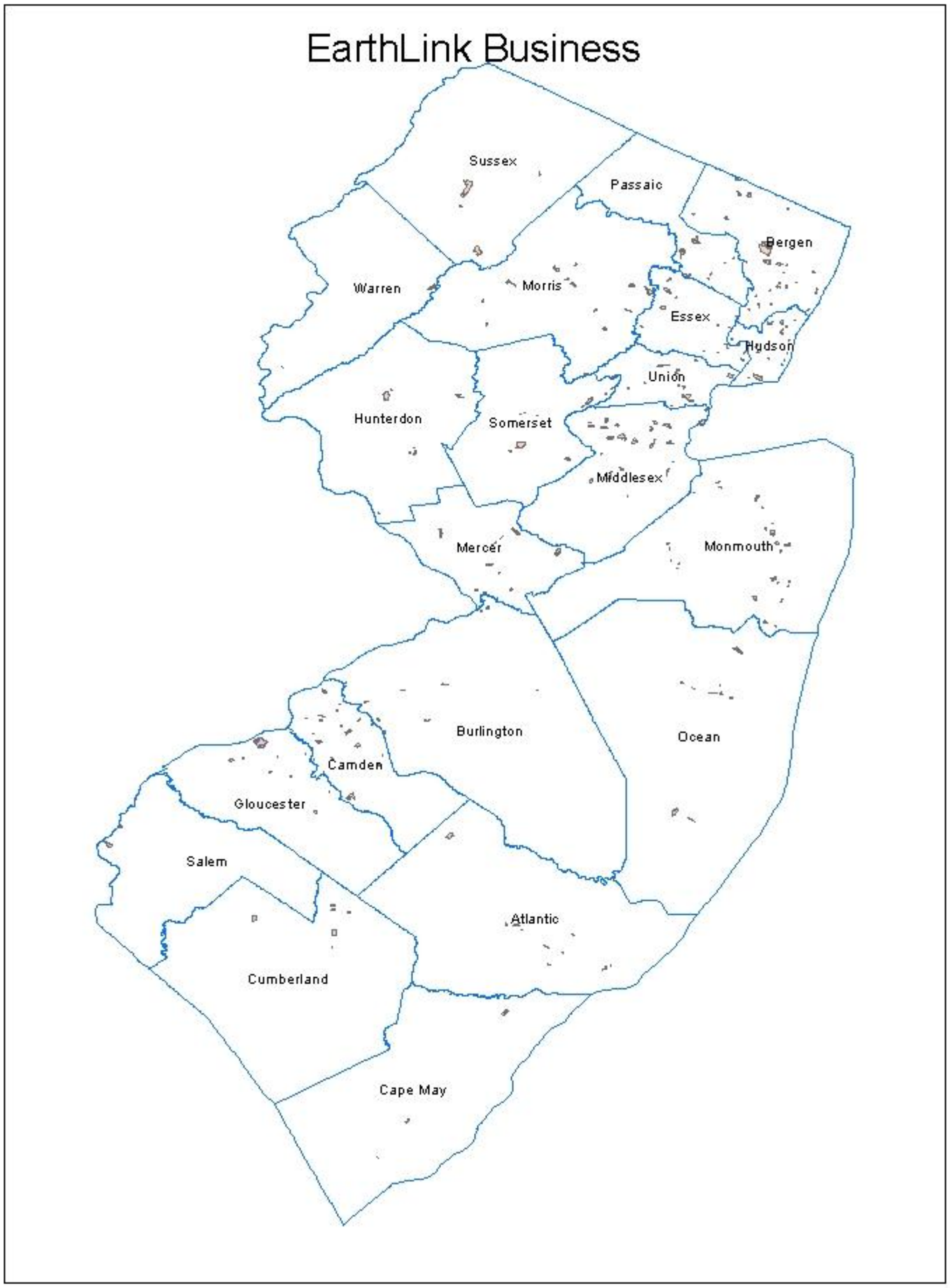
1. The following steps were applied when the data was processed for the fall 2011 submission
   a. Geocoded the addresses using an Arroyo flow and the Yahoo geocoder, leaving the result with address and lat, long data in an Excel spreadsheet.
   b. Imported the spreadsheet to a simple ESRI geodatabase table
   c. Added point shapes corresponding to each Latitude/Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option
   d. Added a column containing the ID of the containing year 2010 census block using ArcCatalog's spatial join feature. The newly created point shapes are joined against census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
   e. Discarded 198 records with upload speeds that are not considered broadband (speed code 1).
   f. Discarded 83 duplicate census block records, which result from multiple addresses in the same census block.
   g. Discarded 1 large census block record (340330216005000).
   h. Two (2) records have technology code 20 (SDSL) but down speed code 4, up speed code 2. Because this is not valid for SDSL but matches many other ADSL records, we changed the technology code on these two records to 10 (ADSL).
   i. Loaded 323 records.
2. Copied the results into a new BB_Service_CensusBlock table for the Spring 2012 submission
3. Results passed all NTIA validations.

Section 5: Clarification Questions and Responses

- In prior interactions, New Edge indicated that they are a pure reseller serving business customers only. They do not do residential at all (not home-based business, according to Pia). They are co-located in LEC central offices and, when they get a service request, they go to LECs for pre-qualification. Pia's view is that they can provide service anywhere that a LEC can. But she also said that 'technically they are not facilities-based.' We elected to limit their coverage area based on current delivery. We will need to determine in the future if we should adjust the coverage area to match LEC.

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.12 HughesNet

Connecting New Jersey - Broadband Provider Data Report

Provider: HughesNet Communications Inc.

Received: March 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><th colspan="5">AVAILABILITY DATA</th></tr>
<tr><td rowspan="3">ID</td><td colspan="3">Provider name</td><td>Hughes Network Systems, LLC</td></tr>
<tr><td colspan="3">“Doing business as” name</td><td>HughesNet</td></tr>
<tr><td colspan="3">FRN</td><td>0017434911</td></tr>
<tr><th colspan="5">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="4">CSV file with list of Year 2000 census blocks, plus email information on speed</td></tr>
<tr><td>File size</td><td colspan="4"></td></tr>
<tr><td rowspan="7">Speeds</td><td>Type</td><td></td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</td><td rowspan="7">Submitted CSV file with list of 141,363 records of Y2000 census blocks, specified by fips code, census tract and block. Note that this exceeds number of Y2000 census blocks in NJ.

Email message contained an description of speeds: 2Mbps down, 300Kbps up. The corresponding speed range codes are 4 down, 2 up.

Spectrum is 7, satellite.</td></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Provided</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Provided</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-</td><td></td><td>Not provided</td></tr>
</table>

	down			
Technology Type	Code 60 (Satellite)			
End-user specification				
Comments:				

INTERCONNECTION DATA: NONE	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: Not provided	

Section 3: Submission File Details

Received an email explaining their service offering and link to download CSV filed of census blocks.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Hughes Network Systems, LLC"
DBANAME	Set to "HughesNet"
FRN	Set to 0017434911
TRANSTECH	Set to 60
SPECTRUM	Set to 7 per translation shown below
MAXADDOWN	Set to 4, see below.

MAXADUP	Set to 2", see below.
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to "NJ"
SHAPE	Single shape created from CBs (See below).

Internal notes on processing:

1. Spectrum: No statement was provided. The NTIA data model has a single column for spectrum. Satellite corresponds to NTIA "SPECTRUM USED" code value 7.
2. We concatenated the fips code, census tract and block values into a census block ID. In some cases the census tract values had less than six digits. In some cases the block id had less than four digits. In these cases, leading zeros were added to the values to pad the values to the correct length.
3. In 21 cases, the values for block ID and census tract were filled in with spaces. We attempted to pad these out with zeros, but the resulting census block IDs did not match any NJ census block. These 21 records represent the amount by which the submission exceeded the count of Y2000 NJ census blocks. These were dropped.
4. We verified that all of the resulting census block IDs were unique.
5. We compared the census block IDs generated from the submission with the set of 141,342 Y2000 census blocks for New Jersey. All NJ census blocks (large and small) were matched. .
6. Speeds: For maximum advertised speeds we encoded the down speed as value 4 (range 1.5-3 Mbps) and encoded the up speed as value 2 (range 200 Kbps -- 768 Kbps).
7. We merged the census blocks into a single shape with the suffix "_dissol" using the ArcGIS "Dissolve" tool.
8. The resulting shape passed all NTIA validations

Section 5: Clarification Questions and Responses

From: Alok Mathur [mailto:Alok.Mathur@hughes.com]
Sent: Monday, March 12, 2012 1:17 PM
To: Wullert, John R II
Cc: Mark Wymer
Subject: RE: NJ Broadband Data Collection

John

You may download listing of each of the FIPS Code, Census Tract and Block where Hughes Network coverage is available at download speeds of up to 2 mbps and upload speeds of up to 300 kbps.

https://REDACTED

username: REDACTED

password: REDACTED

For the most recent data, please use the following folder;

/ Home/ ex_hns_pickup/ 201201 - Census 2000/

Thanks

Alok

Alok Mathur

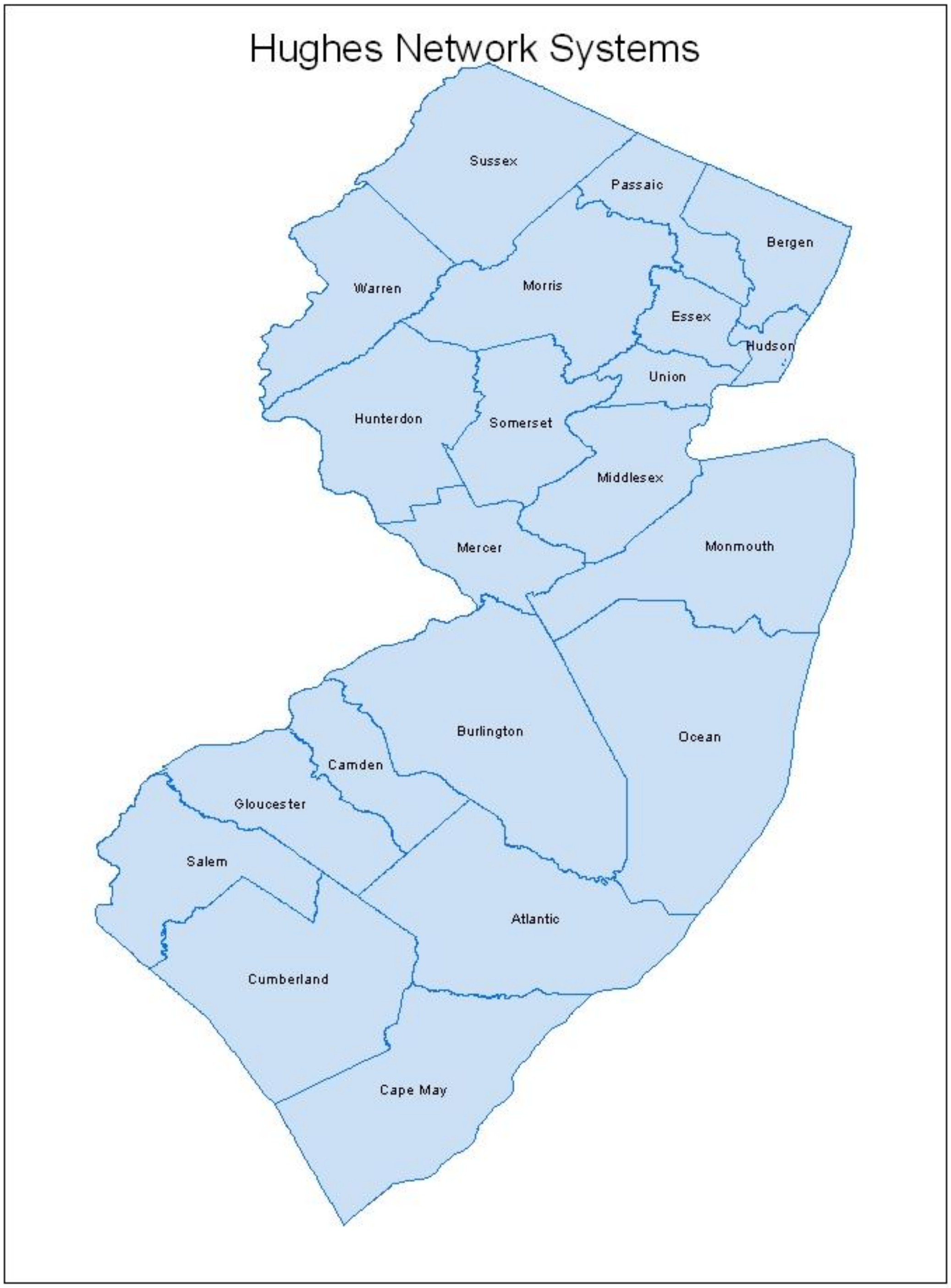
PMP, CISA, CIPP, CRISC

Senior Director – Revenue Management

Hughes Network Systems, LLC., Germantown, MD 20876, USA.

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data


Hughes Network Systems
Sussex
Passaic
Bergen
Warren
Morris
Essex
Hudson
Union
Hunterdon
Somerset
Middlesex
Monmouth
Mercer
Burlington
Ocean
Camden
Gloucester
Salem
Atlantic
Cumberland
Cape May

6.13 Jersey Shore Wireless

Broadband Provider Data Report

Provider: Jersey Shore Wireless

Received: March 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

None

Section 2: Submission Overview

AVAILABILITY DATA			
ID	Provider name "Doing business as" name FRN	Jersey Shore Wireless Duxpond Communications 0011543782	
FOR WIRELESS			
Filetypes	shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.	Images files (jpegs) depicting coverage maps in various regions in New Jersey	
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)	
	Upstream max adv	10 Mbps listed on Web site	
	Downstream max adv	Not specifically advertised. Listed as 800 kbps	
	Upstream typical	N/A	
	Downstream typical	N/A	
	Subscriber-weighted	N/A	

Technology Type	Spectrum (Mhz, FCC code)	Unlicensed
Comments:		

INTERCONNECTION DATA	
ID	NONE
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

Provider pointed us to information on their Web site, including coverage maps and speed offerings.

Section 4: Data Validation, Transformation and Loading

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Jersey Shore Wireless"
DBANAME	Set to "Duxpond Communications"
FRN	Set to 0011543782
TRANSTECH	Set to 70, for fixed wireless
SPECTRUM	Set to "6" for unlicensed
MAXADDOWN	Set to "6", see below.
MAXADUP	Set to "3", see below.
TYPICDOWN	Not provided, set to null

TYPICUP	Not provided, set to null
STATEABBR	Set to “NJ”
SHAPE	Generated, see below

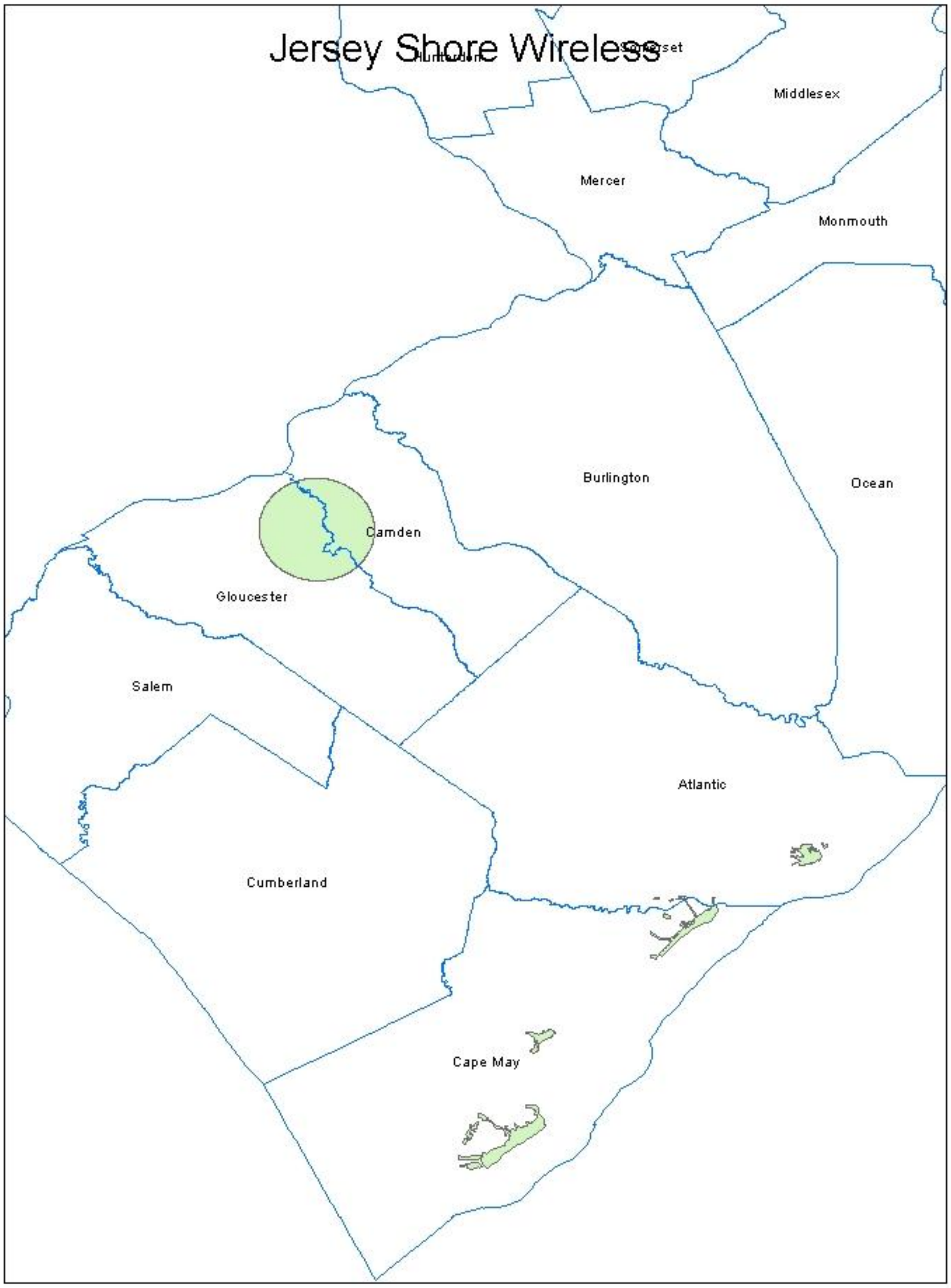
Internal notes on processing:

1. Provider directed us to their Web site, which included image files (jpeg) depicting coverage maps, along with listings of the speed plans they offer.
2. We manually created shape files that replicated the coverage in their image files to produce the SHAPE
3. Their Web site had two different listings for download speeds, one showing speeds of 1, 2 and 5 Mbps and the other showing speeds of 1, 2, 3 and 10 Mbps. Given the discrepancy between the two lists, and without any confirmation from the provider, we elected to map this to speed tier 6, ranging from 6 to 10 Mbps.
4. The Web site did not include advertised upload speeds. There was an indication of typical upload speeds of 800 Kbps. We mapped that value to a speed tier of 3.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.14 Leap/Cricket

Broadband Provider Data Report

Provider: Leap Cricket

Received: February 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA with NJ OIT in place

Section 2: Submission Overview

AVAILABILITY DATA		
ID	PROVIDER NAME	Leap Wireless International, Inc.
	DBA NAME	Cricket Communications, Inc.
	FRN	0002963528
	Holding company name:	Leap Wireless International, Inc."
	Holding company number:	130730
FOR WIRELESS		
Filetypes	shapefile corresponding to NJ terrestrial mobile wireless coverage (type 80)	
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)
	Upstream max adv	yes (for entire shapefile) given in tier
	Downstream max adv	yes (for entire shape) given in tier
	Upstream typical	no.
	Downstream typical	no.
	Subscriber-	no.

	weighted		
Technology Type	Spectrum : yes		3 (PCS) and 4(AWS)
Comments:			
INTERCONNECTION DATA			
ID			
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments: no IC data provided.			

Quick loading results:

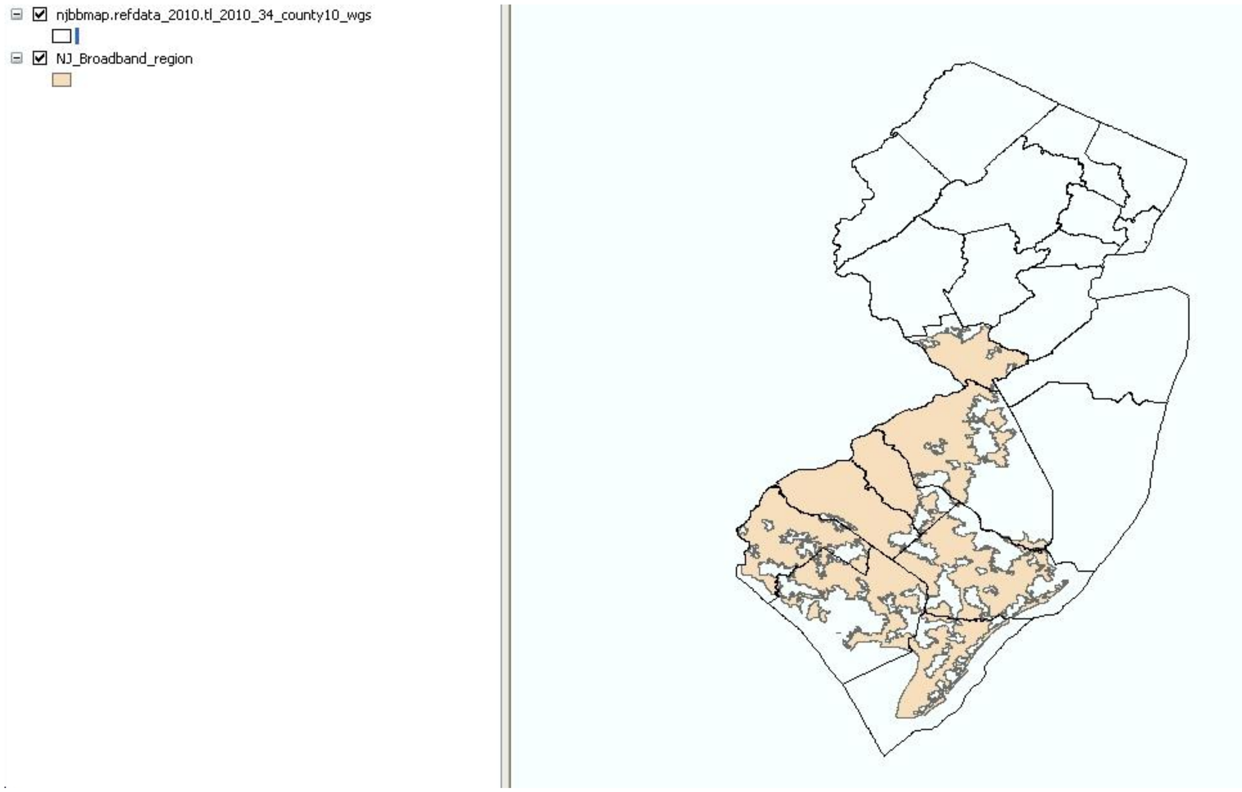


Figure 1. Loading results

Section 3: Submission File Details

1 zip file containing 5 files by (EMAIL, SECURE UPLOAD):

Size	Name
1KB	NJ_Broadband_region.dbf
1KB	NJ_Broadband_region.prj
1KB	NJ_Broadband_region.shx
2112KB	NJ_Broadband_region.shp
2KB	NJ_Broadband_region.TAB

Section 4: Data Validation, Transformation and Loading

Loaded from the supplied Mapinfo file, with transformations as:

Table Column	Data Source / Transformation
PROVNAME	As supplied in column prov_name
DBANAME	As supplied in column dba_name
FRN	Set to " 0002963528"
TRANSTECH	As supplied in column tech_trans
SPECTRUM	Set to “4” per translation shown below
MAXADDOWN	As supplied in column down_speed.
MAXADUP	As supplied in column up_speed..
TYPICDOWN	Not supplied, set to null
TYPICUP	Not supplied, set to null.
STATEABBR	Set to “NJ”
SHAPE	As supplied.

Internal notes on processing:

1. The shape file contains a single row with a multipolygon shape (see above for preview picture). The columns identify that the technology of transmission is wireless and that two different spectrum ranges are in use.
2. The supplied shape uses geographic coordinate system GCS_WGS_1984, same as that required by the NTIA data model. No geographic transformation was required, but the XY Tolerance values differ if the shape file is imported trivially into the geo-database. Imported shape then mapped to separate shape with proper tolerance which resulted in a new feature class with the suffix “_tol”.
3. Spectrum: Leap provided “Y” value in the columns spectrum_pcs and spectrum_aws. In response to previous queries on this, the provider had indicated that they covered separate areas, with PCS coverage limited to a few counties, but did not provide separate shapes. We sent a request again…

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Thursday, February 23, 2012 8:42 PM
To: 'Douglas White'

Cc: 'ConnectingNJ@research.telcordia.com'
Subject: RE: State broadband mapping, 5th round submission for Cricket

Doug,

We had asked previously, but wanted to see if there was any change. Are you able to generate separate shape files for the AWS and PCS coverage areas?

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 28, 2012 10:05 AM
To: Douglas White
Cc: ConnectingNJ@research.telcordia.com
Subject: NJ Broadband Clarification

Doug,

We have reviewed the data you submitted and have discovered two anomalies:

1. The FRN included in your shape file is 5927056. We have your FRN number as 0002963528. Is this latter number still correct?
2. The transtech number in your shape file is 160. This is an invalid value. We have your transtech as 80 (Terrestrial Mobile Wireless). Is this still correct?

Thanks for your help.

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Douglas White [mailto:dougwhite@cricketcommunications.com]
Sent: Friday, March 02, 2012 7:18 PM
To: NJ Broadband Data Collection
Cc: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Clarification

John –

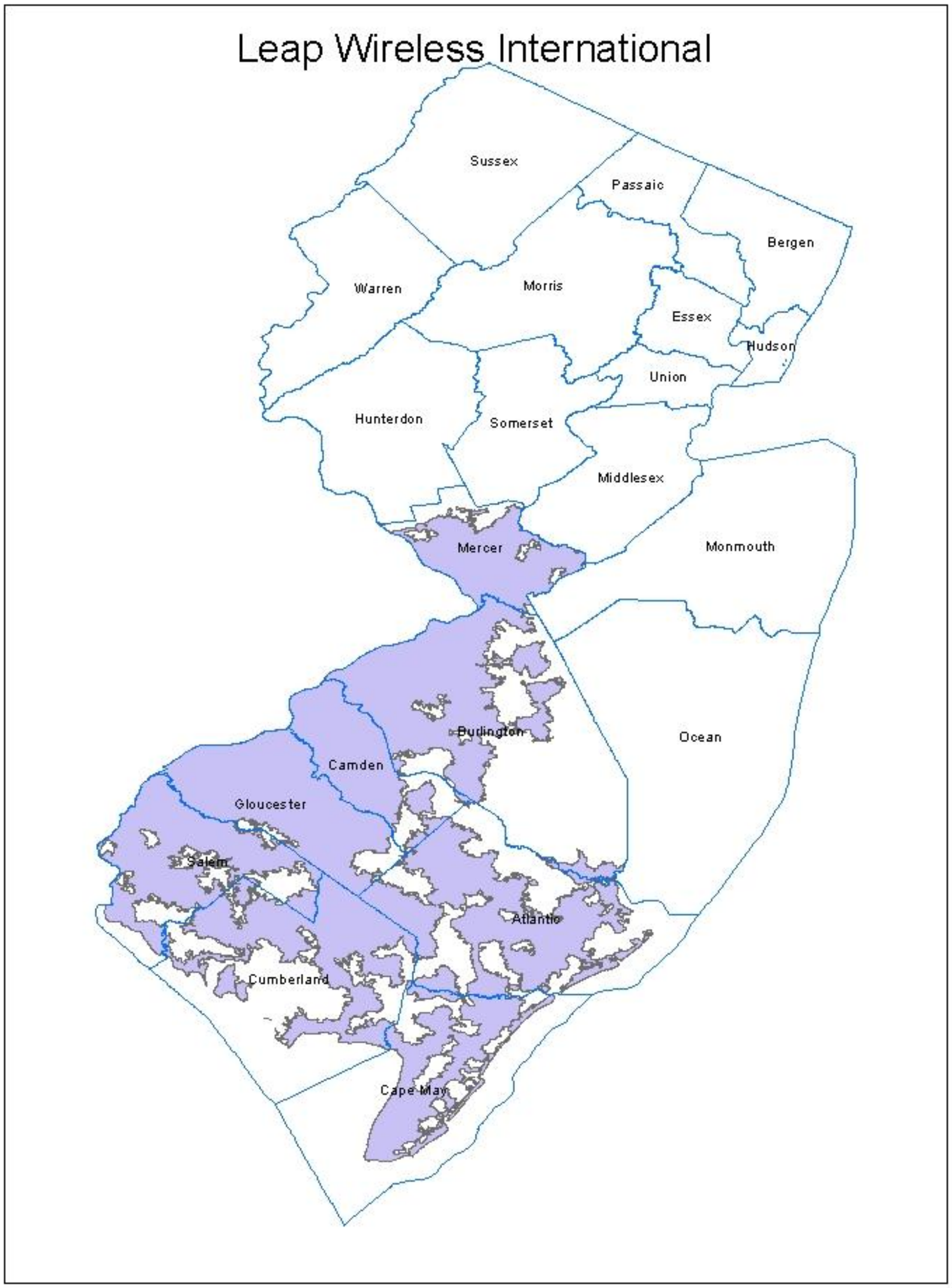
I'm told that the NJ data we previously sent was incorrect. Please find attached the tables with the correction. The FRN is 2963528 and the technology is 80, are correct though.

Please contact me with any questions. Thanks,

-Doug

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.15 Level3

Connecting New Jersey - Broadband Provider Data Report

Provider: Level3 Networks, Inc.

Received: August 2011

Submission date: April 2012

This report presents details on processing of broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

No NDA executed.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Level 3 Communications, LLC
Level 3
0003723822</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Text file spreadsheets</td></tr>
<tr><td>File size</td><td colspan="2">350 data rows</td></tr>
<tr><td>Speeds</td><td><table><tr><th>Type</th><th></th><th>Address level data</th></tr><tr><td>Typical-upstream</td><td></td><td>Yes</td></tr><tr><td>Typical-downstream</td><td></td><td>Yes</td></tr><tr><td>Advertised-upstream</td><td></td><td>Yes</td></tr><tr><td>Advertised-downstream</td><td></td><td>Yes</td></tr><tr><td>Subscriber-weighted-nominal speed</td><td></td><td>Not provided</td></tr></table></td><td>All set to same value: 11 (>= 1gpbs)</td></tr>
<tr><td>Technology Type</td><td colspan="2">50 (optical carrier/fibre)</td></tr>
<tr><td>End-user specification</td><td colspan="2">Yes (addresses)</td></tr>
</table>

Comments: typical and Advertised UP and DOWN are ALL THE SAME VALUE: 11 (>= 1gpbs)	
INTERCONNECTION DATA	
ID	
File size	text spreadsheet with 338 rows. (See comment)
Ownership	Not provided
Transport Type	provided
Data Rates/Capacity	provided
Location	Address provided as well as lat/long
Comments: A large number of duplicate rows were confusing. This is worth asking the provider. Provider indicates that they are separate instances and should NOT be removed as duplicates.	

Section 3: Submission File Details

The Service provider stated there is no change in data for the April 2012 Submission. We copied the Oct 2011 data.

Received 2 files by secure upload:

Size kb	**Name**
45	AddressAvailability_NewJersey_8-18-2011.txt
41	MiddleMile_New Jersey_8-18-2011.txt

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from the supplied tab-separated file. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column "DBA" (no provider name supplied separately)
DBANAME	As supplied in column "DBA"
FRN	As supplied in column "FRN" after removing dashes
OWNERSHIP	Set to null (not supplied)
BHCAPACITY	As provided in column "Serving Facility Capacity"
BHTYPE	As provided in column "Serving Facility Type"
LATITUDE	As supplied
LONGITUDE	As supplied
ELEVFEET	As supplied (all zero values)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Point shape created using ESRI ArcDesktop

Internal notes on processing:

1. The "middlemile" file has 338 rows, including many rows that are exact duplicates which we will have to discard despite the provider's assurances that they are "different".
2. Imported the data to a geodatabase table
3. Added a point for each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
4. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
5. Discarded 149 records with identical lat, long values and addresses.
6. Loaded 188 records.

NTIA Table BB_Service_CensusBlock

The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column "DBA" (no provider name supplied separately)
DBANAME	As supplied in column "DBA"
PROVIDER_TYPE	Set to "1"
FRN	As supplied in column "FRN"

STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column “Technology of Transmission”
MAXADDOWN	As supplied in column “Maximum Advertised Download Speed”
MAXADUP	As supplied in column “Maximum Advertised Upload Speed”
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null (see below)
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on the geocoded address

Internal processing notes:

1. Geocoded the addresses using an Arroyo flow and the Yahoo geocoder, leaving the result with address and lat, long data in an Excel spreadsheet. All addresses were successfully geocoded, although 1 was not placed in New Jersey.
2. Imported the spreadsheet to an ESRI geodatabase table
3. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option
4. Added a column containing the ID of the containing year 2010 census block using ArcCatalog's spatial join feature. The newly created point shapes are joined against census block shapes from reference data. All but three records successfully spatially joined on 2010 NJ Census Block shapes.
5. Discarded typical speeds since they were in all cases identical to maximum advertised speeds, not measured values.
6. The end user category value as originally supplied applied to an address, but we must anonymize the addresses and report census blocks. The NTIA directs us to report the “predominant” end-user category, which is not supplied here.
7. Discarded 79 duplicate census block records, which result from multiple addresses in the same census block.
8. Loaded 270 records.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Wednesday, August 24, 2011 9:14 AM
To: Diamond, Greg
Cc: ConnectingNJ@research.telcordia.com
Subject: NJBB Data Clarification

Greg,

We have reviewed the data you submitted to the New Jersey Broadband Mapping program. We have one question. The middle-mile data you submitted in MiddleMile_New Jersey_8-18-2011.txt includes many rows that are duplicates. Can we safely discard these duplicate entries?

Thanks for you participation,

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

From: Diamond, Greg [mailto:Greg.Diamond@Level3.com]
Sent: Wednesday, August 24, 2011 1:17 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJBB Data Clarification

John, this issue came up with our CA submission as well. We investigated and determined that there were in fact some differences, albeit small, with some of the sites such that each site is in fact unique. Give that, I would not treat them as duplicates.

Greg

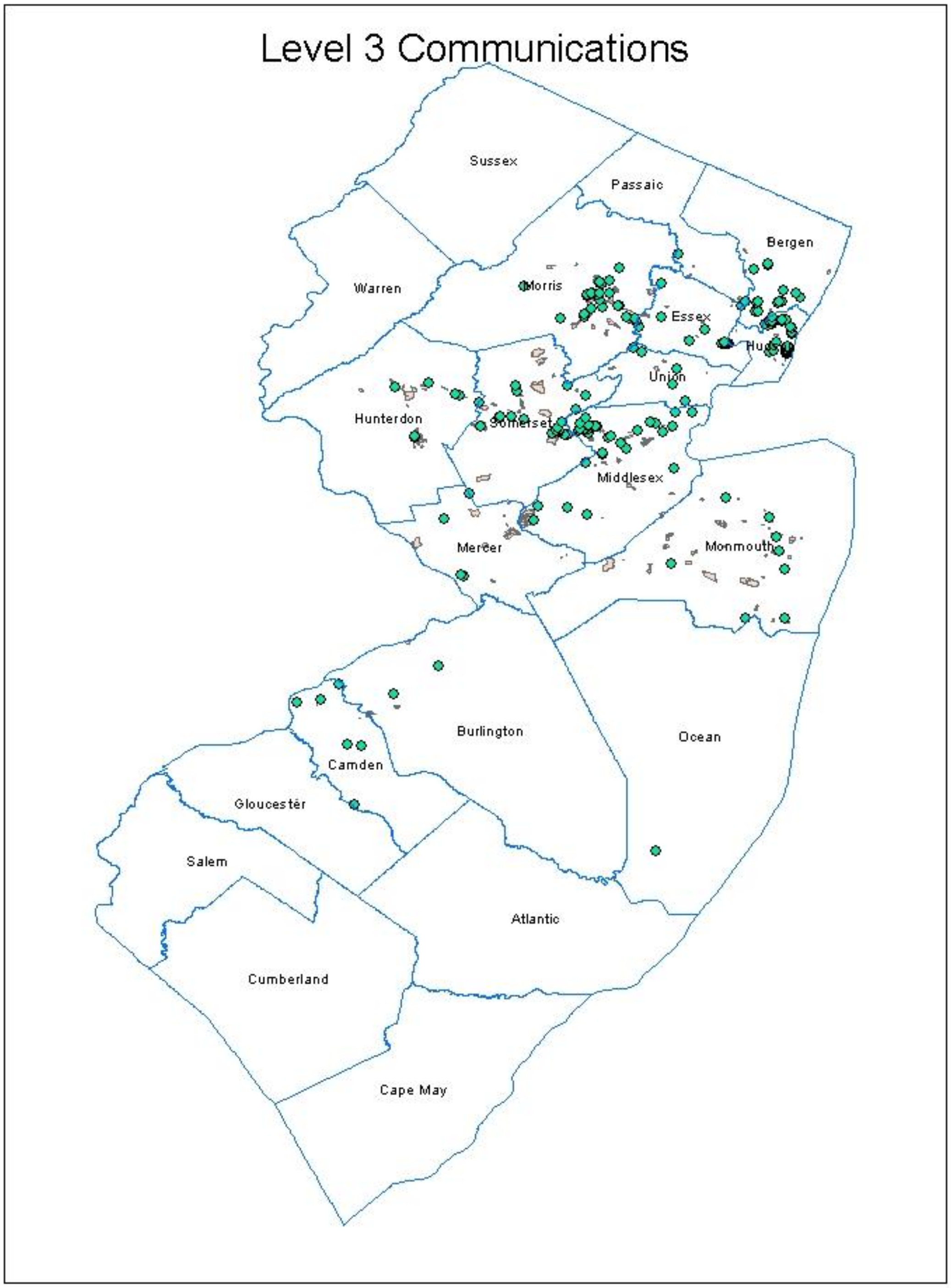
PLEASE NOTE MY NEW ADDRESS AND TELEPHONE NUMBER

Gregory T. Diamond

Regulatory Counsel
Level 3 Communications
1505 5th Avenue
Suite 501
Seattle, WA 98110
Desk: 206-652-5608
Mobile: 303-562-7378

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.16 Monmouth

Connecting New Jersey - Broadband Provider Data Report

Provider: Monmouth Telephone and Telegraph

Received: February 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Signed NDA is in place with NJ OIT.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Monmouth Telephone & Telegraph
same
0004325205</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Csv (NJBB_0004325205_AddressLevelAvailability.xls)</td></tr>
<tr><td>File size</td><td colspan="2">267 Kbytes, 1071 records</td></tr>
<tr><td>Speeds</td><td colspan="2">
<table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Address</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Address</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Address</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Address</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>None provided</td></tr>
<tr><td>Subscriber-weighted-</td><td></td><td>Not provided</td></tr>
</table>
</td></tr>
</table>

	down			
Technology Type	Code 30 – other copper line Code 50 - Optical Carrier/Fiber to the End User			
End-user specification	Code 4 – Medium or Large Enterprise			
Comments:				

INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: No middle mile was provided at this time. Monmouth gave the following explanation: Please note that Table 8, "Middle-mile and Backbone Interconnection Points Data", is not included per instructions on page 11 of the Data Submission Specifications" "Middle-mile and Backbone Interconnection Point information should focus on the connectivity at a point. That is, if a point at which network elements or segments are joined would not reasonably offer the possibility of technical connectivity with the network[s], it should not be reported".	

Section 3: Submission File Details

The data are very similar to the last submission.

Received 1 zip file:

Size	**Name**
20Kb	Broadband Mapping.zip

The zip archive contains the following files:

Size	**Name**
267Kb	NJBB_0004325205_AddressLevelAvailability.xls

27Kb	NJBB_0004325205_CMAAdvertisedAvailability. xls
27Kb	NJBB_0004325205_SubscriberWeightedNominalSpeed. xls
22Kb	Read Me.doc

File details:

File NJBB_0004325205_AddressLevelAvailability.csv:

The file contains 1071 records. Note that data file does not have a header row, but follows (largely) the ADDRESS DATA table from the NTIA "State Broadband Data and Development Grant Program" document. The columns and the corresponding headers are:

A	- Provider Name
C	- FRN
D-L	- Address
M	- EndUserCat
N	- TransTech
O	- MaxAdvDown
P	- MaxAdvUp
Q	- TypicDown
R	- TypicUp

The FRN is missing leading zeros. Most of the zip codes do not have the required leading zeros. It was established (prior interactions) that the DBA is Monmouth Telephone & Telegraph.

NJBB_0004325205_CMAAdvertisedAvailability.csv

The file contains 16 records. Note that data file does not have a header row, but follows the CMA data submission template that we posted on the connectingnj web site. The columns and the corresponding headers are:

A	- Provider Name
C	- FRN
D	- CMA
E	- TransTech
F	- MaxAdvDown
G	- MaxAdvUp

NJBB_0004325205_SubscriberWeightedNominalSpeed.csv

The file contains 16 records. Note that data file does not have a header row, but follows the Subscriber-Weighted Nominal Speed data submission template that we posted on the connectingnj web site. The columns and the corresponding headers are:

A - Provider Name

C - FRN

D - CMA

E - TransTech

F - SubsWeightedSpeed

Read Me.doc

The file contains explanations of the submission.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

We loaded from supplied Excel spreadsheet after suitable geo-spatial operations that obtained latitude/longitude pairs for each address. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Monmouth Telephone & Telegraph”
DBANAME	Set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to “0004325205”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null

FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column TransTech
MAXADDOWN	As supplied in column MaxAdvDown
MAXADUP	As supplied in column MaxAdvUp
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

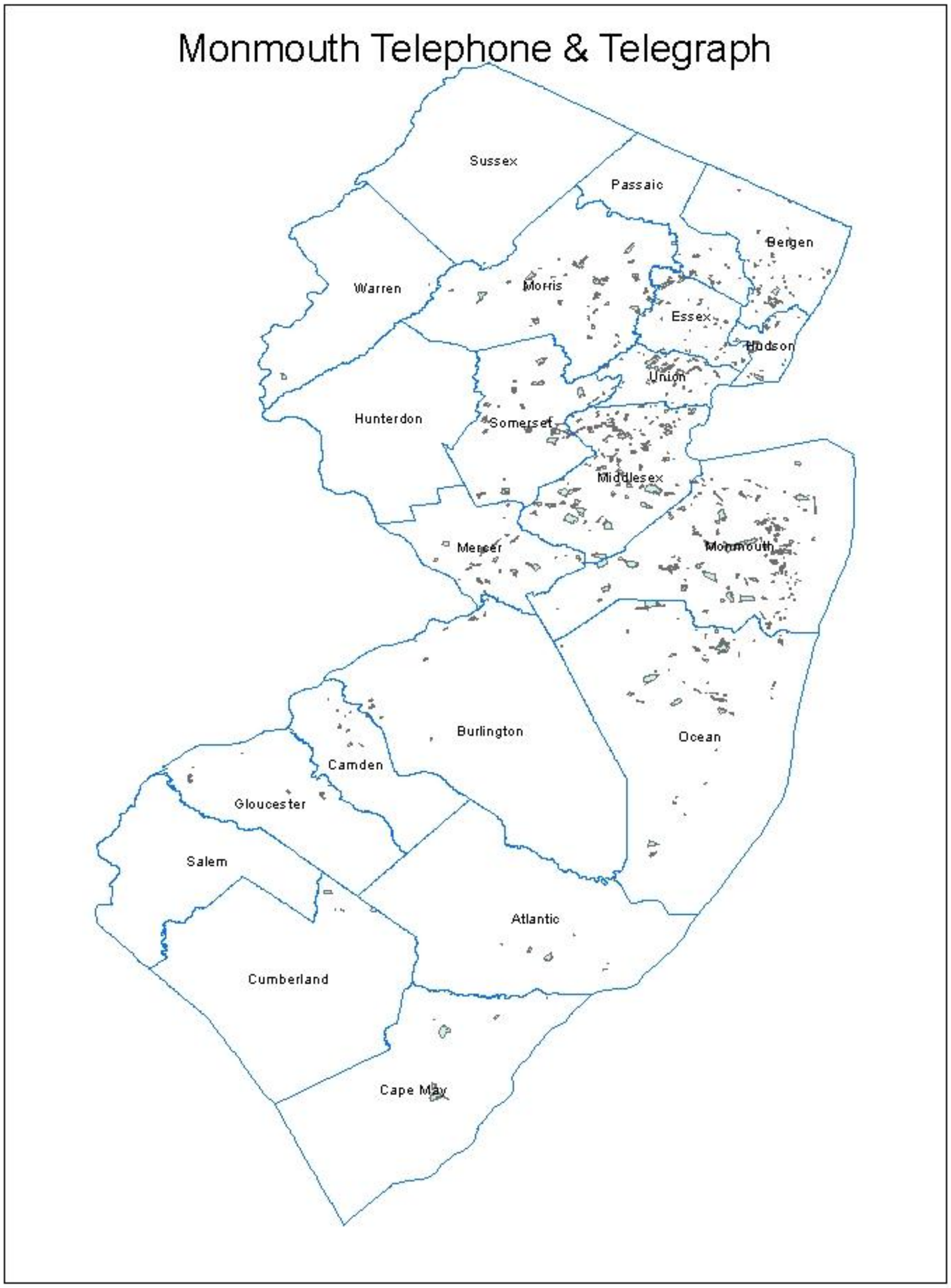
Internal processing notes:

1. All NJBB_0004325205_AddressLevelAvailability.csv records were successfully geo-coded using the Google and Yahoo geocoders to obtain a Latitude, Longitude pair for each.. Addresses that yielded results with accuracy of 6 or below were excluded; only intersection (7) or rooftop (8) accuracy is acceptable.
   Geocoding process failed for one address.
2. Created an Excel sheet and imported it to a geodatabase table.
3. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
4. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data.
5. Discarded one record that failed to spatially join on the 2010 NJ Census Block shapes.
6. Discarded 81 rows because the max adv down speed code was 1 or 2, which is not broadband according to the requirements of the NOFA
7. Discarded 175 rows with duplicate census blocks while preserving the greatest speed. These result from multiple customers in the same census block.
8. Discarded 4 large census blocks (greater than 2 square miles).
9. Final record count loaded is 734.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.17 NetCarrier Telecom

Connecting New Jersey - Broadband Provider Data Report

Provider: Netcarrier

Received: June 2011

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Netcarrier
Netcarrier Telecom, Inc.
0005043195</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Excel</td></tr>
<tr><td>File size</td><td colspan="2">119 KB (595 rows)</td></tr>
<tr><td>Speeds</td><td><table>
<tr><th>Type</th><th></th><th>Spatial Resolution: address</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Address-level</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Address-level</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Address-level</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Address-level</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table></td><td>Provides a .xls file with 895 rows of information (end user addresses).</td></tr>
<tr><td>Technology</td><td colspan="2">Types: 10, 30, 50</td></tr>
</table>

Type	
End-user specification	Address level.
Comments: Provider did not respond to requests for revised information for Spring 2012 submission. Their Web site indicates that they offer T1/T3 and fiber-based services. They do not specifically list ADSL. They do offer fractional T1 services, indicating that they could potentially support new customers at existing locations. Based on this information, it was decided to reuse their prior data for this round.	
INTERCONNECTION DATA	
ID	NJ_Broadband_Mapping-Backbone-090711
File size	12 kb
Ownership	Not provided
Transport Type	Facility type provided (code 1 and 2 used)
Data Rates/Capacity	Not provided
Location	Provided by street address (elevation provided as well)
Comments: 2 other fields called V-COORD and H-COORD (5 digit #'s) are provided.	

Section 3: Submission File Details

Received 1 file by secure upload:

Size	**Name**
74 kb	NJ477_Workbook-090411-NJ-BroadbandMapping-A.xls
12	NJ_Broadband_Mapping-Backbone-090711.xls

Section 4: Data Transformation and Loading

The following describes the processing applied to load the tables

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from the supplied Excel Spreadsheet. The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**

PROVNAME	As supplied in column “Provider Name” but changed “c” to “C”
DBANAME	As supplied in column “DBA” but changed “c” to “C”
FRN	As supplied in column “FRN”
OWNERSHIP	As provided in column “Ownership”
BHCAPACITY	As provided in column “Serving Facility Capacity”
BHTYPE	As provided in column “Serving Facility Type”
LATITUDE	As computed from address
LONGITUDE	As computed from address
ELEVFEET	Set to “0” (zero); values such as “Fl 1” were not parsed
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

1. Used the provider name, DBA name, and FRN as supplied.
2. Following steps were performed for Fall 2011 submission and the results reused:
    a. Geocoded the address to obtain a Latitude, Longitude value pair. All middle-point addresses were successfully geocoded using Arroyo with Yahoo geocoder.
    b. Imported the resulting data to a geodatabase table.
    c. Added a point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
    d. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
    e. Loaded 11 records.
3. These records were copied over into a new BB_ConnectionPoint_MiddleMile table
4. Results passed all NTIA validations.

NTIA Table BB_Service_CensusBlock

The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “Provider Name” but changed “c” to “C”
DBANAME	As supplied in column “DBA” but changed “c” to “C”
PROVIDER_TYPE	Set to “1”
FRN	As supplied in column “FRN”

STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column "Technology Code"
MAXADDOWN	As supplied in column "Max Ad Download Speed"
MAXADUP	As supplied in column "Max Ad Upload Speed"
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null (see below)
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

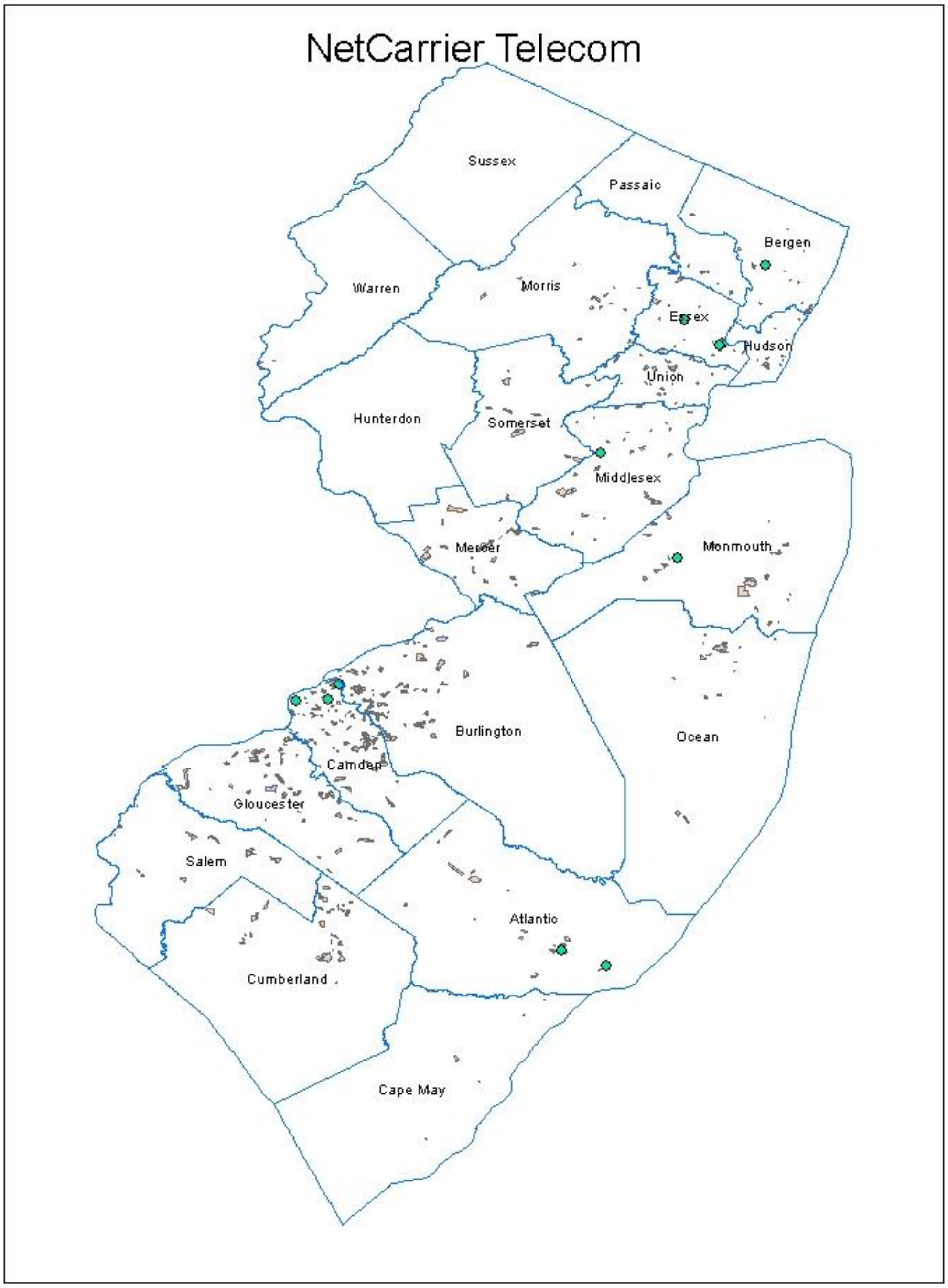
Internal processing notes:

1. Following steps were performed for the Fall 2011 submission:
    a. Geocoded the addresses using an Arroyo flow and the Yahoo geocoder, leaving the result with address and lat, long data in an Excel spreadsheet. All addresses were successfully geocoded (note: Excel file has an empty record at the end).
    b. Imported the spreadsheet to a simple ESRI geodatabase table
    c. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option
    d. Added a column containing the ID of the containing year 2010 census block using ArcCatalog's spatial join feature. The newly created point shapes are joined against census block shapes from reference data. All but three records successfully spatially joined on 2010 NJ Census Block shapes.
    e. Discarded typical speeds since they were in all cases identical to maximum advertised speeds, not measured values.
    f. The end user category value as originally supplied applied to an address, but we must anonymize the addresses and report census blocks. The NTIA directs us to report the "predominant" end-user category, which is not supplied here.
    g. Discarded 324 duplicate census block records, which result from multiple addresses in the same census block.
    h. Discarded 1 large census block record (340297351041013).
    i. Loaded 567 records.
2. Copied result into new BB_Service_CensusBlock

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.18 Network Billing Systems

Connecting New Jersey - Broadband Provider Data Report

Provider: Network Billing Systems

Received: February 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

None

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name "Doing business as" name FRN	Network Billing Systems LLC 0004965141
FOR WIRELINE		
Filetypes		
File size		
Speeds	Type | | Spatial Resolution: **address** Typical-upstream Typical-downstream Advertised-upstream Advertised-downstream Subscriber-weighted-up Subscriber-weighted-down	
Technology	Types:	

Type	
End-user specification	
Comments:	
INTERCONNECTION DATA	
ID	
File size	
Ownership	Confirmed via email - Leased
Transport Type	Fiber
Data Rates/Capacity	T1 to OC 48 (2.488 Gbps)
Location	Provided by street address
One email with three addresses of their fiber ring interconnections, two in New Jersey.	

Section 3: Submission File Details

Received information via email:

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “Network Billing Systems LLC”
DBANAME	Set to “Network Billing Systems LLC”
FRN	Set to “0004965141”
OWNERSHIP	Set to null, not provided
BHCAPACITY	Set to 5, OC-48 is 2.5Gbps
BHTYPE	Set to 1, transport facility is fiber
LATITUDE	As computed from address
LONGITUDE	As computed from address

ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

1. Used the provider name, DBA name, and FRN from FCC Form 477 reference data.
2. The following steps were performed for the October 2011 submission and the results re-used here:
    a. Geocoded the address to obtain a Latitude, Longitude value pair. All middle-point addresses were successfully geocoded using Arroyo with Yahoo geocoder.
    b. Imported the resulting data to a geodatabase table.
    c. Added a point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
    d. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
3. Based on provider email response, set ownership value to leased.
4. Loaded 2 records.

Section 5: Clarification Questions and Responses

From: Ray Wood [mailto:RayW@nbsvoice.com]
Sent: Wednesday, February 22, 2012 4:07 PM
To: NJ Broadband Data Collection
Cc: shelley.bates@oit.state.nj.us
Subject: FW: Reminder - NJ Broadband Data Collection

John/Shelley,

Nothing has changed on our end – sorry this is late, in this chain you will see my other responses.

If this does not suffice, please let me know.

Ray Wood

NBS

973-638-2155

From: Ray Wood
Sent: Tuesday, August 16, 2011 3:11 PM
To: 'ConnectingNJ@research.telcordia.com'
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

This is what I submitted – I think last summer.

Does this suffice?

To: Telcordia (NJ BB Data Collection)

From: Ray Wood (NBS, Product Manager).

Re: NJ BB Data Collection

I believe that we qualify for the BB Data Collection. However, what we do have that qualifies is only a portion of our business.

I don't believe we qualify as a fixed broadband or mobile broadband service provider.

However, we probably do qualify as a middle mile infrastructure provider.

We have a fiber ring that runs through the addresses listed below:

60 Hudson Street

NY, NY

(Carrier Hotel)

155 Halsey Street

Newark, NJ 07102

(Carrier Hotel)

282 Main Street

Little Ferry NJ

(Verizon Central Office)

We can offer bandwidth increments from T1 to OC-48.

Please let me know if you require further detail on this.

Thank you,

Ray Wood

Product Manager

NBS

973-638-2155

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 22, 2012 5:57 PM
To: 'Ray Wood'; 'NJ Broadband Data Collection'
Cc: 'shelley.bates@oit.state.nj.us'
Subject: RE: Reminder - NJ Broadband Data Collection

Ray,

This is great. The NTIA is collecting data every six months, and wants us to get revised data or verify previous data.

A couple of clarifications:

1. I am assuming you lease space at these facilities, rather than own them. Is that true in all three cases?
2. When you say you can offer T1 to OC-48, how is that configured? Do you resell facilities from other providers to connect to your locations?

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Ray Wood [mailto:RayW@nbsvoice.com]
Sent: Wednesday, February 22, 2012 6:00 PM

To: NJ Broadband Data Collection
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 22, 2012 5:57 PM
To: Ray Wood; 'NJ Broadband Data Collection'
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

Ray,

This is great. The NTIA is collecting data every six months, and wants us to get revised data or verify previous data.

A couple of clarifications:

1. I am assuming you lease space at these facilities, rather than own them. Is that true in all three cases?

Yes.

2. When you say you can offer T1 to OC-48, how is that configured?

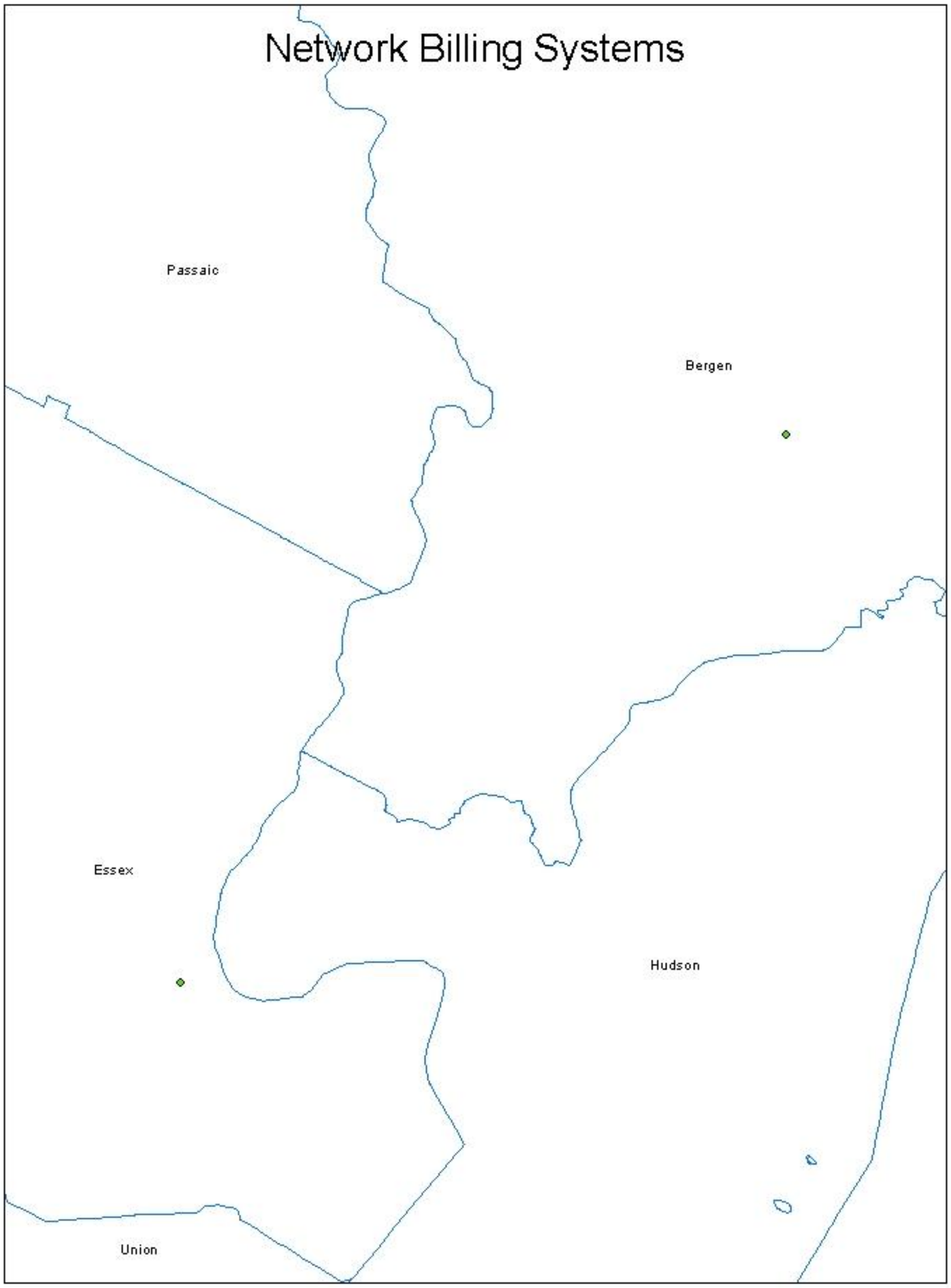
I don't understand.

Do you resell facilities from other providers to connect to your locations?

Yes.

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.19 Service Electric – Hunterdon

Connecting New Jersey - Broadband Provider Data Report

Provider: Service Electric Cable TV of Hunterdon

Received: August 2010/April 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

None.

Section 2: Submission Overview

<table>
<tr><th colspan="5">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="3">Provider name
“Doing business as” name
FRN</td><td>Service Electric Cable TV of Hunterdon, Inc.
DBA not provided
0003760014</td></tr>
<tr><th colspan="5">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="4">Text (a letter, not structured data)</td></tr>
<tr><td>File size</td><td colspan="4"></td></tr>
<tr><td rowspan="6">Speeds</td><td>Type</td><td></td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</td><td rowspan="6">In telephone conversation, provider indicated that their footprint has not changed from previous submissions, that speeds were 15 Mbps down and 1 Mbps up. While they are testing DOCSIS 3.0, it is not yet available commercially for residential customers.

In previous submissions, provider had given a list of municipalities that they covered</td></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Municipality</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Municipality</td></tr>
<tr><td>Subscriber-weighted-</td><td></td><td>Not provided</td></tr>
</table>

	up			completely.
	Subscriber-weighted-down		Not provided	
Technology Type	Docsis 2.0 (use code 41)			
End-user specification	Not provided			
Comments: Provider also indicated they deliver fiber service to business customers, but were not in a position to deliver location data for this round. We will pursue this further for the next round.				
INTERCONNECTION DATA				
ID				
File size				
Ownership	Leased			
Transport Type	Fiber			
Data Rates/Capacity	1 Gbps			
Location	List of addresses			
Comments: In telephone conversation, Provider described locations of interconnection huts and provided information on technology and speeds.				

Section 3: Submission File Details

Received email for October submission with information on the municipalities served in entirety, the technology of transmission, and the speed tiers offered to customers. Confirmed that information via phone on March 4, 2011

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “Service Electric Cable TV of Hunterdon, Inc.”
DBANAME	Not supplied; set same as PROVNAME

PROVNAME	As supplied
DBANAME	As supplied
FRN	Set to “0003760014”
OWNERSHIP	Set to 1 for leased
BHCAPACITY	Set to 4 for 1 Gbps
BHTYPE	Set to 1 for fiber
LATITUDE	Obtained by geo-coding addresses
LONGITUDE	Obtained by geo-coding addresses
ELEVFEET	Set to “0” (zero)
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

1. Provider gave a set of addresses. These addresses were geo-coded using Google geo-coder into an Excel spreadsheet.
2. Imported the Excel sheet to a geo-database table.
3. Added point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
4. Mapped to separate shape file to correct tolerance.
5. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_CensusBlock

Loaded based on email received on August 23, 2010. We submitted all census blocks in the named municipalities. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Service Electric Cable TV of Hunterdon, Inc.”
DBANAME	Not supplied; set same as PROVNAME
RESELLER	Set to “N”
FRN	Set to “0003760014”
STATEFIPS	Set to “34” (NJ)

COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 41 (Cable Modem – Other) per email Docsis-2.0
MAXADDOWN	Set to 7 (15 Mbps) per email
MAXADUP	Set to 3 (1 Mbps) per email
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

Internal processing notes:

1. Following steps were performed for October 2011 submission
    a. Created a file with municipality names that match exactly names in the "name" column in the Year 2000 Census Bureau TigerLine database. Primarily this meant changing "Boro" to "Borough".

Municipality	**County**
Alexandria Township	Hunterdon
Alpha Borough	Warren
Bloomsbury Borough	Hunterdon
Frenchtown Borough	Hunterdon
Greenwich Township	Warren
Harmony Township	Warren
Holland Township	Hunterdon
Kingwood Township	Hunterdon
Lopatcong Township	Warren
Milford Borough	Hunterdon
Phillipsburg	Warren
Pohatcong Township	Warren

    b. Joined against municipalities against reference data to identify corresponding list of census blocks.

2. Ran all NTIA validations.

NTIA Table BB_Service_RoadSegment

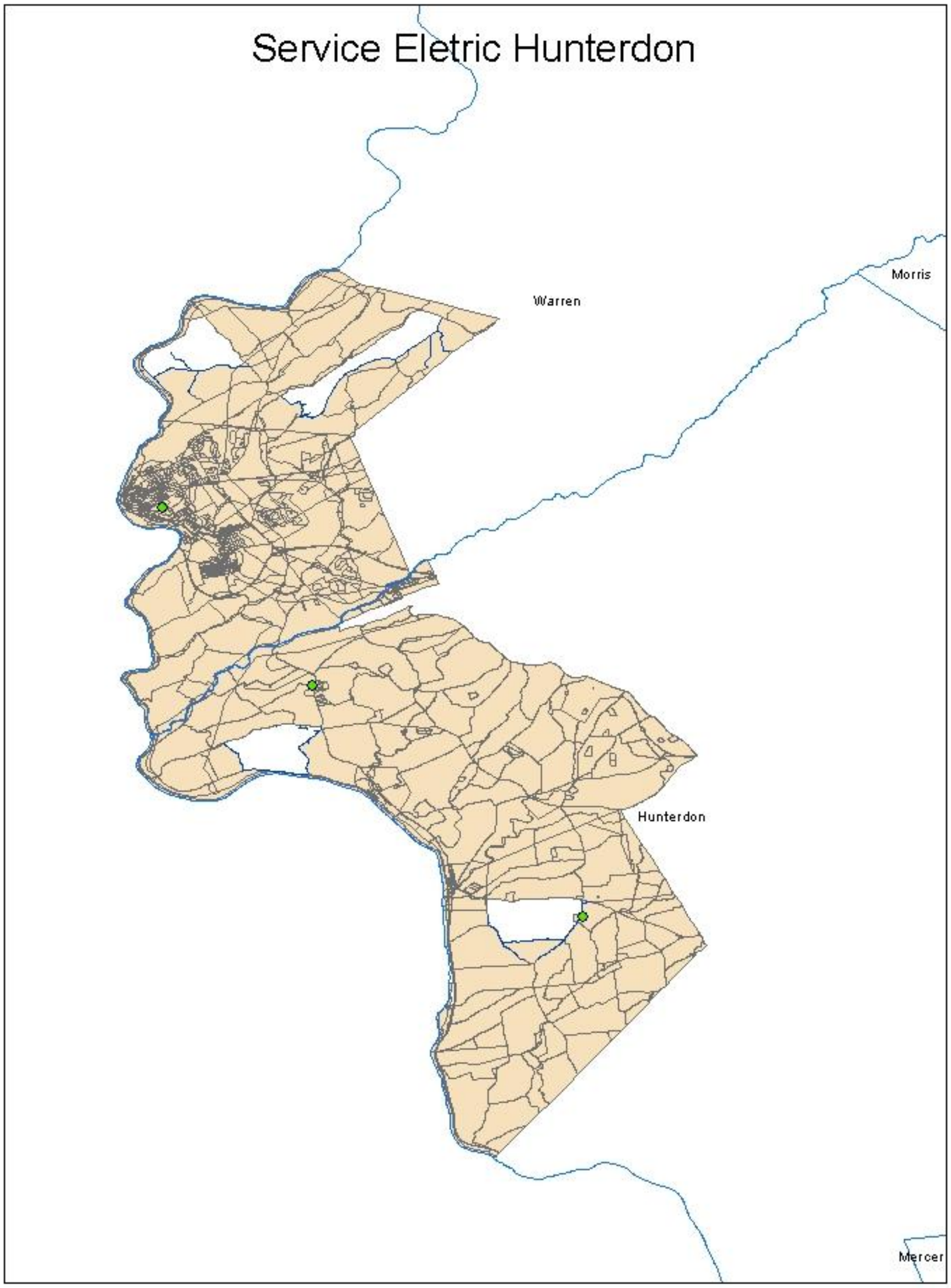
Loaded with street segments in census blocks larger than 2 square miles as listed in Census Bureau TigerLine reference data. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Service Electric Cable TV of Hunterdon, Inc."
DBANAME	Not supplied; set same as PROVNAME
RESELLER	Set to "N"
FRN	Set to "0003760014"
ADDMIN	From reference data
ADDMAX	From reference data
PREDIR	From reference data
STREETNAME	From reference data
STREETTYPE	From reference data
SUFFDIR	From reference data
CITY	From reference data
STATECODE	From reference data
ZIP5	From reference data
ZIP4	From reference data
TRANSTECH	Set to 41 (Cable Modem – Other) per email Docsis-2.0
MAXADDOWN	Set to 7 (10Mbps) per email
MAXADUP	Set to 3 (800Kbps) per email
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	From reference data

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.20 Service Electric – Sparta

Connecting New Jersey - Broadband Provider Data Report

Provider: Service Electric Cable TV of Sparta

Received: March 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

No NDA executed.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Service Electric Cable TV of NJ Inc.
Service Electric Broadband Cable
0005007125</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Text</td></tr>
<tr><td>File size</td><td colspan="2">9728 bytes</td></tr>
<tr><td>Speeds</td><td><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Municipality</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Municipality</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-</td><td></td><td>Not provided</td></tr>
</table></td><td>Provided list of municipalities they serve. Provider indicated that they do not cover all streets in the rural area they serve. Rather than overstate coverage, we elected to omit streets in large census blocks that are more likely to represent rural areas.

Provider indicated in email exchange that they offer DOCSIS 3.1 over their entire footprint. He provided list of speeds, which we confirmed with him.</td></tr>
</table>

	down			
Technology Type	Docsis 3.1 (will use code 40)			
End-user specification	Not provided			
Comments:				

INTERCONNECTION DATA	
ID	
File size	Several addresses provided
Ownership	Owned
Transport Type	Fiber
Data Rates/Capacity	One says “Fiber 10 gbps”; others have no statement - Clarified this via email. See answers below.
Location	Address
Comments:	

Section 3: Submission File Details

Received one (1) file by EMAIL:

Size	**Name**
9728	Broadband data Information.xls

Received a spreadsheet with information on the municipalities served in entirety, the technology of transmission, the modem speeds offered to customers, and some connection points.

We will gather all the census blocks in the municipality based on the TigerLine reference data and report those shapes in the BB_service_censusblock table.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from 8 rows in the supplied Excel spreadsheet. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Service Electric Cable TV of NJ Inc." per email response
DBANAME	Set to "Service Electric Broadband Cable" per email response
FRN	Set to "0005007125" per email response
OWNERSHIP	Set to 0 to indicate owned
BHCAPACITY	Set to 6 or 4, see below
BHTYPE	Set to 1, provider indicated fiber.
LATITUDE	Created by geocoding the supplied address
LONGITUDE	Created by geocoding the supplied address
ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2000 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

1. Following steps were performed during prior submission
   a. Created an excel sheet and imported to a geodatabase table.
   b. Added points corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
   c. Added a column containing the ID of the containing year 2000 census block via a spatial join of the points and the census block shapes from reference data.
2. Provider indicated that two sites are served by dual 10 Gbps links (code 6) and the rest are served by dual 2 Gbps links (code 4).

NTIA Table BB_Service_CensusBlock

Loaded based on the supplied file "Broadband data Information.xls". We submitted all census blocks less than 2 square miles in the named municipalities. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Service Electric Cable TV of NJ Inc." per email response

DBANAME	Set to “Service Electric Broadband Cable” per email response
PROVIDER_TYPE	Set to 1
FRN	Set to “0005007125” per email response
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 3-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code (next 5 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 40 per file (DOCSIS 3.0)
MAXADDOWN	Set to code 8 as reported by provider
MAXADUP	Set to code 5 as reported by provider
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes:

1. Created a file with municipality names supplied by provider in a form that match exactly names the “name” column in the Year 2010 Census Bureau TigerLine database. Primarily this meant changing “Boro” to “Borough”.
2. Joined against reference data to discover census blocks, for a total of 4,135 blocks.
3. Validation rules produced a warning for speed code of 8 with DOCSIS 3.1. Provider was not willing to commit that they offered anything faster. Internet search confirms that the fastest speed they advertise is 35 Mbps down and 3 Mbps up.

NTIA Table BB_Service_RoadSegment

Loaded with street segments in census blocks larger than 2 square miles as gathered from Census Bureau TigerLine reference data. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Service Electric Cable TV of NJ Inc.” per email response
DBANAME	Set to “Service Electric Broadband Cable” per email response
PROVIDER_TYPE	Set to 1

FRN	Set to “0005007125” per email response
ADDMIN	From reference data
ADDMAX	From reference data
PREDIR	Set to null, not available in reference data
STREETNAME	From reference data
STREETTYPE	Set to null, not available in reference data
SUFFDIR	Set to null, not available in reference data
CITY	From reference data
STATECODE	Set to "NJ"
ZIP5	From reference data
ZIP4	Set to null, not available in reference data
TRANSTECH	Set to 40 (DOCSIS 3.0)
MAXADDOWN	Set to code 8 as reported by provider
MAXADUP	Set to code 5 as reported by provider
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	From reference data

Internal processing notes:

1. Discovered all street segments that touch census blocks larger than 2 square miles in the municipalities served by the provider as discussed for table BB_Service_Censusblock.
2. Joined against reference data to discover street segment, for a total of 2,223 entries.

Section 5: Clarification Questions and Responses

From: James Galliford [mailto:jamesg@secable.com]
Sent: Monday, March 05, 2012 4:04 PM
To: Fiuk, Marek J
Cc: Wullert, John R II
Subject: Re: Tiger lines

Marek,

Thank you for your understanding.

These are the changes in speeds:

- 1.5/256 -> 2.0/256

- 7/1 -> 8/1
- 12/2 - 15/2
- 35/3 - No Change

We are going to work on compiling the detailed information using information that apparently has become available from our billing system recently. As soon as we get this information, we'll pass it on to you.

Thanks again.

-James

On 3/12/12 12:30 PM, Fiuk, Marek J wrote:

James,

Thank you for your cooperation in providing us with data needed for the forthcoming New Jersey Broadband submission.

While processing your data we have encountered some issues that we would like to clarify with you, in order to assure the best possible quality of the information we are going to submit.

You have provided us with a list of speed tiers that you support. Are all these speeds (in particular, the highest one) advertised in ALL municipalities from the list you supplied to us ?

If this is not the case, would you be able to provide the speed list on the per-municipality basis?

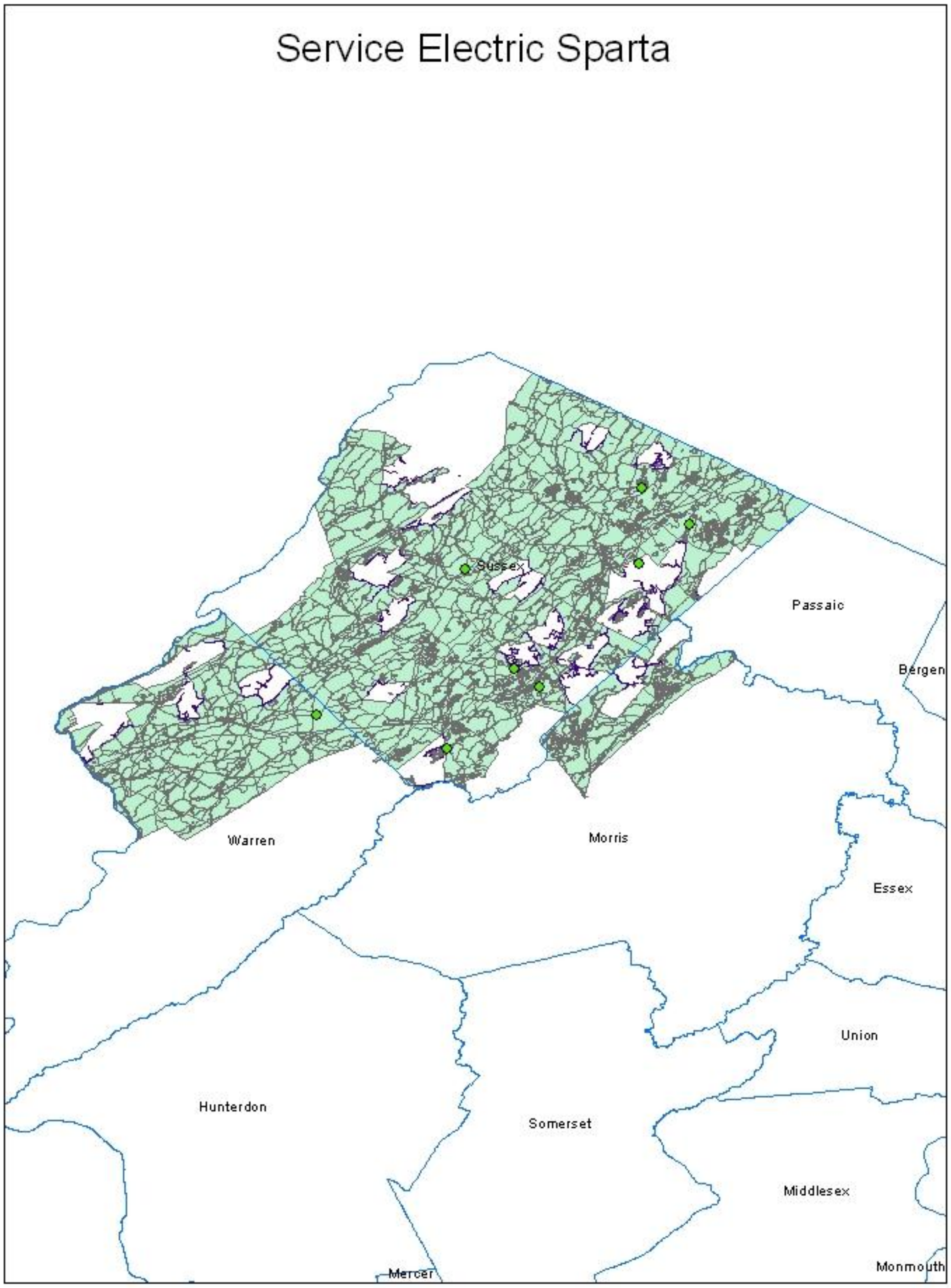
We also have a similar question regarding the cable technology - DOCSIS 3.0 and DOCSIS 1.1. Our current understanding is that you provide both of these in all covered municipalities. Is that correct ? If not, would you be able to provide us with the per-municipality list?

Regards,

Marek Fiuk

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.21 Sprint

Broadband Provider Data Report

Provider: Sprint

Received: October 2011

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA was executed.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA - RECEIVED JULY 15, 2010</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Sprint Nextel Communications
Sprint
0003-77-45-93</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td>Txt, xls, pdf, etc.</td><td></td></tr>
<tr><td>File size</td><td>Number of records, data elements</td><td></td></tr>
<tr><td>Speeds</td><td><table>
<tr><th>Type</th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</th></tr>
<tr><td>Upstream</td><td></td></tr>
<tr><td>Downstream</td><td></td></tr>
<tr><td>Typical</td><td></td></tr>
<tr><td>Advertised</td><td></td></tr>
<tr><td>Subscriber-weighted</td><td></td></tr>
</table></td><td></td></tr>
<tr><td>Technology Type</td><td>DOCSIS, xDSL, fiber, etc.</td><td></td></tr>
<tr><td>End-user</td><td>Business, consumer, gov’t etc</td><td></td></tr>
</table>

specification		
Comments:		
FOR WIRELESS		
Filetypes	shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.	**Supplied a shapefile (zip archive) with a two rows that uses projection GCS_WGS_1984. The actual shape in the archive is a multi-polygon. The 2 rows correspond to spectrums 3 and 5.**
Speeds	<table><tr><th>Type</th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</th></tr><tr><td>Upstream max adv</td><td>Single shape, single speed</td></tr><tr><td>Downstream max adv</td><td>Single shape, single speed</td></tr><tr><td>Upstream typical</td><td>Single shape, single speed</td></tr><tr><td>Downstream typical</td><td>Single shape, single speed</td></tr><tr><td>Subscriber-weighted</td><td>County; but all values are identical</td></tr></table>	Max advertised up 3, down 2; typical upstream 3, down 2.
Technology Type	Spectrum (Mhz, FCC code)	**3 and 5 (PCS 1850-1915 MHz, 1930-1995)**
Comments:		
INTERCONNECTION DATA		
ID	Provider name "Doing business as" name FRN	Sprint Nextel Corporation Sprint 0003-77-45-93
File size	Number of records, data elements	4
Ownership	Leased/owned	Leased = 2, owned = 2
Transport Type	Fiber, wireless, copper	Fiber
Data Rates/Capacity		2.4 GBPS < < 10GBPS

Location	Street address, lat/lon, elevation	Lat/Long
Comments:		
DATA COMPLETENESS		
Data Validation/ Verification	- Sprint provided a map showing coverage areas covering the majority of the state of New Jersey - Sprint provided a single set of attribute data, to be applied to the entire coverage area on 2 polygons ○ They included typical and maximum advertised upload and download speeds - Sprint provided spectrum data	

Section 3: Submission File Details

Received these files by upload to the secure web site:

Size	**Name**
365	Confidential_Middlemile_NJ.zip
3673KB	Sprint_AreaAvailability_NJ.zip

The zip archives contained these files:

Size	**Name**
498	Confidential_Middlemile_NJ.txt
1160	Sprint_AreaAvailability_NJ_region.dbf
143	Sprint_AreaAvailability_NJ_region.prj
5664180	Sprint_AreaAvailability_NJ_region.shp
116	Sprint_AreaAvailability_NJ_region.shx

Section 4: Data Validation, Transformation and Loading

Since there is no change in the data and NTIA data model, the table is copied from the 2011 October table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option.

Below is description for the Oct 2011 model as a reference.

Loaded 4 rows from the text file “Confidential_Middlemile_NJ.txt” supplied in October 2010. The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column “provider_name”
DBANAME	As supplied
FRN	As supplied in column “frn”, after removing hyphens
OWNERSHIP	As supplied
BHCAPACITY	As supplied in column “servingfacilitycapacity”
BHTYPE	As supplied in column “servicefacilitytype”
LATITUDE	As supplied
LONGITUDE	As supplied
ELEVFEET	As supplied in column “elevation” (all zero)
STATEABBR	Set to “NJ”
FULLFIPSID	Year 2010 Census Bureau TigerLine reference data
SHAPE	Created via ArcMap “Add XY Data” feature for lat/long value pairs

Internal notes on processing:

1. Created an excel sheet with the data and imported to a geodatabase table.
2. Created a feature class from the table by creating a Point shape using ArcMap’s “Add XY Data” feature corresponding to each Latitude, Longitude pair.
3. Added a column containing the ID of the containing year 2000 census block via a spatial join of the points and the census block shapes from reference data.
4. The only data imputed was the state abbreviation.
5. Reused the ESRI feature class created in the last round.

NTIA Table BB_Service_Wireless

Loaded two rows from from the supplied shapefile “Sprint_AreaAvailability_NJ_region. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “provider_name”
DBANAME	As supplied in column “dbaname”
FRN	As supplied in column “frn” after removing hyphens
TRANSTECH	As supplied in column “techtrans”
SPECTRUM	Set to 3 or 5 per translation shown below
MAXADDOWN	As supplied in column “maxaddnsp”
MAXADUP	As supplied in column “maxadupsp”
TYPICDOWN	Set to null
TYPICUP	Set to null
STATEABBR	Set to “NJ”
SHAPE	As supplied.

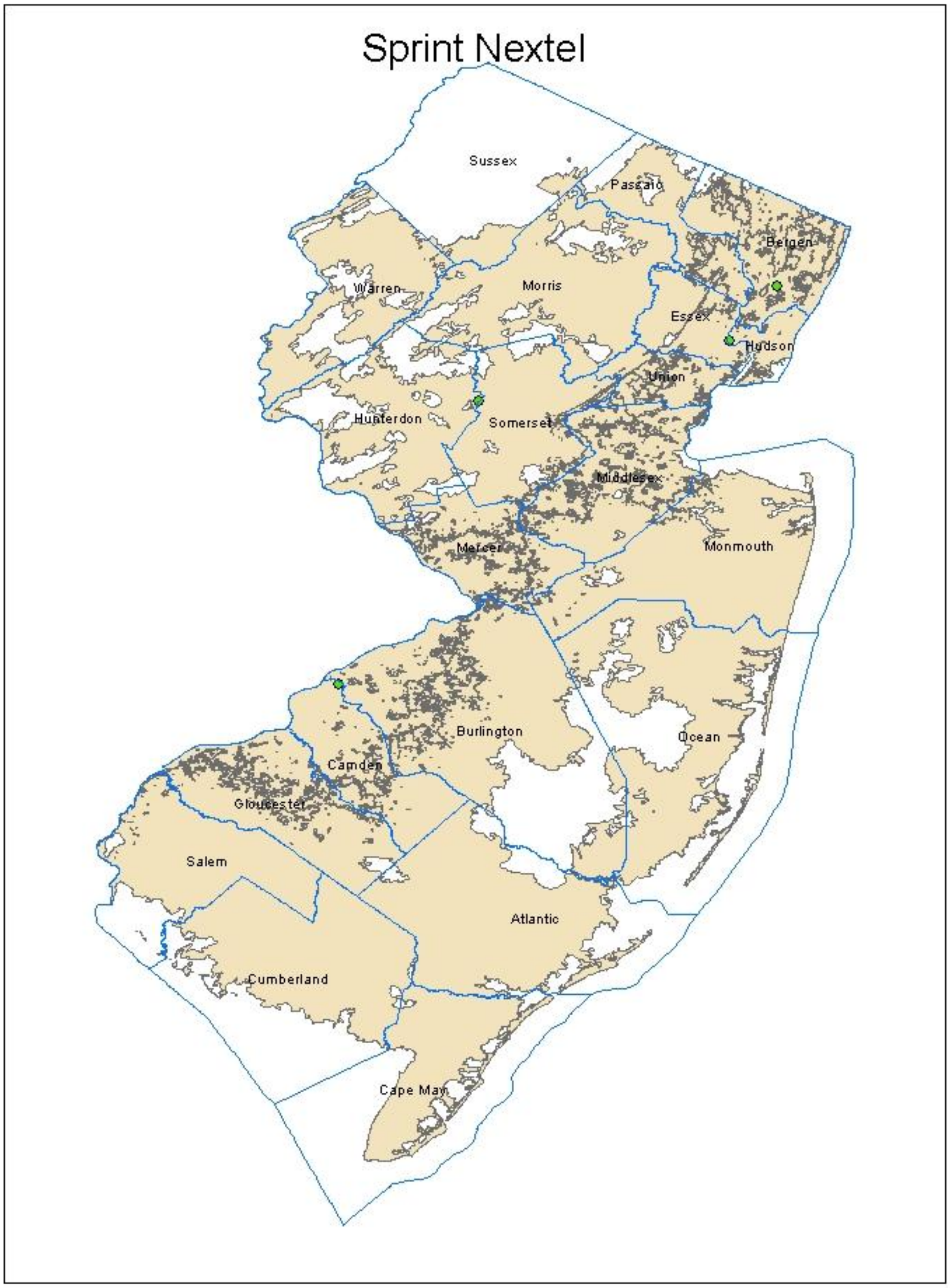
Internal notes on processing:

1. The supplied shape uses geographic coordinate system name GCS_WGS_1984 The NTIA data model requires the same coordinate system. No geographic transformation was required, but the XY Tolerance values differ when the shapefile is imported into the geodatabase. Imported the table schema and the table data in two separate operations, thereby ensuring perfect compatibility with the NTIA data model.
2. Details on spectrum transformation: Sprint provided input columns: spectrum1, spectrum2, spectrum3, spectrum4, spectrum5, spectrum6, spectrum7. Sprint put a "Y" in columns spectrum3 (representing range 1850-1915 MHz) and spectrum5 (representing range 2496–2690 MHz). The NTIA data model has a single column for spectrum. The corresponding NTIA “SPECTRUM USED” coded values are 3 and 5.
3. The only data imputed was the state abbreviation.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.22 Starband

Connecting New Jersey - Broadband Provider Data Report

Provider: Starband

Submission date: April 2012

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

NTIA Table BB_Service_Wireless

Total rows loaded: 1 (shape of The State of New Jersey).

Since there is no change in the data and NTIA data model, the table is copied from the 2011 October table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option.

Provider Interactions

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@spacenet.com]
Sent: Monday, January 23, 2012 5:42 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Dear Sir/Madam:

As of December 31, 2011, StarBand Communications does not have any changes to report.

Regards,

Lesley

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, February 03, 2012 2:05 PM
To: 'Lesley Cooper - McLean'
Cc: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Lesley,

Does Starband have any information on actual coverage areas, taking into account topography, building shadows, etc? Such data, perhaps from modeling and simulations, could improve the accuracy of the coverage map.

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@spacenet.com]
Sent: Tuesday, March 20, 2012 4:58 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Dear John,

Sorry for my delay in getting back to you. For each site that StarBand installs, prior to the actual installation our installers will go out to the site and make an assessment as to where the antenna should be placed so that it has adequate line of site.

Hope this helps.

Thanks,

Lesley

Connecting New Jersey - Broadband Provider Data Report

Provider: StarBand Communications Inc.

Received: March 2011

Submission date: April 2011

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

AVAILABILITY DATA				
ID	Provider name		StarBand Communications Inc.	
	"Doing business as" name		Not provided	
	FRN		0005087457	
FOR WIRELINE				
Filetypes				
File size				
Speeds	Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)	Max advertised up is Code 2 (256 Kbps), down is Code 3 (1.5 Mbps)
	Typical-upstream		Not provided	
	Typical-downstream		Not provided	
	Advertised-upstream			
	Advertised-downstream			
	Subscriber-weighted-up		256Kbps	
	Subscriber-weighted-down		1.5Mbps	

Technology Type	Code 60 (Satellite)
End-user specification	Not provided
Comments:	
INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: Not provided	

Section 3: Submission File Details

Received email explaining their service offering. Satellite service is provided in all of New Jersey.

On subscriber weighted values, they say:

"Since we have only 1 service that meets the definition of broadband service, the weighted average is the same as the average for that service. Upload speed is 256 Kbps and download speed is 1.5Mbps."

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

Loaded county shapes from reference data for counties in the State of New Jersey based on emailed statements that all counties are covered. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "StarBand Communications Inc."
DBANAME	Set to "StarBand"

FRN	Set to 0005087457
TRANSTECH	Set to 60
SPECTRUM	Set to 7 per translation shown below
MAXADDOWN	Set to 4, see below.
MAXADUP	Set to 2, see below.
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to "NJ"
SHAPE	County shape read from reference data.

Internal notes on processing:

1. Spectrum: No statement was provided. The NTIA data model has a single column for spectrum. Satellite corresponds to NTIA "SPECTRUM USED" code value 7.
2. Speeds: The maximum advertised speeds provided in the emailed brochure are as discussed above For max adv speeds we encoded the submitted down speed as value 4 (range 1.5-3 Mbps) and encoded the submitted up speed as value 2 (range 200 Kbps -- 768 Kbps).

Section 5: Clarification Questions and Responses

1. What is DBA name if different than provider name?

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Friday, March 18, 2011 10:51 AM
To: 'Lesley Cooper - McLean'
Cc: 'NJ Broadband Data Collection'
Subject: Starband NJBB CLarification

Lesley,

One quick clarification: we have your provider name as Starband Communications Inc. Do you have any other "doing-business-as" name that we should include in the submission to the NTIA?

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@Spacenet.com]
Sent: Tuesday, March 22, 2011 5:48 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: Starband NJBB CLarification

John,

No, we do not. StarBand is the provider of consumer broadband. StarBand is a part of another company, Spacenet Inc., but Spacenet is not a provider of consumer broadband services.

Please let me know if you have any further questions.

Lesley

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@Spacenet.com]
Sent: Tuesday, July 12, 2011 11:54 AM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Data Collection

This is to advise you that StarBand Communications does not have any changes to report.

Regards,

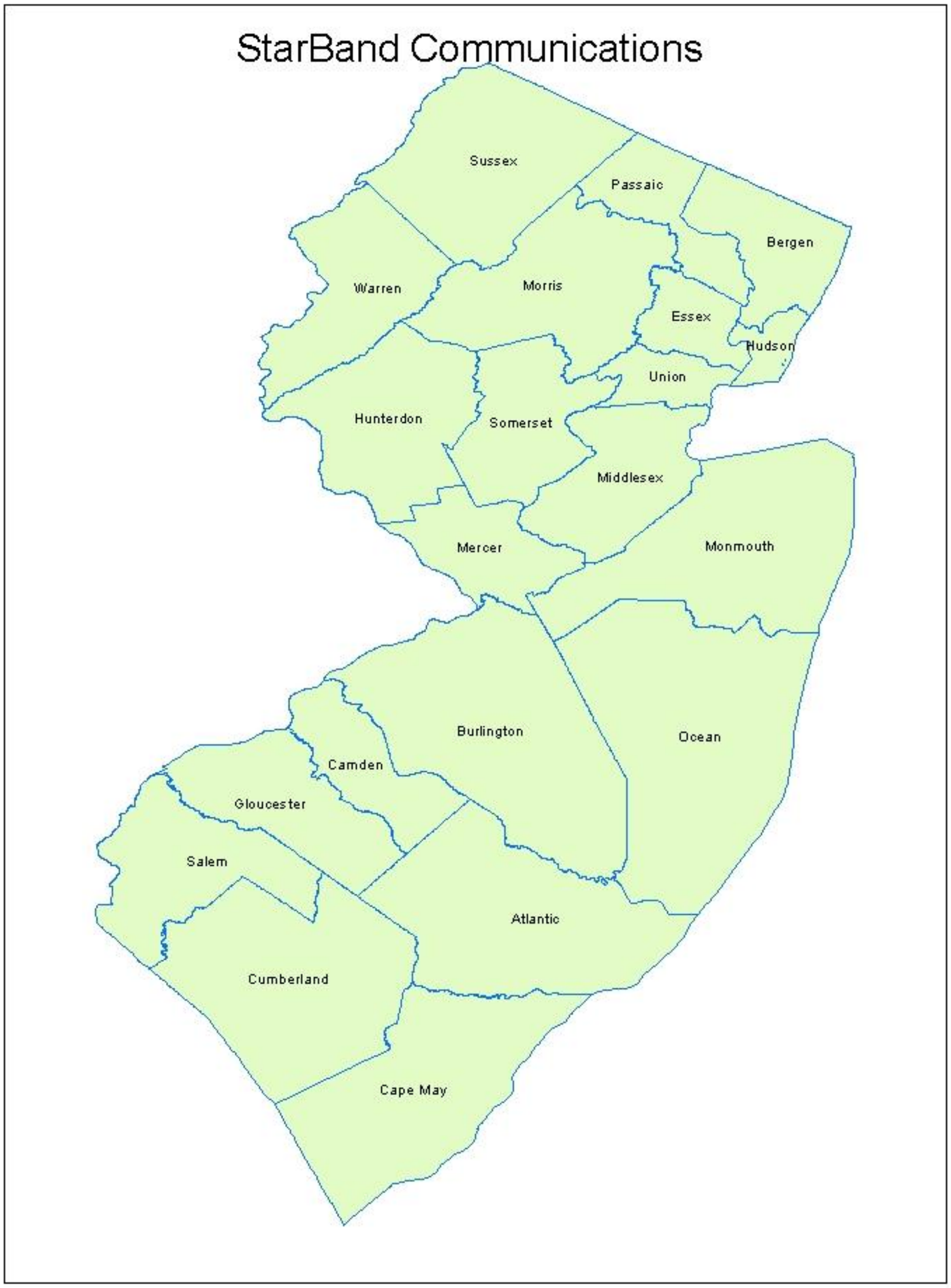
Lesley Cooper

Senior Counsel

StarBand Communications

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.23 Time Warner

Broadband Provider Data Report

Provider: Time Warner

Received: Feburary 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA established with NJ OIT.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	PROVIDER NAME	Time Warner Cable, LLC
	DBA NAME	Time Warner Cable
	FRN	0013430244
	Holding company name	Time Warner Cable Inc.
	Holding company number	131352
FOR WIRELINE		
File types	Time Warner supplied 2 pdf files and a shapefile showing coverage on FIPS census block level.	

	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)
Speeds	Upstream max adv	yes (code 5). census block.
	Downstream max adv	yes (code 9). census block
	Upstream typical	not provided.
	Downstream typical	not provided

	Subscriber-weighted	not provided	
Technology Type	40		
Comments:			

INTERCONNECTION DATA: INSTRUCTED TO USE PREVIOUS DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: **not provided** with initial submission. Sent request for updated information.	

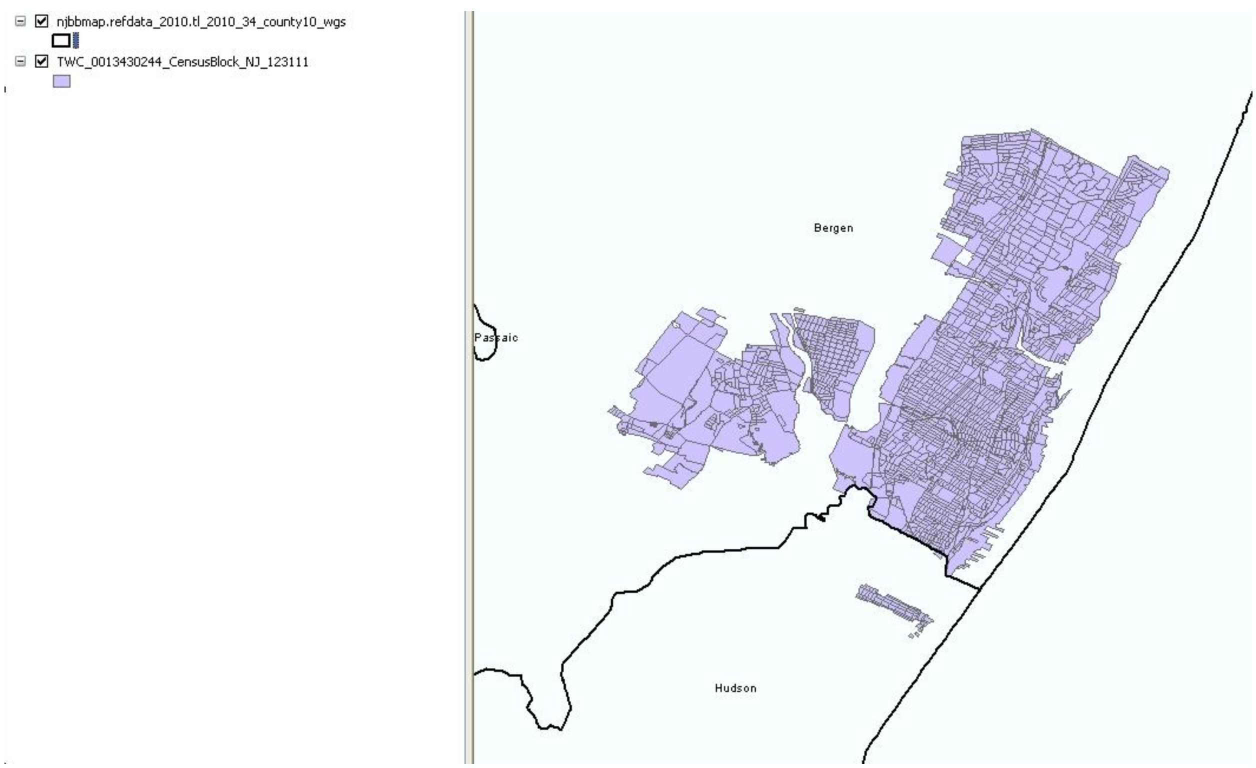
Section 3: Submission File Details

Received 1 archive file by EMAIL:

Name	**Size**
NJ 5th Round BB Cltr.pdf	147 KB
TWC_0013430244_CensusBlock_NJ_123111.cpg	1 KB
TWC_0013430244_CensusBlock_NJ_123111.dbf	644 KB
TWC_0013430244_CensusBlock_NJ_123111.prj	1 KB
TWC_0013430244_CensusBlock_NJ_123111.shp	529 KB
TWC_0013430244_CensusBlock_NJ_123111.shx	16 KB

Quick loading results: 1973 polygons in shapefile, spanning 2 counties in NJ.

Figure 1. Loaded results



Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from supplied file “0013430244_middlemile_NJ_06302009.txt” (19 rows, only 1 in New Jersey) received in **June 2010** (and apparently unchanged since). The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Time Warner Cable LLC” (“LLC” was missing)
DBANAME	As supplied in column ”DBAName”
FRN	Set to “0013430244”
OWNERSHIP	As supplied in column ”Ownership”
BHCAPACITY	As supplied in column ”Serving Facility Capacity”
BHTYPE	As supplied in column ”Serving Facility Type”
LATITUDE	As supplied in column “Latitude”
LONGITUDE	As supplied in column “Longitude”
ELEVFEET	As supplied in column “Elevation”
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau reference data
SHAPE	Point corresponding to Lat, Long created using ESRI

Internal processing notes from prior report:

1. Created an excel sheet and imported to a geodatabase table.
2. Added points corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
3. We dropped all locations outside the New Jersey state boundary, leaving just one. In this row, the elevation value is 30, and we were told in June 2010 that the connection point is on the 7th floor of a building, so we did not change the value.
4. Added a column with the ID of the containing Year 2000 Census block via a spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_CensusBlock

The census block information was oaded from the supplied shape file. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Time Warner Cable LLC” (“LLC” was missing in submitted data)

DBANAME	As supplied in column ”DBAName”
PROVIDER_TYPE	Set to 1
FRN	Set to “0013430244”
STATEFIPS	Set to “34”
COUNTYFIPS	Populated from cb_fips (digits 3-5)
TRACT	Populated from cb_fips (next 6 digits)
BLOCKID	Populated from cb_fips (next 4 digits)
FULLFIPSID	As supplied in column cb_fips
TRANSTECH	As supplied in column tech_trans
MAXADDOWN	As supplied in column max_ad_dwn
MAXADUP	As supplied in column max_ad_up
TYPICDOWN	Submitted as “0” in provided data, set to null
TYPICUP	Submitted as “0” in provided data, set to null
ENDUSERCAT	Not provided, set to null
SHAPE	As supplied

Internal notes on processing

1. The shapefile TWC_0013430244_CensusBlock_NJ_123111 contains 1973 rows (polygons). See above for a preview picture.
2. The shapes use XY coordinate system GCS_North_American_1983. Provides census-block shapes and associated speed data. All census block IDs are length 15. All submitted block IDs are unique and were found in Census Bureau Year 2010 reference data. Only technology code 40 is present. Maximum advertised speed codes are present.
3. Geographic coordinate system: The supplied shape uses geographic coordinate system name GCS_North_American_1983. The NTIA transmittal data model requires coordinate system GCS_WGS_1984. To change the projection we applied the geographic transformation NAD_1983_To_WGS_1984_5 (per ESRI KB article 24159). We also had to load the data into a second feature class such that the tolerance value matches the NTIA transmittal model’s value of 0.000000002.
4. Checked that all census blocks were valid NJ blocks and that no duplicates were present.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Monday, February 27, 2012 10:26 AM
To: 'monique.crawford@twcable.com'
Cc: 'NJ Broadband Data Collection'
Subject: NJ Braodband Clarification

Monique,

We have begun reviewing your latest broadband availability data and noticed that this round you did not include any information on middle mile. Do you have updated middle mile information or should we use the data you submitted in the previous round?

Thanks,

John Wullert

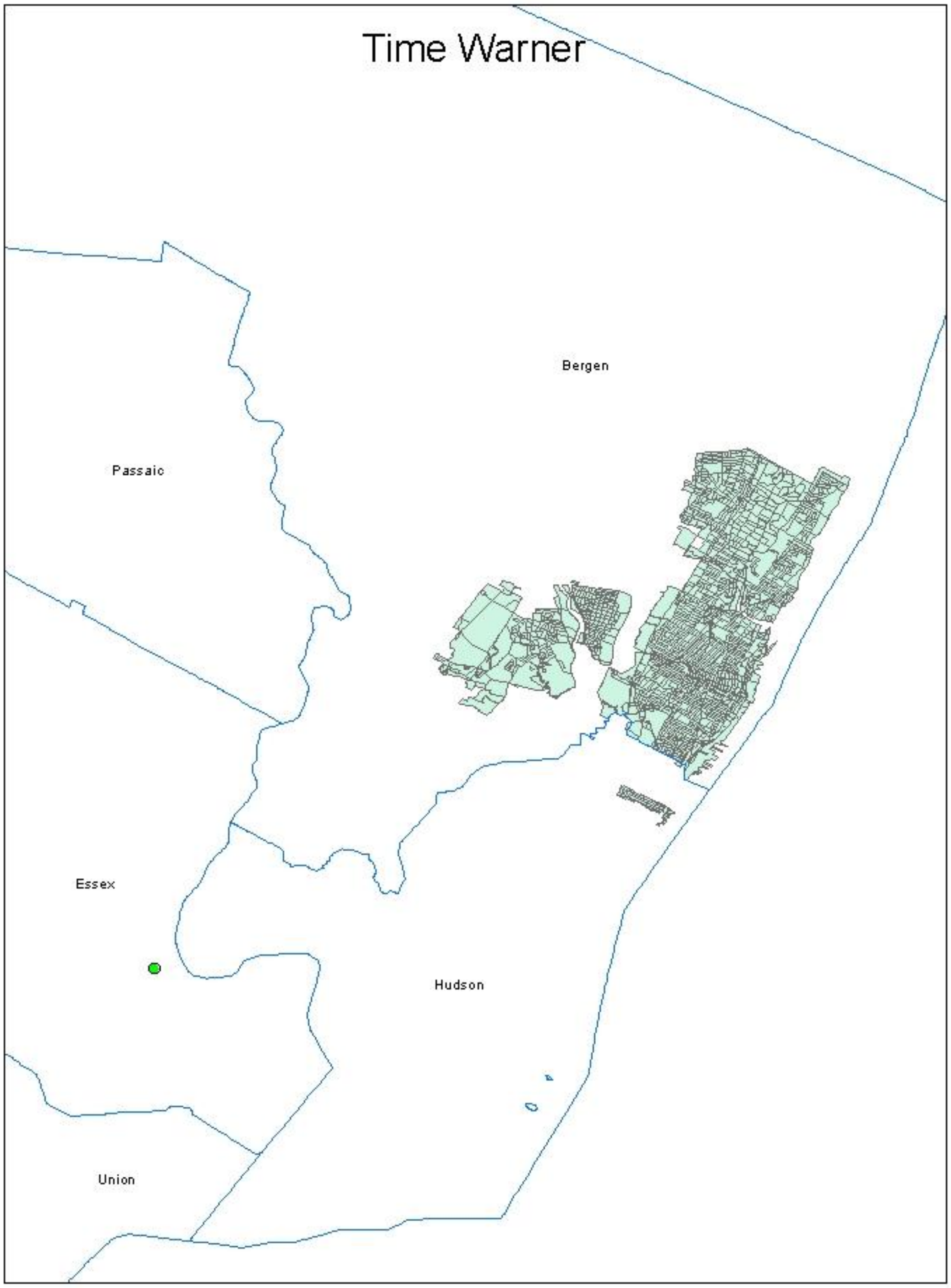
Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data


Time Warner
Bergen
Passaic
Essex
Hudson
Union

6.24 T-Mobile

Connecting New Jersey - Broadband Provider Data Report

Provider: T-Mobile

Received: February 2012

Submission date: April 2012

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Executed with NJ OIT.

Section 2: Submission Overview

AVAILABILITY DATA			
ID	PROVIDER NAME	T-Mobile USA, Inc.	
	DBA NAME	T-Mobile	
	FRN	0006945950	
	Holding company name	T-Mobile USA	
	Holding company number	130403	
FOR WIRELESS			
Filetypes	T-mobile supplies .xls, .txt. and shapefiles (availability). They supply 3 sets of shape files: 2 for HSPA+ coverage and another for 3G coverage.		
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)	**Notes: "T-Mobile submitted three sets of map files for this state. The file names correspond with maximum advertised speed data above. HSPA42 represents increased 4G download speed (it does not affect upload speed)."**
	Upstream max adv	yes (shapefiles for both 3G and 4G)	
	Downstream max adv	yes (shapefiles for both 3G and 4G)	
	Upstream typical	not found.	
	Downstream typical	not found.	

	Subscriber-weighted	Provided as a table of values in mbps (not kbps) correlated to 21 FIPS codes (code 80)	
Technology Type	Spectrum (Mhz, FCC code)		Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155)
Comments:			

INTERCONNECTION DATA	
ID	
File size	10 rows
Ownership	Code 1
Transport Type	Type 1
Data Rates/Capacity	codes 4 and 6
Location	lat/longs given for all (either A or Z end is in NJ)
Comments: T-Mobile had reported with their submission that this information would be delayed	

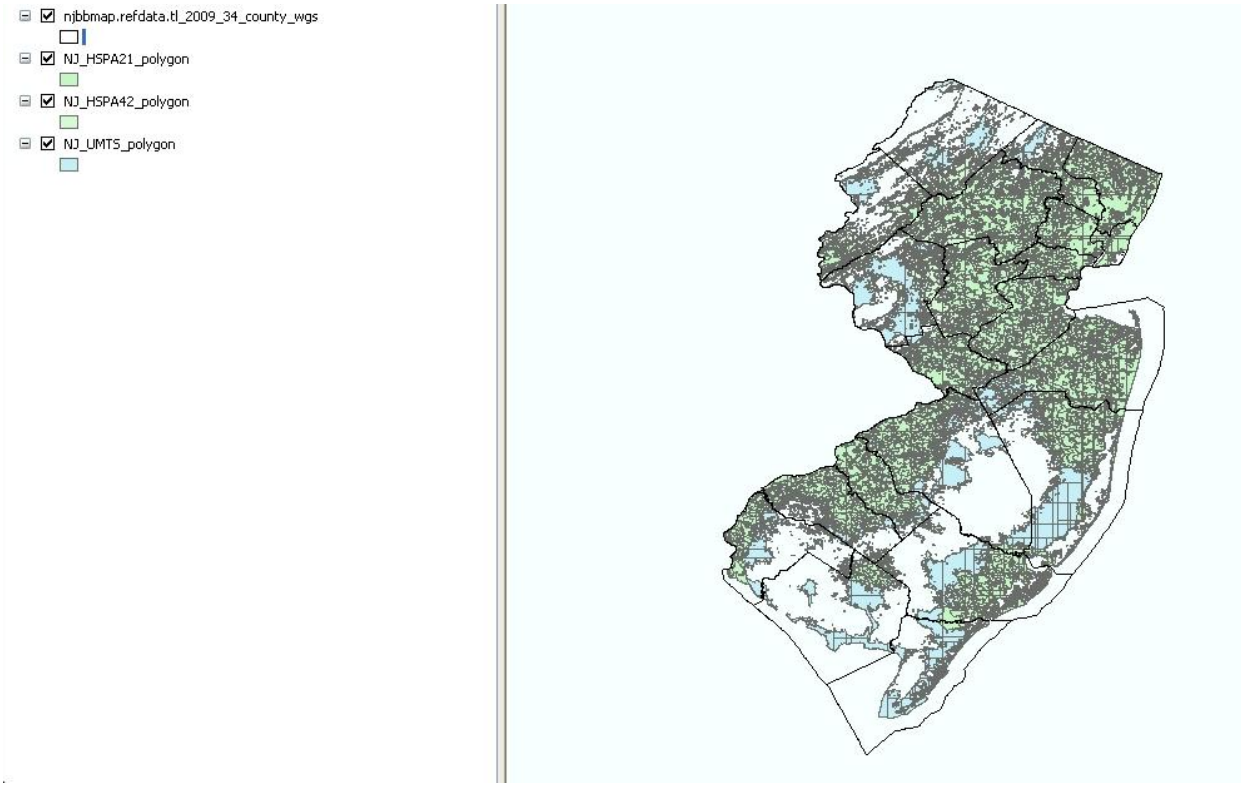


Figure 1. Preview of submitted data in ESRI

Section 3: Submission File Details

The original submission includes the following files:

Name	Size
area_availability_NJ.txt	3 KB
area_availability_NJ.zip	5,547 KB
avg_speed_NJ.xlsx	12 KB
confidential_NJ.txt	1 KB
Cover Letter_NJ.pdf	406 KB
NJ_HSPA21_polygon.dbf	395 KB
NJ_HSPA21_polygon.prj	1 KB
NJ_HSPA21_polygon.shp	5,517 KB
NJ_HSPA21_polygon.shx	48 KB
NJ_HSPA42_polygon.dbf	62 KB
NJ_HSPA42_polygon.prj	1 KB
NJ_HSPA42_polygon.shp	1,024 KB
NJ_HSPA42_polygon.shx	8 KB
NJ_UMTS_polygon.dbf	170 KB
NJ_UMTS_polygon.prj	1 KB
NJ_UMTS_polygon.shp	5,906 KB
NJ_UMTS_polygon.shx	21 KB
T-Mobile_BB Data_NJ.zip	5,869 KB

The second submission includes the middle mile data

Name	Size
Middle-mile_NJ.xls	10kb

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from supplied file "middle_mile_NJ.xlsx" (10 rows). The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "T-Mobile USA, Inc."
DBANAME	Set to "T-Mobile"
FRN	Set to "0006945950"

OWNERSHIP	As provided in column Ownership (value 1)l
BHCAPACITY	As provided in column Serving Facility Capacity
BHTYPE	As provided in column Serving Facility Type
LATITUDE	Created by geocoding the supplied address
LONGITUDE	Created by geocoding the supplied address
ELEVFEET	Set to “0” (zero)
STATEABBR	As provided in column State
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau reference data
SHAPE	Point created using ESRI tools

Internal notes on processing:

1. Created an excel sheet with the original data, add the Latitude and Longitude columns, copied the NJ lat/long from the A or Z lat/long to the Latitude and Longitude columns, and imported to a geo-database table.
2. Added points corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
3. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the Year 2010 census block shapes from Tiger Line reference data. Ensured that all entries were successfully mapped to 2010 census blocks.
4. Dropped 6 records that were as duplicate census blocks
5. Loaded 4 records.

NTIA Table BB_Service_Wireless

Loaded from the supplied shapefiles NJ_HSPA21_polygon (6022 rows), NJ_HSPA42_polygon (970 rows), and NJ_UMTS_polygon (2586 rows). The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	Set to "T-Mobile USA, Inc." per area_availability_NJ.txt
DBANAME	Set to “T-Mobile" per area_availability_NJ.txt
FRN	Set to “0006945950”
TRANSTECH	Set to 80 per area_availability_NJ.txt
SPECTRUM	Set to “4” per translation shown below
MAXADDOWN	Set as follows: • HSPA 21 is 6; • HSPA 42 is 7;

	• UMTS is 4; as specified in file area_availability_NJ.txt
MAXADUP	Set as follows: • HSPA 21 is 4; • HSPA 42 is 4; • UMTS is 2; as specified in file area_availability_NJ.txt
TYPICDOWN	Set to null (not supplied)
TYPICUP	Set to null (not supplied)
STATEABBR	As supplied in column “state” with “NJ”
SHAPE	As supplied.

Internal notes on processing:

1. Received three shape files; see above for preview of shapefiles in ESRI. (Note that we do not check duplicate since the shapes will be merged to a single shape for each technology)
    a. NJ_HSPA21
        i. 6022 candidates
    b. NJ_HSPA42
        i. 970 candidates
    c. NJ_UMTS
        i. 2586 candidates
    d. All shapes are contained within the state of New Jersey
2. The data rows carry no technology, speed, or other broadband data. This data is provided in a separate file. File “area_availability_NJ.txt” provides technology and spectrum codes that are within the valid set. It also provides maximum-advertised speeds for each wireless technology.
3. File “avg_speed_NJ.xls” provides subscriber-weighted nominal speeds, which we will not be using for this round (no overview table required).
4. Spectrum: NOFA defines 7 spectrum columns. T-Mobile provided a “Y” value in column 4 (Advanced Wireless Services, ranges 1710-1755 MHz; 2100-2155) in file area-availability_NJ.txt, so we coded the value as '4'.
5. The supplied shapes use geographic coordinate system GCS_North_American_1983. The NTIA data model requires coordinate system GCS_WGS_1984. To change the projection we applied the ESRI geographic transformation NAD_1983_To_WGS_1984_5 (per ESRI KB article 24159). The resulting table is named with suffix “_wgs”.
6. The supplied shapes use tolerance values different from the NTIA transmittal model. The transformed feature classes with suitable tolerances are named with suffix “_wgs_tol”.
7. The NJ_HSPA42 and NJ_UMTS shapefiles contained some identical rows as determined by spectrum, technology, and shape; the rows only differed in the maximum advertised speed. To prevent the problem of duplicate shapes in the merged data, we took the following actions:
    a. Merged shapes in NJ_HSPA21_polygon_wgs_tol into a single shape, using ArcGIS Dissolve tool. The transformed table is named with suffix "_wgs_tol_Dissolve".
    b. Merged shapes in NJ_HSPA42_polygon_wgs_tol into a single shape, using ArcGIS

Dissolve tool. The transformed table is named with suffix "_wgs_tol_Dissolve".
   c. Merged the shapes in NJ_UMTS_polygon_wgs_tol into a single shape, using ArcGIS Dissolve tool. The transformed table is named with suffix "_wgs_tol_Dissolve".
8. Validation rules produced a warning with the HSPA42 having a Maximum Advertised Download Speed code of 7. Investigation of the T-Mobile Web site showed that they are advertising average speeds "approaching 10 Mbps" and peak speeds of 27 Mbps. Sent a note to the provider to verify the value. Provider confirmed that those values are correct.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 28, 2012 8:21 AM
To: 'jeni.wilcox@t-mobile.com'
Cc: 'NJ Broadband Data Collection'
Subject: NJ Broadband Clarification

Jeni,

As part of the validation of the Broadband Data, the NTIA has defined a set of speed ranges associated with various technologies and asked us to verify any submission values outside those ranges. In the case of the T-Mobile data, the value of 7 (10 to 25 Mbps) associated with download on HSPA42 is outside the NTIA's expected range. Can you please confirm that you are reporting download speeds of greater than or equal to 10 Mbps and less than 25 Mbps?

Thanks,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Wilcox, Jeni [mailto:Jeni.Santana@t-mobile.com]
Sent: Tuesday, March 20, 2012 12:41 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Clarification

Hi John,

Sorry, this one slipped by me. Yes, T-Mobile is reporting **≥ 10 mbps < 25 mbps** as the maximum advertised download speed for its HSPA+42 network.

Thank you,

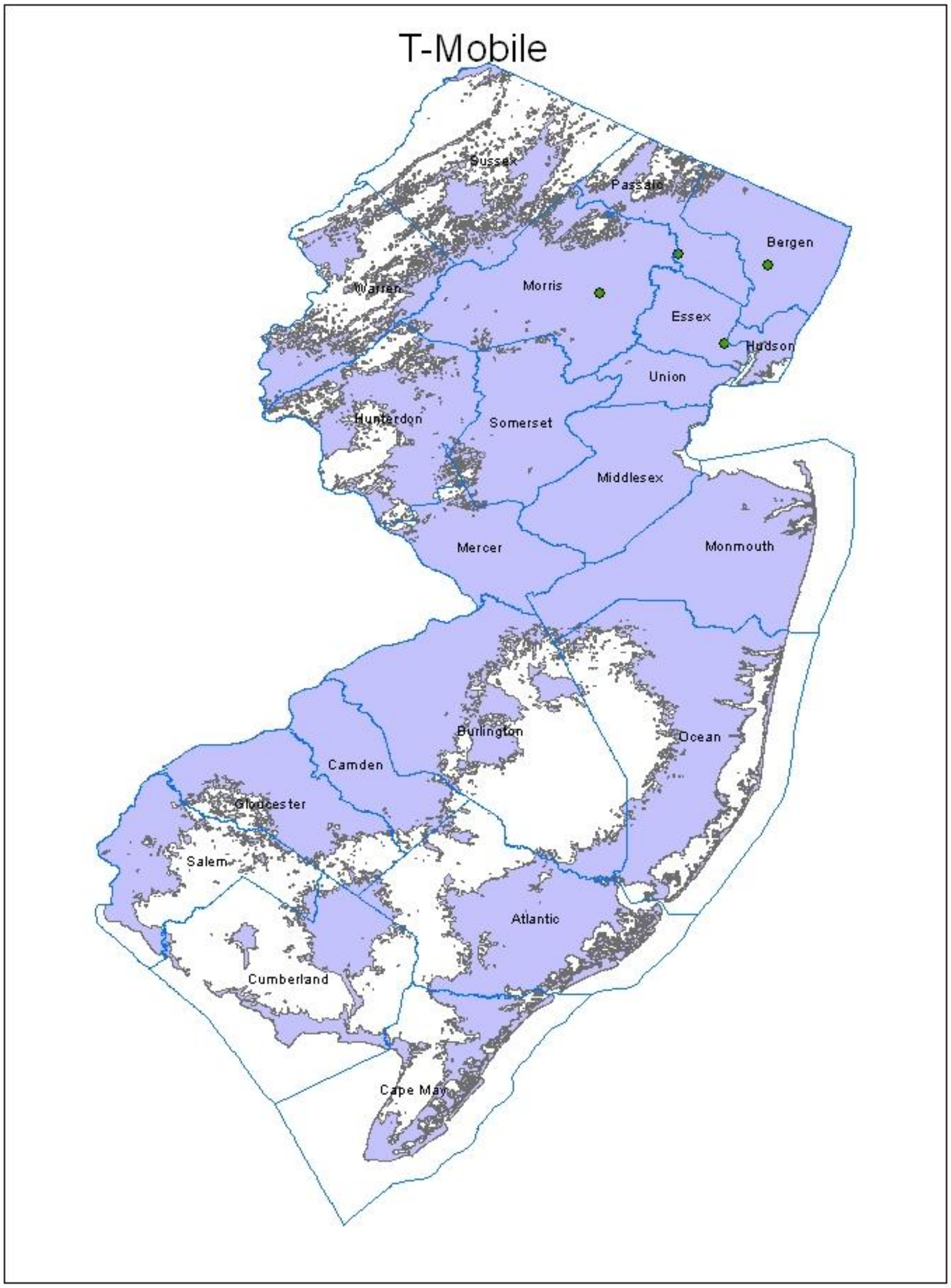
Jeni Wilcox
Senior Specialist, State Regulatory Affairs

Section 6: Notes and Open Issues

This provider has given us three sets of shapes, one for "HSPA21", one for "HSPA42" and one for "UMTS". All are submitted to us as technology code 80 and all in spectrum code 4. But they have different speeds. The validations complain about duplicate rows, based on the shape column and the technology code. Here it seems the technology and spectrum codes do not adequately capture what we have received from the provider.

We solved the problem by using the ArcGIS “Dissolve” tool to merge all the polygons in each submitted feature class into a single polygon. The submission has exactly three rows, one shape for each speed tier, and is not flagged as duplicates.

Section 7: Overview Map of Submitted Data



6.25 TW Telecom

Connecting New Jersey - Broadband Provider Data Report

Provider: tw telecom of new jersey l.p.

Received: February 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name "Doing business as" name FRN Holding company name Holding company number	tw telecom of new jersey l.p. Not provided 0004351417 tw telecom inc. 160153
FOR WIRELINE		
Filetypes	Text	
File size	3419 bytes, 35 records	
Speeds		

Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)
Typical-upstream		Not provided
Typical-downstream		Not provided
Advertised-upstream		Address; values 2..11
Advertised-downstream		Address; values 2..11
Subscriber-weighted-		Not provided

	up			
	Subscriber-weighted-down		Not provided	
Technology Type	30 (Other copper) and 50 (fiber)			
End-user specification	4 (medium – large enterprise) in all cases			
Comments:				

INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: None provided	

Section 3: Submission File Details

Received 1 file by secure upload:

Size	**Name**
3419	NJBB_0004351417_AddressLevelAvailability.txt

The file has 41 records. All are addresses; no apartment/suite/unit numbers are provided. Some addresses are repeated, sometimes with different speed numbers, suggesting that these entries are customer service addresses. Several are the addresses of multi-tenant buildings. Technology code 30 is present with symmetric speeds, codes range from 4 to 7. Technology code 50 is present with symmetric speeds; codes range from 4 to 11. This is a result of the provider collecting information about the services subscribed to by current customers at these addresses.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from supplied file "NJBB_0004351417_AddressLevelAvailability.txt". The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column "Provider Name", but removed "l.p." from the end of the address.
DBANAME	Not supplied; set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	As supplied in column "FRN", with leading zeroes appended
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 3-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code (next 5 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column Technology of Transmission
MAXADDOWN	For technology 30: Set to 7, the max val in MaxAdDown For technology 50: Set to 11, the max val in MaxAdDown
MAXADUP	For technology 30: Set to 7, the max val in MaxAdDown For technology 50: Set to 11, the max val in MaxAdDown
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

Internal processing notes:

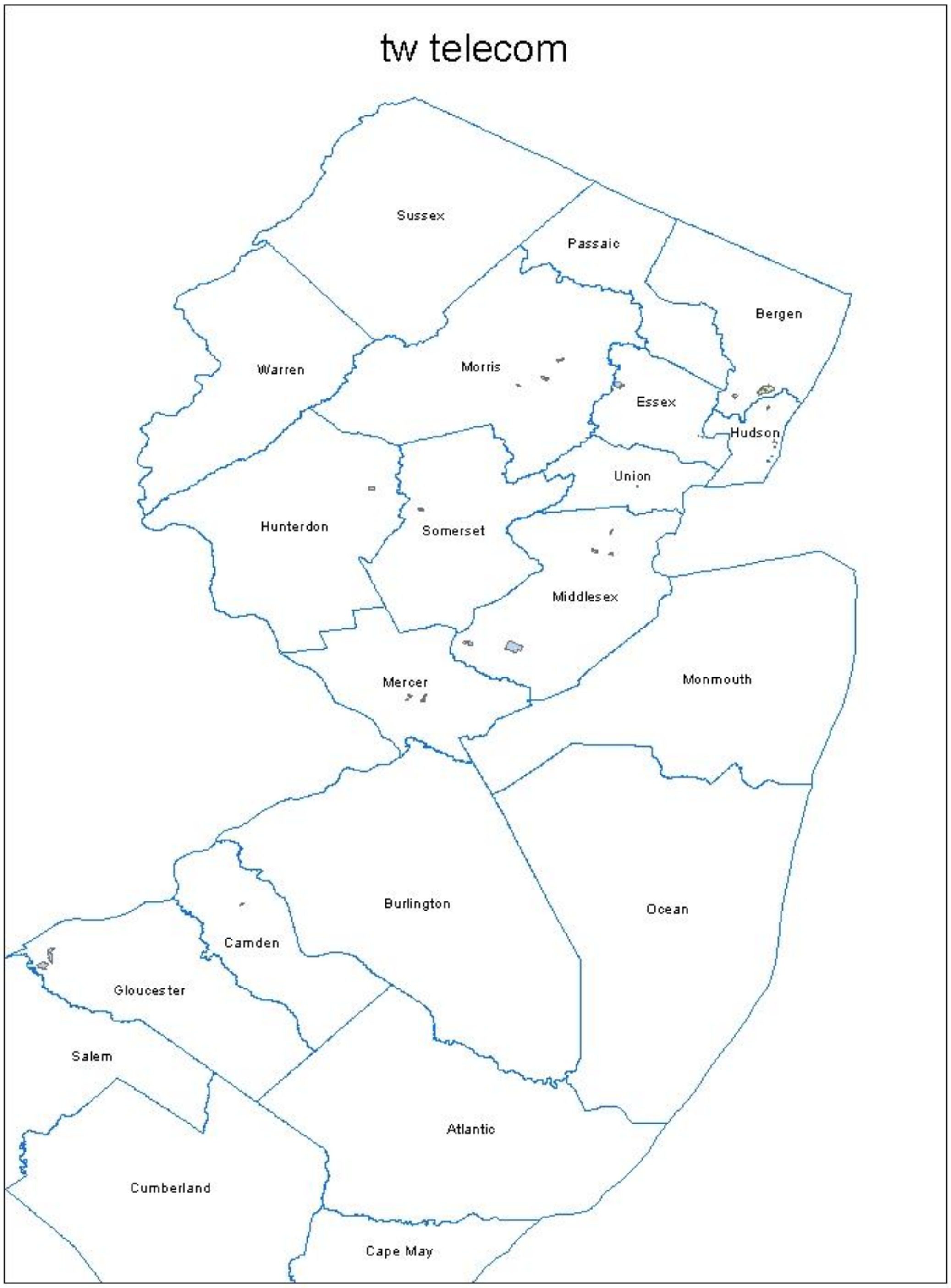
1. Geocoded the addresses using the Google geocoder to obtain a Latitude, Longitude pair for each.
2. Created an excel sheet and imported it to a geodatabase table.
3. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
4. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data. All addresses were successfully joined with a census block.
5. Discarded 14 rows with duplicate census blocks, generated from the multiple entries at the same addresses
6. Verified that all census blocks were in New Jersey and that no census block was greater than 2

square miles
7. Loaded 26 records into the transfer model table.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.26 Verizon

Broadband Provider Data Report

Provider: Verizon

Received: February 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Verizon executed an NDA with NJ OIT.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN
Holding company name
Holding company number</td><td>Verizon Online LLC
Verizon
0012254363
Verizon Communications Inc.
131425</td></tr>
<tr><td colspan="3">FOR WIRELINE</td></tr>
<tr><td>Filetypes</td><td colspan="2">Text and excel</td></tr>
<tr><td>File size</td><td colspan="2">See below</td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode, etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Census Block</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Census Block</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
</table></td></tr>
</table>

	Subscriber-weighted-down		Not provided	
Technology Type	DSL (10) and FTTP (50)			
End-user specification	Not provided			
Comments:				

INTERCONNECTION DATA	
ID	
File size	Excel file, 2 POP rows provided, see below
Ownership	Specified in cover letter as being owned by Verizon's affiliate, MCI Communications Services, Inc.
Transport Type	Not provided
Data Rates/Capacity	Not provided
Location	Address
Comments: Sent email to Verizon requesting additional information on Middle Mile points.	

Section 3: Submission File Details

Received these files via email, sent to Shelley Bates in an encrypted zip archive.

Size	**Name**
114,692	NJ - Broadband Data Cover Letter (2-16-12).pdf
6,454,124	NJ - Wireline Service By Census Block with Speeds (Dec 2011).txt
138,739	NJ - Wireline Service By Street Segment with Speeds (Dec 2011).txt
2,481	NJ - Pricing (Dec 2011).txt
28,160	NJ - POP List (Dec 2011).xls

Section 4: Data Validation Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Started with information supplied in Excel Spreadsheet "NJ - POP List (Dec 2011).xls". The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Verizon Online LLC""
DBANAME	Set to "Verizon"
FRN	Set to "0012254363"
OWNERSHIP	Set to 0, owned, based on cover letter information
BHCAPACITY	Set to null
BHTYPE	Set to null
LATITUDE	Created by geocoding the supplied addresses
LONGITUDE	Created by geocoding the supplied addresses
ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

1. We geocoded the addresses to obtain latitude, longitude value pairs. Both addresses were found. Verizon did not supply information on the elevation, serving facility capacity, and service facility type of these addresses. Sent request to Verizon regarding this information.
2. Created an excel sheet and imported to a geodatabase table.
3. Added points corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
4. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_CensusBlock

Loaded from supplied text file "NJ - Wireline Service By Census Block with Speeds (Dec 2011).txt". The following table explains the transformations that were applied to load the target table.

Table Column **Data Source / Transformation**

PROVNAME	Set to "Verizon Online LLC"
DBANAME	Set to "Verizon"
PROVIDER_TYPE	Set to 1
FRN	Set to "0012254363"
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from 2010_Census_Block_FIPS_Code (Digits 3-5)
TRACT	Populated from 2010_Census_Block_FIPS_Code (next 6 digits)
BLOCKID	Populated from 2010_Census_Block_FIPS_Code (next 4 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	First 15 digits of 2010_Census_Block_FIPS_Code See discussion of Census blocks below.
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	As supplied
MAXADUP	As supplied
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Year 2000 Census Bureau reference data, As matched by Census block 2000 ID

Internal processing notes:

1. No anomalies were noted in the data

NTIA Table BB_Service_RoadSegment

Loaded from supplied text file "NJ - Wireline Service By Street Segment with Speeds (Dec 2011).txt" and from road segments discovered in large census blocks our calculations put at slightly larger than two square miles (See item 2 above). The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Verizon Online LLC"
DBANAME	Set to "Verizon"
PROVIDER_TYPE	Set to 1

FRN	Set to “0012254363”
ADDMIN	Set to the least of the address numbers, if any
ADDMAX	Set to the greatest of the address numbers, if any
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to “NJ”
ZIP5	Set to null (no value supplied)
ZIP4	Set to null (no value supplied)
TRANSTECH	As supplied
MAXADDOWN	As supplied
MAXADUP	As supplied
TYPICDOWN	Set to null (no value supplied)
TYPICUP	Set to null (no value supplied)
TLID	As supplied
SHAPE	Copied from Census Bureau TigerLine 2010, As matched by County + Tiger Line ID

Internal notes on processing:

1. All rows were supplemented with a line-segment shape from the Census Bureau’s TigerLine data set.
2. We removed 108 records from the Verizon submitted data that were duplicates, based on county and tlid.
3. We removed 12 records from the Verizon submitted data that had entries in the tlid field that did not match our list of street segments in large census blocks.
4. Passed all NTIA validations

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 21, 2012 8:48 AM
To: 'laura.a.shine@verizon.com'
Cc: 'Clemons, Keefe B'
Subject: Question on NJ Broadband Data from Verizon

Laura and Keefe,

I believe we raised this issue in the past, but the NTIA wants us to ensure that we have the most accurate and complete data possible. The data you submitted on the middle mile access points (NJ - POP List (Dec 2011).xls) does not include information on elevation, serving facility capacity, or service facility type at these addresses. Would you be willing and able to provide this information?

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Clemons, Keefe B [mailto:keefe.b.clemons@verizon.com]
Sent: Tuesday, February 21, 2012 9:43 AM
To: 'NJ Broadband Data Collection'; Shine, Laura A
Subject: RE: Question on NJ Broadband Data from Verizon

John:

The data we provided is consistent with the data that we have provided for all prior rounds of data collection, and is consistent with the level of detail we provide in every state in which we provide this data. Given the sensitivity of this information, we are not prepared to provide additional information regarding our middle mile facilities.

Feel free to contact me if you have any additional questions.

Sincerely,

Keefe

Keefe B. Clemons

General Counsel - Northeast Region

Verizon

140 West Street, 27th Floor

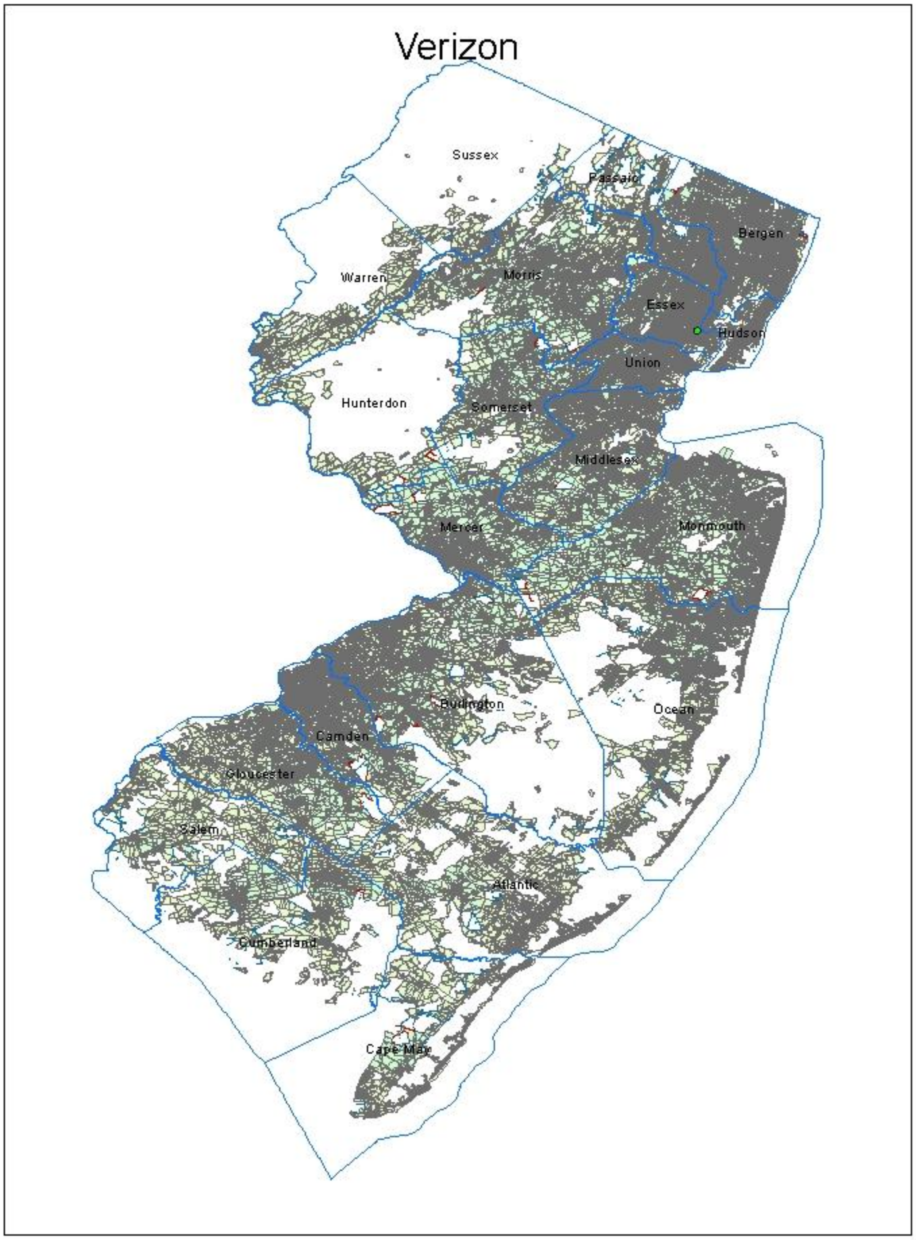
New York, New York 10007-2109

(212) 321-8136 (Phone)

(212) 962-1687 (Fax)

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.27 Verizon Wireless

Connecting New Jersey - Broadband Provider Data Report

Provider: Verizon Wireless

Received: February 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA was executed.

Section 2: Submission Overview

AVAILABILITY DATA			
ID	Provider name	Cellco Partnership	
	"Doing business as" name	Verizon Wireless	
	FRN	0003290673	
	Holding company name	Verizon Communications Inc.	
	Holding company number	131425	
FOR WIRELESS			
Filetypes	shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc. Two sets of data provided – one for EVDO and one for LTE (this was not explicitly stated - infered from the file names).	Supplied 2 shapfiles (zip archive) with 21 and 17 rows for each county. Shapefiles use projection GCS_WGS_1984..	
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)	
	Upstream max adv	201 - 767 kbps	
	Downstream max adv	768 kbps - 1.49 mbps	
	Upstream typical	500k-800kbps	
	Downstream typical	600kpbs-1.4mbps	

	Subscriber-weighted	Not provided	Ranges provided instead of single values. Lower end of the Down Typical range is OUTSIDE of the Broadband speed definition (will use upper end values for the time being).
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)	Ranges provided instead of single values.
	Upstream max adv	3.00 - 5.99 mbps	
	Downstream max adv	600k - 9.99 mbps	
	Upstream typical	2mbps -5mbps	
	Downstream typical	5mbps -12mbps	
	Subscriber-weighted	Not provided	
Technology Type	Spectrum (Mhz, FCC code)		Code 80 [Cellular (824-849Mhz, 869-894 Mhz); PCS 1850-1990 Mhz; AWS (1710-1755Mhz, 2110-2155Mhz); 700 (757-758Mhz, 776-779Mhz, 787-788Mhz, 805-806Mhz)] One of the provided Spectrum ranges (1st set) is 869-894 Mhz, which is not within ranges defined for that spectrum The shapefiles are named "NJ_evdo" and NJ_lte suggesting that the availability is only for EVDO and LTE. Verizon Wireless documents on the web suggest the company uses spectrum 850 MHz and 1900 MHz for their EVDO.
Comments:			

INTERCONNECTION DATA	
ID	
File size	
Ownership	

Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

All data was supplied by email.

Received overview file "VerizonWireless - Email Speed_Technology Informatoin.pdf" with spectrum and speed information.

Received 2 shapefiles with the following contents. The EVDO_NJ shapefile has 21 polygons, and the NJ_LTE shapefile has 17 polygons for each county.

Size	Name
266	NJ_evdo.dbf
145	NJ_evdo.prj
324	NJ_evdo.sbn
132	NJ_evdo.sbx
386052	NJ_evdo.shp
5294	NJ_evdo.shp.xml
268	NJ_evdo.shx

Size	Name
234	NJ_lte.dbf
145	NJ_lte.prj
292	NJ_lte.sbn
132	NJ_lte.sbx
196768	NJ_lte.shp
5284	NJ_lte.shp.xml

236 NJ_lte.shx

Cover letter “Verizon Wireless Broadband Statistics.pdf” was included.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

Loaded from the supplied shapefiles. The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in Word document
DBANAME	As supplied in Word document
FRN	Set to "0003290673"
TRANSTECH	Set to 80 per Word document
SPECTRUM	NJ_EVDO: Set to “3” per translation shown below VZW_NJ_LTE: Set to "2"
MAXADDOWN	NJ_EVDO: Set to “3”, see below. VZW_NJ_LTE: Set to "7" per email clarification
MAXADUP	NJ_EVDO: Set to “2”, see below. VZW_NJ_LTE: Set to "5" per email clarification
TYPICDOWN	Set to null
TYPICUP	Set to null
STATEABBR	Set to “NJ”
SHAPE	As supplied.

Internal notes on processing:

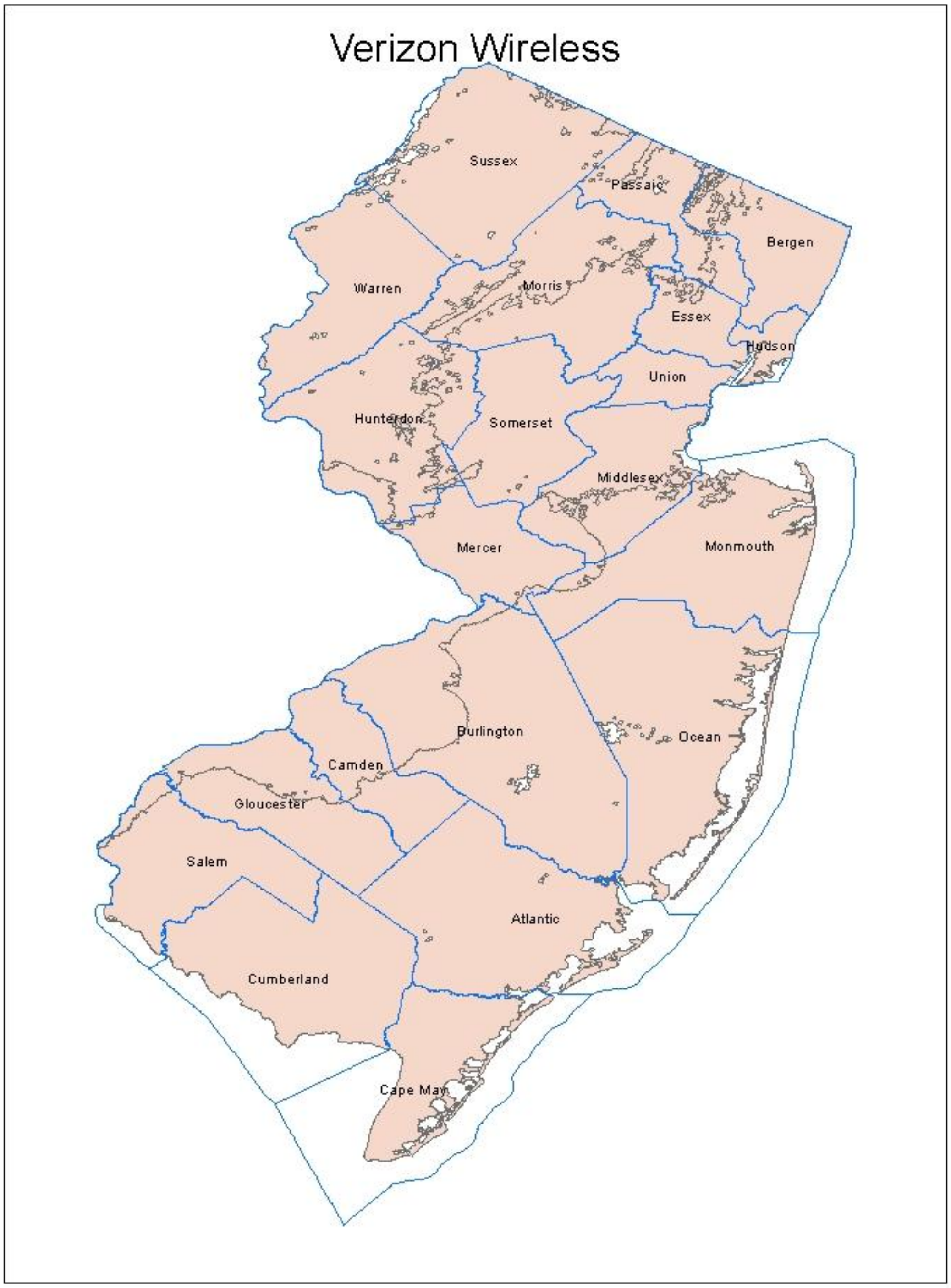
1. Shapefile NJ_evdo: The total shape apparently covers the entire state of New Jersey. Some differences are visible along the water body edges. There are duplicate shapes in this shapefile.
2. Shapefile NJ_lte: The shape covers portions of central-Northern New Jersey; the NJ Turnpike appears to be covered for its entire length. Duplicate shapes appear in this shapefile also.The supplied shape uses geographic coordinate system name GCS_WGS_1984. The NTIA data model requires the same coordinate system. No geographic transformation was required.
3. The XY Tolerance value differs on the supplied data from the required NTIA model. Imported the table schema and the table data in two separate operations, thereby ensuring perfect

compatibility with the NTIA data model. The tables have the suffix "_tol".
4. Coalesced the EVDO single-part polygons into one multi-part polygon using the ArcGIS "Dissolve" tool, which resulted in a new feature class with the suffix "_dissolved".
5. Coalesced the LTE single-part polygons into one multi-part polygon using the ArcGIS "Dissolve" tool, which resulted in a new feature class with the suffix "_dissolved".
6. Spectrum:
    a. NJ_EVDO: Verizon Wireless provided a statement in their cover letter about their licensed spectrum. Searching on the web indicates that EV-DO uses frequencies 850MHz and 1900Mhz. The NTIA data model has a single column for spectrum. No mapping is provided for frequency 850MHz. Frequency 1900MHz corresponds to NTIA "SPECTRUM USED" code value 3.
    b. VZW_NJ_LTE: Verizon wireless web site advertises "nationwide contiguous 700 Mhz 4G spectrum. The NTIA coding table provides value 2 for 700Mhz spectrum.
7. Speeds:
    a. NJ_EVDO: The maximum advertised speeds provided in the cover letter are 768 kbps - 1.49 mbps down and 201 - 767 kbps up. The typical speeds are provided as ranges: 600k to 1.4 Mbps down and 500Kbps-800Kpbs up. For max adv speeds we encoded the submitted down speed as value 3 (range 768k-1.5Mbps) and encoded the submitted up speed as value 2 (range 200-768kbps). This matches the values provided in the email from Anne Neville data 2/21/2012
    b. VZW_LTE_NU: The supplied Word document suggests speeds are "10 times EVDO". The maximum advertised speeds provided in the cover letter are 600 - 9.99 mbps down 3.00 - 5.99 mbps up. The typical speeds are provided as ranges: 5 - 12 Mbps down and 2 - 5 Mbps up. For max adv speeds we had originally encoded the submitted down speed as value 6 (range 6-10Mbps) and encoded the submitted up speed as value 5 (range 3-6mbps). Based on the email from Anne Neville data 2/21/2012, we modified the down speed to code 7.
8. The only data imputed was the state abbreviation.
9. Values agreed to by Anne Neville produced warnings in the NTIA validations

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.28 Voxitas

Connecting New Jersey - Broadband Provider Data Report

Provider: Voxitas

Received: August 2010

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Executed.

Section 2: Submission Overview

AVAILABILITY DATA				
ID	Provider name "Doing business as" name FRN		Netlogic, Inc. Voxitas 0006825954	
FOR WIRELINE				
Filetypes	Excel spreadsheet			
File size	9767 bytes, 4 data rows			
Speeds	Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)	Address rows with speed entries were provided, probably the speed promised to the customer. Not averaged over an area so not typical; no advertised speeds provided.
	Typical-upstream		Not provided	
	Typical-downstream		Not provided	
	Advertised-upstream		Not provided	
	Advertised-downstream		Not provided	
	Subscriber-weighted-up		Not provided	
	Subscriber-weighted-		Not provided	

	down			
Technology Type	Not provided; Web site search indicates and provider confirmed "Copper – Other"			
End-user specification	Not provided			
Comments:				

INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: Not provided	

Section 3: Submission File Details

Received 1 file by secure upload.

Size	**Name**
9767	NJBroadband.xlsx

The file has 4 (four) rows of data. All have customer names and addresses. Three records describe DS1 service, one describes something else. Speeds listed are probably the provisioned speeds, not typical or advertised. No cover letter with DBA name, FRN, or other company data is present. No coded representations of data such as end user type, technology of transmission, etc. are provided.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from supplied file "NJBroadband.xlsx" (4 rows). The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**

PROVNAME	Set to “Netlogic, Inc.”
DBANAME	Set to “Voxitas”
RESELLER	Set to “N”
FRN	Set to “0006825954”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to “30”
MAXADDOWN	As supplied in column Downstream
MAXADUP	As supplied in column Upstream
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

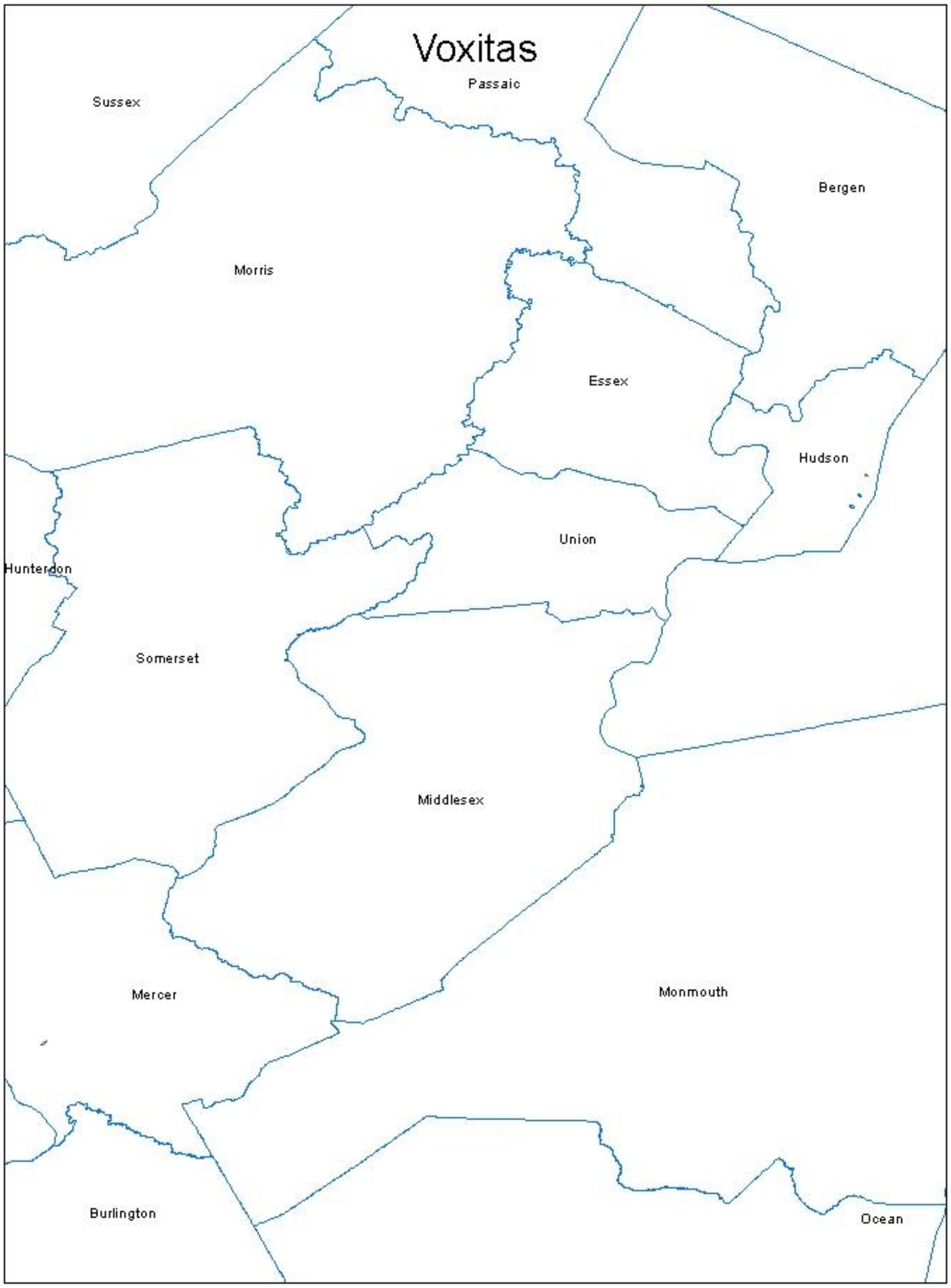
Internal processing notes:

1. Following steps were performed when data was initially submitted and results were reused in this round
    a. Geocoded the addresses using the Google geocoder.
    b. Created an excel sheet and imported to a geodatabase table.
    c. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
    d. Added a column containing the ID of the containing year 2000 census block via a spatial join of the point shapes and the census block shapes from reference data.
    e. Discarded NN rows with duplicate census blocks.
2. Ran NTIA validations and all passed

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.29 WildBlue

Connecting New Jersey - Broadband Provider Data Report

Provider: WildBlue Communications Inc.

Received: February 2012

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>WildBlue Communications, Inc.
WildBlue
0007843766</td></tr>
<tr><th colspan="3">FOR WIRELESS</th></tr>
<tr><td>Filetypes</td><td colspan="2">text file, shape file</td></tr>
<tr><td>File size</td><td colspan="2"></td></tr>
<tr><td>Speeds</td><td>
<table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided (‘0’)</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided (‘0’)</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>yes. Entire state.</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>yes. Entire state</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
</table>
</td><td>Submitted shape file describing the entire state of NJ with attributes for technology and maximum advertised up/down speed codes. Spectrum is listed as “Satellite”.

Second submission from WildBlue included values in Mbps for maximum advertised up/down speeds:
Download: 1.5 Mbps
Upload: 0.25 Mbps</td></tr>
</table>

	Subscriber-weighted-down | | Not provided	These correspond to the speed tiers 4 and 2, respectively.
Technology Type	Code 60 (Satellite)	
End-user specification		

Comments: From the provider's input package:

WildBlue notes that of the possible 'Spectrum Used' options provided, none list Ka-Band as an option for Satellite Providers.

INTERCONNECTION DATA: NONE	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	

Comments: Not provided

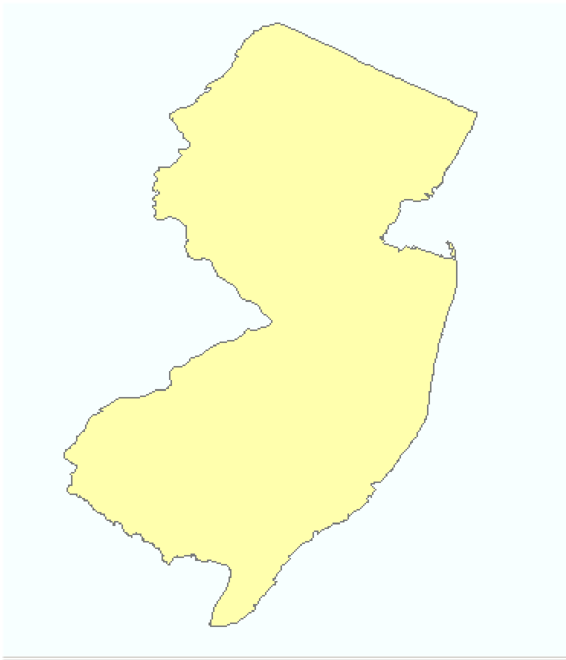


Figure 1. The shape submitted by the provider (the entire state of NJ)

Section 3: Submission File Details

Size (kb)	Name
1	WildBlue_Communications_Area_Availability_New Jersey.shx
1	WildBlue_Communications_Area_Availability_New Jersey.dbf
1	WildBlue_Communications_Area_Availability_New Jersey.prj
19	WildBlue_Communications_Area_Availability_New Jersey.shp

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "WildBlue Communications, Inc."
DBANAME	Set to "WildBlue"

FRN	Set to 0007843766
TRANSTECH	Set to 60
SPECTRUM	Set to 9 per translation shown below
MAXADDOWN	As provided, confirmed from speed data
MAXADUP	As provided, confirmed from speed data
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to “NJ”
SHAPE	County shape read from reference data.

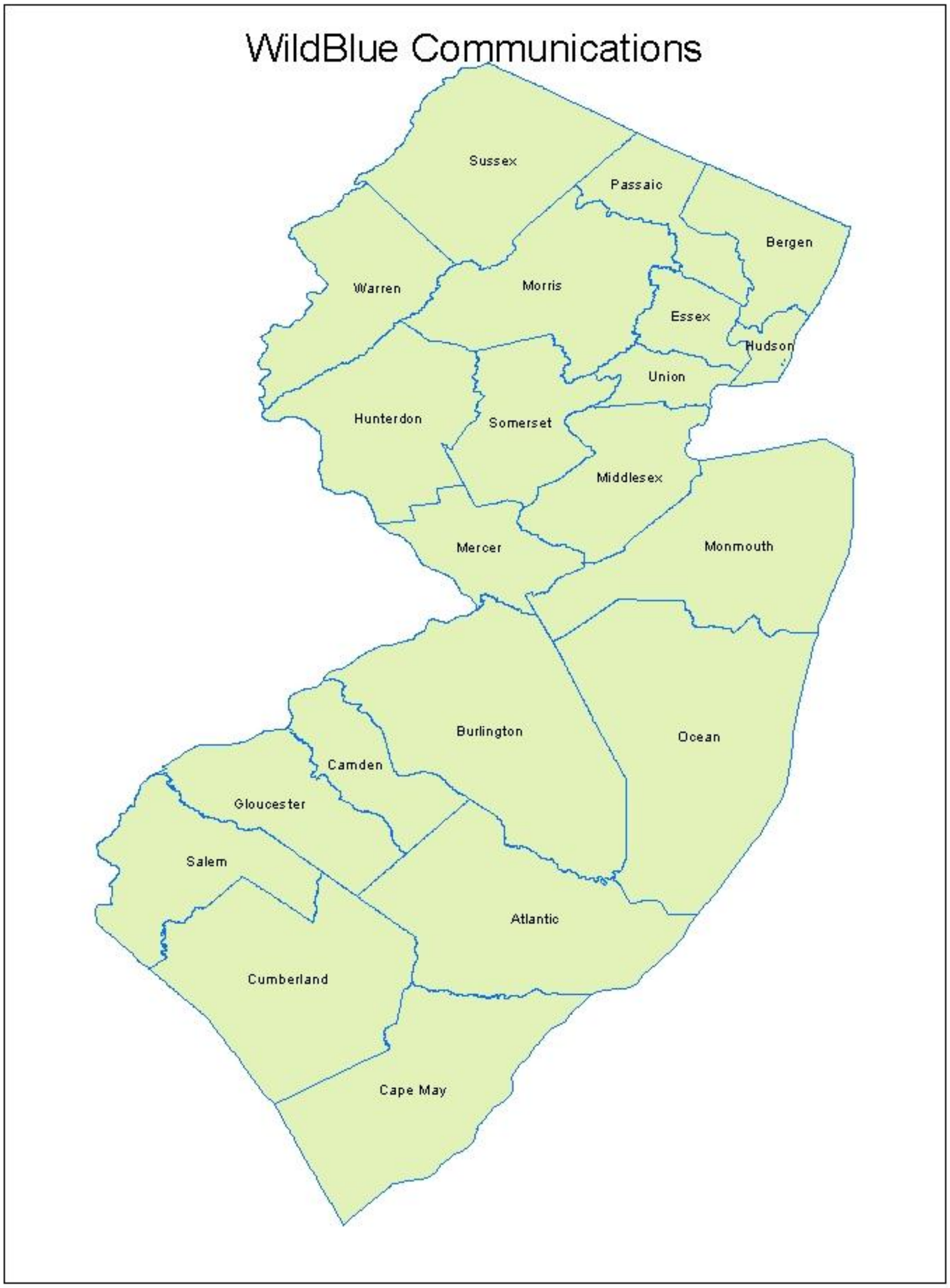
Internal notes on processing:

1. Spectrum: WildBlue uses Ka-Band spectrum (uplink in the 29.5 – 30 gigahertz band and downlink in the 19.7 – 20.2 gigahertz band). While this is not specifically included in the list of satellite frequencies associated with Code 9, we used code 9 anyway. This is a change from previous submissions.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.30 Xchange Telecom

Connecting New Jersey - Broadband Provider Data Report

Provider: Xchange Telecom

Connecting New Jersey - Broadband Provider Data Report

Provider: Xchange Telecom

Received: March 2011

Submission date: April 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

None

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Xchange Telecom Corp
Xchange Telecom
0006831713</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2"></td></tr>
<tr><td>File size</td><td colspan="2"></td></tr>
<tr><td>Speeds</td><td><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td></td></tr>
<tr><td>Typical-downstream</td><td></td><td></td></tr>
<tr><td>Advertised-upstream</td><td></td><td>2 Mbps (code 4)</td></tr>
</table></td><td>Information provided via email exchange (see below).

Provider originally indicated that their coverage was limited to the area supported by a single central office. In further exchanges, the provider indicated that their coverage is</td></tr>
</table>

	Advertised-downstream		10 Mbps (code 7)	limited to city of Lakewood and that they cover the entire city limits.
	Subscriber-weighted-nominal speed			
Technology Type	ADSL (code 10)			
End-user specification	In response to inquiry, provider reported residential and small business.			
Comments:				

INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

Received no file submission, only statements by email.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Based on the emailed statement coverage area, we selected all of the census blocks in Lakewood Township, Ocean county, New Jersey. We submitted all census blocks less than 2 square miles in this municipality. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Xchange Telecom Corp" per email response
DBANAME	Set to "Xchange Telecom"
PROVIDER_TYPE	Set to 2 (reseller leasing plant from Verizon)

FRN	Set to “0006831713” per email response
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Pre-populated from Census Block FIPS Code (digits 3-5)
TRACT	Pre-populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Pre-populated from Census Block FIPS Code (next 5 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 10 (ADSL) per email
MAXADDOWN	Set to code 7 per email
MAXADUP	Set to code 4 per email
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Census block

Internal processing notes:

1. Created a file with a municipality name that matches exactly the “name” column in the Year 2010 Census Bureau TigerLine database.
2. Joined against reference data to discover census blocks, for a total of 1012 blocks.
3. Verified that all the census blocks discovered for Lakewood Township are smaller than 2 square miles, so no road segments were loaded.
4. Validation script produced a warning regarding the speed code of 7 with ADSL. We were unable to obtain any confirmation of advertised speeds from provider Web site, because it required entry of a specific phone number. The provider confirmed via email that they offer 10 Mbps download speeds.

Section 5: Clarification Questions and Responses

Key provider Data submission messages:

From: Duvid Rottenberg [mailto:drottenberg@xchangetele.com]
Sent: Tuesday, March 08, 2011 3:36 PM
To: ConnectingNJ@research.telcordia.com
Cc: 'Shelley Bates'
Subject: RE:

John,

We are a UNE-L company, we lease the loop from Verizon and provide broadband for the end user on the leased circuits. I believe we do cover the whole city of Lakewood.

Duvid Rottenberg

Xchange Telecom, Corp.

drottenberg@xchangetele.com

(646) 722-7258

From: Duvid Rottenberg [mailto:drottenberg@xchangetele.com]
Sent: Monday, March 14, 2011 4:31 PM
To: ConnectingNJ@research.telcordia.com
Cc: 'Shelley Bates'
Subject: RE:

2 Mbps Upstream and 10 Mbps downstream.

Duvid Rottenberg

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Monday, March 14, 2011 4:46 PM
To: 'Duvid Rottenberg'; 'ConnectingNJ@research.telcordia.com'
Cc: 'Shelley Bates'
Subject: RE:

Thanks for this.

One other question – do you serve both residential and business customers?

John

From: Duvid Rottenberg [mailto:drottenberg@xchangetele.com]
Sent: Monday, March 14, 2011 4:57 PM
To: ConnectingNJ@research.telcordia.com

Cc: 'Shelley Bates'
Subject: RE:

Yes we do.

Duvid Rottenberg

Spring 2012 Interactions

From: Duvid Rottenberg [mailto:DRottenberg@xchangetele.com]
Sent: Wednesday, February 29, 2012 1:20 PM
To: NJ Broadband Data Collection
Subject: RE: New Jersey Broadband Data Collection - Third Notice

You can reuse our previous data.

Thank You,

Duvid Rottenberg

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 29, 2012 2:07 PM
To: 'Duvid Rottenberg'
Cc: NJ Broadband Data Collection
Subject: RE: New Jersey Broadband Data Collection - Third Notice

Duvid,

The data we have states that you cover all of Lakewood township, offering DSL service, with download speeds of 10 Mbps and upload speeds of 2 Mbps. Is that all correct?

Thanks,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Duvid Rottenberg [mailto:DRottenberg@xchangetele.com]
Sent: Wednesday, February 29, 2012 2:10 PM
To: NJ Broadband Data Collection
Subject: RE: New Jersey Broadband Data Collection - Third Notice

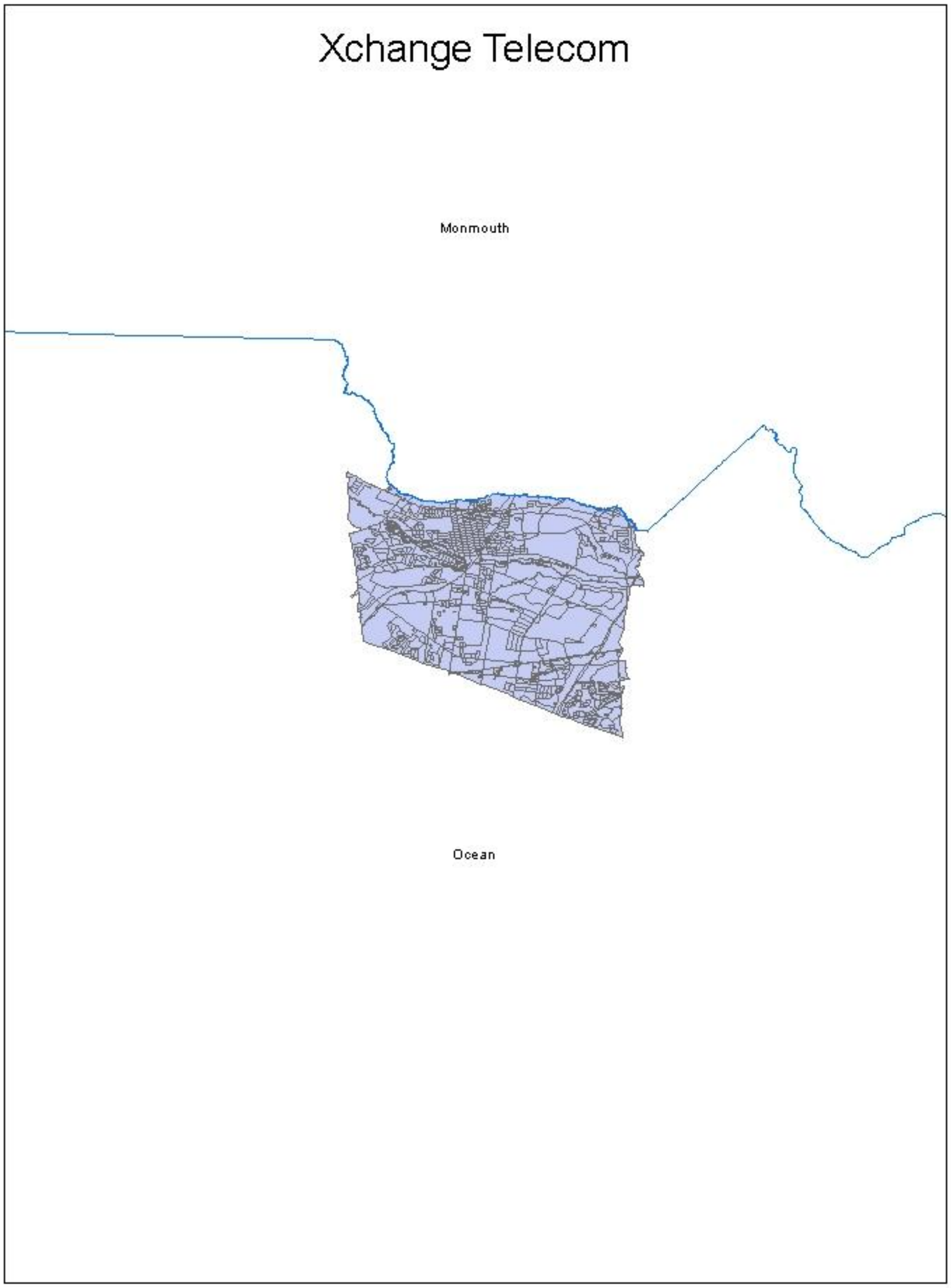
Yes.

Thank You,

Duvid Rottenberg

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.31 XO Communications

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications

Submission date: April 2012

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins below. Notable differences from the processing done on the previous submission are listed next.

The provider reported that there were no changes to the reported data. Given that the data we have was submitted in August 2010, we verified with the provider that there were no changes to the coverage area and speeds that they offered.

NTIA Table BB_Service_CensusBlock

Since there is no change in the data and NTIA data model, the table is copied from the 2011 October table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option.

Provider Interactions

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Wednesday, February 01, 2012 12:02 PM
To: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Data Collection - Spring 2012

Neither XO nor Nextlink have any new or revised data to report.

Thanks,

Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, February 03, 2012 10:15 AM
To: Adams, Sharon E
Cc: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Data Collection - Spring 2012

Sharon,

The last time that you submitted data to us was in August of 2010. Are you saying that the area covered by XO services, and the service speeds offered over that area, have not changed in the last year and a half? I just want to make sure that we can accurately reflect the capabilities you have available in the state of New Jersey.

Thanks,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Friday, February 03, 2012 1:42 PM
To: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Data Collection - Spring 2012

Yes.

Thanks,

Sharon Adams

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications

Submission date: October 2011

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins below. Notable differences from the processing done on the previous submission are listed next.

The provider reported that there were no changes to the reported data. Given that the data we have was submitted in August 2010, we verified with the provider that there were no changes to the coverage area and speeds that they offered.

NTIA Table BB_Service_CensusBlock

1. Column " blocksubgroup" was dropped.
2. Column "endusercat" was added; set to null because data was not supplied.

Notes

1. Discarded 28 records with missing or slow maximum download speed codes.
2. Total rows loaded: 879

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications

Submission date: April 2011

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

NTIA Table BB_Service_CensusBlock

1. Column "reseller" was dropped.
2. Set the new column "provider_type" to value 1 ("Broadband provider as described in the NOFA")
3. Set the max advertised speed code values (down and up) to 9, which is the maximum value among all records provided to us.
4. Dropped non-measured typical up/down speed code values.

Provider Interactions

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Tuesday, March 01, 2011 4:11 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011

Hi John,

I don’t have any new data to report.

Thanks,

Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Tuesday, March 01, 2011 4:23 PM
To: Adams, Sharon E
Cc: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011

Sharon,

Are you saying that we can use the data you submitted last time (that it reflects your network capabilities as of 12/31/2011)?

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Tuesday, March 01, 2011 4:41 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011

Yes, the previous data can be used again.

Thanks,

Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Friday, March 18, 2011 9:34 AM
To: 'Adams, Sharon E'
Cc: 'NJ Broadband Data Collection'
Subject: XO NJBB Data Clarification

Sharon,

We have performed our initial review of your data and have a clarification question:

> We see several locations where your download speeds are a tier 2, which the NTIA does not consider broadband. This appears that it might be the provisioned speed sold to the customer. Is there a higher, advertised speed that you could provision to these locations if the customer asked? One option would be for us to use the highest speed you deliver in a larger area as the maximum advertised speed. Would that accurately represent your ability to deliver service?

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Thursday, July 07, 2011 9:56 AM
To: ConnectingNJ@research.telcordia.com
Subject: NJ Broadband Data Collection

Good morning,

Neither XO Communications Services, Inc. nor Nextlink Wireless, Inc. have any updates to previously submitted data. Please advise what steps need to be taken in order to ensure these companies compliance.

Kind regards,

Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Thursday, July 07, 2011 11:13 AM
To: 'Adams, Sharon E'
Cc: 'connectingNJ@research.telcordia.com'
Subject: RE: NJ Broadband Data Collection

Sharon,

Thanks for the quick response. Your email message is sufficient notification for us to proceed using the data you have already submitted.

Note that we will be applying additional validation and verification procedures during this round and will get back to you if any issues arise with the data you supplied.

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications

Received: August, 2010

Submission date: October 2010

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Executed.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>XO Communications, LLC
Provided, but looks weird
0006275945</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2"></td></tr>
<tr><td>File size</td><td colspan="2"></td></tr>
<tr><td>Speeds</td><td colspan="2">
<table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>census block</td></tr>
<tr><td>Typical-downstream</td><td></td><td>census block</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>census block</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>census block</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table>
</td></tr>
</table>

Technology Type	Entered codes 1, 2, and 3, which are not valid NOFA TechTrans codes.
End-user specification	Business (444 entries), Residence (5 entries)
Comments:	
INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: Not provided	

Section 3: Submission File Details

Received 1 file by SECURE UPLOAD.

Size	**Name**
41358	NJBroadbandData63009.xlsx

Section 4: Validations and Results

The spreadsheet provides census block IDs and associated max adv and typical speeds. The last two rows of the sheet are different from the 447 data rows proceeding them, and one of those last two is in New York. The DBA name looks unusual and the technology of transmission codes are not valid. After receiving clarification by email we created a corrected spreadsheet based on the original submission as follows:

1. Dropped the last two rows that have addresses instead of provider name, DBA name, etc.
2. Changed DBA Name entries to “XOCSI”
3. Changed technology of transmission codes: 1 to 10, 2 to 20, and 3 to 30.

Section 5: Data Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from the supplied spreadsheet. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “Provider Name”
DBANAME	As supplied in column “DBA Name”
RESELLER	Set to “N”
FRN	As supplied in column “FRN”, after adding leading zeros
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from column census_block (1st 3 digits)
TRACT	Populated from column census_block (next 6 digits)
BLOCKID	Populated from column census_block (last 4 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	As supplied in column census_block
TRANSTECH	As supplied in column Tech Code
MAXADDOWN	As supplied in column MaxDownload
MAXADUP	As supplied in column MaxUpload
TYPICDOWN	As supplied in column TypDownload
TYPICUP	As supplied in column TypUpload
SHAPE	Copied from Census Bureau TigerLine 2010, As matched by Census block ID

Internal processing notes:

1. No duplicate census blocks were found.

Section 6: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Tuesday, September 13, 2011 4:07 PM
To: 'Adams, Sharon E'
Cc: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Data Collection

Sharon,

We realized that we have a potential issue with processing the data you submitted previously. The NTIA has transitioned from using the 2000 census block geometry to the 2010 census block geometry. While it is possible for us to translate your prior data, there is a high risk of overstating or understating your actual coverage area due to the many-to-many mappings between the two sets of census blocks.

Is it possible for you to provide your data using the 2010 geometry?

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Tuesday, September 13, 2011 4:10 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Data Collection

Hi John,

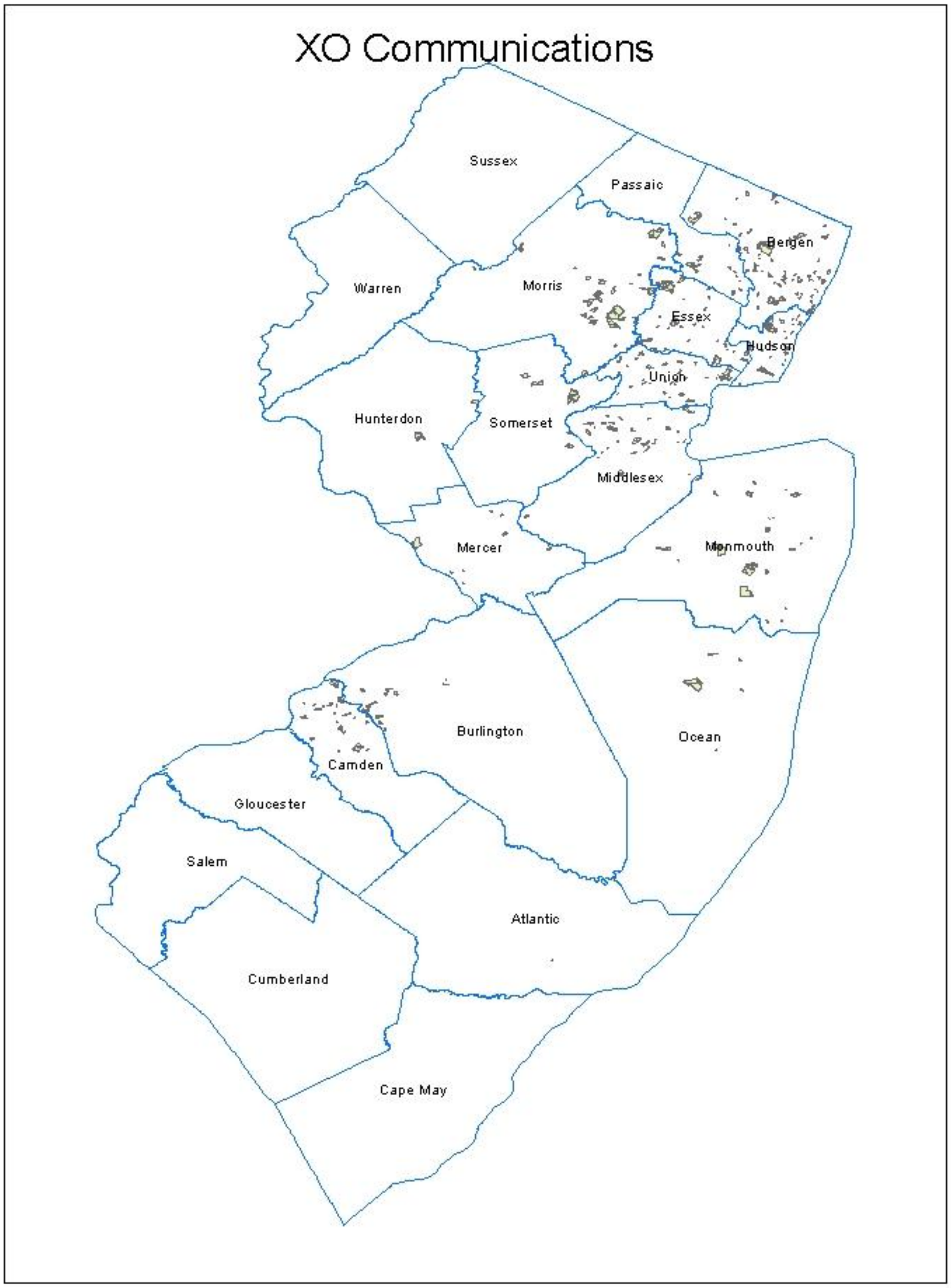
It's fine to restate our data with the new census block geometry. I do not have the new 2010 geometry to restate the data.

Thanks,

Sharon Adams

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



7 Appendix B: CAI Process Description

7.1 Summary

For each category of community anchor institution, we generally obtained data from two sources. One source was a reference source that provided a list of institutions with name, address and ID number where applicable. This reference source was expected to be nearly complete, representing all the institutions of the specified type in the state. The other source provided the broadband information. In most cases, the broadband information was supplied by the institutions via our Web site.

There were exceptions, however, to these guidelines. In the case of Higher Education, we obtained the broadband access information from NJEdge, an organization that collects data via its own survey. In the case of State Government, we obtained a list of broadband circuits provided to the state by Verizon; there was no reference list for comparison. We similarly had no reference list for local government and non-governmental organizations; we used only data collected via our Web site for these classes of institution.

For each CAI category, the following table provides the number of records we obtained from the reference source, the number of broadband access records we obtained, the total number of records we submitted to the NTIA and the number of complete records, with verified address information and broadband access information.

Table 6: CAI Process Results

CAI Category	Reference Records	Broadband Records	Total Records Submitted	Complete Records Submitted
School K-12 (Public)	2603	796 (Web) 478 (eRate)	2598	227
School K-12 (Private)	1260 (NCES)		1267	169
Libraries	465 (IMLS)	89	472	50
Medical/Healthcare	1139 (NJHA + NJ HHS)	5	1139	5
Public Safety	343 (NJ 911 Comm.)	120	349	95
University	158 (NCES IPEDS)	39 (NJEdge)	160	36
Other – State Government		2007	1692	1692
Other – Local Government	0	54	54	54
Other – Non Government	0	8	7	7

7.2 Local Government and Non-Government Organizations

1. There were no new submissions to the web site since the October 2011 report. Accepted data submitted by 54 local government and 8 non-governmental organizations via specially designed Web site. We merged data submitted to Web site for April 2011 delivery with that submitted between April and September. The flow named SubmittedCAI_GovNGO_Process.arroyo was used to process the data. (Files lib_20110323-edit.xml and lib_20110907.xml) Data collected included:
    i. Community Anchor Institution Category
    ii. Community Anchor Institution Name (System, Branch)
    iii. Address: Street, City, State, Zip, County
    iv. Contact info: Name, Phone, Email, Web address
    v. Wi-Fi access
    vi. Broadband info: Provider, Technology, Upstream and Downstream speeds
    vii. Comment
2. Generated Latitude and Longitude via geo-coding using Yahoo geocoder API.
    a. Ensured no errors were present, that at least on entry was returned and that quality metric was over 75. Also ensured that result was in New Jersey and that city and zip were not both blank. Output is in file Submitted_GovNGO_CAIs.xls.

7.3 State Government

1. Obtained a listing of 2007 connections provided by the primary broadband service provider, Verizon, to the state. List of connections included the following data:
    a. Service address
        i. This field included an indication of the office or department being served and an extremely abbreviated version of the address
        ii. e.g.: "(SPNL)STATE OF NJ-TLS 19 LANDIS AV, UP DRFLD T"
    b. Speed (single value, 1.5 to 1000 Mbps)
    c. Technology (ATM, Ethernet, Frame Relay, PRI, Point-to-Point
2. Used an automated process to expand the town names in the Service Address field (flow for steps 2-6 is in file VerizonList_Geocode.arroyo; input file is Broadband Mapping Prod Sum 2500 Feb 11_Addressed_Ida_Murray4.xlsx)
    a. For example, replaced "PRSPY" with "Parsippany" and "FR LN" with "Fair Lawn"
    b. Improved the mapping of abbreviated city names to their expansions
        i. BRIG: Brigantine
        ii. BRDTN: Bordentown
        iii. DVR: Dover
        iv. HMTN: Hammonton
        v. LWR TWP: Lower Township
        vi. MAN: Manchester
        vii. MANT: Mantua
        viii. MIDL TWP: Middle Township
        ix. MIDLTN TWP: Middletown
        x. OAKLN: Oaklyn

xi. PIT: Pitman

3. Extracted address information from Service Address field by removing the following:
    a. Digits following and including a pound sign (e.g., NJ STATE PAROLE DIST **#6** 210 S BROAD)
    b. "P.O Box NNNN",
    c. Anything in parentheses (e.g., **(SPNL)**STATE OF NJ:OIT 90 STATE HWY NO 183)
    d. Any string consisting solely of letters, backslashes, colons, dashes, ampersands and spaces prior to the first number string in the address (e.g., **SONJ:DOE** 7 GLENWOOD AV, E O BLDG FLR 4;DES SUITE 401-402)
    e. Any string after the first comma (e.g., 7 GLENWOOD AV, **E O BLDG FLR 4;DES SUITE 401-402**
    f. Text prior to and including an ampersand (e.g., **NJ STATE DOT @** ROUTE 23)
    g. Replacing "AV," with "AVE,"
    h. Any text between commas (e.g., 3810 NEW JERSEY AV, **WILD DES DEPT LABOR,**)
    i. Any number preceded by "PROJECT" or "PRJCT"
4. Merged city information and state information with extracted addresses.
5. Generated Latitude and Longitude via geo-coding using Yahoo geocoder API.
    a. Ensured no errors were present, that at least one entry was returned
    b. Ensured that state was New Jersey and that city and state values were populated.
6. For those that failed test with Yahoo geocoder API, attempted to match with Google geocoder API
    a. Ensured no errors were present, that at least on entry was returned
    b. Ensured that state was New Jersey and that city and state values were populated.
7. Results in successful geocoding of 1941 of the 2007 entries. Entries that could not be geocoded were ones with no street address and those whose street addresses were deliberately disguised.
    a. Results are in file NJ_State_Verizon_Geocoded_new.xls

7.4 Hospitals

1. Obtained a listing of 111 hospitals from NJ Hospital Association (List available at http://www.njha.com/directories/dirmemhosalpha.aspx). List of connections included the following data:
    a. Facility Name
    b. Address: Street, City, State, Zip
    List was copy/pasted from Web page and edited to remove extraneous blank space into file HospitalRawList_2011-10.txt. Subsequently edited to remove extra non-geo address information (e.g., 7th floor) from a few addresses that failed geocoding)
2. Also obtained listing of 1134 hospitals from the NJ Health and Human Services. We created the reference list of hospitals from the union of the two lists (Hospitals_Merged_List.csv) using the flow HHS_NJHA_Hospital_Process.arroyo.
3. Generated Latitude and Longitude via geo-coding using Google geocoder API.
    a. Ensured that at least one entry was returned, that state was New Jersey and that city or zip were present in recognized address.
    NJHA_NJHHS_Hospital_Geocode.arroyo. Output of this stage is in file Hospitals_Geocoded3.csv.
4. Merged reference data (NJ HHS and NJHA) with data collected from 5 hospitals via our hosted Web site to merge address and ID information with speed and Wi-Fi availability information. We merged data

submitted to Web site for April 2011 delivery with that submitted between April and September. No new data after September. (Files lib_20110323-edit.xml and lib_20110907.xml)

a. Performed exact match between NJHA and submitted data on institution name
    i. Facilitated matching by Converting names to upper case, removing certain common words (THE, HOSPITAL, MEDICAL, CENTER, SYSTEM, HEALTHCARE), removing double spaces and trimming leading and trailing spaces.

This portion of the process occurs in SubmittedCAI_Hospital_Process.arroyo.
Output is in file Hosp_Submitted_Matched.xls.

5. Produced 1139 hospital records at the end of the processing.

7.5 Higher Education

1. Obtained the following data from the named sources in February 2012
    a. List of higher education institutions from National Center for Education Statistics IPEDS Data Center (http://nces.ed.gov/collegenavigator/?s=NJ). Table included information on 158 institutions with the following fields:
        i. Institution Name
        ii. Address: Street, City, County, State, ZIP
        iii. IPEDS ID

    Final input data, including a few manual edits (see below) is in file CollegeNavigator_Search_NJ_2012-02-02_edit.xlsx
    b. Generated Latitude and Longitude via geo-coding using Yahoo geocoder API (flow IPEDS_HigherEd_Geocode.arroyo).
        i. Ensured no errors were present, that at least on entry was returned
        ii. Ensured that state was New Jersey and that city and state values were populated.
    c. For those that failed test with Yahoo geocoder API, attempted to match with Google geocoder API (Flow IPEDS_HigherEd_Geocode.arroyo)
        i. Ensured no errors were present, that at least on entry was returned
        ii. Ensured that state was New Jersey and that city and state values were populated.
    d. Manually updated a few addresses that failed to produce maps. Result was that 156 of 158 institutions were properly geocoded.
2. Obtained an updated list of members of NJEdge (Format-edited version is in file Mapping Bandwidth_Mb_01102012_edit.xlsx). Table included information on 52 institutions, most of which (39) were unique state, community or private institutions of higher learning. Information from NJEdge included:
        i. Institution Name
        ii. Address
        iii. Technology Type
        iv. Upstream and downstream speeds
3. Merged IPEDS and NJEdge data to match institution data with broadband access information (HigherEd_Merge.arroyo)
    a. Performed exact match on institution name
        i. Facilitated matching by Converting names to upper case and trimming excess spaces
    b. Of those NJEdge data entries that did not match, used approximate matching based on institution name

i. Preprocess prior to approximate match involved
    1. Removing strings COLLEGE, UNIVERSITY, NEW JERSEY
    2. Removing any punctuation
ii. Matched using Levenshtein Distance metric with threshold of 4.

c. Reviewed unmatched NJEdge data manually and identified three additional matches.

4. Successfully merged data from all 36 NJEdge institutions into IPEDS data for total of 160 institutions
    a. Note that remaining NJEDGE institution (Fairleigh Dickenson) has different address than either of the campuses in the IPEDS data.
    b. Note that Rutgers entry in NJEdge data has different address than the IPED entries

Final output is in file HigherEd_Geocoded_RateMatched_01102012.xls

7.6 Libraries

1. Obtained the following data from the named sources
    a. Obtained the file "Public Libraries Survey Fiscal Year 2009" from http://harvester.census.gov/imls/data/pls/index.asp. Used file puout09b_NJ.txt
        i. Manually extracted 465 records for the state of New Jersey
        ii. Used the following data items:
            1. FSCSKEY
            2. FSCS_SEQ
            3. LIBNAME
            4. ADDRESS
            5. CITY
            6. ZIP
            7. LATITUDE
            8. LONGITUDE

    Manually changed the town name for W. Patterson Library to new official name of Woodland Park.

    b. Data submitted by 89 library organizations via specially designed Web site. No new data was submitted after September 2011. However, corrected the category type for Summit Public Library, which was mis-categorized as a hospital. Data collected included same fields listed above for Local Governmental organizations
2. Merged library survey data with data collected from libraries via our hosted Web site to merge address and ID information with speed and Wi-Fi availability information (SubmittedCAI_Library_Process.arroyo).
    a. Performed exact match between survey and submitted data on library name
        i. Facilitated matching by Converting library names to upper case, cutting submitted names to fixed-field length of survey data (60 characters) and trimming excess spaces
    b. For those submitted data entries that did not match, performed an approximate match based on library name
        i. Preprocess prior to approximate match involved
            1. Removing strings "P.L.", "FREE", "PUBLIC", "LIBRARY", TOWNSHIP, TSWP, PUB, LIB, THE, SYSTEM
            2. Removing any punctuation
            3. Converting "NO"/"SO" at start of line to NORTH and SOUTH respectively
        ii. Matched using Levenshtein Distance metric with threshold of 3.

c. Manually changed the names of some libraries to make them consistent between reference data and submitted entries with respect to library name (town name vs. specific name).
d. Successfully matched all but ten submitted entries to Library Survey Data
    i. Remaining ten were branches of Newark Public Library, but all were submitted with the same address, so they could not be successfully geocoded.

Results (LibraryPlusSubmitted.xls) include 472 Library entries. This is larger than the 465 from the survey because some libraries submitted more than one broadband provider.

7.7 Private K-12 Schools

1. Obtained the following data from the named sources:
    a. List of private K-12 education institutions from National Center for Education Statistics Private School Universe Survey (http://nces.ed.gov/surveys/pss/pssdata.asp). Table included information on 1260 institutions with the following fields:
        i. Name
        ii. Address: Street, City, State, ZIP
        iii. NCES_ID
        iv. Latitude/Longitude
    b. Data submitted by schools via specially designed Web site. There was no new data submitted after September 2011. Data collected included same fields listed above for Local Governmental organizations. Total number of Public and Private schools submitting information was 796.
    c. Data from the USAC eRate program, listing schools that have obtained subsidized Internet access, including following relevant fields
        i. Name
        ii. Address: Street, City, State, ZIP
        iii. Provider

    There were 478 records that corresponded to schools and Internet access.
2. Merged NCES private school with data collected from private schools via our hosted Web site to merge address and ID information with speed information (SubmittedCAI_Process.arroyo).
    a. Performed exact match between NCES and submitted data on institution name and zip code
        i. Facilitated matching by:
            1. Converting school names to upper case
            2. Removing string ", NJ"
            3. Converting string SAINT to ST
    b. For those submitted data entries that did not match NCES data, performed an approximate match based on institution name
        i. Preprocess prior to approximate match involved
            1. Replacing string SCHOO or SCHO with SCHOOL
            2. Replacing string "HIGH SCHOOL" with HS and string "ELEMENTARY" with ELEM
            3. Removing strings SCHOOL, THE, REGIONAL, HIGH and ACADEMY
            4. Trimming excess spaces
        ii. Matched using Levenshtein Distance metric with threshold of 3.
    c. Successfully merged data from submitted private school into NCES institutions
        i. Manual comparison resulted in matching of additional institutions
        ii. Remaining institutions were ambiguous or not present in the NCES data.

3. Combined results of step 2 with eRate data to merge address and ID information with access and provider data. (Flow in file K-12_eRateProcess.arroyo, handles both public and private schools)
    a. Performed exact match between step-2 results and eRate data on institution name and zip code
    b. Verified uniqueness of results based on institution name, zip code and provider
    c. When a match was detected, set the Availability flag to "y" and filled in provider name from eRate data. (Unless provider name was already present from Web-submitted data)
4. Generated 1267 records to submit, of which 169 were merged with submitted broadband data. Note that some schools had more than one service provider and thus include multiple records.
    a. Output file is PrivateSchool_GeoMatched.xls

7.8 Public K-12 Schools

1. Obtained the following data from the named sources:
    a. List of public K-12 education institutions from National Center for Education Statistics Public School Universe Survey. (Went to http://nces.ed.gov/ccd/schoolsearch/ , searched for schools in New Jersey, then selected option at bottom of results page to download an Excel file which was then edited: ncesdata_86F3D620_edit.xls.) Table included information on 2605 institutions with the following fields:
        i. Name
        ii. Address: Street, City, State, ZIP
        iii. NCES_ID
    b. Data submitted by schools via specially designed Web site. There was no new data submitted after September 2011. This was entries in the school category that did not match any of the NCES private schools. Total number of Public and Private schools submitting information was 796. Of those, 673 did not match private schools.
    c. Data from the USAC eRate program, listing schools that have obtained subsidized Internet access, including following relevant fields
        i. Name
        ii. Address: Street, City, State, ZIP
        iii. Provider

    There were 486 records that corresponded to schools and Internet access.
2. Merged NCES private school with data collected from private schools via our hosted Web site to merge address and ID information with speed information. (Flow in file PublicK-12Process.arroyo)
    a. Performed exact match between NCES and submitted data on institution name and zip code
        i. Facilitated matching by:
            1. Removing SCHOOL and all truncated versions of the word from the ends of any string
            2. Performing the following conversions
                a. "SENIOR HIGH" and HIGH to HS
                b. "MIDDLE", "M S", "MID" and "MIDD" to MS
                c. "ELEMENTARY" to ELEM
                d. CHARTER to CS
                e. BOROUGH to BORO
                f. AVENUE to AVE
                g. TOWNSHIP to TWP

            h. STREET to ST
        3. Removing the strings REGIONAL, " REG" and ACADEMY
        4. Removing punctuation and double spaces
        5. Trimming any leading or trailing spaces
  b. For those submitted data entries that did not match NCES data, performed an approximate match based on concatenation of institution name and zip code
      i. Preprocess prior to approximate match involved
        1. Removing the following phrases
            a. "BOARD OF EDUCATION" and all truncated versions
            b. BOE
            c. DISTRICT and all truncated versions
            d. PRIMARY, INTERMEDIATE, ELEM, MS, HS, SR, JR
            e. # or any digits
            f. PUBLIC
        2. Trimming excess spaces
        3. Submitted entries that were blank after these operations were removed.
      ii. Matched using Levenshtein Distance metric with threshold of 2.
  c. Successfully merged data from 169 submitted entries into 2595 NCES institutions
      i. Dropped 8 NCES institutions as incomplete
      ii. Recurring issue was information submitted for districts that did not correspond to a specific school
3. Combined results of step 2 with eRate data to merge address and ID information with access and provider data. (Flow in file K-12_eRateProcess.arroyo, handles both public and private schools)
  a. Performed exact match between step-2 results and eRate data on institution name and zip code
  b. Verified uniqueness of results based on institution name, zip code and provider
  c. When a match was detected, set the Availability flag to "y" and filled in provider name from eRate data. (Unless provider name was already present from Web-submitted data)
  d. Filled in nine additional records
4. Generated Latitude and Longitude via geo-coding using Yahoo geocoder API.
  a. Ensured no errors were present, that at least on entry was returned and that quality metric > 75.
  b. Ensured that state was New Jersey and that city and/or zip value was populated.
5. Generated 2598 records to submit, 203 matched. Note that some schools had more than one service provider and thus include multiple records.
  a. Output file is PublicSchool_GeoMatched.xls
6. Further matches obtained through manual matching of Montgomery, Hillsborough, Paramus and Manchester submission to schools. Website submissions included several entries where comment column stated that the connectivity applies to all schools in district. Also, followed up by email to points-of-contact to verify that some of the entries listed as district BOE were entries that covered all schools in district. Obtained 255 matches after manual matching.

7.9 Public Safety Organizations

1. Obtained the following data from the named sources:

a. List of local and state public safety organizations obtained from NJ State 911 Commission. (Reused data from April 2011 - PSAP's & PSDP's_Geocoded.xls) Table included information on 343 institutions with the following fields:
    i. Name
    ii. Address: Street, City, State, ZIP, County
    iii. NCES_ID
b. Data submitted by 120 public safety organizations via specially designed Web site. Data collected included same fields listed above for Local Governmental organizations

2. Generated on 911 Commission Data Latitude and Longitude via geo-coding using Yahoo geocoder API.
    a. Ensured no errors were present, that at least on entry was returned and that quality metric was over 75.
3. Merged 911 Commission data with PSAP data collected from via our hosted Web site (120 entries) to merge address and ID information with speed information.
    a. Performed exact match between 911 and submitted data on institution name
        i. Facilitated matching by:
            1. Converting names to upper case
            2. Removing the Strings DEPARTMENT, DEPT, TOWNSHIP, TWP
            3. Removing punctuation and double-spaces
            4. Replacing string PD with POLICE and string BOROUGH with BORO
    b. Performed manual merging to integrate additional submitted records that were not matched.
        i. Successfully merged 95 submitted PSAP entries with 911 Commission data.

    Output in file PSAP_911_Matched.xls

7.10 CAI Validation and Loading

After the records were pre-processed as described above, we performed final validations on the results and loaded them into the NTIA transfer model.

The validations we performed had the following results:

- Verify that the address had a zip code. If not, attempt to extract it from the remaining address information.
    - Discarded 4 reocrds that had no zip code
- Verify that the addresses had a building number. If not, attempt to extract it from the remaining address information. If no number was found, populate field with "N/A"
- Verify that the address had a city. If not, attempt to extract it from the remaining address information.
    - Discarded 3 records that had no city value
- Verify that the address had state. If not, attempt to extract it from the remaining address information.
- Verify that the address had street information.
    - Discarded 79 records that had no street information (generally P.O Boxes)
- Ensure that records meet NTIA model restrictions
    - bbService and publicWifi set to Y, N or U
    - Ensure that transtech has valid value
        - We discarded two records that had fixed wireless technologies
        - For records that the incomplete records, we filled in a value of 0

We loaded 7549 records.

NEW MEXICO DEPARTMENT OF INFORMATION TECHNOLOGY

New Mexico State Broadband Initiative
Mapping Methodology: April 1, 2012

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New Mexico State Broadband Initiative
Mapping Methodology: April 1, 2012

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New Mexico State Broadband Initiative
Methodology: April 1, 2012

Introduction

The State of New Mexico (hereafter, NM or State), through its agents Earth Data Analysis Center (EDAC [Mapping Team]) at The University of New Mexico and NM Department of Information Technology (DoIT), submitted the April 1, 2012 New Mexico Broadband (NMBB) Program data package, in compliance with the National Telecommunications and Information Administration (NTIA) State Broadband Initiative Program (SBI).

Data Submittal Description

The NMBB April 1, 2012 data submission includes:

- NMBB _DeliverableMemo_2012_04_01.pdf: This document describes NMBB data submittal components, state-restricted data fields, and contact information.
- NM_SBDD_2012_04_01.gdb: The NMBB geodatabase was created to NTIA standards and includes FGDC-compliant metadata for the database layers.
- NM_DataPackage_2012_04_01.xls: The FCC-prepared data-package spreadsheet consists of three worksheets for overview and checklist, record count, and provider table.
- NM_2012_04_01.txt: The data receipt file generated from running the Check Submission Tool, lists pass/fail for received data-submission layer and field entries.
- NM_ReadMe_2014_04_01.txt: This readme gives a brief description on the error or warning messages generated by the Check Submission Tool.
- NM_Methodology_2012_04_01.pdf: This Methodology document is included in the submitted package.
- NM_Changes_ and_Corrections_ 2012_04_01.pdf: The document corresponds to a readme document, especially for Internet Service Provider (ISP) information.
- NMBB_Provider_ Data_ Request_Template.xls: The data-request spreadsheet contains an overview and upload instructions in addition to eight worksheets for different types of service, subscriber speed, and community anchor institutions.

All files were zipped together and submitted as NM_SBDD_20120401.zip.

SBDD Geodatabase Layer	Number of Records: April 1, 2012
BB_Service_Address	0*
BB_Service_Road_Segment	4269
BB_Service_CensusBlock	161827
BB_Service_CAInstitutions	2718
BB_Service_Wireless	35
BB_Service_Overview	150
BB_ConnectionPoint_LastMile	0*
BB_ConnectionPoint_MiddleMile	456

***** Due to restrictions in the Non-disclosure Agreement (NDA) with New Mexico Internet Service Providers (ISPs), New Mexico cannot populate the Service Address and Last-Mile feature classes in the NMBB Geodatabase.

Provider Participation

The NMBB Program requested broadband data in January 2012 from sixty-three (63) companies, which represented sixty-nine (69) NM Internet Service Providers (ISPs).

A total of thirty-three different ISPs, representing twenty-seven companies, responded to the April 2012 (Round 5) data request. Of those, twenty-six ISPs (representing twenty-two companies) provided data and the rest indicated no changes to their previously-submitted data. One ISP was identified as 'not a broadband provider' because of the provided speeds, which didn't meet broadband requirements. One previously contacted company was not included in this Round-5 data request because it had been purchased by a different company.

Internet Service Providers	Number: April 1, 2012
Contacted	69
Responded: Provided Data	26
Responded: No Changes to Data	7
Responded: Will not Participate	0
Responded: Not NM Broadband Provider	1
Did Not Respond: Previously Submitted Data	10
Did Not Respond	25

See *Appendix A: Table of New Mexico Internet Service Providers* for those ISPs included in the data request and the participating ISPs.

Data Verification Techniques

Consistency Checks

- EDAC reviewed data provided by NM ISPs for completeness (and/or consistency), per NTIA Data Transfer Model requirements. The NMBB Program contacted ISPs by e-mail to request any missing information.
  This review included comparing newly provided data with the provider's previous data sets. Discrepancies or inconsistencies were noted and addressed through e-mail correspondence with the provider. *Appendix B: ISP-Data Verification and Validation* presents examples of these e-mails.
  See sections *1. Data Collection, 1.5 Data Evaluation* and *2. Data Validation, 2.1 Data Assessment, 2.6 Final Data Validation*.
- For those ISPs who provided block- or segment-level coverage, the Mapping Team checked for coverage containment within known service boundaries.
  See section *3. Data Processing, 3.3 GIS Data Verification*.
- For ISPs providing wireless coverage, the Team checked for coverage containment to New Mexico. (*3.3 GIS Data Verification*)
- If an ISP provided Census Block shapefiles, the Team checked the area of the block to confirm that it fell into the categories for area less than 2 sq mi or greater than 2 sq mi.
  (*3.3 GIS Data Verification*)

- The Mapping Team performed speed checks on data received from the ISPs to make sure they met broadband requirements.
  (*3.3 GIS Data Verification*)
- Topology is validated after loading the data into the geodatabase to identify any inconsistencies in data.
  See section *3. Data Processing, 3.6 Validate Geodatabase*.

Geocoding

- The Mapping Team geocoded address data using different reference street data sets to determine which road reference data set provided the best match. Sometimes a combination of reference data sets was used to obtain better address match rates.
  See section *3. Data Processing, 3.1, 3.2 GIS Data*.
- Unmatched records were sent to the ISP as part of the validation process, with a request for better address information.
  See section *3. Data Processing, 3.3, 3.4 GIS Data Verification, Updates, and Edits*.

NM ISP Feedback Loop

- After processing ISP data, the Mapping Team sent Feedback maps for approval. Any issues for how the service area was represented on the map, such as addition or removal of service, were addressed and corrected, as appropriate. Revised maps then were sent to the provider for review and approval. Feedback maps also included propagation-model results for Wireless broadband.
  See section *3. Data Processing, 3.3, 3.4 GIS Data Verification, Updates, and Edits*.
  See *Appendix C: Feedback and Propagation Model Map*.

Workflow Processing Scheme

New Mexico acknowledges the importance of understanding data reliability and integrity as the Provider data are processed for NTIA submittal. The NMBB Data Workflow and Processing Scheme includes four broad stages:

1. Obtain – Acquire raw Provider data.
2. Validate – Check for internal data consistency and for consistency with external data sources.
3. Process – Develop Geographic Information System (GIS) data and update NTIA Geodatabase.
4. Report – Submit the final Geodatabase to NTIA.

These stages and their relationships are depicted in the diagram below, and are discussed in the sections that follow. The April 1, 2012 Data Workflow and Processing Scheme did not change from the April 2011 scheme and so retained the V3.0 designation.

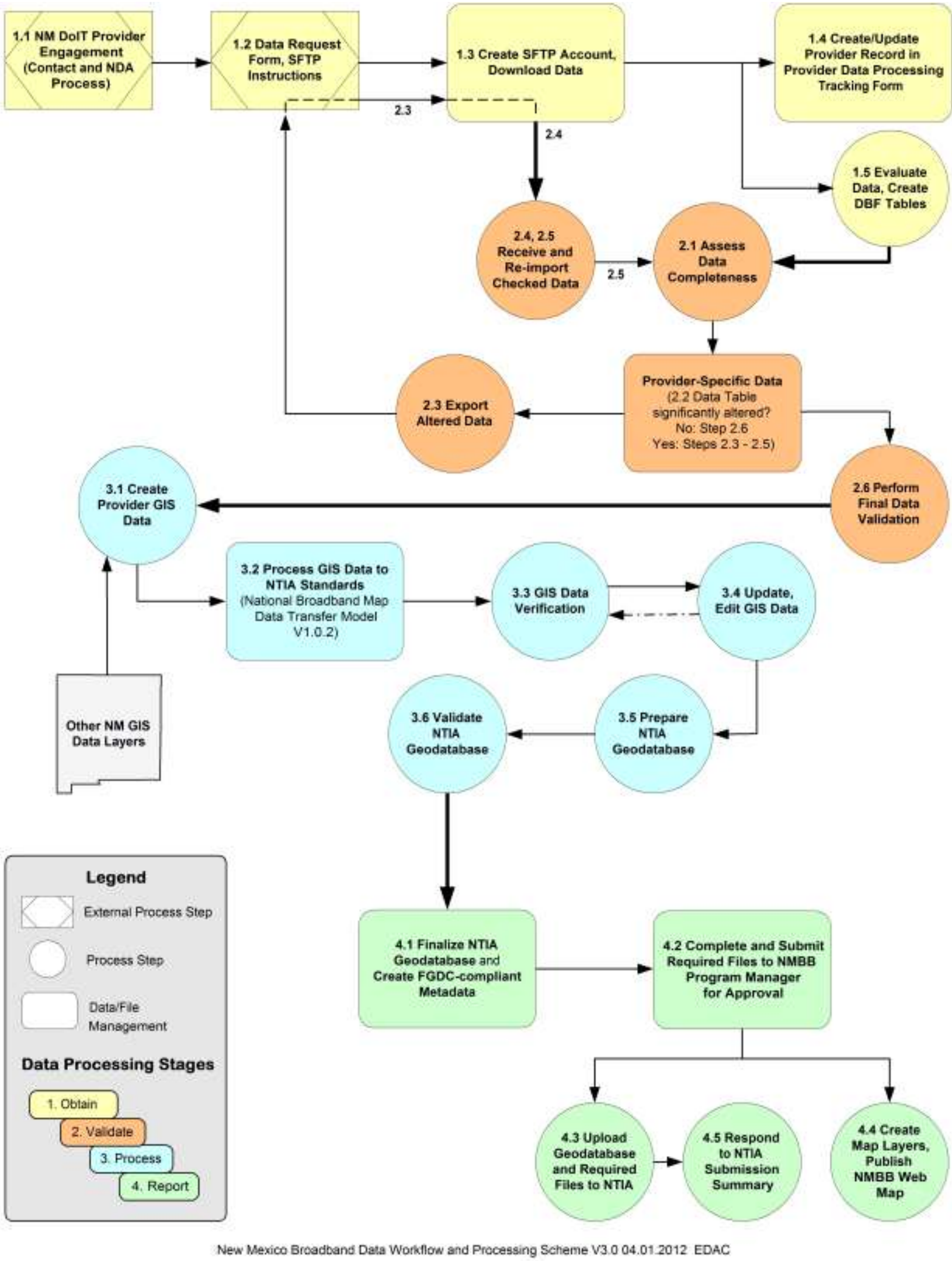


Figure 1 New Mexico Broadband Workflow and Processing Scheme

1. Data Collection

1.1 Provider Engagement

The NM Department of Information Technology established contact with each New Mexico Broadband Provider and negotiated a signed NDA with the State and with EDAC, as required.

1.2 Data Request

EDAC sent an e-mail requesting broadband data to sixty-three NM companies (sixty-nine ISPs) in January 2012, and a reminder e-mail in February to those who had not responded. In addition to an NMBB Program overview and formal request for data, the message included a Web link for the NM Broadband Data Request Form (MS Excel Worksheet); this form included instructions for completing the eight data worksheets and for securely uploading Provider data to the EDAC Secure FTP site.

Data Request Schedule

NMBB Round 5 Data Collection Announcement	1/18/2012
NMBB ISP Data Collection Due	2/20/2012
NMBB Feedback Maps to ISPs for Approval	3/19/2012
NMBB ISP Feedback Due	3/23/2012
NTIA Round 5 Data Due	4/1/2012

1.3 Data Receipt

EDAC created a Secure File Transfer Protocol (SFTP) site for broadband data upload, and created an account on the site for each NM Provider. Each Provider is assigned a unique username and password; this account information is stored in the NMBB SFTP Account Management form.

Provider data arrive in numerous formats, including NMBB or Provider spreadsheets, shapefiles, CAD files, and text files. These data are downloaded from the SFTP site to the EDAC network.

1.4 Provider and Data Tracking

EDAC creates or updates the specific Provider record in a Provider Data Processing Tracking Form. Throughout the data process, each Tracking Form step is recorded with analyst initials and date of task completion. Steps include:

- Record Provider name information and the assigned 2-digit Primary Key (PKey).
- Record the Holding Company Name, DBA Name, FRN (if available), and whether Community Anchor Institutions data are provided.
- Record type of files submitted; date of data submission and the initials of the receiving GIS analyst; and how data were submitted (e.g., FTP or physical medium).

1.5 Data Evaluation

EDAC evaluates the uploaded Provider data for consistency with the NTIA data model and previously submitted data and creates database-format tables.

2. Data Validation

2.1 Data Assessment

EDAC assesses the submitted data for completeness according to the National Broadband Map Data Transfer Model V1.0.2:

- Identify fields (names, types);
- Fill in missing data, if possible; and
- Check field codes, and standardize the values where appropriate.

2.3 Data Export

If the data are incomplete, based upon the above assessment steps, EDAC performs the *If required* steps, below; otherwise, EDAC proceeds with data validation. Changes and assumptions are documented.
If required:

- 2.2 Was the Data Table significantly altered? If yes, go to step 2.3. If no, go to step 2.6.
- 2.3 Return data in standardized format to the Provider for completion.
- 2.4 Receive modified data back from Provider.
- 2.5 Re-import data.

2.6 Data Validation

EDAC performs the final data validation for each Provider's data set: all missing data filled in; all field codes checked and standardized where appropriate. EDAC checks the ISP's provider name and FRN number using FCC's Commission Registration System (CORES) database.
https://fjallfoss.fcc.gov/coresWeb/publicHome.do

3. Data Processing

3.1, 3.2 GIS Data

EDAC creates and verifies Provider-specific GIS data, using ArcGIS 10 software and third-party data sets.

- New Mexico Road Centerline (NM RCL) data files [Geocoding; Primary Roads Data Set]
- NM Telephone Exchange Boundaries 911 [Census Blocks Processing]
- U.S. Census TIGER/Line shapefiles [Geocoding]
- TomTom MultiNet Road shapefiles [Geocoding]
- NAVTEQ Road data files [Geocoding]
- ESRI Road shapefiles [Geocoding]
- ESRI Cable Boundaries data file [Census Blocks Processing]
- Ancillary consistency checks include comparison with other data sources that are available through the New Mexico geospatial clearinghouse – Resource Geographic Information System (RGIS; http://rgis.unm.edu)
- Propagation model results

EDAC processes the GIS data according to the National Broadband Map Data Transfer Model V1.0.2.

Middle Mile Points

- ISPs provide the geographic coordinates for Middle Mile points. Those points are exported as shapefiles and a spatial join is performed against Census 2010 Blocks to obtain FULLFIPSID.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Census Blocks

- ISP data were requested for the Census 2010 Blocks, rather than the Census 2000 Blocks.
- If an ISP provides the Census Block IDs, then those tables are spatially joined with the Census 2010 Data and the blocks are extracted. Then, the Census Blocks (Area < 2 sq mi) are extracted.
- If the ISP provides address-specific data, those addresses are geocoded against the New Mexico Road Centerline (NM RCL) address locator. Unmatched addresses are processed against third-party data sets, such as the TomTom MultiNet and NAVTEQ Road data, which were purchased by the State as a part of the NMBB project, and ESRI Road data. All of those matched records are appended together to obtain a single address data set. The address points are aggregated spatially to the Census Blocks, and the Census Blocks (Area < 2 sq mi) are extracted.
- If an ISP provides shapefiles of Census Blocks, EDAC verifies those to make sure they are less than 2 sq mi in area.
- If an ISP provides telephone exchange boundaries instead of addresses, then those boundaries are verified with the NM Telephone Exchange Boundaries 911 data set, and Census Blocks (Area < 2 sq mi) that lie within those boundaries are extracted. If an ISP provides the CO/RT locations, then a buffer of 1800 ft is drawn, and the Census Blocks (Area < 2 sq mi) that intersect with the buffer area are extracted.
- If an ISP provides service areas instead of addresses for Cable, then the service areas are verified with the ESRI Cable Boundaries data file. Census Blocks (Area < 2 sq mi) that lie within the boundaries are extracted.
- If an ISP does not provide data for this data-submittal round, data processed for the previous rounds are used for the current submittal.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Road Segments

- If an ISP provides address-specific data, EDAC geocodes those points (using a process similar to that explained above in *Census Blocks*). The address points are aggregated spatially to Census Blocks, and the blocks with area greater than 2 sq mi (Area > 2 sq mi) are extracted. NM RCL roads within those Census Blocks are exported, and the geocoded address points are spatially joined with adjacent road segments within a distance of 25 ft (or 30 ft for rural areas). The road segments with joined address points are selected and exported.
- If an ISP provides road segment data with address ranges, any one of the address range values (TO/FROM) for the road is taken and the data are geocoded. Or, if no address ranges are provided, the address file is joined with the NM RCL roads, based on Street Name, City, and Postal Code and the matched records are extracted. This involves manual data processing.
- If an ISP provides Tiger/Line roads data, those roads are extracted from the U.S. Census Tiger/Line shapefile by joining them based on the TLID (Tiger/Line ID). NM RCL road data that match the Tiger/Line roads are exported.
- If an ISP provides Telephone Exchange Boundaries or CO/RT locations or Cable service area boundaries, road segments for these data sets are not processed due to uncertainty about the NMBB procedures for these cases. EDAC checks for ISP-provided address-specific data and, if those data are present, processes the data using the first-listed *Road Segments* step. Otherwise, those roads are not further processed.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Community Anchor Institutions

- EDAC created an Anchor Geodatabase that has data for all the Community Anchor Institutions, such as Schools, Libraries, Health Care, Higher Education, Public Safety Facilities, Government Agencies, and Non-governmental Institutions throughout the State of New Mexico. These data were obtained from different sources, including the Public School Facilities Authority (PSFA), New Mexico State Library, Homeland Security Information Program (HSIP), and NM Resource Geographic Information System Program (RGIS).
- EDAC developed a Community Anchor Site Assessment (CASA) crowd-sourcing application to collect information about Institutions and their Broadband Internet Access in the State of New Mexico. These results are added to the Anchor Database after locations are validated against satellite and aerial imagery.
- The UNM Bureau of Business and Economic Research (BBER) created and conducted a digital-literacy survey to obtain non-governmental-organization (NGO) community support data. EDAC supplemented the Anchor Geodatabase with these NGO data.
- Broadband data provided by the ISPs are also included in the geodatabase. EDAC uses the third-party USAC (Universal Service Administrative Company) data set for broadband information for Schools and the NM State Library data set for broadband information for Libraries.
- The Anchor Geodatabase is further processed to meet the NTIA requirements. NCES IDs for schools, IPEDS IDs for higher education, and IMLS IDs for libraries are obtained from the respective Web sites and are joined with records in the geodatabase.
- Data sets are additionally processed by adding required fields based on the NTIA Data Model.

Wireless

- If an ISP has multiple spectra, the provided polygon is duplicated for each spectrum and then appended together to obtain a single shapefile with stacked geometry.
- If an ISP provides only tower locations (address or coordinates) instead of shapefiles showing their wireless coverage, EDAC generates wireless coverage using SiteSync propagation modeling software. For this, we request additional information from the ISP, such as: Location (address or coordinates), Antenna pattern (omni-directional, 180, 120, 90, etc.), Transmit frequency (MHz), Transmit Antenna Gain (dBi), and Antenna elevation.
- If an ISP provides tower location (address or coordinates), transmit radius and no other above mentioned variables, those locations are mapped and a buffer is drawn with the transmit radius.
- Wireless-coverage polygons with area less than 0.125 sq mi, whether ISP-provided or modeled, are eliminated from the coverage, per NTIA specifications.
- If an ISP indicates providing Satellite services state-wide, a state boundary file is added to the database, processed per NTIA requirements.
- If an ISP (reseller) provides Satellite subscriber data, those addresses are geocoded and the Census Blocks in which the addresses fall are considered for the coverage area.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Overview

- This set of notes applies to wire-line data, only.
- If an ISP provides the Subscriber Weighted Nominal (SWNOM) Speed of respective technology types for the counties it serves, those values are joined with the County boundary file from the U.S. Census Tiger/Line shapefiles.

- If an ISP provides the technology of transmission, number of subscribers, and the maximum advertised speed for the Counties it serves, the SWNOM Speed is calculated and the values are joined with the County boundaries shapefile.
- These county files from each ISP are appended together to obtain a statewide stacked geometry. Data are further processed by adding required fields based on the NTIA Data Model.

3.3, 3.4 GIS Data Verification, Updates, and Edits

Processed data are developed as Provider-specific spreadsheet and GeoPDF products. As the first step in New Mexico's Provider feedback loop, EDAC places each Provider's products on the SFTP site and requests that Providers verify accuracy and identify needed edits and corrections. Six (6) ISPs responded to the verification request in the April 1, 2012 data submission cycle.

GIS and modeled data are updated and edited, based on Provider feedback, and modified data products (spreadsheet and GeoPDF) are delivered to the Provider through the SFTP site for final verification and to complete the feedback loop.

3.5 NTIA Geodatabase Preparation

EDAC produces a final "clean" GIS data set from the processed and Provider-specific, versioned feature data sets, and then prepares the NTIA Geodatabase from these finalized GIS data. Crowd-sourced data were not used for preparation or validation.

3.6 NTIA Geodatabase Validation

EDAC validates the geodatabase by performing the validation checks provided below and by running the geodatabase through the SBDD_CheckSubmission tool. EDAC then assigns Quality Assurance/Quality Control (QA/QC) values.

- Repair Geometry
- Validate Topology
- Check Provider identification fields by Frequency tool and Summarize tool
- Check for Provider Name, Census Block, and Transmission Technology. Each ISP (Provider Name) should have only one Census Block per Transmission Technology.
- Check for Null values in Transmission Technology codes, PROVIDER_TYPE, FULLFIPSID, STATEFIPS, COUNTYFIPS, TRACT, BLOCKID, GEOUNITTYPE, STATECOUNTYFIPS fields
- Check for Null values in OWNERSHOP, BHCAPACITY, BHTYPE, TRANSTECH, ANCHORNAME, ADDRESS (BLDGNBR, STREETNAME), CITY, ZIP5, STATE, Latitude, Longitude fields
- Check Maximum advertised and typical down/upload speed fields for null values and for valid domain values: MAXADDOWN/TYPDOWN < MAXADUP/TYPUP; MAXADDOWN < '0' OR MAXADDOWN > '11'
- BHCAPACITY <0 and >9, BHTYPE <0 and >4, CAICAT <1 and >7
- Check for SPECTRUM values <1 and >10
- Speed Tiers:
    - DSL download speed tier: if 7 or higher, contact ISP to verify
    - Cable Modem – DOCSIS 3.0 should not be 7 or lower
    - Cable Modem – Other should not be 9 or higher
    - Fixed Wireless download speed tier should not be 8 or higher

4. NMBB Report and Submittal

4.1 Finalized NTIA Geodatabase and Metadata

EDAC finalizes the Geodatabase per NTIA standards (National Broadband Map Data Transfer Model V1.0.2) and creates the associated metadata.

4.2 NMBB Program Manager

The NMBB Program Manager receives the finalized Geodatabase through the SFTP site and approves the files for submittal to NTIA.

EDAC completes and delivers all files to the NMBB Program Manager, as required by the Program. Files include correspondence logs with NM Providers, documentation for Web mapping activities, and the Provider-specific Data Processing Tracking Form.

4.3 NTIA Submittal

The Geodatabase and required files (data transmittal memorandum, Provider data request template [not a required file], data package spreadsheet, check-submission receipt, methodology, and changes and corrections) are uploaded, using the FCC/NTIA SFTP site.

4.4 NMBB Map Layers

Following the NTIA submittal, EDAC creates GIS map layers from the Geodatabase and publishes them to the New Mexico Broadband Program Mapping site, www.nmbbmapping.org/mapping/.

4.5 Response: NTIA Submission Summary

NM DoIT and EDAC developed a document template to respond to the NTIA Submission Summary, both to address NTIA-identified issues or gaps and to request clarification and additional information. New Mexico responds within one week of receiving NTIA's Submission Summary.

NMBB System Security

System Security

The NM Broadband Server is a fully patched Windows Server 2008. The server is protected by Symantec Endpoint Protection and a double firewall.

The first layer of firewall protection is a Cisco hardware firewall that protects the Server from any intrusion from outside the EDAC network. This firewall only allows connections on Ports 80 and 22.

- Port 80 allows Web browsing.
- Port 22 allows Secure FTP. SFTP service is fully encrypted with SHA1 stored passwords.

The Windows software firewall is configured to allow access on Ports 80, 22, 443, and 3389.

- Port 443 gives EDAC developers the ability to configure ArcGIS Server from within the EDAC network.
- Port 3389 gives EDAC system administrators the ability to configure the base Windows server from within the EDAC network.

Server Connections

Connect to the Server from the outside:

- HTTP: No authentication (simple Web browsing).
- SFTP: Authentication required and fully encrypted.

Connect to the Server from within the EDAC network:

- HTTPS: Authentication required and fully encrypted.
- RDP: Authentication required and fully encrypted.
- SMB: Port 445, Windows file-share port.

Virtual Machine and Networked Drive Back-ups

The NMBB Virtual Machine (VM) is a dedicated server.

Back-up: Development Networked Drive (not published)

- Daily: A differential back-up to a tape server is performed; the tape server is connected to a secure tape library.
- Friday/Weekend: A full back-up of the networked drive is performed to the secure tape server.

Back-up: Virtual Machine (published)

- Daily: The entire VM is backed up by VDR (VMware Data Recovery [application]) to a secure, self-contained data store.
- Weekly: The entire VM is backed up to a TrueCrypt volume in remote storage.

Physical Security

NM Broadband Server physical security is accomplished through:

- Controlled-environment floor space in a locked, code-protected room for system servers, and
- An uninterrupted power supply (UPS).

Lessons Learned

Provider Feedback Loop

EDAC identified and implemented several measures for more effective data collection during the 2011 data submittals. These included:

- Developing and formalizing an interaction process between data providers and EDAC.
- Modifying the data request template, based on the updated NTIA data model.
- Setting deadlines for receiving data from ISPs. This allowed EDAC sufficient time for processing and submitting feedback maps to ISPs for their verification.

These measures have been successful with respect to efficient data processing and validation and for ISP engagement. The NMBB Program continues to evaluate or expand upon these measures.

Data Validation and Processing

EDAC continued to address issues regarding data validation and processing. These included:

- Evaluating and updating data validation procedures to meet requirements for the data model.
- Implementing, testing, and verifying propagation models for Wireless data.
- Exploring propagation models for processing Satellite data.

NMBB Web Map

The New Mexico Broadband Map (www.nmbbmapping.org/mapping/) is developed as part of the NMBB Program for the State of New Mexico. This Web map displays all of the processed ISP broadband data that are submitted to NTIA for the National Broadband Map, and the processed statewide satellite-service data.

Figure 2 (below) is a screen-capture image of the New Mexico Broadband Map V 2.0 with Data Update: 1 October 2011 [map data are updated following each NTIA data submittal]. Map layers for DSL, Cable, and Copper Wire broadband-coverage are displayed with Tribal Land Boundaries and the Streets base map. Fiber, Fixed Wireless, Mobile Wireless, and Satellite layers are not displayed. Tools include: layer selection; base map selection; dynamic legend; slider-bar and custom zoom; drag-and-drop and directional pan; full, previous, and next extent; identify; find address; scale bar; and print map. Additionally, the mapping site provides a feedback tool, help (online user guide), program information, and New Mexico's disclaimer.

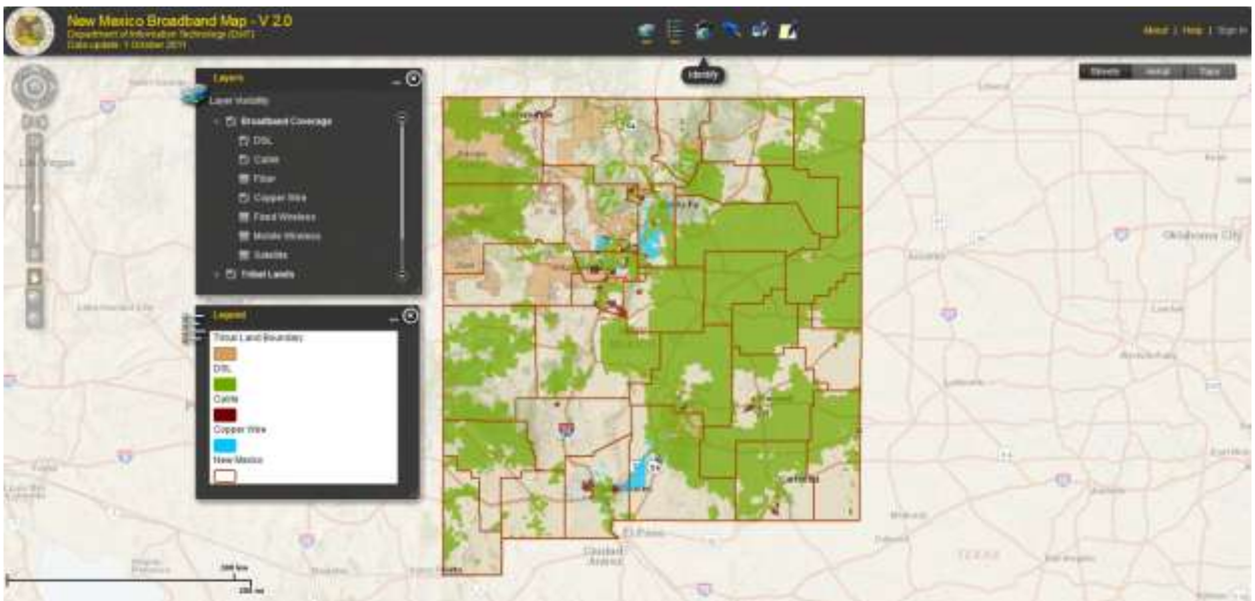


Figure 2 NMBB Program: New Mexico Broadband Map, www.nmbbmapping.org/mapping/; accessed 26 March 2012

Appendix A: Table of New Mexico Internet Service Providers

Internet Service Providers listed in black text were participating providers in NTIA Data Round 5. Providers listed in blue text did not respond to NTIA Data Round 5 data requests.

Identified New Mexico Internet Service Providers: NTIA Data Submittal, April 1, 2012	
360networks (USA) Inc.	US Cable
Agave Broadband LLC	Valley Telecom Group (Copper Valley Telephone, Inc.)
AT&T Corp, Inc.	Valley Telecom Group (Valley Telephone Cooperative, Inc.)
AT&T Mobility LLC	Verizon Wireless
Baca Valley Telephone Company, Inc.	Windstream Communications SouthWest
Baja Broadband	WNM Communications
Cable One	Yucca Telecom (Roosevelt County Rural Telephone Cooperative, Inc.)
CenturyLink	Yucca Telecom (Yucca Telecommunication Systems, Inc.)
Comcast	WildBlue Communications, Inc.
Cricket Communications, Inc.	
Cyber Mesa Telecom	Action INTELEX
Dell Telephone Cooperative, Inc.	AmigoNet
DIECA Communications, Inc. (Covad Communications Company)	Azulstar, Inc.
ENMR Plateau Telecommunications	BlackRock Networks, LLC
Frontier Navajo Communications (Navajo Communications Company, Inc.)	Brainstorm Internet
Higher-Speed Internet, LLC	CityLink Fiber Holdings, LLC
Kit Carson Electric	CNSP Internet
La Jicarita Rural Telephone Cooperative	Desertgate Internet
Leaco Rural Telephone Cooperative	La Canada Wireless Corporation
Level 3 Communications, LLC	La Tierra Communications, Inc.
MATI Networks (Mescalero Apache Telecom, Inc.)	MetTel
Penasco Valley Telecommunications	Rio Grande Unwired
Plateau Telecommunications, Inc.	RioLink, LTD
PTCI (Panhandle Telephone Cooperative, Inc.)	SCS Connect
PVT Networks	SentivaNet
Sacred Wind Communications, Inc.	Southwest Cyberport
Sierra Communications (a subsidiary of Baca Valley Telephone)	Spinn.Net
Southwestern Wireless	Straight Shooting Tech
Sprint	TaosNet, LLC
Suddenlink Communications	Tewa Communications
StarBand Communications, Inc.(Spacenet, Inc.)	Transworld
T-Mobile	Trilogy
Time Warner Cable	TriNet Communications
Tularosa Communications, Inc.	UPHI
TW Telecom of New Mexico, LLC	Virtual Los Alamos

Appendix B: ISP-Data Verification and Validation

The NMBB Program corresponds by with Internet Service Providers to request feedback on and corrections to their submitted data. The following e-mail chain is an example of ISP feedback to their NMBB map and data correction resulting from comparison of Round 5 data with Round 4 data.

Subject: NMBB Program: Feedback - Spring 2012 (Round 5) - Comcast

<ISP Contact>,

The feedback maps for the April 1, 2012, fifth round of deliverables to NTIA for New Mexico Broadband Mapping Program are now complete. See the attached **Feedback.zip** file which contains maps of your data in a PDF format along with a readme describing the contents of the file. These maps and all previous feedback maps are available on your FTP account in a folder named Feedback. Should you need your FTP account information, please email <name> (<e-mail address>).

Verification/ Validation Request
Verify and validate the data provided by your organization to the NMBB program. For the ISPs who provide fixed wireless services and submitted their wireless tower information, we have generated coverage area using SiteSync propagation modeling software. We would encourage you to take a closer look at the coverage and provide your comments. The NMBB Program values your suggestions and comments regarding the feedback maps, feel free to email your comments. Please provide your feedback by **March 23, 2012.** Otherwise, the data portrayed on the map are assumed to be accurate and submitted to NTIA as such.

Sincerely,
<NMBB Analyst>

ISP Contact to NMBB Analyst:
The circles on the attached map indicate areas that incorrectly show us offering broadband service (Internet Access).

NMBB Analyst to ISP Contact:
Thank you for your review. The feedback map is based on the data provided by Comcast for the April 2012 submittal and I would like to confirm details about the data sent for Round 5.

For Fall 2011 (round 4), we generated a map, which you reviewed and confirmed was accurate on 9/14/2011 (I've attached a copy of this map).

The map displayed Comcast services in communities of
Taos
Las Vegas
Grants
Socorro
Hobbs

For Spring 2012 (round 5), we have generated a similar map, which you reviewed and circled the above mentioned communities as being areas in which Comcast does NOT provide cable services. Would you please confirm that you no longer provide services in those communities.

Looking forward to hear from you. Thank you.

ISP Contact:
I assumed in 2011 that Broadband meant video. In talking with <other contact> this week he told me it's not just video, but would need to include internet. These areas do not have Comcast Internet.

Sorry for my confusion on this.

NMBB Analyst:
Thank you for the clarification. We will make the changes as suggested. Please, make the distinction for video and internet services in the next round of data submission, and we will process that accordingly thereby eliminating these discrepancies for the next NTIA Submittal.

Again, thank you for your careful evaluation of the feedback we've provided.

NMBB Analyst:
Looking at the previous feedback map, we realized that there are more number of areas with no broadband internet from Comcast are circled, which are not for this round. Would you please verify whether Comcast provide broadband internet services in the following areas?

I have uploaded a zip file containing shapefile of Census Blocks to the FTP site (because file size exceeds e-mail limit), if this helps in verification.

Raton
Cimarron
Jemez Springs
Thoreau
Tucumcari
Gallup
Deming

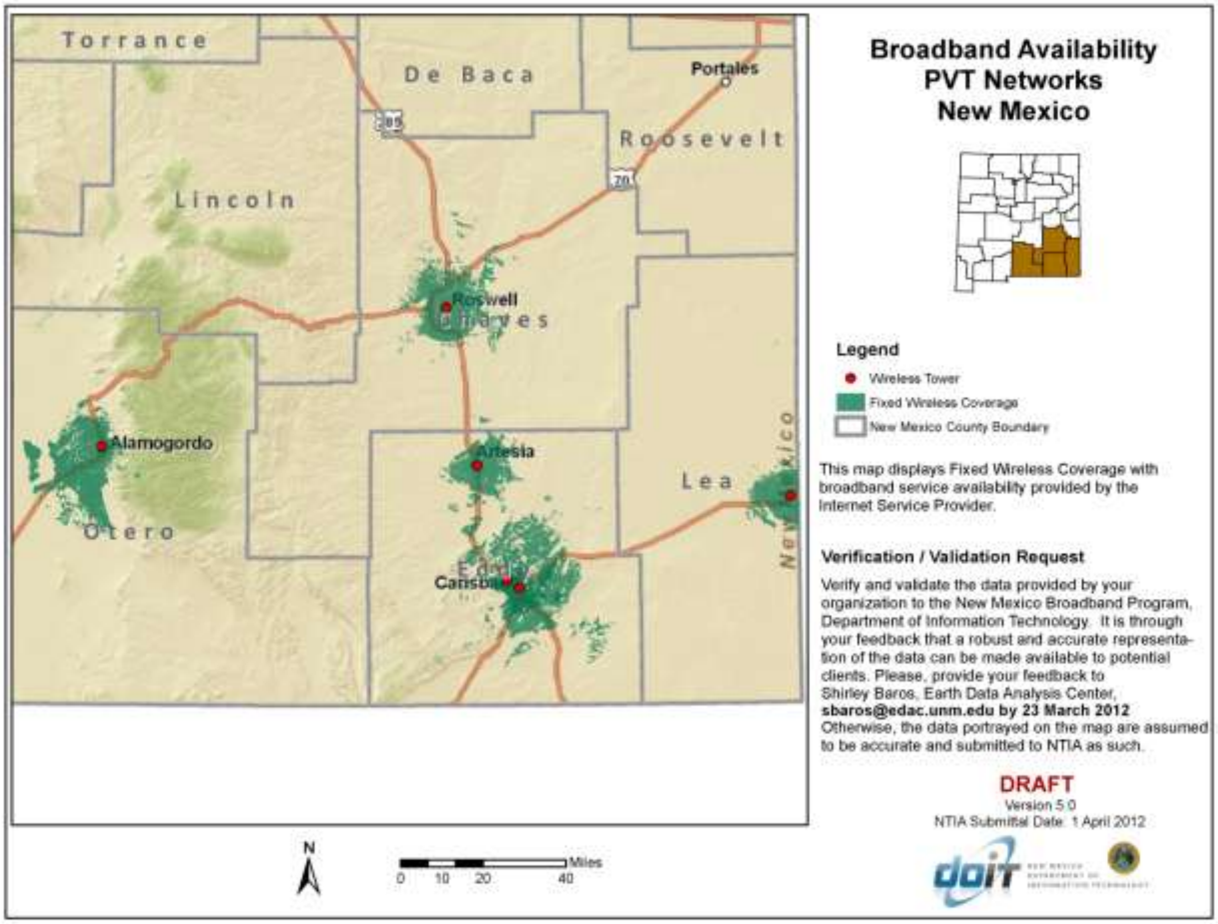
Looking forward to hear from you.
Thank you for your time.

ISP Contact:
Here is the information you requested:
Raton – Does not have Comcast Broadband Internet
Cimarron – Does not have Comcast Broadband Internet
Jemez Springs – Does not have Comcast Broadband Internet
Thoreau – Does not have Comcast Broadband Internet
Tucumcari – Does not have Comcast Broadband Internet
Gallup – Has Comcast Broadband Internet
Deming - Has Comcast Broadband Internet

NMBB Analyst:
Thank you for your quick response. We'll make changes to the data accordingly.
We appreciate your time and cooperation.

Appendix C: Feedback and Propagation Map

This map displays Fixed Wireless coverage with broadband service availability provided by the Internet Service Provider. Fixed Wireless coverage was generated with a propagation model.



Appendix D: Table of Abbreviations and Acronyms

BB	broadband
BBER	[UNM] Bureau of Business and Economic Research
CAD	Computer-aided Design
CO/RT	Central Office/Rural Terminal
DBA	Doing Business As
dBi	decibel isotropic
DoIT	[NM] Department of Information Technology
DSL	Digital Subscriber Line
EDAC	[UNM] Earth Data Analysis Center
FCC	Federal Communications Commission
FGDC	Federal Geographic Data Committee
FRN	FCC Registration Number
ft	foot
FTP	File Transfer Protocol
GDB, gdb	Geodatabase; Geodatabase file extension
GIS	Geographic Information Systems
HSIP	Homeland Security Information Program
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ID	[unique] identifier
IMLS	Institute of Museum and Library Services
IPEDS	Integrated Postsecondary Education Data System
ISP	Internet Service Provider
MHz	megahertz
NCES	National Center for Education Statistics
NDA	Non-Disclosure Agreement
NGO	Non-governmental Organization
NM	New Mexico, State of New Mexico
NMBB	New Mexico Broadband [Program]
NM DoIT	New Mexico Department of Information Technology
NTIA	National Telecommunications and Information Administration
PDF, pdf	[Adobe] Portable Document Format and file extension
PSFA	[NM] Public School Facilities Authority
QA/QC	Quality Assurance/Quality Control
RCL	[NM] Road Centerlines
RDP	Remote Desktop Protocol
RGIS	[NM] Resource Geographic Information System
SBI	State Broadband Initiative
SFTP	Secure File Transfer Protocol
SHA1, sha1	Secure Hash Algorithm 1
SMB	Server Message Block
sq mi	square mile(s)
SWNOM	Subscriber Weighted Nominal [Speed]
TIGER	[U.S. Census] Topologically Integrated Geographic Encoding and Referencing (system)

TXT, txt	Text file extension
UNM EDAC	The University of New Mexico Earth Data Analysis Center
UPS	uninterrupted power supply
USAC	Universal Service Administrative Company
VDR	VMware Data Recovery (application)
VM	Virtual Machine
Web	World Wide Web
XLS, xls	Microsoft Excel file extension
ZIP, zip	Zipped file extension

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

CONNECT Nevada®

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:

As the State Broadband Designated Entity, in partnership with the Nevada Broadband Task Force, please accept this submission from Connected Nation on behalf of the state of Nevada's State Broadband Initiative (SBI) Grant Program, known as Connect Nevada.

It is with highest regard that the collective stakeholders of Connect Nevada 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 Nevada has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit not just Nevadans, 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 Nevada: 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 (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2011 SBI data submission for the Connect Nevada program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 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.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of a new section pertaining to industry mergers and acquisitions – specifically this section will detail any and all mergers or acquisitions that have taken place in Nevada, since the October 2011 submission. The intent of this new section is to provide a better understanding of how the broadband provider landscape has changed over time.

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 98.11 percent of the Nevada provider community, or 52 of 53 total providers. There are 51 participating providers and one additional non-participating provider whose estimated coverage areas have been submitted. Of the 51 participating providers, 20 supplied an update to their network or coverage area(s), while 26 have reported no change. The remaining 5 represent providers who previously supplied data but were 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 provider that is not represented in the attached datasets was non-responsive to multiple contact attempts.

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

Connect Nevada has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Nevada conducts field validation efforts. To date, 38 (69.09 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

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

As an indicator of stakeholder penetration, the Connect Nevada website encountered 4,543 unique visits during this reporting period (10,010 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 14 broadband inquiries over this same reporting period (40 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 Nevada website and the Connect Nevada 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 Nevada mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Nevada to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Nevada 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.

Outreach was conducted during this data update reporting period by Connect Nevada to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Nevada website. Connect Nevada worked with Nevada State Library and Archives to call and e-mail library directors the CAI survey. Connect Nevada also worked with the Department of Education and the Nevada Association of Superintendents to distribute the CAI survey to school contacts. Lastly, Connect Nevada partnered with the Department of Health and Human Services to obtain data from state healthcare institutions. Connect Nevada will continue to build upon these relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

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

The Connect Nevada program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Nevada, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead.

Respectfully submitted,

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

DATA ACQUISITION: NEVADA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this fifth reporting period of the SBI, Connect Nevada, working in close coordination with the state of Nevada, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. During this reporting period Connect Nevada has continued to focus efforts on conducting outreach and raising awareness of this important project.

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

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

The survey can be accessed at this link: http://www.surveymonkey.com/s/7RSHPBS.

Connect Nevada conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Nevada continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity.

Connect Nevada has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. Connect Nevada worked closely with Nevada State Libraries and Archives to administer the CAI survey. Moreover, Connect Nevada partnered with the department of Education and the Nevada Association of Superintendents to distribute the CAI survey to school technology contacts. In addition, Connect Nevada worked with the Department of Health and Human Services to collect data from state healthcare institutions.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Nevada project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Nevada will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI.

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	866	866	865	161	152	148
Libraries	91	91	89	60	64	64
Healthcare	5004	5004	5004	26	4965	4965
Public Safety	112	112	109	8	11	11
Higher Ed Institutions	66	66	64	49	48	48
Other Government	842	842	837	54	101	101
Other Non-Government	1714	1714	1694	25	557	559
Total	**8695**	**8695**	**8662**	**383**	**5898**	**5896**

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

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 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 state of Nevada.

Inventory of Deliverables, Connect Nevada: 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.

The provider data collected by CN on behalf of the state of Nevada have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

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

Mergers and Acquisitions

Throughout the course of the SBI program, CN has maintained a repository of electronic records related to its provider outreach activities. Recently, due to the high volume of mergers and acquisitions (M&A) within the provider community, CN elected to create a listing of M&A activities for this mapping cycle as a way of supplementing the Provider Changes and Corrections section of this document. M&A activities for this state are listed below with a brief description and date as obtained through public records or provider disclosure.

- **CenturyLink Merged with Qwest**
  On April 1, 2011, CenturyLink, Inc. (NYSE: CTL) and Qwest Communications completed their merger, creating the nation's third largest telecommunications company. The combined companies will deliver a broader range of communications services to consumers and small businesses throughout its 37-state service area and to business, wholesale, and government customers nationwide via its 190,000 route mile fiber network.

- **KeyOn Acquired the Wireless Broadband Assets of Wells Rural Electric Company**
  On February 3, 2011, KeyOn Communications Holdings, Inc. (OTCBB: KEYO), one of the largest providers of wireless broadband, satellite video, and voice over Internet protocol (VoIP) services in the United States, announced it had completed its acquisition of substantially all of the wireless broadband assets of Wells Rural Electric Company (WREC).

- **Satview Broadband Ltd. Acquired Portions of Baja Broadband**
  On Wednesday, January 26, 2011, elkodaily.com confirmed that Satview Broadband Ltd., a Nevada-based company, bought Baja Broadband to provide the Elko, Carlin ,and Battle Mountain areas with cable television programming services. The switch happened on January 1.

- **TelePacific Acquired NextWeb, Inc.**
  The News section of the TelePacific Communications website confirmed that on April 1, 2011, TelePacific Communications had received regulatory approval for and completed the acquisition of NextWeb, Inc., d.b.a. Covad Wireless, a broadband fixed wireless carrier operating in California, Nevada, and the Chicago, Illinois area.

- **Zayo Acquired 360networks**
  On December 2, 2011, the Zayo website announced that it had completed its transaction to purchase 360networks. The resulting company is one of the largest Bandwidth Infrastructure companies in North America with an estimated annualized pro forma revenue of $393 million.

- **Zayo Acquired American Fiber Systems**
  On October 1, 2011, Zayo Group, a provider of telecom and Internet infrastructure services, announced that it had closed its previously announced transaction to purchase American Fiber Systems (AFS), a leading provider of metropolitan fiber network and telecom services. The acquisition adds approximately 1,000 route miles of metropolitan fiber footprint and over 600 incremental buildings. AFS operated in nine markets, six of which are new markets for Zayo Group and three of which bolster Zayo's network in existing markets.

NEVADA FIELD VALIDATION METHODOLOGY

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

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets 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 Nevada on the following providers: Above All Communications, LLC; Air-Internet, Inc.; Arizona Nevada Tower Corporation; AT&T, Inc.; Avant Wireless LLC; Baja Broadband LLC; Beehive Telephone Company, Inc.; CalNeva Broadband LLC; CC Communications; CenturyLink; Charter Communications; Citizens Telecommunications Company of Nevada (d.b.a. Frontier Communications of Nevada); Clearwire Corporation; Cox Communications; ETAN Industries (d.b.a. Clark Cablevision, CMA Cablevision); Ezznet, Inc.; Great Basin Internet Services; High Desert Internet Services; Highlands Wireless, Inc.; Hot Spot Broadband, Inc.; InfoWest, Inc.; KeyOn Wireless (also formerly Wells Rural Electric Telephone; Las Vegas.Net; Leap (d.b.a. Cricket License Company LLC); Lincoln County Telephone; Moapa Valley Telephone Company; Mount Wheeler Power; Oasis Online, Inc.; Performance Computing Internet Reliance Connects (d.b.a. Virgin Telephone & Cablevision); Robinson Communications Corporation (formerly Oregon-Idaho Utilities, Inc. and Humboldt Telephone Company); Schatnet Internet LLC; Sprint Nextel Corporation; TelePacific Communications (formerly Nextweb, Covad); T-Mobile USA, Inc.; Vegas Wi-Fi Communications LLC; Verizon Wireless; and Yonder Media (also formerly High Speed Networks-Mound House, LLC).

From program initiation through this reporting period, CN has completed in-the-field validation testing against 38 companies (out of a universe of 55 viable providers) totaling 69.09 percent within the state of Nevada. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters. 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.

AT&T Inc.
Issue: DSL platform with a maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 24 Mbps service; screenshot below.

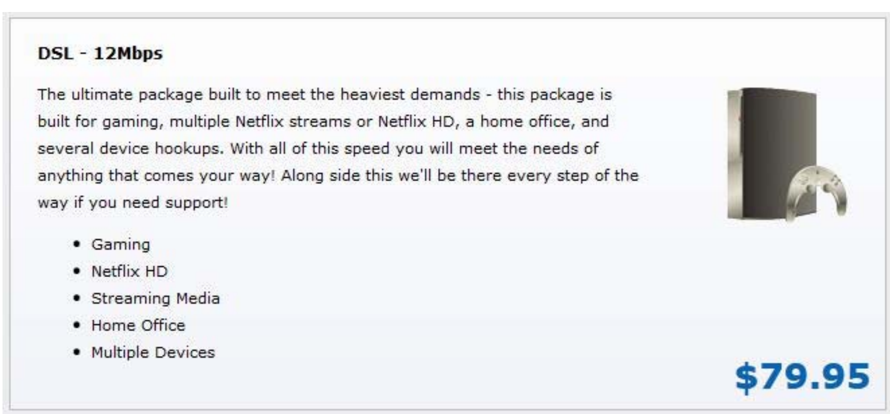
Compare Internet Packages

	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

CalNeva Broadband, LLC
Issue: Technology of transmission 40 with maximum advertised download speed in tier 4, lower than expected value range for the technology.
Resolution: Provider representative confirmed that service area is DOCSIS 3.0, but lower speeds are still in use.

CenturyLink
Issue: DSL platform with a maximum advertised download speed in tiers 7, 8, and 9, higher than the expected value range for the technology.
Resolution: Provider website advertises 25 and 40 Mbps service; screenshot below. Provider representative indicated that tier 9 DSL service is indeed available, but to less than 10% of its customers, which is why it is not widely advertised.

Filer Mutual Telephone Company
Issue: DSL platform with a maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



Great Basin Internet Services, Inc.
Issue: Fixed wireless platform with a maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

STARTER	1 x 1 (down vs. up mbps speed)	$24.95 (monthly)
	2 x 1 (down vs. up mbps speed)	$29.95 (monthly)
	4 x 2 (down vs. up mbps speed)	$39.95 (monthly)
	8 x 2 (down vs. up mbps speed)	$49.95 (monthly)
	12 x 3 (down vs. up mbps speed)	$69.95 (monthly)

Lincoln Communications, Inc.
Issue: DSL platform with a maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider representative confirmed that tier 7 service is indeed available.

Moapa Valley Telephone
Issue: DSL platform with a maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Bundle	Description	Pricing
1	6 Mb Internet	$59.95
2	10 Mb Internet	$69.95
3	15 Mb Internet	$79.95

Rio Virgin Telephone Company
Issue: DSL platform with a maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

Nevada	ADSL				
Introductory DSL Pricing	3.0Mb down/1.0Mb up	6.0Mb down/1.0Mb up	9.0Mb down/1.0Mb up	12.0Mb down/1.0Mb up	768Kb down/768Kb up
Total DSL/Internet Recurring Charge	$34.95	$39.95	$47.95	$54.95	$24.95
*DSL Activation Service Order Charge	**$185.00**	$185.00	$185.00	$185.00	$185.00

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

As requested of SBI grantees through e-mail correspondence on February 22, 2012, CN has also reviewed the fixed wireless coverage of providers in the state that NTIA has recognized as "having an unusual shape" that does not appear to be propagated service. Descriptions on the data collection and methodology used for each provider are supplied below.

Avant Wireless LLC
Background: This provider has not participated in the mapping initiative; therefore, data has been gathered from various public resources and through field validation. In the previous submission, coverage developed from the boundaries posted on their website, which were not model propagations.

Resolution: Based on the information gathered through additional field validation and research, model propagations were created and are being submitted in the April 2012 datasets.

DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDER

Avant Wireless, LLC

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 State Broadband Initiative (SBI) program.

This provider information was submitted to the NTIA in October of 2011 and the following accounts for updates to the coverage for this mapping cycle. The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Avant Wireless LLC (Avant), a wireless Internet service provider (WISP), located in Carson, Nevada with a service area around Reno, Washoe Valley, Spanish Springs, Palomino Valley, Pleasant Valley, and Stead Airport. The narrative will include information regarding how and where CN obtained publicly available data.

April 2012 Submission Commentary

Connected Nation created this coverage estimation document during the October 2011 submission period as a result of the ongoing non-participatory status of the provider. In addition to the 4 instances of e-mail and/or telephone communication during the October 2011 submission period (as previously reported), CN conducted field validation activities on December 8, 2011. This action was precipitated by the response received from the provider on August 4, 2011 (see background information below). On March 5, 2012, CN created the propagation studies included in this report as a replacement for the unusually shaped polygons represented on the provider's website.

CN closely monitored the provider's website to identify any changes in the coverage area or maximum advertised speeds but did not locate evidence of any recent changes. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data.

Background

The provider responded on April 17, 2011, and again on August 4, 2011, ("We continue to decline to participate") demonstrating their non-participatory status.

The Issue

Avant's responses since February 11, 2010, have predicated its unwillingness to participate in the Nevada broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.avantwireless.com)to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system for Avant Wireless LLC, Avant Wireless and Avant * (where * indicates wildcard search) and yielded no FRN **(Exhibit C)**.

Exhibit A: Service Plans

Avant Wireless, LLC

Typical Residential service is $45.95/month and $150 Installation fee
1 Install Rate
Basic One-time Installation $150 standard $200-$400 for special/business installations, $300 typical • If customer purchases equipment (not recommended*) installation is free • If customer purchases equipment monthly, one time installation fee is $75 • Beyond Basic Installation contact us for details
2 Equipment Purchase Price (Not Recommended*)
• Radio, antenna, power supply and cable $249.99 + tax
3 Equipment Lease Price
• Radio, antenna, power supply and cable $17 + tax for 12 months
Choose Only One of the above 3 options
Monthly Service Fees(Residential) this is guaranteed rate, speed will typically be around Max speed. Our outbound speeds are the same as the inbound speeds.
1. 128 kilobits/sec min rate - **7** megabits/sec Max$45.95/month $60/month Mt Rose area
2. 1 megabit/sec min rate **- 10** megabits/sec Max $60/month

Exhibit B: Service Area

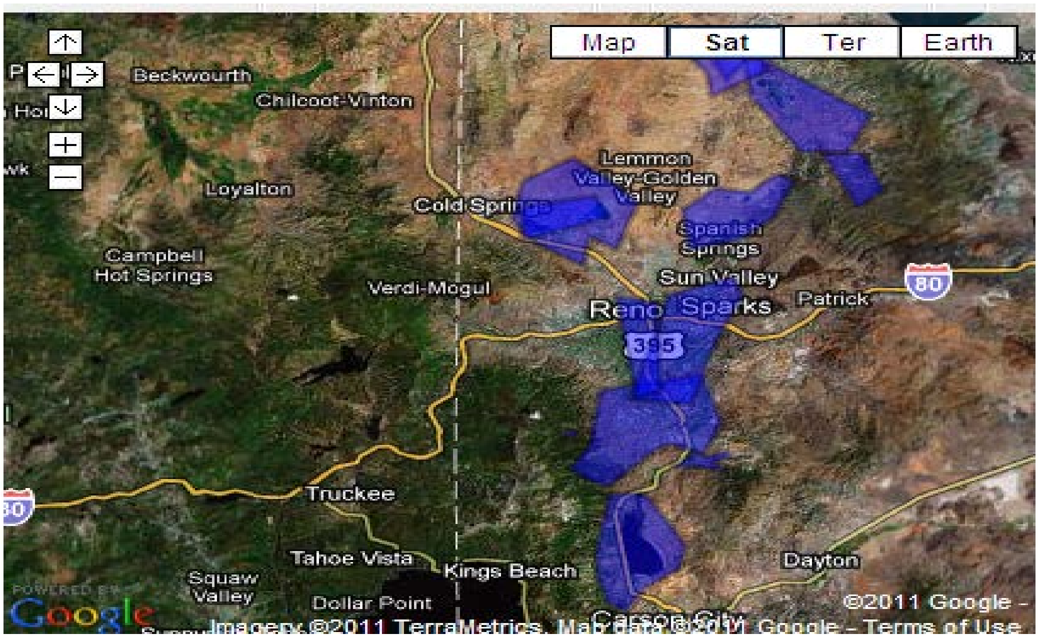
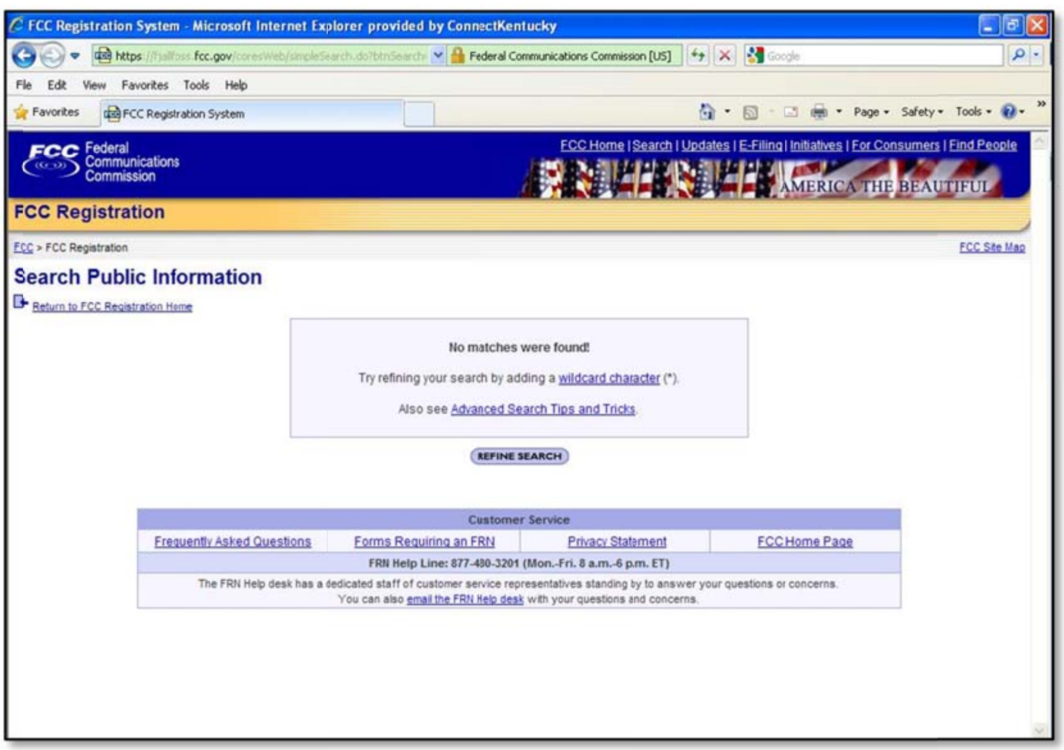


Exhibit C: Federal Registration Number Search Results



Preliminary Identification of Provider's Coverage Area

During the October 2011 mapping cycle, CN extracted the Avant service area polygons from the provider's website **(Exhibit B)** submitted the polygons to NTIA. Information from that website was utilized to create a spectrum analysis testing route.

On February 22, 2012, CN received an e-mail from the NTIA stating "While reviewing the fixed wireless portion of each grantee's data, we have noticed that some of the broadband providers' coverage areas do not appear to be propagated coverage shapes, and in some cases are greater than the reported coverage on the providers' website" (see below). As a result, CN endeavored to create a wireless propagation model to replace the provider-referenced polygons (as identified on its website).

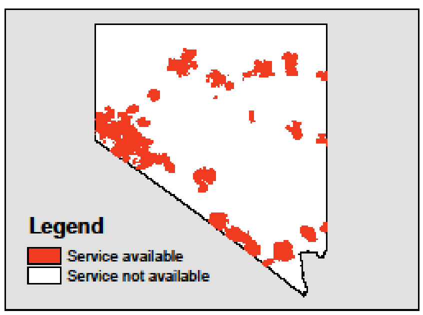
N E V A D A

T E R R E S T R I A L   F I X E D   W I R E L E S S - L I C E N S E D

JUNE 2011 DATA SET

SUMMARY

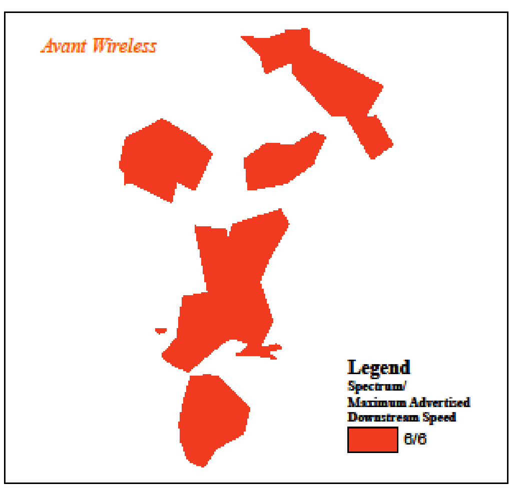
Spectrum/ Maximum Advertised Downstream Speed	Frequency
6/3	3
6/4	4
6/5	6
6/6	6
6/7	1



TABLE

No.	Provider Name
1	Airwavelash
2	Avant Wireless *
3	Express Internet
4	Great Basin Internet Services
5	Highlands Wireless Inc.
6	Hot Spot Broadband
7	InfoWest, Inc.
8	KeyOn Communications, Inc.
9	Mt Wheeler Power
10	Oasis
11	PC Internet
12	Sdsat.net
13	Speedi WiFi
14	Tele-NET.net
15	Vegas WIFI Communications
16	WestNet
17	Wireless Beehive LLC

* The service coverage area has an unusual shape

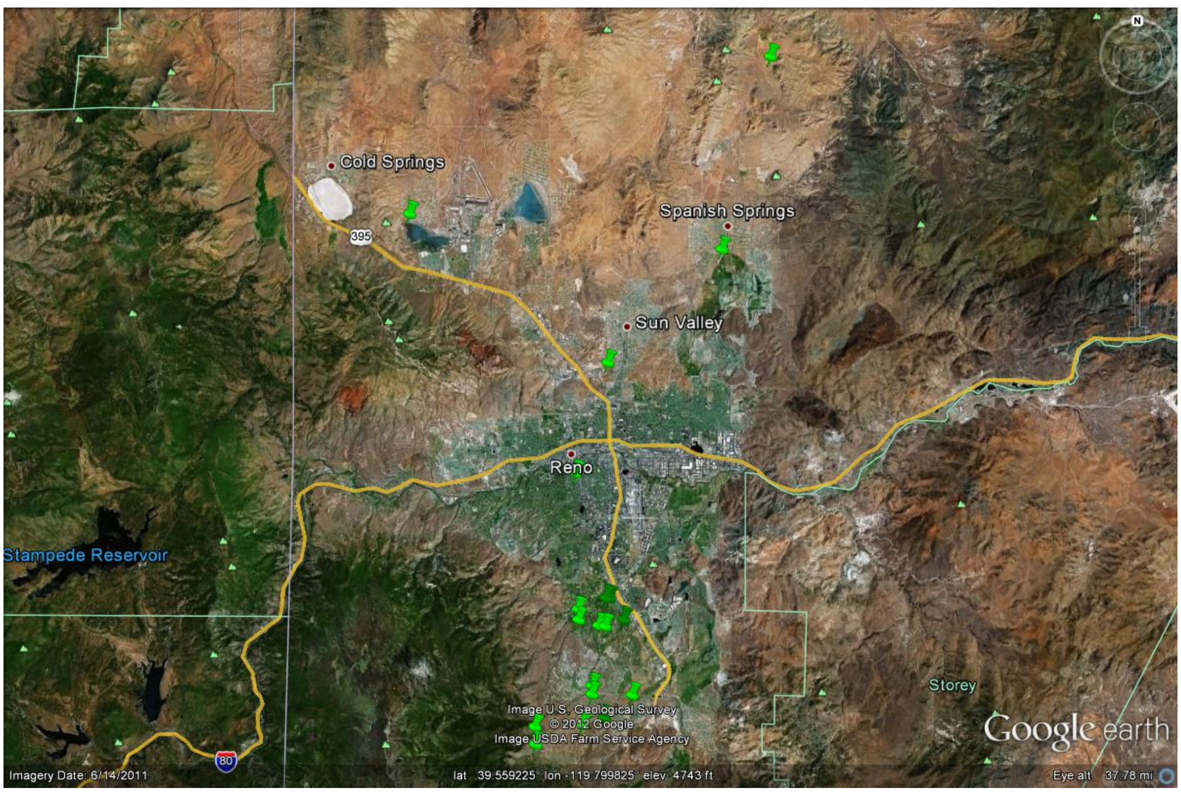


Code description:
Spectrum 6 - unlicensed (including broadcast television "white spaces") spectrum used to proide service
Speed 6 - greater than or equal to 6 mbps and less than 10 mbps

Testing Techniques

CN staff then developed a spectrum analysis data collection and site validation plan **(Exhibit D)** based on information derived from Avant's coverage depiction from its website. From December 5, 2011, through December 8, 2011, the CN engineer measured signal strength at 33 different locations throughout South Reno, Washoe Valley, along Mt Rose Highway, parts of downtown Reno, Sparks, Spanish Springs, and Palomino Valley. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. Each validation point was scrutinized for frequency of operation to ascertain if multiple frequencies were being utilized by the provider. A screen image of the operating frequency (or frequencies) was captured and general notes were recorded for each location **(Exhibit E)**.

Exhibit D: Avant Spectrum Analysis Survey Locations



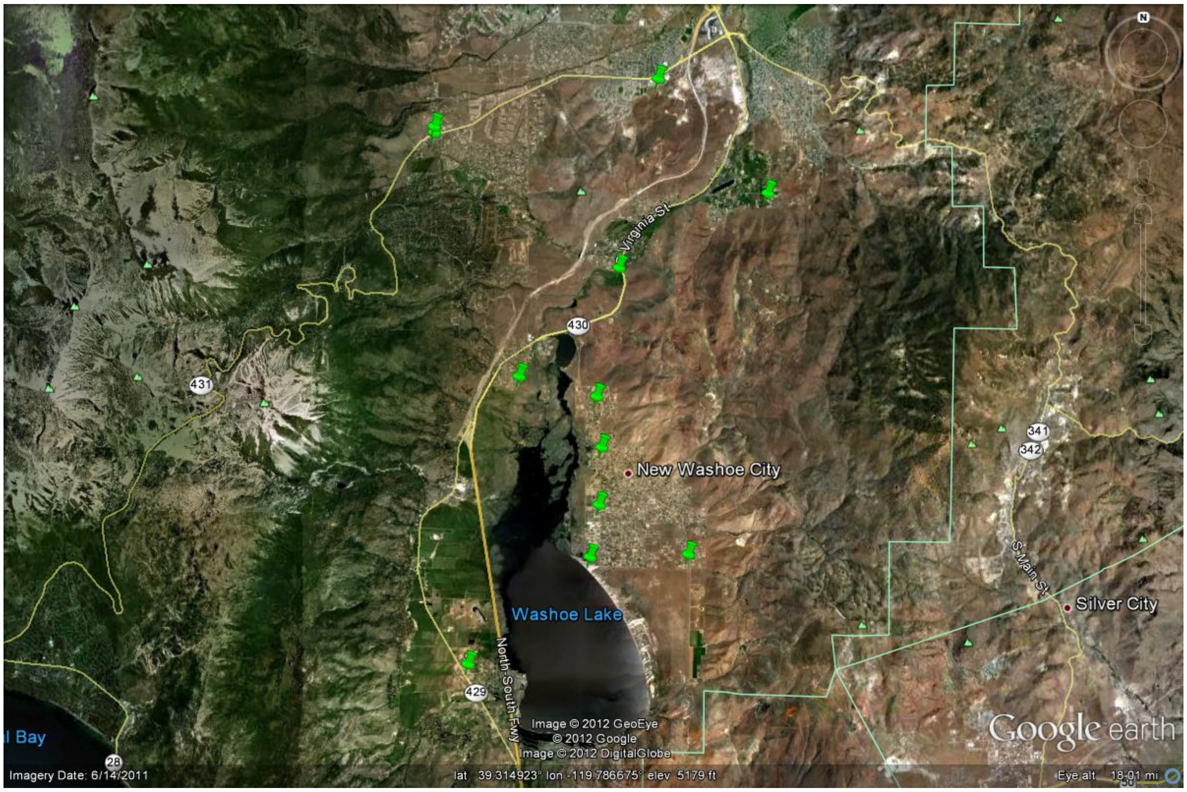
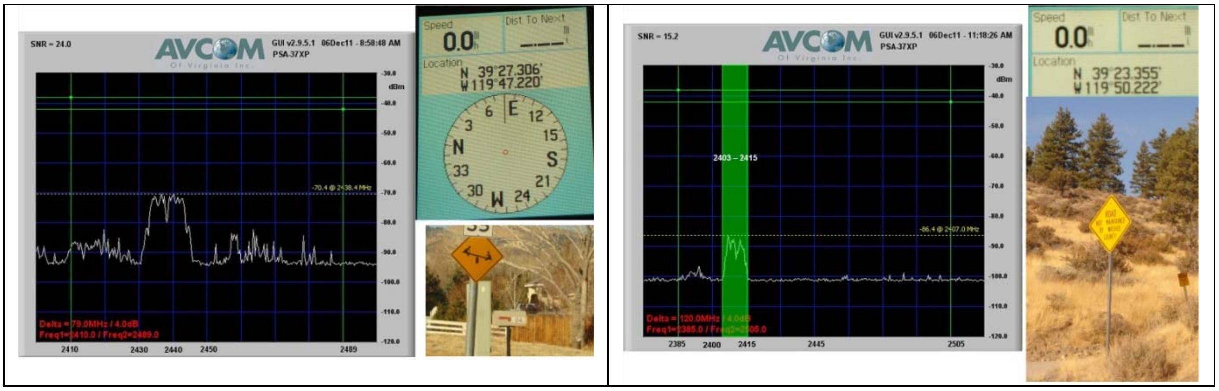
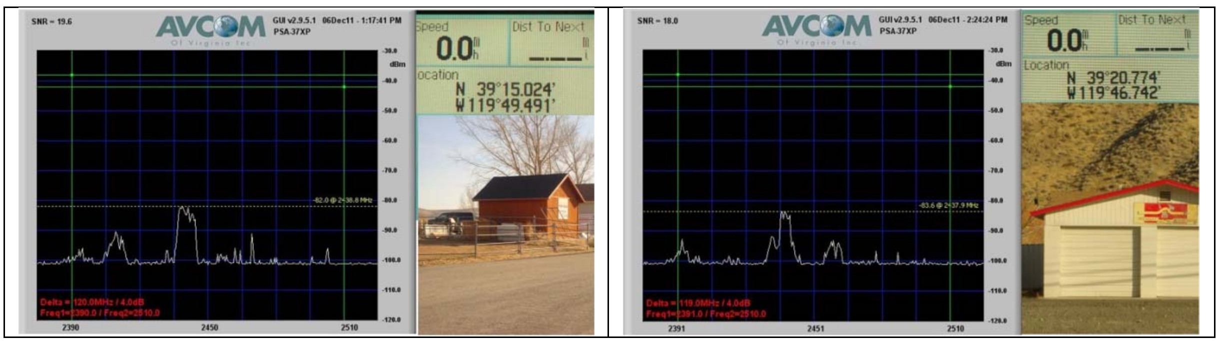


Exhibit E: Avant Field Verification Tests & Notes

Site #	Date	Provider	(N) Lat Decimal	(-)(W) Long Decimal	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Time	Images
21	12/6/11	Avant Wireles	39.379217	-119.836500	2424.4	-63.6	Avcom PSA	11:32 AM	Yes
22	12/6/11	Avant Wireles	39.377800	-119.836483	2434.3	-65.6	Avcom PSA	11:37 AM	Yes
23	12/6/11	Avant Wireles	39.391817	-119.767400	2431.9	-60.4	Avcom PSA	12:19 PM	Yes
24	12/6/11	Avant Wireles	39.364617	-119.732750	2436.4	-88.0	Avcom PSA	12:41 PM	Yes
25	12/6/11	Avant Wireles	39.250400	-119.824850	2438.8	-82.0	Avcom PSA	1:17 PM	Yes
26	12/6/11	Avant Wireles	39.277433	-119.756767	2410.2	-89.6	Avcom PSA	1:32 PM	Yes
27	12/6/11	Avant Wireles	39.276467	-119.787233	2462.5	-95.0	Avcom PSA	1:56 PM	Yes
28	12/6/11	Avant Wireles	39.289083	-119.784600	2410.2	-80.8	Avcom PSA	2:02 PM	Yes
29	12/6/11	Avant Wireles	39.302933	-119.783950	2452.9	-80.8	Avcom PSA	2:04 PM	Yes
30	12/6/11	Avant Wireles	39.315150	-119.785633	2442.5	-83.6	Avcom PSA	2:12 PM	Yes
31	12/6/11	Avant Wireles	39.346233	-119.779033	2437.9	-83.6	Avcom PSA	2:24 PM	Yes
32	12/6/11	Avant Wireles	39.319800	-119.809800	2414.3	-78.8	Avcom PSA	2:38 PM	Yes
33	12/7/11	Avant Wireles	39.520183	-119.780017	2421.9	-53.2	Avcom PSA	11:09 AM	Yes

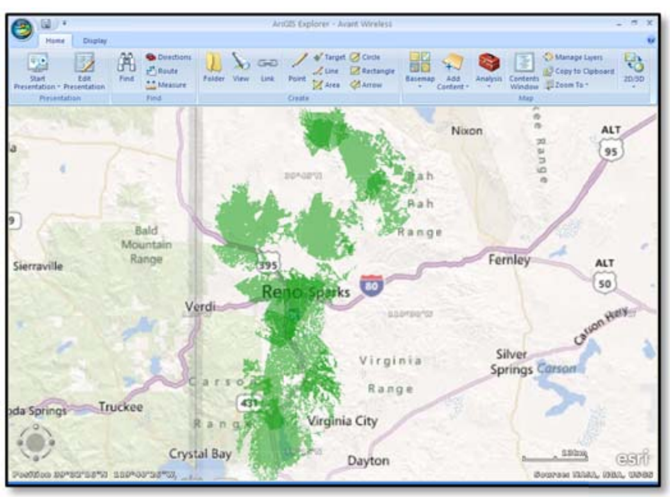




<u>**Results and Submission for April 2012**</u>

The publicly available data was transferred to the CN Provider Information file. A composite propagation study was completed **(Exhibit F)** based on the service area map polygons extracted from the provider's website and based on the field verification data established during the data collection exercise.

Exhibit F: Avant Coverage Estimation (Propagation Model)



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 1.03 percent of Nevada households do not have terrestrial fixed broadband service available, and approximately 0.36 percent[1] of Nevada households have neither mobile nor fixed broadband service available.[2]

Within rural areas of the state, results derived from provider-validated data indicate that approximately 5.70 percent of rural Nevada households do not have terrestrial fixed broadband service available, and approximately 1.18 percent[3] of rural Nevada 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 state.

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

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information 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 Nevada project has received a total of 14 inquiries (40 grant inception to date). As more inquiries are submitted to Connect Nevada, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

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 Nevada project launched BroadbandStat on June 3, 2010, and has received a total of 2,052 visits to date, of which 666 occurred this reporting period.

SPEED TEST METHODOLOGY

The 419 speed tests that are represented in the Connect Nevada Speed Test Report during this reporting period (956 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Nevada speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

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

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 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	21Globe, Inc.	www.21globe.com/is/access/	General Reseller of DSL and backhaul
2	360networks	http://www.360networks.com/	Acquired by another company
3	650Net	www.650net.net/	Dial up only except CA DSL Reseller
4	A & J Hardy Enterprises, Inc.	http://comnett.net	Acquired by InfoWest
5	A 007 Access	www.a007.com/	dba of Cyberonic Communications Inc. reselling DSL and mobile wireless; general reseller of Quest DSL and mobile wireless; DSL does not qualify as the max advertised speed is 768 kbps x 128 kbps
6	A-1 Vegas.com	www.zekes.com	dba Zeke's Internet Service resells Qwest DSL
7	AAA Internet Service	n/a	No longer in business
8	Aaccess Network Communications	www.aaccess.net/	Not a broadband provider; provides services for business IT, home computer, web design
9	Access123.net	n/a	No longer in business
10	ACERX.NET	www.acerx.net/	General reseller of cable, DSL, and satellite broadband access
11	ACI, Inc.	http://www.aci.net	Reseller; unresponsive to multiple attempts to gather data
12	ACS Wireless	n/a	No longer in business
13	Advanced Communications Integration	http://www.aci.net/	Company is difficult to track with several name changes; is currently not a viable provider
14	Airewaves Broadband, LLC	n/a	No longer in business
15	Airmail247.com	www.airmail247.com/	Business mailing list search site; not an ISP
16	Amigo.Net	www.amigo.net/cms/	Qwest reseller in Alamosa, CO offering fixed wireless in CO and NM
17	Antioch Wireless Broadband	n/a	Resells DSL and cellular service in Antioch, IL only
18	Arrowheadnet.com	www.arrowheadnet.com/	Domain registration and web-hosting company

19	ATEK Communications	www.atekcommunications.com	Not an ISP; ATEK is a national data contractor specializing in structured data cabling and fiber optic distribution designs and installations
20	bargainisp.net	www.bargainisp.net/	Generic web directory site; company does not offer broadband
21	Big Kahuna Network	n/a	No longer in business
22	Broadband National	www.broadbandnational.com	Nonfacilities-based general reseller of DSL and satellite for 36 companies (e.g. ACC Business, HughesNet et al.)
23	CAC MediaNet, Inc.	www.cac.net/	DSL reseller; dba First Step
24	California Broadband Cooperative, Inc.	www2.ntia.doc.gov/grantee/california-broadband-cooperative-inc	$81 million BIP/BTOP grant to construct 10 Gbps middle mile fiber network that would mainly follow U.S. Route 395 from Carson City to Topaz Lake; project 5% done as of 8/11 report
25	Camino-Net Internet Services	www.camino-net.com	Reseller; no longer in business; was dial-up only
26	CCIS.net	www.ccis.net	Verizon reseller in DE and NJ
27	Celito Communications	www.celito.net/	Raleigh, NC company supplying tech services to businesses (networks, VoIP, and broadband access) in North Carolina
28	Cheetah Wireless Technologies, Inc.	www.cwti.us/cheeweb/homepage/	LV.Net has assumed CWTI's assets and is operating its networks
29	Cleartouch.Com	www.cleartouch.com/	Reseller of DSL and cable and mobile wireless broadband for various national providers
30	Clover Cable	n/a	Not an ISP; cable television line construction in Las Vegas, NV
31	Colorado River Internet	n/a	No longer in business
32	Comtech Communications Systems	www.comtechlv.com	Not an ISP; business telephone systems
33	Connecting America	www.coam.net/	Dial-up ISP
34	Corridor Communications	www.corridorcomms.ca	URL redirects to http://www.cciwireless.ca/, CCI Wireless, a Canadian company providing broadband access to Alberta

35	Cyberonic Internet Communications, Inc.	http://www.cyberonic.com/	Reseller; A 007 Access (above) is dba of Cyberonic
36	Deltaforce	www.deltaforce.net	Dial-up provider located in Raleigh, NC
37	deluxehost.com	www.deluxe-host.com	Offers web hosting only
38	DGUI	www.dgui.com/	No longer in business; domain name for sale
39	Dial National	www.dialnational.com/	Bad URL; out of business
40	Dialer.net	www.dialer.net/internet_access/United_States.html	International reseller of dial-up and 3G wireless reseller
41	DSL @ Interlync	www.interlync.com	Reseller of business DSL, T-1 and wireless
42	DTS-NET.COM	www.dts-net.com/	Reseller; provides wholesale and retail telecommunications services
43	Elko Broadband	n/a	No URL found; no info
44	estream Wireless	www.estreamwireless.net/	Reseller; no longer in business
45	ETI LLC	www.cyberenet.net/	General reseller of DSL services from infrastructure owned by Verizon, AT&T and Covad
46	Exwire	www.exwire.com/	Wi-Fi hotspot network where Exwire customers can easily access the Internet at several cafes, ski resorts, and other convenient public locations throughout Truckee and Lake Tahoe with Wi-Fi enabled devices
47	Fast Dependable Access	www.fda.net/	No longer in business
48	Go Mango Technologies	n/a	Can find no evidence that Go Mango is a company providing broadband in Nevada
49	Hubwest Protected Networks LLC	www.hubwest.com	Dial-up and web hosting only; not a WISP, merged with Southwest Cyberport
50	Imbris, Inc.	www.imbris.com	Broadband referral site
51	IMGISP.NET	www.imgisp.net/	Broadband referral site
52	In the Air Data	n/a	No URL found; no info
53	Incredible Networks	n/a	No URL found; no info
54	Inercom Communications Inc.	www.inercom.com	No longer in business

55	Interactiveinfo.com Inc.	www.rocketbroadband.com	Redirects to drumbeatnetworks.com, a Buffalo NY company designing, developing, and managing the network infrastructure; offers cable television services in NY only
56	iRadical	n/a	No URL found; no info
57	Ironwood Communications	www.ironwoodcommunications.com	Direct TV
58	ISPartner.net	n/a	No URL found; no info
59	Jenco Speed Web	www.jencospeed.net	Ohio WISP only
60	Jetstream Wireless	n/a	No URL found; no info
61	LANwaves	n/a	No longer in business
62	LARIAT.NET	www.lariat.net/	WISP in Wyoming only
63	LCSisp.com	www.lcsisp.com/index.cfm	National dial-up only
64	Light Link Broadband	www.light-link.net/	Redirects to www.digis.net, a provider of fixed wireless broadband internet in Utah
65	Lightyear Network Solutions, LLC	www.lightyear.net/	Telecommunications network company
66	LinkAmerica.Net	www.linkamerica.net/	Shopping site
67	MainBoard	www.mainboard.cc/internet.htm	VA-based computer store; general reseller; not a WISP
68	Maine Cable and Wireless	www.mainecableandwireless.com	Broadband referral site
69	Marcin Company	n/a	No URL found; no info
70	Millenicom Inc.	www.millenicom.com/internet_access.html	Resells mobile wireless on Sprint network EVDO cards
71	Nanomega.Com	www.nanomega.com	Redirects to GoDaddy; out of business
72	Nanosecond, Inc.	www.nanosecond.com	Provides computer repair, website design, website hosting, SEO, e-mail, and technology consultant
73	Net Nevada	www.netnevada.net/	dba Intuitive Logic, providing IT management and consulting and solutions including colocation, remote network backup and monitoring, shared server hosting, and bandwidth aggregation
74	NetAccess, Inc.	www.nas.net/	Not a WISP; business portal site
75	Netriplex	www.netriplex.com/	Data center
76	NetSpeed Online	www.netspeed-	No URL found; no info

		online.net	
77	NetVoice	www.netvoice.net/	VoIP search site
78	Nevada Comstock Communications, LLC	nevadacomstock.com	Phone systems
79	Nevada Hospital Association	www.nvha.net/	Not a broadband provider
80	Nevada Telecommunications Association	www.nevtelassn.org	Not a broadband provider
81	Nextlink Wireless, Inc.	www.nextlink.com	Acquired by XO Communications
82	NextWeb, Inc.	n/a	www.nextweb.net redirects to http://www.telepacific.com/offer/data-network/wireless-internet-access.asp. NextWeb was a broadband network service acquired by Covad acquired by TelePacific that provides high-speed Internet access over its fixed wireless network to businesses. NextWeb also offers web hosting, dial-up network access, and network consulting and firewall services. Its network covers over 3,000 square miles throughout California and is available in more than 175 cities, including the metropolitan areas of Los Angeles, Orange County, and the San Francisco Bay Area.
83	Northwest ISP	www.northwestisp.com/	No longer in business
84	NuTel Broadband Corporation	www.nutelbroadband.com/	No evidence that this company offers broadband services in Nevada; it appears that this company made a lot of noise in 2006 then disappeared
85	Overarch Broadband	www.overarch.com/	Broadband access in Idaho
86	Pacific Internet Exchange	www.pie.us/, www.pacificinternetexchange.com	URLs not active; no longer in business
87	Paknet Limited	www.ptcl.com.pk/pd_content.php?pd_id=279	Subsidiary of Pakistan Telephone Company; no USA services
88	Planet Online	www.planetonline.net/	Offers website hosting services

89	PremoWeb	www.premoweb.com/about_us/contact_us.html	URL inactive, out of business
90	PrimeVision Communications, LLC	www.myprimevision.net	URL inactive, out of business
91	Priority Wire & Cable	www.prioritywire.com	Not an ISP; priority wire and cable is a distributor of wire and cable serving electrical, utility, telecommunications, mining, and welding wholesale distributors
92	Pyramid Lake Paiute Tribe	n/a	Not operational, BIP/BTOP funded project to deploy fiber-optic middle mile network across 742 square mile reservation
93	Pyramid Net	http://www.pyramid.net/	Offers service, but below broadband threshold.
94	Rapid Cable	n/a	Rapid Cable was recently acquired by CalNeva Broadband in December 2008
95	Renaissance Networks	www.renaissancenetworks.com/	Company based in New Mexico; IT support; not a WISP
96	Sierra Internet Services, Corp.	http://www.sierranv.net/	Reseller of DSL services
97	Silver State Internet	www.ssinternet.net	URL inactive; out of business
98	Simply Dialup A Metrogeek Company	www.simplydialup.com/	Dial-up only; not a broadband supplier
99	Sky Technologies, Inc.	www.skyforall.com	Dish network reseller
100	SkyBridge Wireless	n/a	Not an ISP; renamed SkyBridge Technology Group; acquired aviation business
101	Sling Broadband	www.slingbroadband.com/	Florida WISP
102	SONNET Networking, LLC	www.sonnet.com/	California WISP
103	Sparkplug Las Vegas, Inc.	www.airband.com/	Provides fixed wireless broadband to businesses
104	Speakeasy, Inc.	www.speakeasy.net/	Business phone systems; not an ISP
105	Spring Creek Wireless	www.springcreekwireless.com/index.htm	WiFi access for trailer court in Spring Creek
106	StarNetWX	www.starnetinc.com/	Dial-up and VoIP
107	Surferz.Net	www.surferz.net/	Dial-up in upstate NY only; not a WISP

108	Switch Communications Group LLC	www.switchnap.com/	Colocation; NOC services
109	T1 Shopper	www.t1shopper.com/	Search engine for general reseller
110	The-OnRamp.Net	www.the-onramp.net/	Access provider below NTIA definition
111	Total Access Networks, Inc.	www.totalaccess.net	Fixed wireless provider in Elgin, TX
112	TSISP.NET	www.tsisp.net	Shopping site
113	U.S. TELEPACIFIC CORP	www.telepacific.com	Acquired by MegaPath
114	UNEV Communications, Inc.	n/a	UNEV (Lovelock) does not offer Internet Access
115	United Cable Management, Inc.	n/a	Out of business March 2011
116	University Corporation for Advanced Internet Development	www2.ntia.doc.gov/grantee/university-corporation-for-advanced-internet-development	BIP/BTOP recipient proposes a comprehensive 50-state network benefitting approximately 121,000 CAIs; the project proposes a large-scale, public-private partnership to interconnect more than 30 existing research and education networks, creating a dedicated 100-200 Gbps nationwide fiber backbone with 3.2 terabits per second (Tbps) total capacity that would enable advanced networking features such as IPv6 and video multicasting
117	UNUM Telecommunications, Inc.	www.utinet.net/	URL inactive; out of business
118	USA Airnet, Inc.	www.usaairnet.com	URL inactive; out of business
119	Velocitus	www.velocitus.net	URL inactive; out of business
120	Verde Communications	www.sparkplug.net/	Acquired by Sparkplug in July 2007
121	Washoe Weblinks	www.washoeweblink.com	URL inactive; out of business
122	Wireless Roanoke, Inc.	www.wirelessroanoke.com/	URL inactive; out of business
123	Wireless TelCorp, Inc.	www.wirelesstelcorp.com/	Fixed wireless provider with offices in TX, NV, and NC
124	Wireless Think Tank	www.wirelessthinktank.com/	URL inactive; out of business
125	wisbin	www.wisbin.com/	Wisconsin ISP resells DSL

126	WUE Inc.	www.lctsys.com/index.php?page=home	WUE provides mobile cellular and wireless services
127	www.AmericanAngel.us	www.americanangel.us/	URL inactive; out of business
128	YEYZOO.NET	www.yeyzoo.net/	URL inactive; out of business
129	YLISP (Your Local ISP)	www.itsyournet.com	Provider inactive; no longer in business
130	YourT1Wifi.com	www.yourt1wifi.com/	Providing service In Idaho, Washington, and Alaska
131	ZOOM Internet Services, LLC	n/a	www.zoomon.net redirects to www.fnw.us (FreedomNet) in December 2006; FreedomNet Solutions began offering wireless broadband service in western Michigan in 2002; currently expanding service throughout Michigan and other states; services target businesses and residential service

Broadband Provider Log

Complete	71
Non-Responsive/Refused	1
In Progress	0
Count of Datasets by Status	**72**
Total Unique Providers Represented	**53**

Provider Name	Platform	Status	NDA Execution Date	Notes
Above All Communications, LLC	Fixed Wireless	Data Added to Statewide Inventory		[MAR-12-12 Jess Cary] Change: New fixed wireless tower in operation.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[MAR-12-12 Jess Cary] Change: Expansion of service.
CalNeva Broadband, LLC	Cable	Data Added to Statewide Inventory	4/8/2010	[MAR-12-12 Jess Cary] Change: Expanded coverage area.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[MAR-12-12 Jess Cary] Change: Provider updated coverage area.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[MAR-12-12 Jess Cary] Change: Expanded coverage area
Clearwire Corporation	Fixed Wireless	Data Added to Statewide Inventory	3/3/2010	[MAR-16-12 Jess Cary] Change: Updated service area.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/3/2010	[MAR-12-12 Terry Holmes] Provider supplied additional information on coverage for substantial service sites in October 2011, however requested that CN not submit or publish this coverage since they do not market to these areas. [MAR-12-12 Jess Cary] Change: Coverage area expanded.
Ezznet, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[MAR-12-12 Jess Cary] Change: New provider this submission.
Fort Mojave Telecommunications, Inc.	Fiber	Data Added to Statewide Inventory		[MAR-12-12 Jess Cary] Change: New Fiber provider.
High Desert Internet Services	Fixed Wireless	Data Added to Statewide Inventory		[MAR-12-12 Jess Cary] Change: New fixed wireless tower in operation.
Hot Spot Broadband, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[MAR-12-12 Jess Cary] Change: New fixed wireless tower in operation.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[MAR-12-12 Jess Cary] Change: Expansion of service area.
MetroPCS Wireless, Inc.	Mobile Wireless	Data Added to Statewide Inventory	2/10/2012	[MAR-12-12 Jess Cary] Change: New provider this submission.
Moapa Valley Telephone	DSL	Data Added to Statewide Inventory	2/22/2010	[MAR-12-12 Jess Cary] Change: Expanded coverage area.
Moapa Valley Telephone	Fiber	Data Added to Statewide Inventory	2/22/2010	[MAR-12-12 Jess Cary] Change: Expanded coverage area.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[MAR-12-12 Jess Cary] Change: Service expansion.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[MAR-12-12 Jess Cary] Change: Expansion of service area.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[MAR-12-12 Jess Cary] Change: Service area expansion.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[MAR-12-12 Jess Cary] Change: ViaSat has acquired WildBlue and coverage will be represented as ViaSat, Inc. starting with the April 2012 submission.
Wireless Beehive, LLC	Fixed Wireless	Data Added to Statewide Inventory	4/5/2010	[MAR-16-12 Jess Cary] Change: Added new tower.
Charter Communications, Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/15/2009	
MegaPath Inc.	Backhaul	Backhaul Provider Only Processing Complete	2/15/2010	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
Zayo Bandwidth, LLC	Backhaul	Backhaul Provider Only Processing Complete		
Avant Wireless LLC	Fixed Wireless	Updated-Estimated Coverage Submitted for Non-Participating Provider		[MAR-12-12 Jess Cary] Correction: Field validation was completed to create estimated service area. Coverage was revised to propagations after field validation and other research.
AT&T Inc.	DSL	Approval for Update Not Received – Data Still Submitted	12/16/2009	[MAR-12-12 Jess Cary] Dataset not officially approved, but provider representative instructed CN to proceed with using the new dataset for the April 2011 submission. [MAR-19-12 Jess Cary] Change: Provider updated coverage area. Possible expansion.
Above All Communications, LLC	DSL	No Update to Provide		
Arizona Nevada Tower Corporation	Fixed Wireless	No Update to Provide	3/8/2010	
Arizona Nevada Tower Corporation	Fixed Wireless	No Update to Provide	3/8/2010	
Baja Broadband Holding Company, LLC	Cable	No Update to Provide	2/22/2010	
CC Communications	DSL	No Update to Provide	6/11/2010	
CC Communications	Fiber	No Update to Provide	6/11/2010	

CenturyLink	Backhaul	No Update to Provide	12/4/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Citizens Telecommunications Company of Nevada	Backhaul	No Update to Provide	1/22/2010	
Citizens Telecommunications Company of Nevada	DSL	No Update to Provide	1/22/2010	
CoxCom, Inc.	Backhaul	No Update to Provide	2/3/2010	
CoxCom, Inc.	Cable	No Update to Provide	2/3/2010	
DISH Network Corporation	Satellite	No Update to Provide	1/27/2010	
ETAN Industries	Cable	No Update to Provide		
Filer Mutual Telephone Company	DSL	No Update to Provide	2/9/2010	
Fort Mojave Telecommunications, Inc.	DSL	No Update to Provide		
Great Basin Internet Services, Inc.	Fixed Wireless	No Update to Provide	4/6/2010	
Highlands Wireless Inc.	Fixed Wireless	No Update to Provide		
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
InfoWest, Inc.	Fixed Wireless	No Update to Provide		
LasVegas.Net LLC	Fixed Wireless	No Update to Provide		
Lincoln Communications, Inc.	DSL	No Update to Provide	3/5/2010	
Lincoln Communications, Inc.	Fiber	No Update to Provide	3/5/2010	
Martell Telecommunications	DSL	No Update to Provide	3/23/2010	
Mt. Wheeler Power	DSL	No Update to Provide	4/5/2010	
Mt. Wheeler Power	Fixed Wireless	No Update to Provide	4/5/2010	
Oasis Online, Inc.	Fixed Wireless	No Update to Provide		
Rio Virgin Telephone Company	DSL	No Update to Provide		
Rio Virgin Telephone Company	Fiber	No Update to Provide		
Robinson Communications Corporation	DSL	No Update to Provide	2/25/2010	
Schatnet Internet LLC	Fixed Wireless	No Update to Provide		
SMS Computing, Inc.	Fixed Wireless	No Update to Provide	3/19/2010	
Tele-NET.net LLC	Fixed Wireless	No Update to Provide		
tw telecom of nevada, llc	Backhaul	No Update to Provide	4/27/2010	
Vegas Wifi Communications LLC	Fixed Wireless	No Update to Provide	4/7/2010	
WENR Corporation	Cable	No Update to Provide	1/11/2010	
Wireless Beehive, LLC	DSL	No Update to Provide	4/5/2010	
Yonder Media	Fixed Wireless	No Update to Provide		
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
KeyOn Communications, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	10/15/2009	
Level 3 Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Nevada System of Higher Education	Backhaul	No Update Provided - Use Last Submission Data		
Verizon Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
XO Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	6/2/2010	
Air-Internet, Inc.	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to contact attempts made during past mapping submission periods, 3 additional contact attempts were made this period.

“White Paper” from *New York* describing Round 5 (Spring, 2012) Data Submission to the NTIA under the SBI

April 1, 2012

Executive Summary

The Broadband Mapping Team at the New York State Office of Cyber Security (OCS) is pleased to submit our Round 5 (Spring 2012) data for the State Broadband Initiative (SBI).

Our goals for Round 5 were to: 1) maintain the very high level of participation from New York providers, 2) Add to and enhance our data verification methods and, 3) improve the completeness and quality of the data delivered. We believe we have met those goals.

We had 87 providers participate in the fall 2011, Round 4 submission. That number has been reduced to 84 in Round 5; 3 new providers were added, but 6 Resellers were eliminated from our reporting. We anticipate an increase in that number in the future as we continue to reach out to small fixed wireless companies. We believe mapping these provider’s serviceable areas is a very important component required to fine tune NYS’s served and un-served boundaries.

We are very pleased with the enhancements to our verification methods implemented this round and are energized to continue to find innovative ways to use disparate data available from commercial, government and public sources to validate and identify inconsistencies in provider reported availability data.

Lastly, we made small but significant steps in improving the Community Anchor Institution data (attributes and location), middle mile points and, by working even closer with our providers, we were able to improve the quality of the availability data using the new 2010 Census geography.

The remainder of this paper provides a summary of our data collection results and describes our methodology for performing data verification.

Provider Participation Summary Tables for Round 5:

0	**Potential Providers identified**
4	**Actual Providers identified**
84	**Total Participating Providers with data in the submission**
66	Wireline Providers
19	Wireless Providers (2 are both Wireless & Wireline)
1	Provider is middle-mile only
42	Providers submitted Middle Mile Data

Technology Type	Wireline Census Block Provider Count	Wireline Service Availability by Census Block	Wireline Street Segment Provider Count	Service Availability by Street Segment	Wireless Provider Count	Wireless Services by Shapefile	Middle Mile Provider Count	Middle Mile Points
Asymetric xDSL	38	300,197	34	25,218	0	0	26	1,494
Symetric xDSL	2	61,448	1	52	0	0	0	0
Other Copper Wireline	2	87,666	2	210	0	0	0	0
Cable Modem - DOCSIS 3.0	6	224,355	5	17,018	0	0	3	10
Cable Modem Other	14	55,437	12	15,943	0	0	0	0
Optical Carrier/Fiber to the End User	22	123,514	17	2,225	0	0	9	663
Satellite	0	0	0	0	3	3	0	0
Terrestrial Fixed Wireless - Unlicensed	0	0	0	0	10	16	1	10
Terrestrial Fixed Wireless - Licensed	0	0	0	0	1	1	0	0
Terrestrial Mobile Wireless	0	0	0	0	6	14	2	16
Other (middle-mile only)	0	0	0	0	0	0	1	2

Verification List:

1. Automated tools
    a. Domain and topology rules in delivery geodatabase
    b. Submission scripts
    c. Feature dataset cross checks
2. Provider website research
3. Crowd-sourced data
    a. NYS Speed Test data points
    b. FCC Speed Test records
    c. NYS Broadband Map feedback
4. Use of government data sources
    a. FCC Aggregated 477 Data
    b. NYS DMV data
    c. NYS Lottery terminal data
    d. NYS Streets and Address ranges
    e. NYS Address Points
    f. NYS Orthoimagery
    g. NYS Public Service Commission Cable Franchise Agreements data
5. Commercial data sources

a. TomTom Data ILEC, CLEC and Rate Center Exchange Boundary data
b. Online look up tools for middle mile & central office locations
c. NAVTEQ address points
d. Pictometry oblique aerial imagery/Google's Street View
e. APNIC Whois database (publically available IP Address search engine)

6. Select Community Anchor Institution (CAI) locations
7. Provider verification maps
8. Clip wireless data to NYS Boundary
9. Removal of 'uninhabited areas'
10. Other Grantee State Broadband Maps and National Broadband Map
11. Broadband Organizations: NYSTA, CTANY, WISPA

Explanation of Verification Activities:

1. **Automated verification** was accomplished via the following methods:
   a. Business rules built into the SBI data transfer model: validate features and validate topology
   b. Repeatedly running the NTIA supplied Python script, the Massachusetts modified Python submission script and frequency statistics script, as well as a New York modified version of the NTIA submission script combining elements of the NTIA and Massachusetts scripts
   c. ESRI 'Frequency' tool used on Provider Name, DBA Name, FRN across feature datasets with cross comparisons to ensure consistency across all of these datasets

2. **Provider Website Research:** In Round 4, a careful study was made of the websites for New York State's 80+ broadband providers. The goal was to verify the technology and data transfer speeds that were voluntarily self-reported to the NYS Broadband Mapping Team. To corroborate these reports, speed data was collected from the provider's websites, and the maximum download and upload speeds were reclassified and coded into speed tiers between 1 and 11. The vast majority corresponded to self-reported speeds; however, we found 26 discrepancies of varying magnitudes. For Round 5, we used these findings to question and clarify reported speeds with providers.

   Recently we re-examined the websites of providers where advertised speeds did not agree with those reported to the Broadband Mapping Team. Two of the websites revealed some slight revisions; Armstrong Telephone Co and Berkshire Telephone Corp. adjusted their maximum download speeds and Hometown Online (WVT Communications) website no longer reported speed specifics. Twelve other provider websites do not provide speed specifics. Conversely, providers (primarily the ones that provide a host of technologies) ranging from DSL to Fiber and Ethernet modified their website to better document their speed offerings. Still, there were a number of smaller companies that indicated to our broadband team they provide a higher speed of internet service than what is evidenced on their website. For example, DFT Local Service Corp reported to us they have “11” speed technology, but it is not detailed on their website. We have uncovered only code“7” level speed, which is what their fastest DSL service registers. Also, two of the providers; Castle Communications of Willsboro, and Fishers Island Telephone Corporation, still did not have a working website.

In conclusion, the discrepancies uncovered in Round 4 relating to providers’ websites versus their reports to the broadband team still indeed exist for Round 5, although a slight refinement has occurred over the past 6 months. Most discrepancies are still within one or two speed code numbers (six are more than two apart), and while some of the websites boast higher speeds than self- reports, about half, like the DFT noted above, report to us greater speeds than their websites indicate. Our team realizes that websites cannot always be faulted for providing misinformation to the public. For example, some providers, such as Armstrong Telephone Company (owned by Armstrong Group--- or simply *Armstrong*) have a footprint outside of New York, and the services they offer in New York State are more limited than elsewhere. Therefore, these provider websites appear to indicate a discrepancy from what they report to New York versus their online presence. In this case there is not a discrepancy, rather a misunderstanding on the part of our Broadband Team due to the vague information presented online. This could be a reason why many companies that do not provide the same level of services to their entire territory choose to remain vague on their website, despite the desire for more detailed information by the public at large.

3. **Use of crowd-sourced data:**

   a. <u>NYS Speed Test data points</u> and attributes were used to verify provider reported availability. The NYS speed test website includes a data collection form which requests:
      i. Street address at which the test was taken
      ii. Service provider
      iii. Service technology

   After satellite provider records and sub-broadband speed records were removed, 6,426 records were successfully geocoded and used for verification. Four levels of verification were established for points that fell within areas of reported service availability. They are:

   Code 1 = Provider and technology matched
   Code 2 = Provider matched and technology unknown
   Code 3 = Provider matched but technology is mismatched
   Code 5 = Provider and technology unknown but Broadband is available in the location

   Each census block and street segment availability record involved with this verification activity was assigned one of the above codes.

   b. <u>FCC speed test records</u> were used to verify provider reported availability. FCC speed test records lack provider information but we were able to successfully establish the provider via a publically available IP Address search engine (the APNIC Whois Database). Those records were then used to verify provider reported availability in the same manner as was used with the NYS speed test points. Because the technology was not known, the highest verification code assigned was 2 (Provider Matched and Technology = 'Unknown'). Here is a statistical summary:

	Number	Percentage
Total Number of FCC Wireline Speed Test Points	66,043	N/A
Total Number / Percentage Successfully Geo-coded	36,641 / 62,642	58%
Total Number / Percentage Successfully IP Searched	21,766 / 36,641	59%

c. <u>NYS Broadband Map feedback:</u>

While the volume of email responses has been lower during Round 5, we continue to receive, investigate, and reply to all feedback from responders to our New York State Broadband Map. New York considers this one of our most valuable sources of independent verification.

Public reports of inaccurate availability are logged and investigated within the block or segment using submitted provider data and provider websites, where applicable. If an address within the block or segment was identified by the provider's site as potentially served, that block or segment retained that provider's coverage on our map. If no addresses within the block or segment were identified as potentially served, we removed coverage of that block or street segment for that provider from our Map. Additionally, "suspect" blocks and streets were also investigated in previous rounds for overstated coverage and removed if we determined that coverage was inaccurate. These verification activities have continued during Round 5.

Here are summary statistics for this feedback activity during Rounds 4 and 5:

		Number
Public emails received during Round 4 & 5		134
	Block Records	**Street Records**
Number of locations investigated and verified	107	5
Number of locations investigated and removed	149	213

In an effort to gather more public feedback as well as improve the user experience, New York updated its broadband map on February 15, 2012 with enhanced functionality. Users can now report errors to displayed availability as well as "unserved" locations directly through an interface on the map. While we still encourage response via email, our goal is to increase our Round 6 feedback dramatically by making the process as easy as possible.

4. **Use of government data sources:**

a. **Aggregated FCC 477 data** were used to identify providers by tract, speeds above and below 3 mbps, and business vs. residential offerings. Before our Round 5 data outreach and data collection we examined our Round 4 data against the aggregated FCC 477 data and made notes for each provider on how well our broadband data matched the subscribership area, speeds above and below 3 mbps, and the extent of their business and residential offerings. These findings helped drive our outreach and communication with providers. We were also able to address speed issues and refine the availability footprints of some providers based on this data. In one case we were able to change our State Broadband Map to reflect that one of our providers provides broadband to business customers only, where before we displayed that they served both business and residential customers. In addition, we are looking into using aggregated FCC 477 data will be used to possibly help remove our bias in our calculation of housing units with broadband availability.

b. The **NYS Department of Motor Vehicles** supplied three datasets in Round 4 for our independent verification activities. A list of 2,080 unique Satellite Offices, Dealer Locations and Inspection Station Locations were used to verify provider reported availability. *All of these facilities have broadband connections.* The Dealer and Inspection Location datasets did not have provider or technology information associated with the locations. Therefore, the highest verification code assigned to any Census Blocks containing the points and Street Segments within 500 feet of the points was a 5 because we were only able to confirm that there was broadband at those locations. However, the DMV Satellite Offices dataset came with provider information, so any Census Blocks containing the points and Street Segments within 500 feet of the points that matched the provider name were assigned a verification code of 2.

c. **The NYS Lottery** supplied a new dataset to add to our independent verification sources for Round 5. The majority of the Lottery data we received did not have provider or technology information associated with it, so it could not be determined if many of the sites *actually* had access to a broadband connection. However, there were 276 Lottery terminal locations that had provider information associated with them. These locations were *confirmed* to have broadband connections and therefore any Census Blocks containing the points and Street Segments within 500 feet of the points that matched the provider name were given a verification code of 2.

d. **NYS Streets and Address Ranges** is a dataset we use to submit all of our provider data in census blocks > $2mi^2$. They are also used as part of our geocoding. Street address ranges are also used in verification of provider data by testing addresses along segments with online provider service look-up tools.

e. **NYS Address Points** were used in the verification of provider data from public reports through investigation of in-block addresses and then testing those addresses with online provider service look-up tools.

f. **NYS Orthoimagery** was used as an aid during provider data processing.

g. **NYS Public Service Commission Cable Franchise (PSC) Agreements data** was used in the verification of cable broadband availability. The dataset contains information about which cable providers are franchised by municipality and indicates if they provide cable broadband in the municipality or not. This dataset was used during data processing as a frame of reference for the cable broadband data we received and to flag and correct possible overstatement of provider data.

5. **Continued use of commercial data sources:**

a. **TomTom ILEC, CLEC and Rate Center Exchange Boundary data** were used to verify provider reported availability. The TomTom data included boundaries for many of the broadband providers we have received data from. During data processing, TomTom boundaries for each provider included in the dataset were overlaid onto the provider blocks and street segments footprint to ensure that the availability data sent to us by the providers fell reasonably within the respective boundary in the commercially available TomTom data. All of the provider footprints that had matching boundaries in the TomTom data fell within their respective boundary. In one case, Verizon New York, the ILEC boundary was used to remove outlier data. Discontinuous blocks and streets submitted that fell more than one mile outside Verizon's ILEC boundary were removed. The TomTom Exchange Boundary data was used to further improve broadband availability and middle mile data for Frontier Communications. Their DSLAM data is CLLI-coded which are tied to specific exchanges. By using the exchange boundary dataset we were able to improve the accuracy of many of Frontier's DLSAM and Central Office locations, and thereby improve the blocks and streets broadband data for Frontier overall.

b. **Online look up tools for middle mile & central office locations**- Additional publicly available CLLI code location lookups were used to supplement the refinement of Frontier's DSLAM locations: *Marigold Technologies* Central Office Lookup Tool (http://www.marigoldtech.com/lists/co.php) and *TelcoData.us* (http://www.telcodata.us/) online search tools. Further research into these or other publicly available datasets may help us add to, refine, and verify our middle mile and broadband availability data for all of our facilities-based broadband providers.

h. **NAVTEQ Address Points** were also used as an aid during provider data processing, for geocoding address data, and also in the verification of provider data by testing addresses with online provider service look-up tools.

c. **Pictometry oblique aerial imagery/Google's Street View** . In the process of improving the CAI point location accuracy, we are using the CAI's website, Bing's Bird View (Pictometry Oblique Aerial Imagery) and Google's Street View function to provide us information to accurately put the points on the rooftop of the building. The CAI website can provide information about name, address, and exterior pictures of the CAI. With this information, we can use Google's Street View to identify the exact location of the building, either by matching the pictures or looking at signs. If Google's Street View failed to provide enough clues to be certain, we will use the Bing's Bird View to identify the exterior look of the building and try to match that with the pictures from the homepage. Additionally, we can look for adjoining clues such as a playground around the building if we are looking to improve a school CAI point.

d. **APNIC Whois database,** as mentioned above, was used add provider information to FCC speed test records.

6. **Select CAI locations** were used to verify provider reported availability. Through our continuing relationship with the University at Albany's Center for Technology in Government (CTG), we acquired new, complete broadband service details for 899 CAIs during the Round 5 data gathering process. Each of these records was used to verify the provider reported data. Where the information matched, the highest verification code was assigned (1 = Provider and technology matched). We also selected

Colleges, Hospitals, Federal Correctional Facilities, State Prisons and State Police Stations from our total collection of previously identified CAIs to be used as an additional verification data source. While we do not have complete service details for many of these facilities, we strongly believe all have broadband connections.

7. **Provider verification maps:** For providers with significant changes from the previous round, we created review maps showing Round 5 availability aggregated to census blocks and street segments. The providers were given at least five days to respond and initiate any changes or corrections. Changes were made based on provider feedback. Changes were documented for future reference. These OCS generated maps were later compared to the provider footprints in the geodatabase to ensure that the data loaded correctly. Many of the providers have multiple review maps, so each of these maps had to be examined and compared to the corresponding area in the data.

8. **Clipping all wireless data to the NYS boundary file** to help ensure topological compliance for all wireless availability to be wholly within New York State.
9. **Removal of 'uninhabited areas':** These areas have been classified as land where development cannot occur, and where household wireline broadband will not be needed at any foreseeable time. If the center of a census block with no population or housing units falls within an uninhabitable area, the entire census block ≤ 2mi^2 or all street segments within an identified block > 2mi^2 are classified as uninhabited. We remove uninhabited blocks and streets from the provider submission data. The classifications of uninhabited lands include, but are not limited to: water, wilderness lands, reforestation areas, as well as portions of state parks, federal nuclear sites, and recreation areas. 21,675 census blocks out of 350,169 total census blocks in New York have been classified as uninhabited.
10. **Other Grantee State Broadband Maps** and the **National Broadband Map were** used to compare and identify providers and coverage areas particularly along NYS boundaries
11. **Broadband Organizations: NYSTA, CTANY, WISPA :** Since the outset of the program, we have cultivated and maintained excellent relationships with the New York State Telecommunications Association and the Cable Television Association of New York. During Round 5, we began working with the Wireless Internet Service Providers Association. We consider the collaboration and feedback we receive from these associations to be an important means for improving our broadband availability data and expanding the participation of facilities-based broadband providers in the SBI program.

New York Methodology Outreach List:

As directed by the SBI Program Office in the March 26, 2012 delivery webinar, New York has included only providers who submitted data, or those who have been identified as true potential providers, in our Round 5 Data Package.xls.

The following "outreach list" is a summary of providers not included in Data Package.xls. This list represents the volume of companies that New York has researched, contacted and, in some cases, received data from in previous and current data cycles. The list includes:

- Companies found to be “not a provider”
- Providers who do not serve New York
- Broadband equipment companies
- Providers who chose to opt-out of the program
- Resellers

Providers are identified by DBA name, provider type, and status. Comments are included for additional details.

Filing Company DBA	Provider Type: Broadband=1 Reseller=2 Other=3 N/A=4	Provided Data Will provide data Will Not provide data Non-Responsive	Comments (Correspondence)
2nd Century Communication	4	Will Not Provide Data	Purchased by Covad
3M Telecom Systems Division	4	Will Not Provide Data	Supplier of equipment to broadband providers
8x8, Inc.	4	Will Not Provide Data	Voice only.
A.R.C. Networks, Inc	4	Will Not Provide Data	Cannot identify this company or what they provide
ABA Net, LLC	4	Will Not Provide Data	Voice services
ACC Business	2	Will Not Provide Data	Emailed to indicate they cannot participate
ACC National Telecom	4	Will Not Provide Data	Voice/data infrastructure company
Access One, Inc.	2	Will Not Provide Data	Business only reseller.
Access Point, Inc.	2	Will Not Provide Data	Reseller.
Accessline Communications Corporation	4	Will Not Provide Data	Voice only.
ACCESSLINE COMMUNICATIONS CORPORATION	4	Will Not Provide Data	voice/telephoney services
Ace Innovative Networks	2	Will Not Provide Data	Have contacted previously but reseller status was low priority for R5.
Ace Innovative Networks, Inc.	2	Will Not Provide Data	Reseller of Verizon.
Acella, Inc.	4	Will Not Provide Data	Voice only.
ACN Communications	4	Will Not Provide Data	Reseller "requires a pre-existing connection"
ACN Digital Phone	4	Will Not Provide Data	Voice/phone only.
Adelphia Cable	1	Will Not Provide Data	Does not provide services to NYS customers
Aeroblaze Broadband	4	Will Not Provide Data	Website listed will not open, no Google results.
Airband	4	Will Not Provide Data	Does not operate or have a market in New York
Airespring, Inc.	2	Will Not Provide Data	"Airespring, Inc. is a reseller of underlying carriers Only."
Allegiance Telecom, Inc.	4	Non-Responsive	Purchased by Qwest; no answer through two phone lines
Alliance Group Services, Inc.	3	Will Not Provide Data	Quote: Connects CLECs and ILECs to global network
AlreadyNet	3	Non-Responsive	Discovered in R5. Not a Provider
American Fiber Network, Inc. (AFN)	3	Will Not Provide Data	Company solely provides EVDO wireless cards
American Fiber Systems, Inc.	3	Will Not Provide Data	Sold to Zayo

American Telephone Co. LLC	4	Will Not Provide Data	"Not a provider" on Form C.
American Tower	3	Will Not Provide Data	Wireless tower company/infrastructure
Amextel	4	Will Not Provide Data	Voice services
AMp Networks LLC	4	Will Not Provide Data	Very unclear what they provide.
ANPI	3	Will Not Provide Data	Infrastructure/backbone- not end user.
Apptix, Inc.	4	Will Not Provide Data	Voice only.
Aptela, Inc.	4	Will Not Provide Data	Voice only.
Atlantech Online, Inc.	2	Will Not Provide Data	Reseller, few NY customers, not willing to participate.
Atlantic Telecommunications Services Corp.	4	Will Not Provide Data	Company provides cable services related to the NYS legislature (6/29/10 phone)
Backbone Communications Inc.	2	Non-Responsive	Reseller to businesses only; concentrated in NYC.
Bandwidth.com	2	Will Not Provide Data	CLEC. Buys services in bulk & resells portions to various customers
BCN Telecom Inc	4	Will Not Provide Data	Voice services
Bell Canada	4	Will Not Provide Data	Does not provide services to NYS customers
Bellsouth	4	Will Not Provide Data	Bellsouth serves 9 southern states; is related to AT&T.
Belmont Telecom	4	Will Not Provide Data	VoIP Wholesale, Long Distance, Roaming.
BestWeb Corp.	2	Will Not Provide Data	Not interested in participating.
BetterWorld Telecom LLC	3	Will Not Provide Data	Outside of NY state.
Birch Communications, Inc.	3	Will Not Provide Data	Outside of NY state.
Blue Wireless	1	Non-Responsive	Discovered from Tom Tom data summary. Left message with Rene Whalen. No Response.
BridgeCom International, Inc.	4	Will Not Provide Data	Purchased by Broadview Network Holdings
Bridgevoice, Inc.	4	Will Not Provide Data	International voice carrier.
Broadband Dynamics, LLC	2	Will Not Provide Data	Cannot determine what this company does- most likely reseller
Broadcore, Inc.	2	Will Not Provide Data	Reseller, data will be provided through Level 3.
Broadstar, LLC	3	Will Not Provide Data	Offers broadband within rental/condo communities. not public, more a reseller to communities
Broadview Networks	2	Will Not Provide Data	
BroadvoxGo!, LLC	3	Will Not Provide Data	Trunking and VoIP. not a provider.
Broadwing Communications	2	Will Not Provide Data	Broadwing's data will be provided by Level3
BT COMMUNICATIONS SALES LLC	4	Will Not Provide Data	Cannot identify services provided.
Budget Phone	4	Will Not Provide Data	Pre-pay phone- not a provider. Cannot identify website.
Buffalo Wireless	3	Non-Responsive	Not a Provider

BullsEye Telecom	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Burlington Telecom	3	Will Not Provide Data	Not a broadband provider in NY.
Business Automation Technologies	2	Will Not Provide Data	Reseller, no NY customers
Business Productivity Solutions	4	Will Not Provide Data	Cannot determine services. Not a broadband provider.
Cable Positive	4	Will Not Provide Data	Provides educational programming about HIV/AIDS
Cable Services Company, Inc.	4	Will Not Provide Data	Provides broadband construction services, not broadband.
Cablevision Systems	4	Will Not Provide Data	This company provides internal networking and voice systems.
Call Catchers Inc.	4	Will Not Provide Data	Virtual receptionist- not a provider, not in NY.
Catskill Mountain Cablevision	4	Will Not Provide Data	Now owned by Mid-Hudson Cable
Cause Based Commerce Incorporated	4	Will Not Provide Data	Voice only.
Cavalier Telephone; Cavalier Business Communications; Cavalier Telephone and TV	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
CBN Connect, Inc.	3	Will Not Provide Data	Infrastructure/Backbone
Chain Lakes Cable	4	Will Not Provide Data	Company does not provide broadband to NYS customers.
Charter Communications Plattsburgh	4	Will Not Provide Data	
Cincinnati Bell	1	Will Not Provide Data	Discovered on FCC 477 list; does not offer wireline service in NY.
Cingular Wireless	3	Will Not Provide Data	Provides data through AT&T
Citizens Cablevision	4	Will Not Provide Data	Provides through Citizens Telephone of Hammond
Comcast Networks	3	Will Not Provide Data	
CommPartners, LLC	3	Will Not Provide Data	VoIP, co-location, reseller.
Communication Solutions Partners	3	Will Not Provide Data	Internet reseller previously researched. Website not active any longer.
Communications Network Billing, Inc.	4	Will Not Provide Data	Phone only
Comp Direct USA	3	Will Not Provide Data	Has nothing to do with broadband.
Computer SOS	4	Will Not Provide Data	Does not offer wireless to end user, only wireless networking.
ConnectMe, L.L.C.	4	Will Not Provide Data	Has nothing to do with broadband.
Cordia Communications Corp.	4	Will Not Provide Data	Phone only
CornerStone Telephone Company	2	Will Not Provide Data	Re-seller of Verizon services
Cox Communications	3	Will Not Provide Data	Does not provide services to New York State.
Crown Castle International	3	Will Not Provide Data	Does not provide end user services. Infrastructure only.
CSP Telecom	4	Will Not Provide Data	Voice services only.
Current Communications	4	Will Not Provide Data	Discovered on WISPA list, No wireless offerings.
Custom Network Solutions	3	Will Not Provide Data	Telecom solutions, T1, VoIP, Reseller.
cyberMIND	4	Will Not Provide Data	Does not provide broadband services.
Cypress Communications, Inc.	3	Will Not Provide Data	Not a BB provider. Trunking/colocation, etc.

DANC	4	Will Not Provide Data	DANC is primarily a backbone infrastructure company
Deposit Cable Television Inc.	4	Non-Responsive	Phone out of service; no online information (3/22/10)
Devine Communications, Inc.	4	Will Not Provide Data	Cannot identify company. Does not provide broadband.
DFT Communications/Netsync	2	Will Not Provide Data	
DHAKA TELECOMMUNICATION CORP	4	Will Not Provide Data	Bangladesh Not a NY/US provider
diDi Wireless Communications	4	Non-Responsive	Not a Provider
Direcway	3	Non-Responsive	Satellite service, not BB speed ave 500kbps as of this date, check again for future rounds...see if available in NYS
Dish Network	3	Will Not Provide Data	Television only
Douglas Computing Tech	2	Will Not Provide Data	Reseller, few NY customers, not willing to participate.
Downsville Community Antenna	4	Will Not Provide Data	Planning to close in summer 2010
Doylestown Cable TV	3	Will Not Provide Data	Does not serve NY.
Dream Catcher Communications	4	Will Not Provide Data	Provides advertising & marketing to NYS agencies and government offices
DSCI	2	Will Not Provide Data	Business only reseller. Left message.
DSL Communications, LLC	3	Will Not Provide Data	Cannot determine companies services.
DSL Extreme	2	Non-Responsive	Identified as a reseller, low priority for R4 outreach.
DSL.net	4	Will Not Provide Data	Company dissolved in December 2009.
DSLi	3	Will Not Provide Data	Serves S. Florida only
Earthlink	2	Will Not Provide Data	Reseller
East 2 West Networks Inc.	4	Non-Responsive	Phone disconnected; web site cannot be found.
East Telecom, Inc.	4	Will Not Provide Data	No website or contact information
ECR Voice, LLC	4	Will Not Provide Data	Phone services only.
Electric Lightwave	2	Will Not Provide Data	Purchased by Integra Telecom, which serves only the Northwest
Empire City Subway	3	Will Not Provide Data	Not a broadband provider.
Empire One Telecom (EOT)	2	Will Not Provide Data	Reseller
Encompass Communications	4	Will Not Provide Data	Calling Card Services
Endstream Communications, LLC	3	Will Not Provide Data	Does not supply end-user internet.
Engineered Communication Systems, Inc	4	Will Not Provide Data	Cannot verify company type- no valid website.
Enhanced Communications Network, Inc.	4	Will Not Provide Data	Voice only. From website: leading telecommunications carrier providing local service in California, New Jersey and New York.
Enventis Telecom Inc.	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Equant, Inc.	4	Will Not Provide Data	Not a broadband provider.
Ernest Communications	4	Will Not Provide Data	Business only reseller.

Eschelm Telecom	3	Will Not Provide Data	Owned by Integra Telecom, which serves only the Northwest
Eureka Telecom	4	Will Not Provide Data	Cannot identify company- Eureka Telecom or Eureka Broadband.
EURO CONNECT	4	Will Not Provide Data	Voice services only.
Evercom Systems, Inc.	3	Will Not Provide Data	Does not provide broadband services.
eVolve Business Solutions LLC	4	Will Not Provide Data	VoIP only.
Evolve IP, LLC	3	Will Not Provide Data	Cloud computing- not a provider.
ExteNet Systems	3	Will Not Provide Data	Identified as broadband equipment business for wireless companies.
FASTNET	4	Will Not Provide Data	Discovered on WISPA list, may be part of PAETEC and does not have wireless.
Fidelity Voice Services LLC	3	Will Not Provide Data	Not a provider for NY.
Fionda VOIP, LLC	4	Will Not Provide Data	VoIP company- may not be in NY.
First Communications, LLC	3	Will Not Provide Data	Fiber backbone in NY. Will make contact for R5 for middle-mile.
Fribley Enterprises	4	Will Not Provide Data	Phone out of service; no online information
Gafachi	3	Will Not Provide Data	Provides wholesale VoIP services to providers and resellers.
GAW High Speed Internet	4	Will Not Provide Data	Does not appear to serve NY
Global Capacity Group, Inc.	4	Will Not Provide Data	Provides network services to telcom industry. Not a provider to end users.
Global Crossing	4	Will Not Provide Data	Letter indicates they cannot provider in 7-10 days.
Global Protection Communications Systems	3	Will Not Provide Data	Provides fiber infrastructure.
Globalinx	4	Will Not Provide Data	Reseller, VOIP. No applicable to program.
Globalnet Telecom, Inc.	4	Will Not Provide Data	Hosted PBX provider- no broadband.
GlobalPhone Corp.	4	Will Not Provide Data	Hosted PBX provider- no BB
Gore Mountain Cable TV	3	Will Not Provide Data	Cable TV only- PSC lists their franchises as 'No Broadband'
Granite Telecommunications, LLC	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Great North West Telegraph Co	4	Will Not Provide Data	Company is closed.
GreatCall, Inc.	3	Will Not Provide Data	No data- cell/voice only
GTC Communications	3	Will Not Provide Data	Cannot identify company.
Hancel, Inc.	4	Will Not Provide Data	Cannot find any information on this company.
Hancock Video	3	Will Not Provide Data	Hancock Video does not provide broadband.
Hickory Tech	4	Will Not Provide Data	Added in R5, found on 477 data. Does not serve NY.
High-Speed Solutions	2	Will Provide Data	Reseller
Hilltop Communications, Inc.	3	Will Not Provide Data	Part of GTEL (Germantown Telephone)

Horizonone Communications, Quantumlink Communications, Voip Communications, Optic Communications, ANI Networks	4	Will Not Provide Data	Voice services only.
Hotwire Communications, Ltd.	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Hudson Valley DataNet	3	Will Not Provide Data	Merged with Lightower Fiber networks.
Hughes Network Systems	1	Will Not Provide Data	Satellite company; did not send data.
iBasis	4	Will Not Provide Data	Voice services.
iCore Networks, Inc.	4	Will Not Provide Data	Phone services.
IDT Corporation	4	Will Not Provide Data	Phone services.
IKANO	3	Will Not Provide Data	No end-users. Infrastructure only.
InPhonex.com, LLC	4	Will Not Provide Data	Phone services.
Insight Broadband	3	Will Not Provide Data	Serves only Ohio and Kentucky
Integra Telecom	3	Will Not Provide Data	Provides broadband in the Northwest
Integrated Services, Inc.	4	Will Not Provide Data	Voice services.
Intellifiber Networks	3	Non-Responsive	Infrastructure fiber for business and providers. No end users. Will look for middle mile in future rounds.
Interface Security Systems, LLC	4	Will Not Provide Data	Not a provider.
InterGlobe Communications	2	Will Provide Data	Reseller- low priority for R4 outreach
Internet Professionals & Network Solutions (IPNS)	2	Will Provide Data	Reseller- low priority for R4 outreach
Internet@ntc, Inc.	4	Will Not Provide Data	No idea who or what they are/do.
Interstate FiberNet, Inc.	4	Will Not Provide Data	Part of Deltacom- now part of Earthlink Business. Business only.
ION	3	Will Not Provide Data	Infrastructure only.
IP Communications, LLC.	4	Will Not Provide Data	Phone services.
IP Networked Services, Inc.	3	Will Not Provide Data	Business only reseller.
IPC Network Services, Inc.	4	Will Not Provide Data	Network equipment business- not a provider
Jet Wave Corporation	3	Will Provide Data	Email sent to Mr. Klein- cannot find any information on this company.
Jivetel Communications	4	Will Not Provide Data	Voice only.
Kosmaz Technologies LLC	4	Will Not Provide Data	Voice services only.
LaunchNet	2	Will Provide Data	Reseller
LCR Telecommunciations, LLC	4	Will Not Provide Data	Wholesale long distance.
LDC Telecommunications Inc	4	Will Not Provide Data	Cannot identify company. website blocked.
LDMI Telecommunications, Inc.	3	Will Not Provide Data	Same address as Talk America; website goes to Cavalier.
LI Sky	4	Non-Responsive	Discovered in R5. Not a Provider
Light Tower Fiber Long Island LLC	1	Will Not Provide Data	Cannot provide service within 7-10 days.
LightEdge Solutions, Inc.	3	Will Not Provide Data	Does not provide broadband to NY customers, does not wish to participate.

Lightspeed Fiber Network	3	Will Not Provide Data	Lightspeed closed; phone transfers to Thalle Industries Inc., which does not provide broadband services.
LightSquared LP	3	Will Not Provide Data	Wireless backbone/wholesaler.
Lightyear Network Solutions, LLC	2	Will Not Provide Data	Reseller- may not fit 7-10 day req.
Line Systems, Inc.	2	Will Not Provide Data	Reseller.
Localnet	4	Will Not Provide Data	Dial up service only
Looking Glass Networks, Inc.	3	Will Not Provide Data	Acquired by Level3 Communications in 2006
Luzip Telecom Inc.	4	Will Not Provide Data	Voice only.
M5 Networks, Inc.	4	Will Not Provide Data	Voice only.
Magellan Hill	4	Will Not Provide Data	Telecom management company.
Matrix Telecom, Inc.	4	Will Not Provide Data	Reseller.
McGraw Communications, Inc.	3	Will Not Provide Data	Business only reseller, co-location, etc.
MCI Communications Services, Inc.	3	Will Not Provide Data	Voice only- data services provided by Verizon.
MCImetro Access Transmission Services LLC	3	Will Not Provide Data	Cannot identify.
Mediacom	4	Will Not Provide Data	Does not provide broadband to NY customers
Megapath	2	Will Not Provide Data	Requested removal from call list.
Meriplex Communications, Ltd.	2	Will Not Provide Data	Reseller, no NY customers
Metropolitan Fiber System of New York	1	Will Not Provide Data	Verizon Business Global letter indicates MFS cannot provide in 7-10 days
Metropolitan Telecommunications Holding Company	3	Will Not Provide Data	Reseller, does not provide broadband.
MFS of New York, Inc.	3	Will Not Provide Data	Verizon Business Global letter indicates MFS cannot provide in 7-10 days
Middleburgh Telephone	3	Will Not Provide Data	Seamless Geoport Communications does not provide BB
Milestone Communications of NY	3	Will Not Provide Data	Does not provide broadband to NY customers
Millicorp	4	Will Not Provide Data	VoIP and voice only.
Mitel Netsolutions Inc.	2	Will Not Provide Data	Reseller.
MIX NETWORKS, INC.	4	Will Not Provide Data	Voice services.
MKL.net	4	Non-Responsive	Discovered in R5. Not a Provider
My Tel Co, Inc.	4	Will Not Provide Data	part of Cordia- VoIP only.
Navigator Telecommunications, LLC.	4	Will Not Provide Data	Voice services
NBC TV	3	Will Not Provide Data	NBC TV - does not provide broadband services
NECC TELECOM	4	Will Not Provide Data	Voice/long-distance service.
Net One International, Inc.	4	Will Not Provide Data	Voice/long distance/calling cards
NetCarrier	4	Will Not Provide Data	Voice/pbx/data. not a bb provider.
Netifice Communications	3	Will Not Provide Data	purchased by Megapath in 2006

Netlogic, Inc.	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Netsville	4	Will Not Provide Data	Discovered on WISPA list. Does not provide wireless to end user- networking only.
Network Billing Systems LLC	2	Will Not Provide Data	Reseller.
Network Communications International Corp.	4	Will Not Provide Data	Provides voice services for inmate/correctional population
Network Innovations	1	Will Not Provide Data	Provides broadband in MA & NH; very limited data service in NY
Network Operator Services, Inc	3	Will Not Provide Data	Cannot identify this company.
Network Service Billing, Inc.	4	Will Not Provide Data	Voice/long-distance services
New Edge Networks	2	Will Not Provide Data	Reseller that cannot provide within 7-10 days.
New Jersey DataNet Telecom, LLC	3	Will Not Provide Data	From our research: New Jersey DataNet Telecom, LLC, was the CLEC subsidiary of DataNet Communications Group. Lightower Fiber Acquired DataNet Communications Group.
New York RSA 2 Cellular Partnership (Verizon Wireless)	3	Will Not Provide Data	Provides data through Verizon wireless/Cellco Partnerships
NexGen Networks Corporation	2	Will Provide Data	Non responsive in previous rounds.
NextGen Telephone	4	Will Not Provide Data	From their website: &NextGen Telephone has ceased operations effective January 24, 2011."
Nextlink Wireless	2	Will Not Provide Data	
NextWave Wireless	2	Will Not Provide Data	No end user service
nexVortex,Inc.	2	Will Not Provide Data	Reseller.
NightOwl Internet Gateway	3	Will Not Provide Data	Email indicated company provides BB primarily in Missouri; not in NYS
NobelTel	4	Will Not Provide Data	Voice services only
North Penn Telephone	3	Will Not Provide Data	Offices located in NY, does not serve NY.
Northeast Optic Networks	3	Will Not Provide Data	Merged with Sidera
Northland Networks	2	Will Not Provide Data	Northland leases all of its facilities from its parent company, Oneida County Rural Telephone. (3/9/10 email)
Northstar Telecom	3	Will Not Provide Data	Called previously- not responsive. May not provide in NY.
NOS Communications, Inc.	4	Will Not Provide Data	Toll free and out-bound telephone services
NOSVA Limited Partnership	4	Will Not Provide Data	Same as NOS communications- voice services only.
NTCNet Telecom, Inc.	3	Will Not Provide Data	From research: NTCNet Telecom, Inc. is a small CLEC that operates as a subsidiary of Newport Telephone Company.
Nuvox	4	Will Not Provide Data	
NYSYS Broadband	1	Will Not Provide Data	Discovered on WISPA list. Business only fixed wireless in Rochester area. Called 12/14 and left voicemail.
Ojo Service LLC	4	Will Not Provide Data	Video/voice service.

OLS Inc.	4	Will Not Provide Data	Cannot identify this company or its services.
Omnipoint Communications	3	Will Not Provide Data	Small northeast wireless company, acquired by VoiceStream which is now T-Mobile.
One Communications	2	Will Not Provide Data	
One Source Networks	2	Will Not Provide Data	Global partner- reseller.
OneLink Communications, Inc.	4	Will Not Provide Data	Company located in Puerto Rico
Online Image	4	Will Not Provide Data	Discovered on WISPA list. Does not supply BB.
OnWav, Inc	2	Will Not Provide Data	Reseller- does not serve NY.
Open Access	4	Will Not Provide Data	Discovered on WISPA list. Website redirects to Lightower Fiber
Open Access Inc.	3	Will Not Provide Data	Open Access is now LightTower Communications
Optimum TV	3	Will Not Provide Data	Company provides data through CSC holdings
Pac-West Telecomm, Inc.	3	Will Not Provide Data	Broadband Infrastructure
PAD Business Solutions	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
PAETEC	2	Will Not Provide Data	Company acquired by Windstream.
Pannon Telecom, Inc.	4	Will Not Provide Data	International voice/phone
PCCW Global, Inc.	3	Will Not Provide Data	HKT is Hong Kong Telephone- PCCW is subsidiary.
Peerless Network of New York, LLC	3	Will Not Provide Data	Backbone voice services.
PeoplePC	2	Non-Responsive	Non responsive in previous rounds.
Phone.com, LLC	4	Will Not Provide Data	Voice only.
PNG Telecommunications	4	Will Not Provide Data	Phone services only
posTrack Technologies, Inc.	4	Will Not Provide Data	Voice services for colleges.
PowerDSL	3	Will Not Provide Data	Likely reseller, web search returns inactive website and little results.
PowerNet Global	2	Will Not Provide Data	Likely reseller, very unclear website
Premier Wireless	1	Will Not Provide Data	Premier Wireless was closed
Proximiti Technologies, Inc.	3	Will Not Provide Data	Primarily voice and phone tracking Offers internet as reseller.
QTel	4	Will Not Provide Data	VoIP- provides DSL in select areas only.
QuantumShift Communications, Inc.	3	Will Not Provide Data	Manages carrier service. Not a provider.
Qwest Communications Company	3	Will Not Provide Data	Qwest is now Century Link. http://www.centurylink.com/index.html
RAI Telecom, Inc.	3	Will Not Provide Data	VoIP services.
Razorline LLC	4	Will Not Provide Data	May not be in NY. Voice services.
Real Linx	2	Will Not Provide Data	Reseller
Reliance Globalcom	2	Non-Responsive	Reseller
RGT Utilities, Inc.	4	Will Not Provide Data	Utility company in Calif. cannot identify website or more information.

RGTS (Rockefeller Group Technology Solutions)	2	Will Not Provide Data	Provides broadband to specific businesses, does not wish to be on the map, has confidentiality concerns; Legal department advised them not to participate (6/29/10 phone)
RNK Communications	4	Will Not Provide Data	Reseller/voice services- difficult to identify services provided. Not and end user BB provider.
SAVVIS Communications	3	Will Not Provide Data	Cloud, Colocation, VoIP, etc. No BB provider. Acquired by CenturyLink.
SBA Communications Corp.	3	Will Not Provide Data	Provides tower site management and locations for cell and wireless companies.
SBC	4	Will Not Provide Data	phone goes directly to AT&T.
Semperon	2	Will Not Provide Data	Reseller with network partnerships
Silv Communication Inc.	4	Will Not Provide Data	Worldwide telephone service. Not a BB provider.
SinglePipe Communications	4	Will Not Provide Data	Company hard to find. Possible merge- voice services only.
Smart Choice Communications	2	Will Not Provide Data	Cooperative, but waiting until reseller decision made.
S-One Communications, Inc.	3	Will Not Provide Data	Cannot identify this company or services it provides.
Spa Net	3	Will Not Provide Data	Discovered on WISPA list but does not advertise wireless on website.
Spectrotel, Inc.	2	Will Not Provide Data	Reseller.
Speedus	4	Will Not Provide Data	Discovered on WISPA list. Nothing to do with BB service.
Stage 2 Networks	4	Will Not Provide Data	Voice and Hosted business phone
Sterling Telecom	2	Will Not Provide Data	Quote website: Wholesaler of Verizon Phone Service to Businesses.
Stratos Offshore Services Company	3	Will Not Provide Data	Provides communication services to US military and government entities outside of the country.
T2 Technologies	2	Will Not Provide Data	Reseller, may be business only. Not sure where/who they serve.
TCE Net	1	Will Not Provide Data	Company has 12 wireless customers, is not advertising to expand, will phase out these customers. Primarily serves dial up customers.
TCO Network, Inc.	2	Will Not Provide Data	Reseller, may be business only.
TCSweb Communications	4	Will Not Provide Data	Discovered on WISPA list. Website not active, no good Google results.
TDS Telecom	3	Will Not Provide Data	Provides data under 6 other subsidiaries
Tekmenwireless	3	Will Not Provide Data	Not a BB Provider
Telco Experts, LLC	2	Will Not Provide Data	
TelCove	3	Will Not Provide Data	Website redirects to Level 3.
Telcove	3	Will Not Provide Data	Website redirects to Level 3.
Telecom	2	Will Not Provide Data	From internet: dba Telecom and Verizon

Telefonica USA	3	Will Not Provide Data	Reseller, does not provide broadband.
Telekenex, Inc.	2	Will Not Provide Data	Business only reseller.
TelePacific	3	Will Not Provide Data	Reseller, no NY customers
Teleport Communications	3	Will Not Provide Data	Cannot identify company or services they provide.
Telergy Metro	3	Will Not Provide Data	Acquired by Con Ed communications, which was acquired by RNC.
Telesphere Networks Ltd.	4	Will Not Provide Data	Telephony services.
Telnes Broadband	2	Non-Responsive	Reseller, few NY customers, not willing to participate.
Telovations, Inc.	3	Will Not Provide Data	Reseller, no NY customers
TELZEQ Communications	4	Will Not Provide Data	Provides voice services and phone equipment
The Flat Planet Phone Company Inc.	4	Will Not Provide Data	Voice/telephoney/ PBX
Thinking Phone Networks, LLC	4	Will Not Provide Data	Voice only.
TNCI	2	Will Not Provide Data	Business only reseller.
Towerstream	1	Will Not Provide Data	Opt out - business only. Too much work to participate.
Transbeam	2	Non-Responsive	Reseller
Tremcom International, Inc.	4	Will Not Provide Data	Voice services, long distance, etc.
TruCom Corporation	3	Will Not Provide Data	Cannot identify this company or the services it provides.
TTI National, Inc.	4	Will Not Provide Data	From Website: for state-to-state, in-state long distance, local toll (limited availability) and international calls to existing customers. In addition Toll-Free service and Calling Cards are also available.
UCN	4	Will Not Provide Data	Cannot identify this company or what services it provides.
Unison Communications, Inc.	2	Will Not Provide Data	Business only reseller. Quote: We interconnect with major carriers.
UNITED STATES CELLULAR CORPORATION	3	Will Not Provide Data	Not located in NY.
US LEC	3	Will Not Provide Data	Merged with PAETEC, was a "Will Provide" for previous rounds but no data provided R4.
Valstar, Inc.	3	Will Not Provide Data	Cannot identify this company or services it provides.
Vanco Direct	3	Will Not Provide Data	Cannot identify this company, aka Global Capacity Direct.
Velocity Networks Inc	2	Will Not Provide Data	Business only reseller.
Verio	3	Will Not Provide Data	Verio offer web hosting among other things, NTT is global reseller.
Verizon Avenue Corp.	3	Will Not Provide Data	no longer active.
Verizon Business Global LLC	3	Will Not Provide Data	Email indicates they cannot provide in 7-10 days
Verizon Network Integration Corp.	3	Will Not Provide Data	
Verizon New York	3	Will Not Provide Data	
Verizon Online	3	Will Not Provide Data	

Verizon Select Services, Inc.	3	Will Not Provide Data	formerly GTE Comm. Corp., focus on long-distance service.
Verizon Wireless	3	Will Not Provide Data	Provides data as Verizon Wireless
Verizon Wireless	4	Will Not Provide Data	Verizon Wireless services are now reported under Cellco Partnership dba Verizon Wireless.
Verizon Wireless	3	Will Not Provide Data	tower management company for Verizon Wireless
V-Global Communications	4	Will Not Provide Data	Voice and VoIP services.
VIA ONE TECHNOLOGIES INC.	4	Will Not Provide Data	Cannot identify this company or services they provide.
Vocal IP Networx Ltd	4	Will Not Provide Data	Voice and telephony services only.
Voda Networks, Inc.	2	Will Not Provide Data	Reseller. from website: Partnered with industry leading providers.
VoIPnet Technologies	4	Will Not Provide Data	Voice only.
VoIPStreet, Inc.	4	Will Not Provide Data	VoIP services only.
Vonage	4	Will Not Provide Data	Provides phone services only.
VPN Systems	3	Will Not Provide Data	Discovered on WISPA list. Does not provide BB service.
Warp Drive Products	3	Will Not Provide Data	Discovered on WISPA list. Does not provide BB service.
Wave2Wave Communications Inc	2	Will Not Provide Data	Company is a reseller, low priority, no outreach for R4
WavHost	3	Will Not Provide Data	Discovered on WISPA list. Webpage does not open, cannot get good search results on company.
WCS Wireless License Subsidiary, LLC	4	Will Not Provide Data	Cannot verify any information on company.
WDT	2	Will Not Provide Data	Reseller- unsure of service to NY.
White Fence	3	Will Not Provide Data	Company connects customers with broadband providers.
Wholesale Carrier Services, Inc.	2	Will Not Provide Data	Reseller- low priority for R4 outreach
WilTel Communications, LLC.	3	Will Not Provide Data	Acquired by Level 3.
Winstar	3	Will Not Provide Data	Company was reseller but since has gone bankrupt.
Worldlink USA Inc.	4	Will Not Provide Data	Unsure of actual company- best search turns up maritime communications company.
Worldwide Marketing Solutions	4	Will Not Provide Data	Research indicates website hosting, many pending lawsuits and scam reports.
Xand Corporation	3	Will Not Provide Data	Network systems- not BB provider
XCHANGE TELECOM CORP.	4	Will Not Provide Data	Voice services only.
Xcyncroj	4	Will Not Provide Data	Cannot identify company or services. Number is out of service
XO Communications Services, Inc. (Affiliated Entity)	2	Will Not Provide Data	
Zayo Group	3	Will Not Provide Data	Reseller, no NY customers
Zone Telecom, Inc.	4	Will Not Provide Data	Voice services, VoIP, etc.

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

CONNECT OHIO ®

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:

Please accept this submission from Connected Nation on behalf of the state of Ohio's State Broadband Initiative (SBI) Grant Program, known as Connect Ohio.

It is with highest regard that the collective stakeholders of Connect Ohio 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 Ohio has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit not just Ohioans, 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 Ohio: 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 (NPP)Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2011 SBI data submission for the Connect Ohio program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 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.

> In addition to the requirements mentioned above, please find this methodology paper to be inclusive of a new section pertaining to industry mergers and acquisitions – specifically this section will detail any and all mergers or acquisitions that have taken place in Ohio, since the October 2011 submission. The intent of this new section is to provide a better understanding of how the broadband provider landscape has changed over time.

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 90 percent of the Ohio provider community, or 117 of 130 total providers. There are 115 participating providers and 2 additional non-participating provider(s) whose estimated coverage areas have been submitted. Of the 115 participating providers, 30 supplied an update to their network or coverage area(s), while 61 have reported no change. The remaining 24 represent providers who previously supplied data but were 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. Of the 13 providers that are not represented in the attached datasets, 12 have refused to participate in the voluntary program or were non-responsive to multiple contact attempts, and one provider is currently in some form of progress toward data submission but was not able to submit coverage areas at the time of this submission.

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

Connect Ohio has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Ohio conducts field validation efforts. To date, 68 (52.31 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

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

As an indicator of stakeholder penetration, the Connect Ohio website encountered 27,970 unique visits during this reporting period (125,010 total to date for the life of the grant awarded on

December 20, 2009). Additionally, this pronounced Web activity netted 332 broadband inquiries over this same reporting period (1,510 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 Ohio website and the Connect Ohio 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 Ohio mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Ohio to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Ohio 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.

Outreach was conducted during this data update reporting period by Connect Ohio to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Ohio website. Connect Ohio has established a relationship with eTech Ohio, a statewide agency that provides a telecommunications infrastructure that links classrooms and public broadcasting affiliates to each other and the Internet. eTech Ohio was able to gathering data for K-12 schools that utilize its network, and Connect Ohio has included these results in the April 2012 submission. Connect Ohio will continue to build upon existing relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

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

The Connect Ohio program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Ohio, as well as the United States 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.

Data Acquisition: Ohio Community Anchor Institutions Methodology

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

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

Connect Ohio continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Ohio website that was developed during the first reporting period. Connect Ohio will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/R3RLVNG.

Connect Ohio conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. Connect Ohio has established a relationship with eTech Ohio, a statewide agency that provides a telecommunications infrastructure that links classrooms and public broadcasting affiliates to each other and the Internet. eTech Ohio was able to gather data for K-12 schools that utilize its network, and Connect Ohio has included these results in the April 2012 submission.

In tandem with these efforts to identify existing data, Connect Ohio 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. Connect Ohio continued to work to obtain new relationships this reporting period to promote the importance of gathering connectivity data from all CAI sectors. This data-gathering effort will continue leading up to the October 2012 submission.

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

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Ohio project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Ohio will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI.

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

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	8596	8596	8596	2654	1878	5
Libraries	748	748	748	686	588	7
Healthcare	1954	1954	1954	5	5	5
Public Safety	3834	3834	3834	6	4	4
Higher Ed Institutions	613	613	613	15	10	7
Other Government	589	589	589	13	7	7
Other Non-Government	3687	3687	3687	28	19	14
Total	**20,021**	**20,021**	**20,021**	**3407**	**2511**	**49**

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

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 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 state of Ohio.

Inventory of Deliverables, Connect Ohio: 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.

The provider data collected by CN on behalf of the state of Ohio have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

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

Mergers and Acquisitions

Throughout the course of the SBI program, CN has maintained a repository of electronic records related to its provider outreach activities. Recently, due to the high volume of mergers and acquisitions (M&A) within the provider community, CN elected to create a listing of M&A activities for this mapping cycle as a way of supplementing the Provider Changes and Corrections section of this document. M&A activities for this state are listed below with a brief description and date as obtained through public records or provider disclosure.

- **Armstrong Utilities Inc. Acquired S. Bryer Cable TV Corporation, Inc.**
  Milestone Communications, Inc., a leading brokerage firm serving the cable telecommunications industry, served as advisor to S Bryer Cable TV Corporation, Inc. in the sale of its cable television system serving 769 revenue-generating units in portions of Ashtabula and Trumbull Counties in Ohio to Armstrong Utilities, Inc. Michael W. Drake of Milestone Communications represented S Bryer Cable TV Corporation, Inc. in the transaction.

- **CenturyLink Merged with Qwest**
  On April 1, 2011, CenturyLink, Inc. (NYSE: CTL) and Qwest Communications completed their merger, creating the nation's third largest telecommunications company. The combined companies will deliver a broader range of communications services to consumers and small businesses throughout its 37-state service area and to business, wholesale, and government customers nationwide via its 190,000 route mile fiber network.

- **Hometown Cable Acquired gWireless**
  On August 4, 2009, the notes of a presentation to the Preble County by Bill Kessler of G Wireless presented on behalf of his company and Hometown for a border-to-border wireless broadband system stated that "Hometown Cable is acquiring G Wireless." The Hometown Cable website confirms the acquisition with the statement, "Thank you for your interest in Hometown Cable Wireless Division, formerly g-Wireless, Inc."

- **Level 3 Acquired Global Crossing**
  The Global Crossing website confirmed that Level 3 and Global Crossing joined forces under the brand name Level 3 on October 4, 2011.

- **Time Warner Acquired Cobridge Operation**
  The *Bellefontaine Examiner* website reported on May 13, 2011, that Time Warner Cable had purchased Cobridge Broadband's local operation on May 2, 2011. The Monitor, a JSI Capital Advisors blog confirmed on December 14, 2011, that Time Warner picked up a cable system in Ohio from Cobridge Communications.

- **Windstream Acquired PAETEC**
  The News section of the Windstream website dated December 1, 2011, announced that it had completed the acquisition of PAETEC Holding Corp. in a transaction valued at approximately $2.3 billion.

- **Zayo Acquired American Fiber Systems**
  On October 1, 2011, Zayo Group, a provider of telecom and internet infrastructure services, announced that it had closed its previously announced transaction to purchase American Fiber Systems (AFS), a leading provider of metropolitan fiber network and telecom services. The acquisition adds approximately 1,000 route miles of metropolitan fiber footprint and over 600 incremental buildings. AFS operated in nine markets, six of which are new markets for Zayo Group and three of which bolster Zayo's network in existing markets.

OHIO FIELD VALIDATION METHODOLOGY

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

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets 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 Ohio on the following providers: 1 Touch Technology; Access Ohio Valley; Amplex Internet; AT&T, Inc.; Avolve; Bascom Mutual Telephone (d.b.a. BrightNet-Bascom); Benton Ridge Telephone (d.b.a. W.A.T.C.H. TV); BluSky Wireless; Buckeye Cablevision, Inc.; Buckland Telephone; Celerity Networks; CenturyLink; Champaign Telephone; Cincinnati Bell Telephone Company LLC; Cincinnati Communications, LLC; City Net Fiber; Clearwire Corporation; Comcast; Computers4U; ConnectLink; Country Connections LLC; Coyote Wireless; Dark Horse Wireless; Databit Solutions; DuplexCom of Ohio, LLC; Eagle Communications, LLC; Frontier Communications Corporation (d.b.a. Citizens Communications); GMN Wireless; Horizon Telecom, Inc.; Hometown Cable Company; Intelliwave LLC; Insight Communications of Central Ohio, LLC; JB-Nets LLC; Jenco Wireless; Just Micro Digital Services, Inc.; KeyOn Communications, Inc.; Leap; Level 3 Communications LLC; LightSpeed Technologies; MegaPath, Inc; MetaLINK; Mikulski Communications LLC; Mobilecomm (d.b.a. Heavenwire); New Era Broadband LLC; New Knoxville Telephone; NextGen Access; North West Net, Inc.; nTelos (d.b.a. Ohio FiberNet); OmniCity; One Communications Corporation; PAETEC Communications. Inc. (formerly Cavalier Telephone and Talk America, Inc.); R.A.A. Services; Redbird Internet Services; Southern Ohio Communications Services, Inc. (also formerly Scioto Wireless); Sprint Nextel Corporation; Stratus Wave; Telephone Service Company; Time Warner Cable Access; T-Mobile; UData; Verizon

Communications, Inc.; Wavelinc Communications; Wilkshire Wireless; Windstream; XO Communications; and Zayo Group LLC.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 68 companies (out of a universe of 130 viable providers) totaling 52.31 percent within the state of Ohio. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters. 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.

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

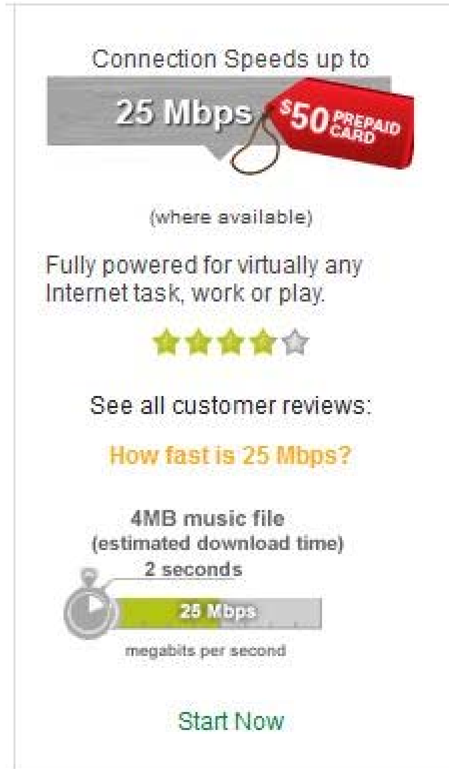
SPEED - Amplex Internet gives you reliable connections that surpass the competition. Our premium plans offer 3.5Mbps down with a 10MB Burst!*

AT&T Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 24 Mbps service; screenshot below.

Compare Internet Packages

	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

CenturyLink
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.



Cequel Communications
Issue: Technology of transmission 40 with maximum advertised download speed in tiers 6 and 7, lower than expected value range for the technology.
Resolution: Provider representative confirmed that DOCSIS 3.0 is indeed in use, but speeds have not been turned up higher at this time.

Conneaut Telephone Company

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises 24 Mbps service; screenshot below.

SERVICE	PRICE
2.0MB/512k	$29.95
8MB/768k	$44.95
12MB/768k	$59.95
24MB/1MB	$74.95

Just Micro Digital Services, Inc.

Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Resolution outstanding as information on the towers being reported as tier 7 service were received in 2010 when they were part of the service area for the provider Innovative Fiber Optic Solutions (aka iFiber). Due to the passing of the owner of Just Micro Digital Services and the service being in transition currently, we were unable to confirm the current speeds available on those towers.

Massillon Cable TV, Inc.

Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.

Resolution: Provider website confirms use of DOCSIS 3.0 with the lower speeds.

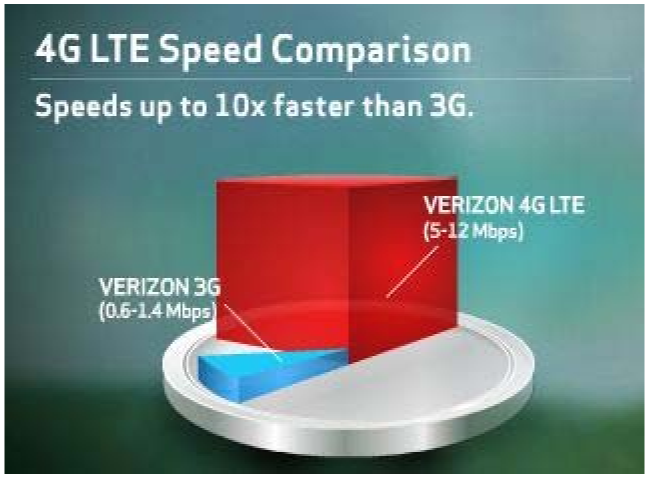
- DOCSIS 3.0 High- Speed Data- Maximize your online experience with download speeds up to 10 Mbps, upload speeds up to 1.5 Mbps and 3 email addresses included for only $159.95/month.

TDS Telecommunications Corporation
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website confirms that 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.

Verizon Communications, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



Windstream Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

See which of our speeds matches your online activities. Choose the right Internet speed (WATCH VIDEO)	3 Mbps (Basic Use)	6 Mbps (Most Popular)	12 Mbps (Fastest Option)
E-mail friends	x	x	x
Browse the Internet	x	x	x
Bank online	x	x	x
Shop for deals	x	x	x
Download music	x	x	x
Connect with friends on Facebook and Twitter	x	x	x
Use wireless home networking	x	x	x
Download large files		x	x
Stream video		x	x
Watch TV shows online			x
Play online games			x

DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDER

Insight Communications

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 provides detail regarding the recent data collection activities related to Insight Communications, a cable broadband internet provider, located in Central Ohio, with a service area around Columbus. The narrative will include information regarding how and where CN obtained publicly available data and the consumer-provided validation techniques that support the underlying data.

April 2012 Submission Commentary

Connected Nation created this coverage estimation document during the October 2011 submission period as a result of the ongoing non-participatory status of the provider. In addition to the 4 instances of e-mail and/or telephone communication during the October 2011 submission period (as previously reported), CN made several additional attempts to contact the provider during this mapping cycle and was informed that Time Warner was in the process of acquiring the assets of Insight Communications.

CN closely monitored the provider's website to identify any changes in the coverage area or maximum advertised speeds but did not locate evidence of any recent changes. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data. However, CN anticipates that Time Warner will voluntarily submit data once they have a comprehensive understanding of the service area).

Documentation supporting this acquisition is illustrated herein:

> *(LOUISVILLE, KY), February 29, 2012 – Time Warner Cable today announced that it has completed its previously announced acquisition of Insight Communications, becoming the new local provider of high-speed Internet, video and voice services to additional communities (see list below) in Kentucky.*
>
> *The acquisition adds more than 760,000 customers throughout Kentucky, Ohio and Indiana to Time Warner Cable's operations.*
>
> *"Today we are pleased to welcome new customers, new employees and new communities to Time Warner Cable," said ," said Glenn Britt, Chairman and CEO of Time Warner Cable. "We are excited to begin building on Insight's successes and serving our new customers."*

> *Time Warner Cable noted that it will mostly remain "business as usual" for former Insight customers as the company begins the day-to-day management of the new areas. The transition will be gradual to ensure a positive customer experience, Time Warner Cable said. The company plans to introduce its advanced, innovative cable products and services later this year and will keep customers well informed of those plans.*

The Issue

Insight Communications, by its lack of responsiveness since January 20, 2011, has predicated its unwillingness to participate in the Ohio broadband mapping initiative.

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

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.myinsight.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's cable network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded an FRN of 0003748324 **(Exhibit C)** with contact information relative to the owner of the company.

Exhibit A: Service Plans

Need for Speed

Up to 7 Meg Internet.
Surf at High-Speed.

$35.00 /mo

Continue

What's Included:

Road Runner

- Fast Internet with download speeds up to **7 Meg**.
- Upload speeds up to **512Kbps**.
- Includes Wireless Home Networking
- FREE security software.
- 1 year price guarantee
- 1 year contract required

Up to Twice as Fast

Up to 15 Meg Internet.
Perfect for Wireless.

$45.00 /mo

Continue

What's Included:

Road Runner Turbo

- Fast Internet with download speeds up to **15 Meg**.
- Upload speeds up to **768Kbps**.
- Includes Wireless Home Networking
- FREE security software.
- 1 year price guarantee
- 1 year contract required(Must maintain at least RoadRunner)

Exhibit B: Service Area

Indiana | Kentucky | Ohio

Alexandria	43001	Columbus	43223	Lancaster	43130
Amanda	43102	Columbus	43224	Lewis Center	43035
Ashville	43103	Columbus	43227	Lithopolis	43136
Baltimore	43105	Columbus	43229	Lockbourne	43137
Blacklick	43004	Columbus	43231	Millersport	43046
Brice	43109	Columbus	43232	New Albany	43054
Canal Winchester	43110	Columbus	43235	Pataskala	43062
Carroll	43112	Columbus	43240	Pickerington	43147
Columbus	43209	Delaware	43015	Powell	43065
Columbus	43211	Etna	43018	Reynoldsburg	43068
Columbus	43213	Gahanna	43230	Sunbury	43074
Columbus	43215	Galena	43021	Westerville	43081
Columbus	43216	Groveport	43125	Westerville	43082
Columbus	43217	Johnstown	43031	Worthington	43085
Columbus	43219	Kilbourne	43032		
Columbus	43222				

Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0003748324
Registration Date:	08/30/2000 04:20:35 PM
Last Updated:	03/06/2009 01:28:31 PM
Business Name:	Insight Communications of Central, Ohio, LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	Insight Communications Company
Contact Position:	
Contact Name:	Daniel Mannino
Contact Address:	810 7th Avenue, 40th Floor New York, NY 10019 United States
Contact Email:	mannino.d@insight-com.com
ContactPhone:	(917) 286-2257
ContactFax:	(917) 286-2303

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the Insight Communications service area listing from its website based on the ZIP Code listings provided. Each ZIP Code was checked for cable broadband availability and information entered into a spreadsheet for reference **(Exhibit D)**. Each ZIP Code has a website listing as to whether cable broadband Internet is available in addition to the basic cable TV offering, or if only cable TV is available. If cable broadband Internet was determined to be available in the ZIP Code, the available service plan packages were reviewed for maximum advertised download and upload speeds **(Exhibit A)**. All ZIP Codes with cable broadband available indicated a maximum download speed of 15 Mbps and a maximum upload speed of 768 Kbps.

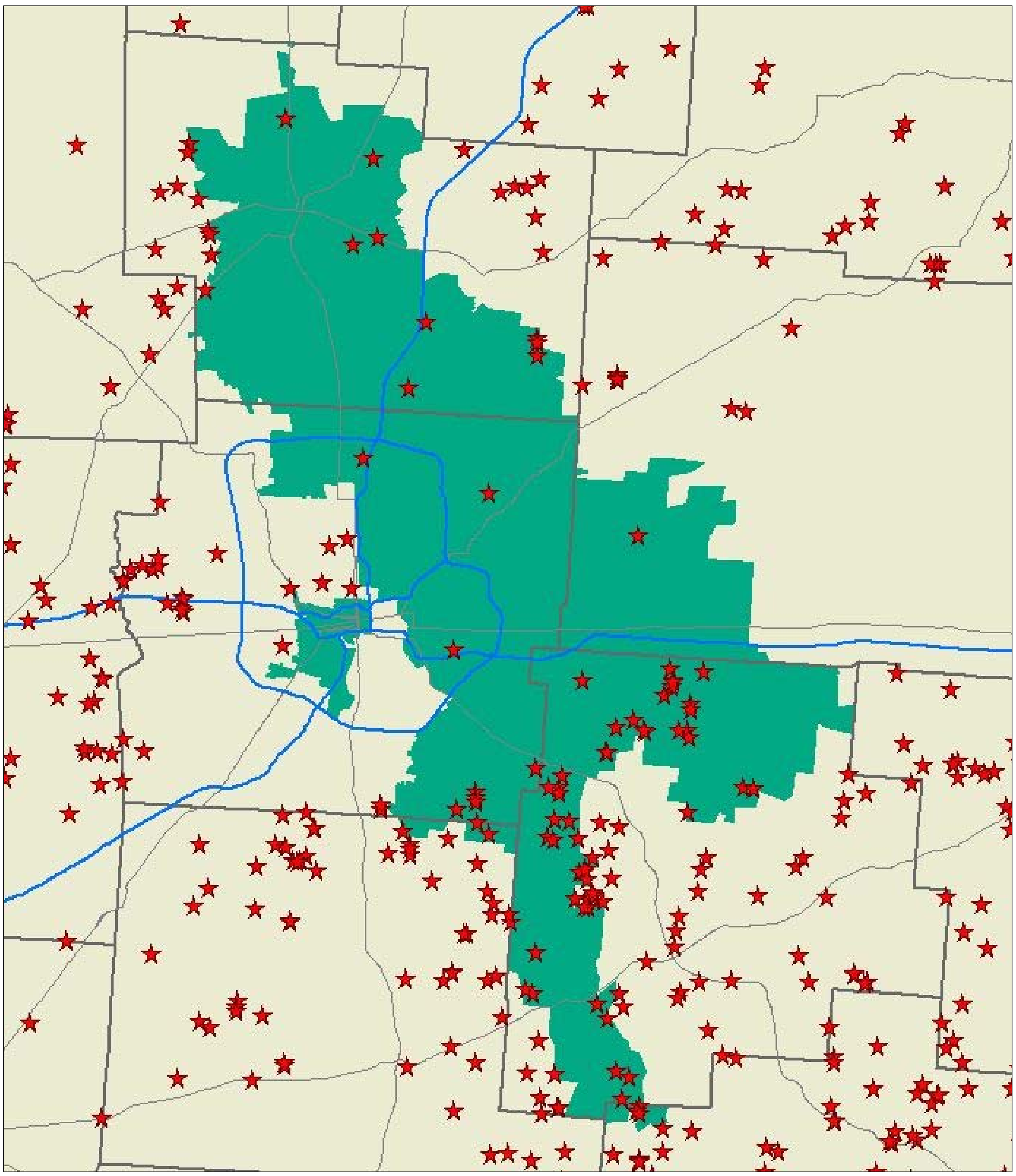
Exhibit D: ZIP Code Availability of Cable Broadband

City	ZipCode	Cable Broadband	Download Speed	Upload Speed		City	ZipCode	Cable Broadband	Download Speed	Upload Speed
Alexandria	43001	no				Columbus	43240	yes	15 Mbps	768 Kbps
Amanda	43102	yes	15 Mbps	768 Kbps		Delaware	43015	yes	15 Mbps	768 Kbps
Ashville	43103	no				Etna	43018	yes	15 Mbps	768 Kbps
Baltimore	43105	yes	15 Mbps	768 Kbps		Gahanna	43230	yes	15 Mbps	768 Kbps
Blacklick	43004	yes	15 Mbps	768 Kbps		Galena	43021	yes	15 Mbps	768 Kbps
Brice	43109	yes	15 Mbps	768 Kbps		Groveport	43125	yes	15 Mbps	768 Kbps
Canal Winchester	43110	yes	15 Mbps	768 Kbps		Johnstown	43031	no		
Carroll	43112	no				Kilbourne	43032	yes	15 Mbps	768 Kbps
Columbus	43209	yes	15 Mbps	768 Kbps		Lancaster	43130	no		
Columbus	43211	yes	15 Mbps	768 Kbps		Lewis Center	43035	yes	15 Mbps	768 Kbps
Columbus	43213	yes	15 Mbps	768 Kbps		Lithopolis	43136	yes	15 Mbps	768 Kbps
Columbus	43215	yes	15 Mbps	768 Kbps		Lockbourne	43137	no		
Columbus	43216	yes	15 Mbps	768 Kbps		Millersport	43046	yes	15 Mbps	768 Kbps
Columbus	43217	yes	15 Mbps	768 Kbps		New Albany	43054	yes	15 Mbps	768 Kbps
Columbus	43219	yes	15 Mbps	768 Kbps		Pataskala	43062	yes	15 Mbps	768 Kbps
Columbus	43222	yes	15 Mbps	768 Kbps		Pickerington	43147	yes	15 Mbps	768 Kbps
Columbus	43223	yes	15 Mbps	768 Kbps		Powell	43065	yes	15 Mbps	768 Kbps
Columbus	43224	yes	15 Mbps	768 Kbps		Reynoldsburg	43068	yes	15 Mbps	768 Kbps
Columbus	43227	yes	15 Mbps	768 Kbps		Sunbury	43074	no		
Columbus	43229	yes	15 Mbps	768 Kbps		Westerville	43081	yes	15 Mbps	768 Kbps
Columbus	43231	yes	15 Mbps	768 Kbps		Westerville	43082	yes	15 Mbps	768 Kbps
Columbus	43232	yes	15 Mbps	768 Kbps		Worthington	43085	yes	15 Mbps	768 Kbps
Columbus	43235	yes	15 Mbps	768 Kbps						

Broadband Inquiries and Consumer Feedback

The estimated coverage created by the ZIP Codes that were confirmed to have cable broadband available per the Insight Communications website were then refined through the review of broadband inquiries. Broadband inquiries are a set of crowdsourced data where consumers provide feedback on the available, or more importantly, unavailable, broadband services in their area. This information allowed Connected Nation to refine the estimated coverage by reviewing which inquiries indicated broadband service was not available at their location in Central Ohio **(Exhibit E)**.

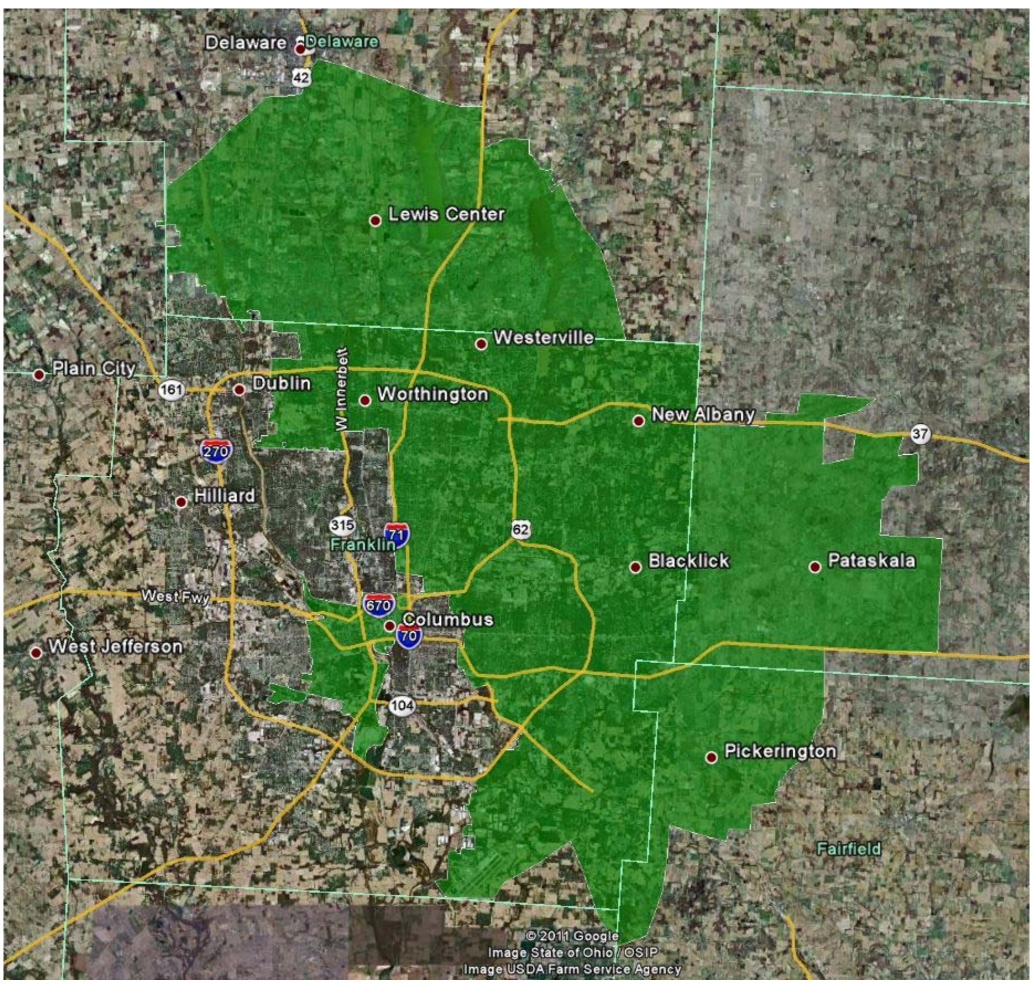
Exhibit E: Insight Communications Estimated Coverage and Broadband Inquiries



Background Results and Submission for April 2012

Based on the broadband inquiries submitted by consumers, the estimated coverage area for Insight Communications was refined to a display that Connected Nation felt better represented the actual cable broadband service area. A composite map was created based on all information acquired on the service area of this provider in Central Ohio **(Exhibit F)**. A map of the estimated cable broadband coverage was forwarded to Insight Communications and provider representatives were advised the information will be submitted to Connect Ohio and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period. Representatives from the respective companies suggested that it should only be a matter of time before data can (and will) be submitted for this SBI project. CN and Time Warner have a long history of collaboration, an executed NDA already in place, and a collective desire to represent broadband coverage areas as accurately as possible. Thus, it is CN's expectation that Time Warner should be able to report broadband coverage and maximum advertised speeds (in the former Insight systems) during the October 2012 mapping cycle, thereby eliminating the need to resubmit this NPP methodology narrative in future submissions.

Exhibit F: Insight Communications Composite Coverage



Just Micro Digital Services, Inc.

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 State Broadband Initiative (SBI) program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Just Micro Digital Services, Inc. (d.b.a. Just Micro .Net), a wireless Internet service provider (WISP), located in Southeast, Ohio, with a service area around Brown, Clinton, Clermont, Fayette, Highland, and Warren counties. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

Just Micro Digital Services, Inc. voluntarily participated in the April and October 2010 mapping cycles and, on January 26, 2011, notified CN that it refused any further participation in the Connect Ohio and National Broadband Map initiatives. Furthermore, the provider requested that its wireless coverage be removed from the Connect Ohio map. From January 26, 2011, to present, CN staff members have continued trying to obtain the participation of the provider with 3 instances of communication via telephone and e-mail sessions; however, the requests were never acknowledged.

The Issue

Just Micro Digital Services, Inc., by its lack of responsiveness since January 26, 2011, has predicated its unwillingness to participate in the Connect Ohio broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

Given that CN was already in possession of a dataset from April 2010 **(Exhibit A)** CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed news articles on the provider's then current website (www.justmicro.net) and videos available on YouTube (www.youtube.com/user/eatmoresoap/featured) collectively **(Exhibit B)** all related to the provider's wireless network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded an "no match" **(Exhibit C)**. Additionally, the FCC Universal Licensing System (ULS) was searched to determine if the provider was the authorization holder of any spectrum; this search also yielded "no match" **(Exhibit D)**.

Exhibit A: Service Area as of April 2010

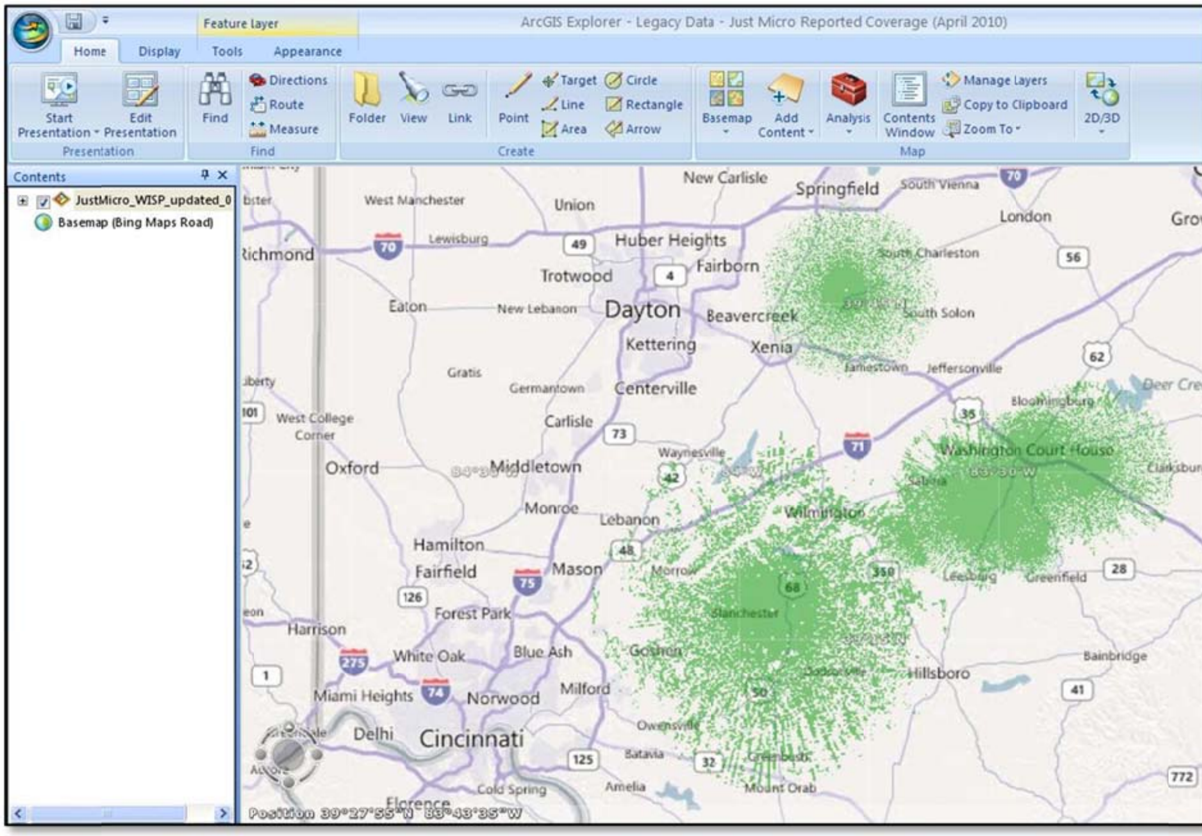
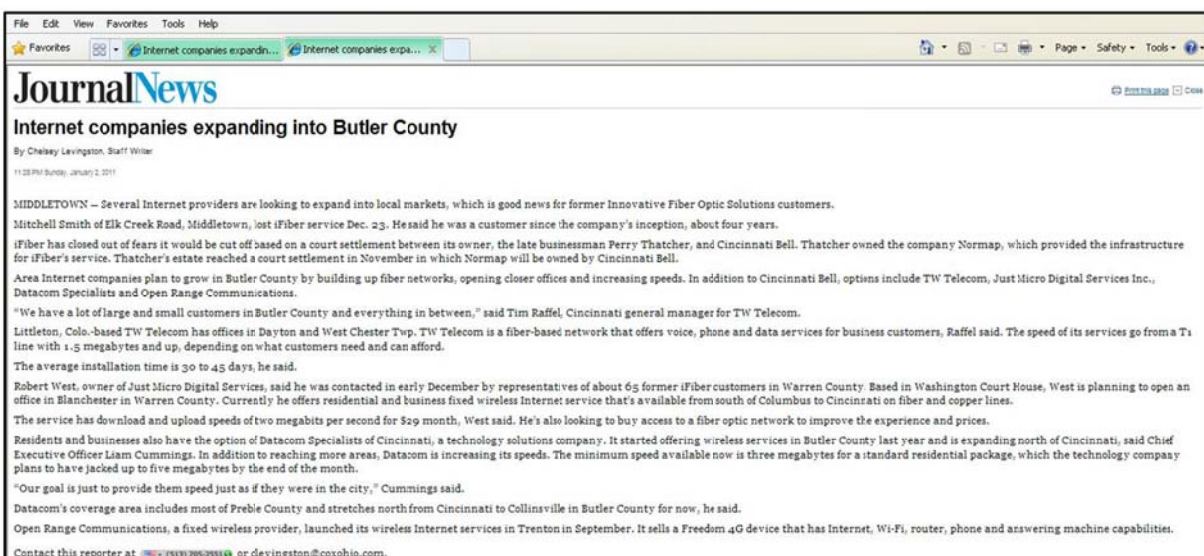


Exhibit B: Public Data Sources



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JournalNews

Internet companies expanding into Butler County

By Chelsey Levingston, Staff Writer

11:28 PM Sunday, January 2, 2011

MIDDLETOWN — Several Internet providers are looking to expand into local markets, which is good news for former Innovative Fiber Optic Solutions customers.

Mitchell Smith of Elk Creek Road, Middletown, lost iFiber service Dec. 23. He said he was a customer since the company's inception, about four years.

iFiber has closed out of fears it would be cut off based on a court settlement between its owner, the late businessman Perry Thatcher, and Cincinnati Bell. Thatcher owned the company Normap, which provided the infrastructure for iFiber's service. Thatcher's estate reached a court settlement in November in which Normap will be owned by Cincinnati Bell.

Area Internet companies plan to grow in Butler County by building up fiber networks, opening closer offices and increasing speeds. In addition to Cincinnati Bell, options include TW Telecom, Just Micro Digital Services Inc., Datacom Specialists and Open Range Communications.

"We have a lot of large and small customers in Butler County and everything in between," said Tim Raffel, Cincinnati general manager for TW Telecom.

Littleton, Colo.-based TW Telecom has offices in Dayton and West Chester Twp. TW Telecom is a fiber-based network that offers voice, phone and data services for business customers, Raffel said. The speed of its services go from a T1 line with 1.5 megabytes and up, depending on what customers need and can afford.

The average installation time is 30 to 45 days, he said.

Robert West, owner of Just Micro Digital Services, said he was contacted in early December by representatives of about 65 former iFiber customers in Warren County. Based in Washington Court House, West is planning to open an office in Blanchester in Warren County. Currently he offers residential and business fixed wireless Internet service that's available from south of Columbus to Cincinnati on fiber and copper lines.

The service has download and upload speeds of two megabits per second for $29 month, West said. He's also looking to buy access to a fiber optic network to improve the experience and prices.

Residents and businesses also have the option of Datacom Specialists of Cincinnati, a technology solutions company. It started offering wireless services in Butler County last year and is expanding north of Cincinnati, said Chief Executive Officer Liam Cummings. In addition to reaching more areas, Datacom is increasing its speeds. The minimum speed available now is three megabytes for a standard residential package, which the technology company plans to have jacked up to five megabytes by the end of the month.

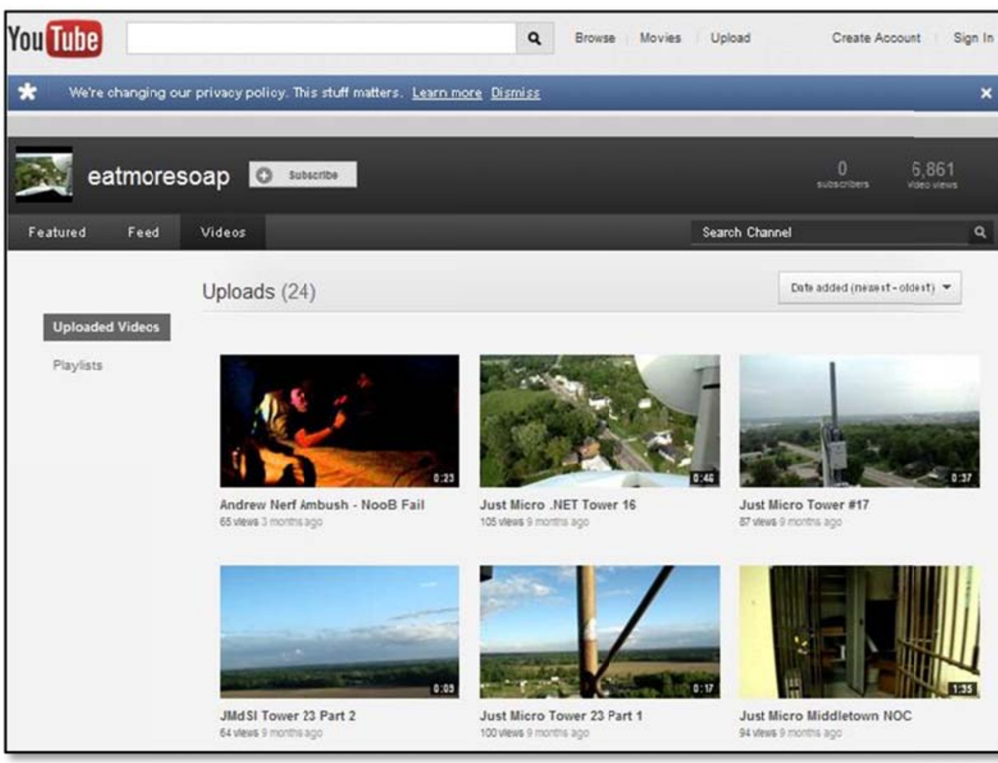
"Our goal is just to provide them speed just as if they were in the city," Cummings said.

Datacom's coverage area includes most of Preble County and stretches north from Cincinnati to Collinsville in Butler County for now, he said.

Open Range Communications, a fixed wireless provider, launched its wireless Internet services in Trenton in September. It sells a Freedom 4G device that has Internet, Wi-Fi, router, phone and answering machine capabilities.

Contact this reporter at (513) 705-2551 or clevingston@coxohio.com.


* Just Micro .NET *
Affordable Internet For Everyone
Now Offering Affordable High Speed Wireless Internet In Limited Areas*
Web Mail
Affordable Dial-Up Internet Service is Only
$5.99
Per Month with NO setup fees and NO contracts
*Now Offering High Speed Broadband Wireless Internet
In Limited Areas of
Southern Fayette County
Eastern and Southern Clinton County
Northern Brown County
South Eastern Warren County
North Eastern Clermont County
Small Portion of Western Highland County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Movies
Upload
Create Account
Sign In
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Subscribe
0 subscribers
6,861 video views
Featured
Feed
Videos
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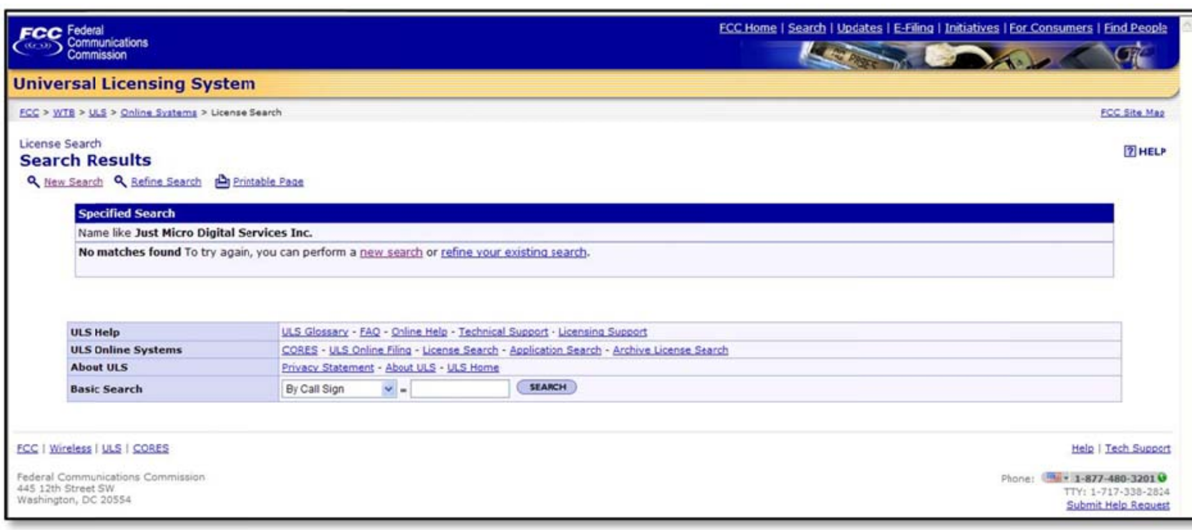
Uploads (24)
Uploaded Videos
Playlists
Andrew Nerf Ambush - NooB Fail
Just Micro .NET Tower 16
Just Micro Tower #17
JMdSI Tower 23 Part 2
Just Micro Tower 23 Part 1
Just Micro Middletown NOC

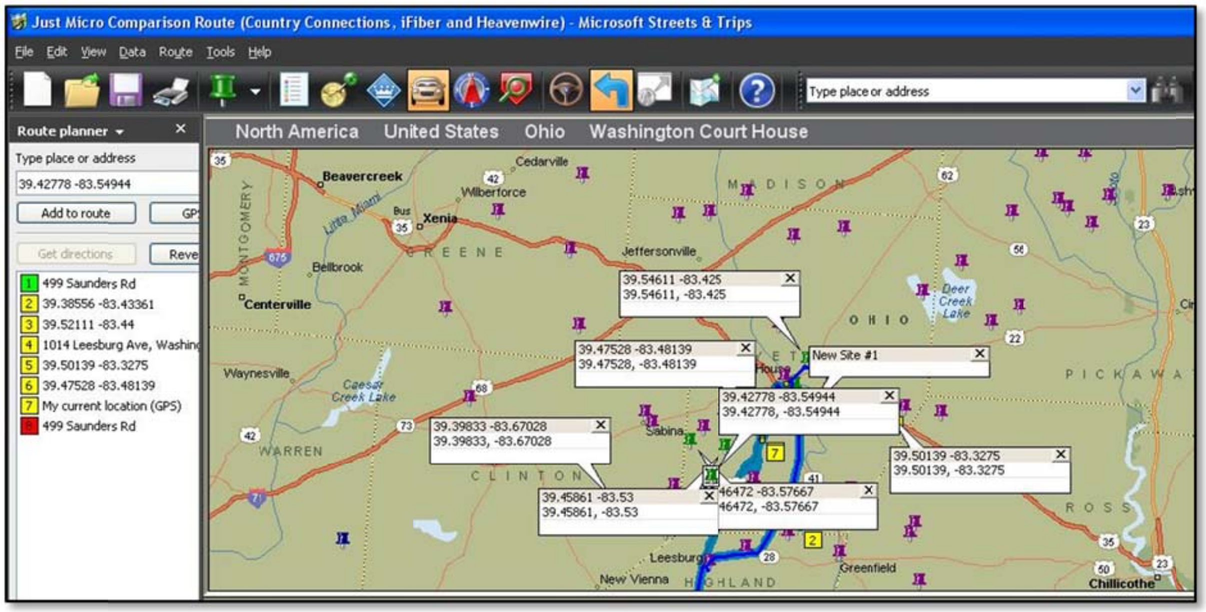
Exhibit C: Federal Registration Number

Exhibit D: License Reference



<u>**Preliminary Identification of Provider's Coverage Area**</u>: Since CN was in possession of the April 2010 dataset for Just Micro Digital Services, Inc., as well as the April 2010 dataset of Innovative Fiber Optic Solutions (d.b.a. iFiber) referenced in the January 2, 2011, news article (found in Exhibit B), the CN engineer was able to isolate 10 Just Micro Digital Services, Inc. wireless transmit sites and the 9 Innovative Fiber Optic Solutions wireless transmit sites. All 19 locations were entered into Microsoft *Streets & Trips* to develop a route for the data collection and validation process. An abbreviated route is presented herein as **(Exhibit E).**

Exhibit E: Validation Points for AP Structures



Testing Techniques

CN staff developed a data collection and site validation route based on information as outlined above. To ensure accuracy of coverage estimates, the CN engineer also included wireless transmit sites of neighboring WISPs to eliminate confusion when a transmit site was located. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit F)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored) and photographs were taken of the access points.

During the on-site testing, the CN wireless engineer identified an access point that was located immediately adjacent to the business office of a neighboring WISP. In order to clarify ownership of the wireless device, the CN engineer stopped by the office of the neighboring WISP and was informed that Robert West, the owner of Just Micro Digital Services, Inc., had recently been killed in an automobile accident **(Exhibit G).** As such, it is unclear what will happen with the wireless broadband system. CN awaits further information from Mr. West's widow.

Exhibit F: Field Data for Just Micro .Net Office/Hub Location

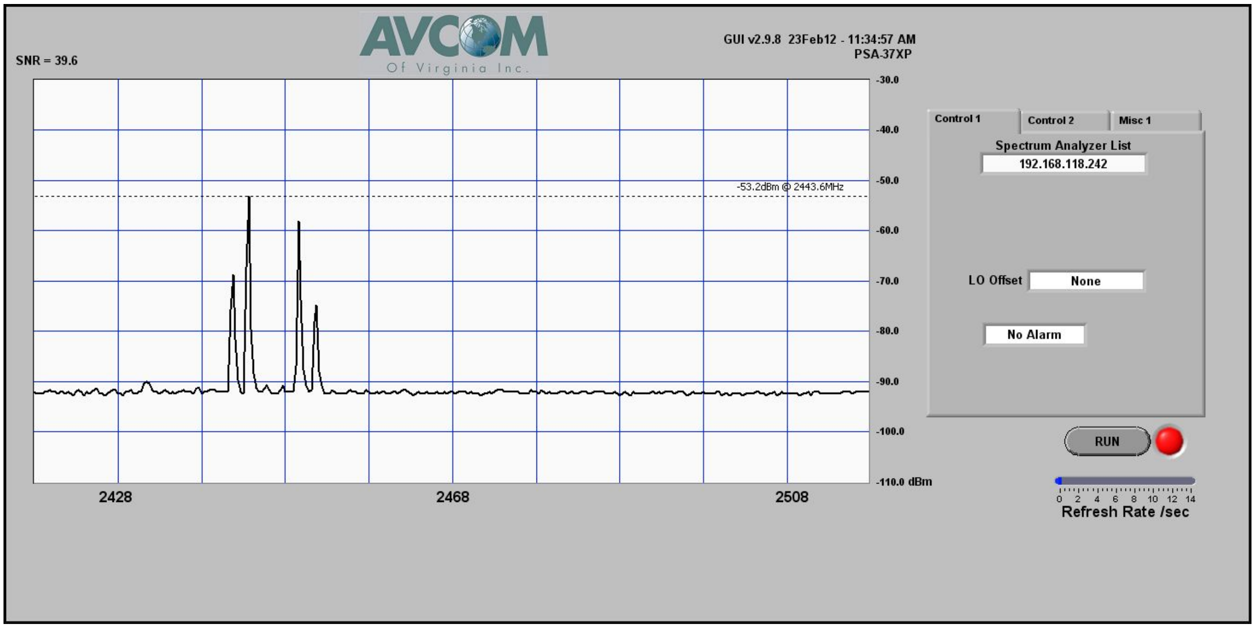
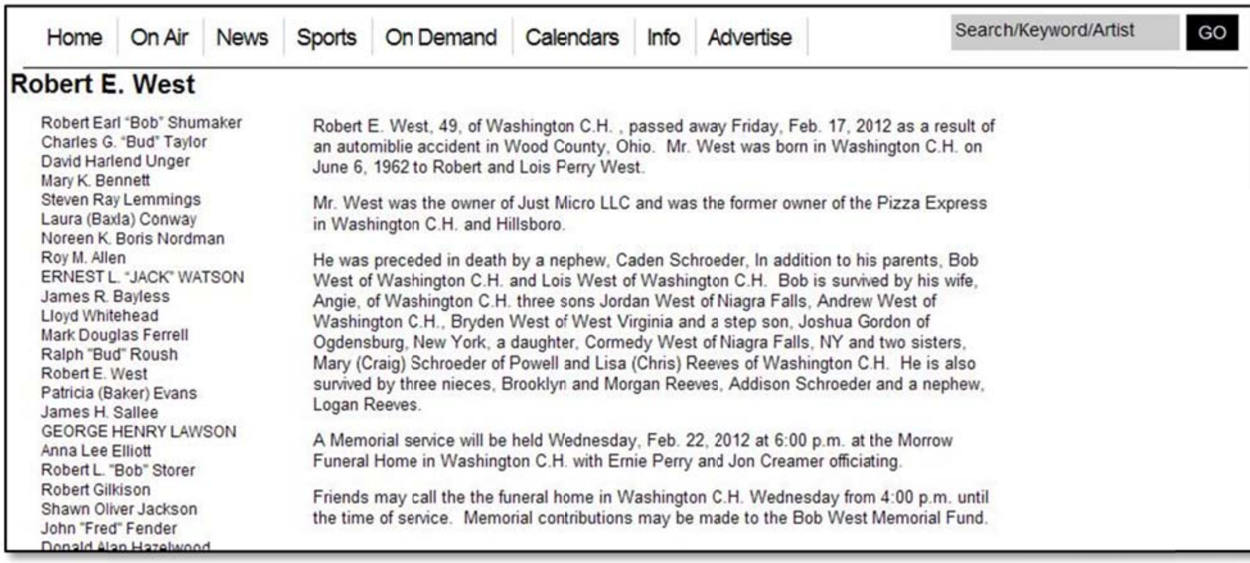


Exhibit G: Obituary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Robert E. West

Robert Earl "Bob" Shumaker
Charles G. "Bud" Taylor
David Harlend Unger
Mary K. Bennett
Steven Ray Lemmings
Laura (Baxla) Conway
Noreen K. Boris Nordman
Roy M. Allen
ERNEST L. "JACK" WATSON
James R. Bayless
Lloyd Whitehead
Mark Douglas Ferrell
Ralph "Bud" Roush
Robert E. West
Patricia (Baker) Evans
James H. Sallee
GEORGE HENRY LAWSON
Anna Lee Elliott
Robert L. "Bob" Storer
Robert Gilkison
Shawn Oliver Jackson
John "Fred" Fender
Donald Alan Hazelwood

Robert E. West, 49, of Washington C.H. , passed away Friday, Feb. 17, 2012 as a result of an automiblie accident in Wood County, Ohio. Mr. West was born in Washington C.H. on June 6, 1962 to Robert and Lois Perry West.

Mr. West was the owner of Just Micro LLC and was the former owner of the Pizza Express in Washington C.H. and Hillsboro.

He was preceded in death by a nephew, Caden Schroeder. In addition to his parents, Bob West of Washington C.H. and Lois West of Washington C.H. Bob is survived by his wife, Angie, of Washington C.H. three sons Jordan West of Niagra Falls, Andrew West of Washington C.H., Bryden West of West Virginia and a step son, Joshua Gordon of Ogdensburg, New York, a daughter, Cormedy West of Niagra Falls, NY and two sisters, Mary (Craig) Schroeder of Powell and Lisa (Chris) Reeves of Washington C.H. He is also survived by three nieces, Brooklyn and Morgan Reeves, Addison Schroeder and a nephew, Logan Reeves.

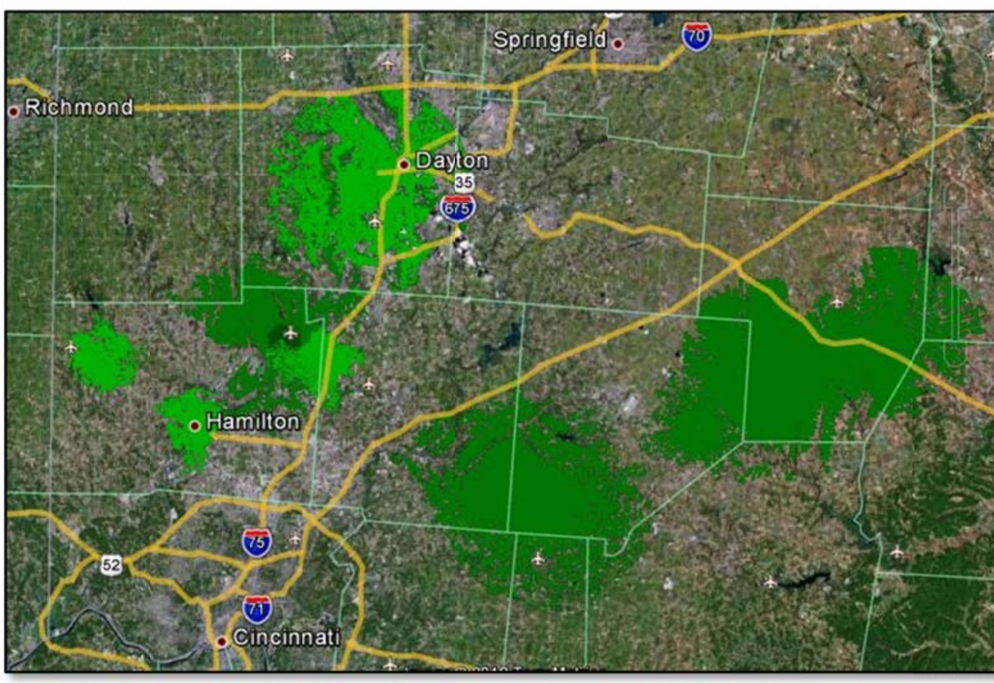
A Memorial service will be held Wednesday, Feb. 22, 2012 at 6:00 p.m. at the Morrow Funeral Home in Washington C.H. with Ernie Perry and Jon Creamer officiating.

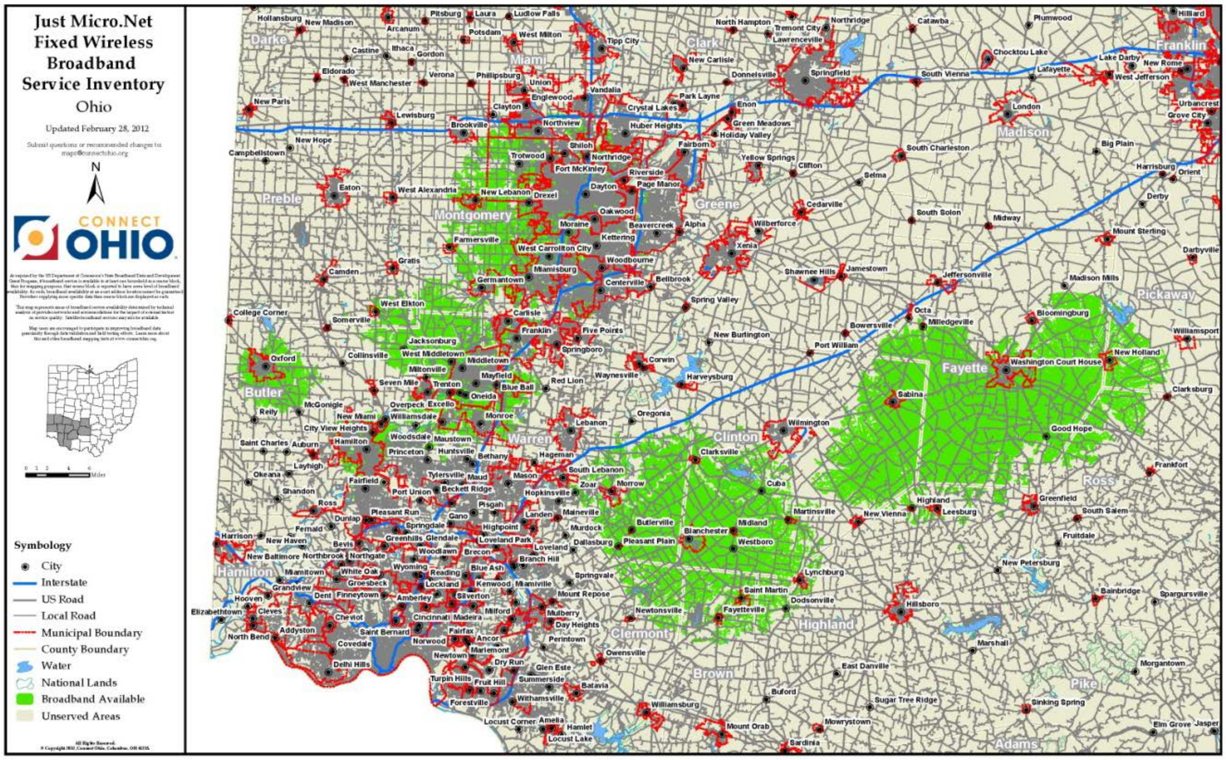
Friends may call the the funeral home in Washington C.H. Wednesday from 4:00 p.m. until the time of service. Memorial contributions may be made to the Bob West Memorial Fund.

<u>Results and Submission for April 2012</u>

Through the analysis of the combined 19 locations, the CN engineer was able to create a revised composite propagation study based on the information in hand and collected during the field validation **(Exhibit H)**.

Exhibit H: Just Micro Digital Services, Inc. Wireless Composite Coverage





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 1.60 percent of Ohio households do not have terrestrial fixed broadband service available, and approximately 0.35 percent[1] of Ohio households have neither mobile nor fixed broadband service available.[2]

Within rural areas of the state, results derived from provider-validated data indicate that approximately 3.19 percent of rural Ohio households do not have terrestrial fixed broadband service available, and approximately 0.68 percent[3] of rural Ohio households have neither mobile nor fixed broadband service available.[4] Please note that the availability estimates presented are based on Census 2010 household information.

[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 state.

[3] See footnote 1.

[4] See footnote 2.

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

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information 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 Ohio project has received a total of 332 inquiries (1,510 grant inception to date). As more inquiries are submitted to Connect Ohio, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

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 Ohio project launched BroadbandStat on February 24, 2010, and has received a total of 10,405 visits to date, of which 2,150 occurred this reporting period.

SPEED TEST METHODOLOGY

The 2,827 speed tests that are represented in the Connect Ohio Speed Test Report during this reporting period (11,568 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Ohio speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

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

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 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	21Globe, Inc.	www.21globe.com/is/access/	General reseller of DSL and backhaul
2	650Net	www.650net.net/	Dial-up only
3	A 007 Access	www.a007.com/	General reseller of Quest DSL and mobile wireless; DSL does not qualify as the max advertised speed is 768 kbps x 128 kbps
4	AAA Internet Service	n/a	URL no longer in service
5	Aaccess Network Communications	www.aaccess.net/	Not a broadband provider; installs and maintains WiFi systems
6	ACC-NET	www.acc-net.com/	This company is no longer an active provider or in business
7	ACERX.NET	http://acerx.net/	General reseller but no contact information listed on website; requests for information were never returned
8	Adelphia	n/a	No longer in business; assets liquidated
9	Airespring, Inc.	www.airespring.com	General reseller of VOIP, long distance and data circuits (non-residential)
10	Airewaves Broadband, LLC	www.airewaves.com	URL no longer in service
11	Airmail247.com	www.airmail247.com	Business mailing list search site; not a broadband provider

12	Alphalink Technologies	www.alink.com/index.htm	This company is a nonfacilities-based reseller
13	American Broadband & Telecommunications	www.ambt.net	This company is a nonfacilities-based reseller
14	Antioch Wireless Broadband	www.antiochwirelessbroadband.com/	Resells DSL and cellular service in Antioch, IL only
15	Arrowheadnet.com	www.arrowheadnet.com/	Domain registration and web hosting company
16	bargainisp.net	www.bargainisp.net/	Generic web directory site; company does not offer broadband
17	Beonline	www.beol.net	This company is a nonfacilities-based reseller
18	Bonzai Pipeline, Inc.	www.bonzaipipeline.net	This company is no longer in business
19	BreezeWave Broadband	www.breezewave.com	This company is no longer in business
20	Bright Choice	www.brightchoice.com	Bright Choice was acquired by Omnicity
21	Broadband National	www.broadbandnational.com	Nonfacilities-based general reseller of DSL and satellite for 36 companies (e.g. ACC Business, HughesNet et al.)
22	Broadview Networks Holdings, Inc.	www.broadviewnet.com	Wholesale reseller of partners' communication products and services; company is nonfacilities-based
23	BullsEye Telecom, Inc.	www.bullseyetelecom.com	Integrated suite of telecommunications services for businesses and general reseller of backhaul
24	Byesville.Net	www.byesville.net	This company is no longer in business
25	Cable One	n/a	Inactive; non-state provider
26	CAC MediaNet, Inc.	n/a	No longer in business; acquired by First Step (Michigan general reseller of DSL)
27	Camino-Net Internet Services	www.camino-net.com	No longer in business; was dial-up only
28	CanNet Internet Services	www.cannet.com	Offers dial-up and B2B services, webhosting, etc.

29	Canton Cable	n/a	Acquired by Comcast
30	CCIS.net	www.ccis.net	Now owned by Beacon Technologies; offers dial-up and is general reseller of DSL in Pennsylvania
31	Celito Communications	www.celito.net/	Offers dial-up and wireless in North Carolina
32	CIMCO Communications, Inc.	www.cimco.net	This company is a nonfacilities-based reseller
33	Clear Sky Communications	www.clearskycommunications .com/	This company is a general reseller of and an installation company for Satellite services
34	Cleartouch.Com	n/a	This company is no longer in business
35	CloverNet	n/a	Script coding application company
36	Coax-Net	www.coax.net	This company is a nonfacilities-based reseller
37	Cobridge Communications, LLC	www.cobridge.net/communications	This company was acquired in Ohio by Time Warner
38	Cognisurf	www.calling-plans.com	Dial-up internet provider
39	Columbus Cable	n/a	Possibly acquired by ComCast; OSS service branch
40	Combined Technologies Inc.	www.ctipack.com	This company is no longer in business
41	Communication Options Inc.	www.coi.net	Provides B2B and residential dial-up
42	Community ISP, Inc.	http://www.totalink.net/	
43	config.com Internet	www.config.com	Nonfacilities-based reseller; provided limited data but not enough for creation of coverage area or identification of services
44	CoreComm Wireless	n/a	This company is no longer in business
45	Dacor Internet Services	www.dacor.net/	This company is a nonfacilities-based reseller
46	Data-Tel of Illinois, Inc.	www.data-telinc.net/	This company is a nonfacilities-based reseller
47	Davis Voice and Data	n/a	Cellular reseller only; does not operate a broadband network

48	Dayton Digital Networks	www.daytondigital.net	No longer offers broadband services
49	Deltaforce	www.deltaforce.net	Dial-up and webhosting services only
50	deluxehost.com	deluxe-host.com	Offers web hosting only
51	Devlin Express	www.devlinex.com	This company is a nonfacilities-based reseller
52	DGUI	www.dgui.com/	No longer in business; domain name for sale
53	DHB Networks, Ltd.	www.dhbnetworks.com	This company is no longer in business
54	Dial National	www.dialnational.com/	Bad URL; out of business
55	Dialer.net	www.dialer.net/internet_access/United_States.html	Offers international dial-up services
56	DigitalBridge Communications Corp.	n/a	Non-state provider; serves Idaho, Indiana, Montana, South Dakota, Virginia, and Wyoming
57	DSL @ Interlync	www.interlync.com	General reseller of Covad and for this mapping cycle they have been non-responsive
58	DTS-NET.COM	www.dts-net.com/	Provider of wholesale and retail telecommunications services
59	Duvall Wireless	www.duvallwireless.net	This company is no longer in business
60	East Allen High Speed Internet, LLC	n/a	Non-state provider; serves Allen County, Indiana
61	East Palestine Internet, Inc.	www.epiinternet.com/	Company appears to have gone out of business; phone is disconnected and bad URL
62	Enventis Telecom Inc.	n/a	Non-state general reseller
63	Erielink LLC	www.erielink.com	No longer in business
64	ETI - Connecting Your World	www.cyberenet.net/	General reseller of DSL services from infrastructure owned by Verizon, AT&T, and Covad
65	EZnet Ohio	www.2.ezo.net/iserv.htm	Provides dial-up service
66	FairPoint Broadband	www.fairpoint.com	Non-state provider
67	Fast Dependable Access	www.fda.net	Bad URL; company appears to have gone out of business
68	g wireless, Inc.	http://www.g-wireless.net	Acquired by another company

69	Galaxywave Internet	www.galaxywave.net/	Phone number was disconnected
70	Global Crossing Telecommunications, Inc.	n/a	Acquired by another company
71	GO Concepts	n/a	This company is a nonfacilities-based reseller
72	Great American Broadband, Inc.	www.oibw.net	Non-state provider; serves Indiana
73	Hubwest Protected Networks LLC	www.hubwest.com	Dial-up and web hosting only
74	iDigi Wireless	www.digi.com	Bad URL; no longer in business
75	Imbris, Inc.	www.imbris.com	Provides fixed wireless in Idaho only
76	IMGISP.NET	www.imgisp.net/	Search engine
77	Incredible Networks	n/a	Bad URL; out of business
78	Inercom Communications Inc.	www.inercom.com	Bad URL; out of business
79	Interactiveinfo.com Inc.	www.rocketbroadband.com	Offers cable television services in NY only
80	In-Touch Software	www.intouchsoftware.co.uk	Software development company
81	iRadical	n/a	Bad URL; out of business
82	ISPartner.net	n/a	Bad URL; out of business
83	KAS Cable TV	www.kascable.com	This company is a nonfacilities-based reseller
84	LARIAT.NET	www.lariat.net/	Offers fixed wireless services in Wyoming only
85	LCSisp.com	www.lcsisp.com/index.cfm	Offers national dial-up services only
86	Lek.net Internet Services, Inc.	www.lek.net	General reseller of AT&T DLS and offers dial-up and computer repair
87	LightEdge Solutions, Inc.	www.lightedge.com	IT consulting; LightEdge does not provide residential service in any state
88	Lightyear Network Solutions, LLC	www.lightyear.net	Nonfacilities-based general reseller
89	LinkAmerica.Net	www.linkamerica.net/	Bad URL; out of business
90	Magnum Cable	n/a	Bad URL; out of business
91	MainBoard	www.mainboard.cc/internet.htm	General reseller in Virginia
92	Maine Cable and Wireless	www.mainecableandwire	Bad URL; out of business

		less.com	
93	Marcin Company	n/a	Bad URL; out of business
94	Metropolitan Telecommunications Holding Company	n/a	MetTel provides facilities-based and resold services (certified CLEC in some states); the company provides a variety of voice, including wireless, and data services to commercial customers
95	Millenicom Inc.	www.millenicom.com	General reseller of dial-up and mobile broadband (Sprint network)
96	Nanomega.Com	www.nanomega.com	Bad URL; out of business
97	NCO Wireless	www.ncowifi.com	Acquired by NexGen Access
98	NetAccess, Inc.	www.nas.net/	Offers wireless B2B services only
99	NetSpeed Online	www.netspeed-online.net	Bad URL; out of business
100	New Edge Network, Inc.	www.newedgenetworks.com	Acquired by EarthLink
101	Northwest ISP	www.northwestisp.com/	Bad URL; out of business
102	nTelos, Inc.	n/a	Non-state provider; offers mobile wireless cards in West Virginia
103	NuVox, Inc.	www.nuvox.com	Acquired by Windstream
104	OffWorld1	n/a	Bad URL; no longer in business
105	ONEcom Wireless	n/a	Bad URL; no longer in business
106	Open Range Communications, Inc.	http://www.openrangecomm.com/	No longer in business
107	Overarch Broadband	n/a	Offers services in Idaho only
108	Pacific Internet Exchange	www.pie.us/	Bad URL; company appears to have gone out of business
109	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company
110	Paknet Limited	n/a	Subsidiary of Pakistan Telephone Company; no services offered in the U.S.
111	Pattersonville Telephone Company	n/a	Does not offer broadband service
112	Planet Online	www.planetonline.net/	Offers website hosting services
113	Practical Support, Ltd.	http://www.practicalsupport.com/	Offers service, but below broadband threshold

114	PremoWeb	www.premoweb.com/about_us/_contact_us.html	Offers national dial-up services only
115	Reliance Globalcom Services, Inc.	www.relianceglobalcom.com	California-based company; non-state provider
116	Renaissance Networks	www.renaissancenetworks.com/	IT support company based in New Mexico
117	Simply Dialup A Metrogeek Company	www.simplydialup.com/	Offers dial-up only
118	Siscom Internet Service	www.siscom.net/index.html	This company is a nonfacilities-based reseller
119	SkyLAN	n/a	This company is not a broadband provider
120	Skymax Broadband, Inc.	http://www.skymaxbroadband.com/	No longer in business
121	Sling Broadband	n/a	Non-state provider; WISP in Florida
122	Supernova Systems, Inc.	home.onlyinternet.net/	Company acquired by Great American Broadband
123	Surferz.Net	www.surferz.net/	Offers dial-up in upstate NY only
124	T1 Shopper	www.t1shopper.com/	Search engine for general reseller
125	TelNet Worldwide, Inc.	n/a	Does not offer broadband service
126	The Iserv Company, LLC	www.iserv.net	This company is a nonfacilities-based reseller
127	The T1 Company	www.t1company.com	Offers B2B services
128	Total Access Networks, Inc	n/a	Does not offer broadband service
129	TSISP.NET	www.tsisp.net	Bad URL; out of business
130	U.S. Wireless Online, Inc.	n/a	Non-state provider; acquired by Caviair and offers service in Florida only

131	University Corporation for Advanced Internet Development	n/a	BIP/BTOP recipient proposes a comprehensive 50-state network benefitting approximately 121,000 CAIs. The project proposes a large-scale, public-private partnership to interconnect more than 30 existing research and education networks, creating a dedicated 100-200 Gbps nationwide fiber backbone with 3.2 terabits per second (TBps) total capacity that would enable advanced networking features such as IPv6 and video multicasting.
132	UNUM Telecommunications, Inc.	www.utinet.net/	Bad URL; out of business
133	WCNet	www.wcnet.org/rates/hispeed/	This company is a nonfacilities-based reseller
134	Wcoil	www.wcoil.com	Despite numerous outreach efforts, this company remains nonresponsive; accordingly, we are uncertain of the types of services offered
135	WilTel Communications, LLC	www.level3.com	Acquired by Level 3
136	WireFire Internet	www.wirefire.com	Acquired by FiberNet
137	Wireless Roanoke, Inc.	www.wirelessroanoke.com/	Bad URL; out of business
138	wisbin	www.wisbin.com/	No longer in business
139	www.AmericanAngel.us	www.americanangel.us/	Bad URL; out of business
140	YEYZOO.NET	www.yeyzoo.net/	Bad URL; out of business
141	YLISP (Your Local ISP)	www.itsyournet.com	Resells DSL and dial-up
142	YourT1Wifi.com	yourt1wifi.com/	Offers wireless service in Idaho only
143	Zito Media Communications, II, LLC	n/a	Zito Media does not yet offer broadband service in Ohio
144	ZOOM Internet Services, LLC	n/a	Michigan-based dial-up provider and web hosting company

Broadband Provider Log

Complete	166
Non-Responsive/Refused	13
In Progress	4
Count of Datasets by Status	**183**
Total Unique Providers Represented	**130**

Provider Name	**Platform**	**Status**	**NDA Execution Date**	**Notes**
1 Touch Technology Solutions, LLC	Fixed Wireless	Data Added to Statewide Inventory		[FEB-02-12 Amanda Bentley] Change: New fixed wireless provider in the market.
Amplex Internet	Fixed Wireless	Data Added to Statewide Inventory	3/26/2010	[MAR-05-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Armstrong Utilities, Inc.	Cable	Data Added to Statewide Inventory	3/11/2010	[JAN-17-12 Amanda Bentley] Change: Armstrong Utilities has completed the acquisition of S. Bryer Cable assets in Ashtabula and Trumbull counties.
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[FEB-22-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-22-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Block Communications, Inc.	Cable	Data Added to Statewide Inventory	2/8/2010	[JAN-17-12 Amanda Bentley] Change: Speeds changed to speed tier 9 max down and speed tier 5 max up.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-17-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Cequel Communications	Cable	Data Added to Statewide Inventory	12/15/2009	[FEB-27-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Cincinnati Bell Telephone Company LLC	DSL	Data Added to Statewide Inventory	3/16/2010	[FEB-27-12 Amanda Bentley] Change: Provider expanded service area.
Cincinnati Bell Telephone Company LLC	Fiber	Data Added to Statewide Inventory	3/16/2010	[FEB-27-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Cincinnati Communications, LLC	Fiber	Data Added to Statewide Inventory	1/6/2011	[FEB-20-12 Amanda Bentley] Change: New platform addition (FTTH).
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/3/2010	[JAN-20-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission. [MAR-12-12 Terry Holmes] Provider supplied additional information on coverage for substantial service sites in October 2011, however requested that CN not submit or publish this coverage since they do not market to these areas.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-07-12 Amanda Bentley] Changes and/or Corrections: Speeds increased; possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Country Connections LLC	Fixed Wireless	Data Added to Statewide Inventory	2/15/2010	[FEB-20-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
D&P Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[MAR-05-12 Amanda Bentley] Change: New fixed wireless provider in the market.
FairPoint Communications	DSL	Data Added to Statewide Inventory	12/22/2009	[MAR-15-12 Amanda Bentley] Correction: Speed tier 7 was corrected to speed tier 6.
Farmers Mutual Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	12/22/2009	[FEB-20-12 Amanda Bentley] Change: New fixed wireless towers in operation.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-27-12 Amanda Bentley] Change: Provider expanded service area and upgraded speeds.

JB-Nets, LLC	Fixed Wireless	Data Added to Statewide Inventory	4/5/2010	[FEB-21-12 Amanda Bentley] Change: New fixed wireless towers in operation.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-21-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Massillon Cable TV, Inc.	Cable	Data Added to Statewide Inventory	2/9/2010	[JAN-17-12 Amanda Bentley] Change: Provider expanded service area.
Mobilcomm	Fixed Wireless	Data Added to Statewide Inventory	2/16/2012	[MAR-01-12 Amanda Bentley] Change: New fixed wireless provider in the market.
New Era Broadband, LLC	Fixed Wireless	Data Added to Statewide Inventory	7/12/2010	[FEB-20-12 Amanda Bentley] Change: New fixed wireless towers in operation.
S. Bryer Cable TV Corp.	Cable	Data Added to Statewide Inventory	11/8/2011	[JAN-17-12 Amanda Bentley] Change: Armstrong Utilities has completed the acquisition of assets in Ashtabula and Trumbull counties. New coverage for S. Bryer Cable is located in Brown County.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JAN-25-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-20-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[FEB-27-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Time Warner Cable LLC	Cable	Data Added to Statewide Inventory	12/21/2009	[FEB-22-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-20-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Waldron Communication Company	Fixed Wireless	Data Added to Statewide Inventory	3/19/2010	[JAN-20-12 Amanda Bentley] Change: Provider added 3650 wireless spectrum to existing tower location and increased wireless speed infrastructure on 900 mhz spectrum to match 3650.
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
US Signal Company, LLC	Backhaul	Backhaul Provider Only Processing Complete	6/17/2010	
Zayo Group, LLC	Backhaul	Backhaul Provider Only Processing Complete		
Insight Communications of Central Ohio, LLC	Cable	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Just Micro Digital Services, Inc.	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider	4/13/2010	[FEB-28-12 Amanda Bentley] Correction: Estimated coverage created and submitted for non-participating provider.
Arthur Mutual Telephone Company	DSL	No Update to Provide	12/22/2009	
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Avolve, Inc.	Fixed Wireless	No Update to Provide	2/17/2011	
Ayersville Telephone Company	DSL	No Update to Provide	3/22/2010	
Bascom Mutual Telephone Company	Backhaul	No Update to Provide	3/22/2010	
Bascom Mutual Telephone Company	Cable	No Update to Provide	3/22/2010	
Bascom Mutual Telephone Company	Fiber	No Update to Provide	3/22/2010	
Bascom Mutual Telephone Company	Fixed Wireless	No Update to Provide	3/22/2010	
Benton Ridge Telephone Company	DSL	No Update to Provide	4/13/2010	
Benton Ridge Telephone Company	Fixed Wireless	No Update to Provide	4/13/2010	
Bryan Municipal Utilities	Cable	No Update to Provide		
Bryan Municipal Utilities	Fiber	No Update to Provide		
Buckland Telephone Co.	Fiber	No Update to Provide	4/10/2010	
Cable Co-op, Inc.	Cable	No Update to Provide	4/9/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Champaign Telephone Company	DSL	No Update to Provide		
Champaign Telephone Company	Fiber	No Update to Provide		
Champaign Telephone Company	Fixed Wireless	No Update to Provide		
Cincinnati Bell Telephone Company LLC	Cable	No Update to Provide	3/16/2010	
Cincinnati Bell Telephone Company LLC	Mobile Wireless	No Update to Provide	3/16/2010	
Cincinnati Communications, LLC	Backhaul	No Update to Provide	1/6/2011	
Cincinnati Communications, LLC	BPL	No Update to Provide	1/6/2011	
City of Wadsworth	Cable	No Update to Provide	7/19/2010	
Citynet, LLC	Backhaul	No Update to Provide	4/5/2010	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Com Net, Inc.	Backhaul	No Update to Provide		
Computers4U	Fixed Wireless	No Update to Provide		
Conneaut Telephone Company	Cable	No Update to Provide	12/22/2009	
Conneaut Telephone Company	DSL	No Update to Provide	12/22/2009	
ConnectLink, Inc.	Backhaul	No Update to Provide	3/15/2010	
CoxCom Inc.	Backhaul	No Update to Provide	1/29/2010	
CoxCom Inc.	Cable	No Update to Provide	1/29/2010	

Coyote Wireless Broadband LLC	Fixed Wireless	No Update to Provide	4/19/2010	
Dark Horse Networks, LLC	Fixed Wireless	No Update to Provide	3/15/2010	
DataBit Solutions Corp	Fixed Wireless	No Update to Provide		
DISH Network Corporation	Satellite	No Update to Provide	1/27/2010	
DuplexCom of Ohio, LLC	Fixed Wireless	No Update to Provide		
Eagle Communications, LLC	Fixed Wireless	No Update to Provide		
East Cleveland Cable TV and Communications, LLC	Cable	No Update to Provide	4/13/2010	
Erie County Cablevision, Inc.	Cable	No Update to Provide	2/8/2010	
FairPoint Communications	Cable	No Update to Provide	12/22/2009	
Farmers Mutual Telephone Company	DSL	No Update to Provide	12/22/2009	
Fort Jennings Telephone Company	DSL	No Update to Provide	4/2/2010	
Fort Jennings Telephone Company	Fiber	No Update to Provide	4/2/2010	
Freund Enterprises Inc.	Backhaul	No Update to Provide	3/2/2010	
Freund Enterprises Inc.	Fixed Wireless	No Update to Provide	3/2/2010	
Frontier Communications Corporation	Backhaul	No Update to Provide	1/22/2010	
Gateway Telecom LLC	Fixed Wireless	No Update to Provide	3/22/2010	
Glandorf Telephone Company, Inc.	DSL	No Update to Provide	3/9/2010	
Glandorf Telephone Company, Inc.	Cable	No Update to Provide	3/9/2010	
Hometown Cable Company	Fiber	No Update to Provide	4/15/2010	
Hometown Cable Company	Fixed Wireless	No Update to Provide	4/15/2010	[JAN-25-12 Amanda Bentley] Change: Hometown Cable has acquired gWireless, Inc. and coverage will be represented as Hometown Cable starting with the April 2012 submission.
Horizon Telcom, Inc.	DSL	No Update to Provide	3/27/2010	
Horizon Telcom, Inc.	Fiber	No Update to Provide	3/27/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
Imagine Networks, LLC	Fixed Wireless	No Update to Provide	7/13/2011	
Jefferson County Cable TV, Inc.	Cable	No Update to Provide	2/1/2010	
Kalida Telephone Company, Inc.	DSL	No Update to Provide	3/8/2010	
McClure Telephone Company	DSL	No Update to Provide	4/5/2010	
McClure Telephone Company	Fiber	No Update to Provide	4/5/2010	
Mechcom Dot Net	Fixed Wireless	No Update to Provide	4/22/2010	
Mediacom Indiana LLC	Cable	No Update to Provide	1/12/2010	
MegaPath Inc.	Backhaul	No Update to Provide	2/15/2010	
MetaLINK Technologies, Inc.	Fixed Wireless	No Update to Provide	3/22/2010	
Middle Point Home Telephone Company	DSL	No Update to Provide	1/19/2010	
Mikulski Communications LLC	Fixed Wireless	No Update to Provide	4/13/2010	
Minford Telephone Company	DSL	No Update to Provide	3/3/2010	
New Knoxville Telephone Company	DSL	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	Fiber	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	Fixed Wireless	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	Backhaul	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	Cable	No Update to Provide	3/12/2010	[MAR-17-12 Ashley Littell] Correction: Technology revised to Cable Modem - Other after confirmation of DOCSIS 2.0 system; also adjusted speeds to represent what is currently advertised, tier 7 download.
North West Net, Inc.	Fixed Wireless	No Update to Provide	4/6/2010	
Nova Telephone Company	DSL	No Update to Provide	4/5/2010	
Omnicity, Inc.	Fixed Wireless	No Update to Provide		
OneCommunity	Fixed Wireless	No Update to Provide	4/14/2010	
OneCommunity	Backhaul	No Update to Provide	4/14/2010	
Ottoville Mutual Telephone Company	Backhaul	No Update to Provide	12/22/2009	
Ottoville Mutual Telephone Company	DSL	No Update to Provide	12/22/2009	
Ottoville Mutual Telephone Company	Fiber	No Update to Provide	12/22/2009	
Ridgeville Telephone Company	DSL	No Update to Provide	3/12/2010	
Sherwood Mutual Telephone Association	DSL	No Update to Provide	3/25/2010	
Slane Telecom	Fixed Wireless	No Update to Provide	4/9/2010	
Sprint Nextel Corporation	Backhaul	No Update to Provide	1/14/2010	
Sycamore Telephone Company	DSL	No Update to Provide	12/22/2009	
Sycamore Telephone Company	Backhaul	No Update to Provide	12/22/2009	
TDS Telecommunications Corporation	Backhaul	No Update to Provide	1/27/2010	
Telephone Service Company	DSL	No Update to Provide	4/6/2010	
Telephone Service Company	Cable	No Update to Provide	4/6/2010	
Telephone Service Company	Fiber	No Update to Provide	4/6/2010	
tw telecom of ohio, llc	Backhaul	No Update to Provide	4/21/2010	
Vaughnsville Telephone Company, Inc	DSL	No Update to Provide	12/22/2009	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	[FEB-28-12 Amanda Bentley] Change: ViaSat has acquired WildBlue and coverage will be represented as ViaSat, Inc. starting with the April 2012 submission.
Wabash Mutual Telephone Company	DSL	No Update to Provide	3/30/2010	
Wabash Mutual Telephone Company	Fiber	No Update to Provide	3/30/2010	
Wabash Mutual Telephone Company	Fixed Wireless	No Update to Provide	3/30/2010	
Waldron Communication Company	Backhaul	No Update to Provide	3/19/2010	
Wavelinc Communications	Fixed Wireless	No Update to Provide		
WideOpenWest Finance, LLC	Cable	No Update to Provide		
Windstream Communications	Backhaul	No Update to Provide	1/28/2010	
Windstream Communications	DSL	No Update to Provide	1/28/2010	
YES Learning and Computer Center Inc	Backhaul	No Update to Provide	4/24/2010	
BluSky Wireless	Fixed Wireless	No Update Provided - Use Last Submission Data	2/24/2010	
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
Doylestown Telephone Company	Cable	No Update Provided - Use Last Submission Data	4/14/2010	

Doylestown Telephone Company	DSL	No Update Provided - Use Last Submission Data	4/14/2010	
Doylestown Telephone Company	Fiber	No Update Provided - Use Last Submission Data	4/14/2010	
GMN Wireless Broadband	Fixed Wireless	No Update Provided - Use Last Submission Data	3/15/2010	
Intelliwave, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		[MAR-9-12 Amanda Bentley] Partial data was received very late and could not be processed in time for the April 2012 submission; provider coverage will be processed and added for the October 2012 submission.
Jenco Speed Web	Fixed Wireless	No Update Provided - Use Last Submission Data	4/28/2010	
KeyOn Communications, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	10/15/2009	
King Office Service, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	4/9/2010	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
LightSpeed Technologies	Fixed Wireless	No Update Provided - Use Last Submission Data	2/9/2010	
Mango Bay Internet	Fixed Wireless	No Update Provided - Use Last Submission Data	2/23/2010	
Nelsonville TV Cable, Inc.	Cable	No Update Provided - Use Last Submission Data	4/7/2010	
NexGenAccess Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	4/16/2010	
North Coast Wireless Communications	Fixed Wireless	No Update Provided - Use Last Submission Data	4/14/2010	
nTelos, Inc.	DSL	No Update Provided - Use Last Submission Data		
RAA Services	Fixed Wireless	No Update Provided - Use Last Submission Data	3/12/2010	
Redbird Internet Services	Fixed Wireless	No Update Provided - Use Last Submission Data	3/22/2010	
RTEC Communications, Inc.	Cable	No Update Provided - Use Last Submission Data	4/13/2010	
RTEC Communications, Inc.	Fiber	No Update Provided - Use Last Submission Data	4/13/2010	
SAA bright.net, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/23/2010	
Southern Ohio Communication Services, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	4/20/2010	
The City of Dover	Backhaul	No Update Provided - Use Last Submission Data	4/9/2010	
UDATAnet	Fixed Wireless	No Update Provided - Use Last Submission Data		
Verizon Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Wilkshire Communications, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/16/2010	
XO Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	2/12/2010	
One Communications Corporation	Backhaul	Other	3/18/2010	[MAR-05-12 Wes Kerr] Earthlink now owns One Communications and has requested that no data be submitted, as the data submitted in the past may not be accurate.
Windstream Communications	DSL	Other	1/28/2010	[FEB-01-12 Wes Kerr] Company representative notified us that they do not have the ability at this time to provide data for the acquired company.
Windstream Communications	Backhaul	Other	1/28/2010	[FEB-01-12 Wes Kerr] Company representative notified us that they do not have the ability at this time to provide data for the acquired company.
Windstream Communications	DSL	Other	1/28/2010	[FEB-01-12 Wes Kerr] Company representative notified us that they do not have the ability at this time to provide data for the acquired company.
Advanced Computer Connections	Fixed Wireless	Refused to Participate		[JAN-20-12 Mark Messer] Spoke with a company representative who indicated that their network is being reduced month by month and will most likely not have a footprint in the near future. Therefore they choose not to participate.
Bellaire Television Cable Co. Inc.	Cable	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.
First Communications, LLC	Fiber	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 3 additional contact attempts were made this period.

Hocking Internet Technologies, Ltd	Fixed Wireless	Non-Responsive to Multiple Attempts	8/12/2010	In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period. A provider representative indicated a new interest in participating, but then became non-responsive again.
Linked Communications, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.
New Albany Net	Fiber	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during the last mapping submission period, 4 additional contact attempts were made this period.
Reliance Globalcom Services, Inc.	Backhaul	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.
Utopian Wireless Corporation	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 3 additional contact attempts were made this period.
Firewire Internet	Fixed Wireless	Slated Field Audit for Estimated Coverage Analysis		

Oklahoma Broadband Mapping

Data Submission Methodology Report

April 1, 2012

April 1, 2012

Sanborn
1935 Jamboree Drive
Suite 100
Colorado Springs, CO 80920

Data Submission Report (April 1, 2012)

Table of Contents

1 Introduction

This report is submitted along with the fifth data submission for the Oklahoma Broadband Mapping Project. This submission includes all data collected so far per the requirements of the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program (Docket No. 0660-ZA29) Notice of Funds Availability (NOFA) and formal and informal clarifications to it. Specifically, it includes broadband data collected from broadband providers and community anchor institutions data compiled from various sources for the State of OK. The State of OK has retained a mapping contractor, The Sanborn Map Company to perform the work related to the Mapping Grant for this project. Data from the previous submission is now publicly accessible via the Oklahoma Broadband Program (http://www.ok.gov/broadband/).

This document is a supplement to the four previous reports submitted with previous data submissions on May 1, 2010, October 1, 2010, April 1, 2011, and October 1, 2011 respectively. Therefore, it builds on the documents provided with those submissions. Rather than repeat the contents of the previous report, this document makes incremental updates on various topics where changes have been made in the methodology or reiterates the methodology used. Please refer to the previous documents for further details.

2 Overall Project Status

2.1 DATA COLLECTION

This section details data collection related to NTIA deliverables which include broadband data and community anchor institution data.

2.1.1 Broadband Data

For this submission, Sanborn started data collection efforts on January 26th, 2012 by sending out data update requests and technical data specifications after NTIA announced all final changes on January 17th, 2012. These were sent to a large list of companies which were compiled from multiple lists (FCC 477 list (dated July 29th, 2011), a list provided by the Oklahoma UTC, Wireless Internet Service Providers Association (WISPA)) and from any providers that were identified through other sources such as web research, planning meetings, State outreach, etc. Sanborn also uploaded the final data for each provider in NTIA format from the previous submission to the Sanborn Provider Portal. The providers were encouraged to use the provider portal and update their information on it.

We followed the same contact and follow-up protocols as the previous submissions. In brief, this involved following up with already participating providers after sending them a letter requesting data updates. For newly identified providers, we contacted them three additional times and offered any/all support to make this as easy as possible. We provided a due date for submission but worked with providers who needed more time. If providers did not submit updated data and did not respond to our efforts to contact them, we reused their existing data.

The following are some of the important changes or no changes:

1. In the October 2011 submission, we migrated all data to Census 2010 geography. We continued to use this geography for this submission. All census blocks and road segments continue to be mapped based on 2010 census data set. Any data submitted in 2000 or 2009 format was converted to 2010 for this submission.

2. We requested all providers to provide us their speed information in mbps rather than as a speed tier. We did this in order to better validate the data, analyze served/underserved, and identify the breakdowns in speeds within a given tier. This had some challenges because some providers were confused with our request, others refused to provide the information, and in some cases, there were mismatches between what they provided before in speed tiers vs. what they were providing in mbps for this submission. This continues to be a work in progress. For this submission, 35% of the participating providers in OK have given us their speed in mbps rather than speed tier.

3. We also requested fixed wireless providers to provide us appropriate information to do propagation analysis. While most providers were open to this idea, due to time limitations and resource constraints, we were successful in getting data from only five providers in OK. We plan to continue gathering additional data from the providers and conduct a propagation analysis in Submission 6.

4. We continued to not collect data from resellers.

5. Due to our NDA restrictions, last mile infrastructure points, if submitted by providers, are still not being submitted to NTIA.

6. We continue to submit data for satellites in this submission based on NTIA clarifications. At present, Oklahoma received acceptable files from three companies (HughesNet, Wildblue, and Starband). We hope to receive coverage from another satellite provider (Stratos) in our next delivery to NTIA (Submission 6, due to NTIA on October 1, 2012)

    1) The four satellite providers have been identified in Oklahoma are Hughes, Starband, Wildblue, and Stratos.

7. Due to NDA restrictions, address points are not included in this submission to NTIA for any commercial provider.

8. Some providers did not submit middle mile elevation or backhaul capacity, particularly when they asked us to reuse previous submission data. Wherever possible, we went back to providers to obtain that information, but it is not available for every record.

9. Terrestrial Mobile Wireless and Terrestrial Fixed Wireless (licensed and unlicensed) were treated as wireless coverage and were delivered as a shapefile. In cases where a provider served using the same technology and spectrum but with different speeds, overlapping areas were removed and the higher speed was assigned.

10. If a cable based wireline provider provides both DOCSIS 2.0 and DOCSIS 3.0 service to the same area, the block or road was listed only once with a technology code of 40.

11. Providers were only willing to indicate on a general level if they served business, residential or both, so we did not get any providers that broke down the type of service by block. Only if the provider stated they only serve business to business customers did we fill in the “category of end user” with a code of 2, otherwise this field was left blank. There are three providers in OK who are identified as serving business customers only. These are:

    1) Cogent Communications, Inc.
    2) TW Telecom of Oklahoma LLC
    3) XO Communications, LLC

12. The submission 5 provider data model is currently based on the NTIA data model as of 1/17/12.

    We have added 6 new providers in this submission:

    1) Plainsnet, LLC (Fixed Wireless)
    2) Valnet (Fixed Wireless)
    3) NEOKNET (Fixed Wireless)
    4) Oklahoma Western Telephone Company (Wireline)
    5) Phoenix Communications (Fixed Wireless)
    6) StarBand Communications Inc. (Satellite)

In this submission:

1) 49% of the providers submitted new or updated data whereas for 51% of the providers we reused data from their previous submissions. This is in contrast to 41% submitting new or updated data during the previous submission.
2) We have identified 92 potential providers, of which 81 are participating in this map to date and 11 have refused to participate. In addition, two providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers, and non-providers is provided at the end of this document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.

13. Two changes have occurred to AT&T's data for Submission 5.

    1) Processing from the last submission. AT&T noticed a discrepancy between the census block data that AT&T had provided for June 2011 and the NTIA website which showed approximately 5036 fewer census blocks than AT&T had submitted. Upon further investigation, when the data was processed, these records were omitted due to the large file size and versions of Excel having a limitation on the number of rows it can handle which caused the missing blocks. The data has been corrected in this submittal.
    2) AT&T also changed their wireline data decreasing the records by 5394. This decrease is due to refinement and quality control procedures that were implemented by AT&T.

2.1.2 OK Community Anchor Institutions Data

The community anchor institutions data continues to be crowd-sourced through the online data gathering application created by the Sanborn Team. This submission we were able to increase our CAI numbers working with Oklahoma University. OU was able to provide survey data collected during their outreach to rural communities where data was limited. The numbers of community anchor institutions that have responded so far is provided below:

Category	Name	Total in Submission 5	Total with Broadband Information in Submission 5
1	School - K through 12	1966	296
2	Library	211	175
3	Medical/healthcare	460	148
4	Public Safety	1794	192
5	University, college, other post-secondary	79	21
6	Other community support - government	507	85
7	Other community support - nongovernmental	16	1

2.2 DATA PROCESSING

We started with the following base data:

Census Blocks:

For this submission, Census 2010 data was utilized. The data was set up as follows:

- Block size (AREA) is calculated combining the 2010 land area (ALAND) and water area (AWATER)
- AREA is converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

Road Segments:

2010 Tiger Line IDs (TLID) were used for data processing for this submission. The data was set up as follows:

- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
  - The 2010 road segment <u>is completely within</u> a block that is NOT less than 2 square miles
- Only minimum and maximum address ranges and a single zip code for each road segment is maintained.

All data received went through the following processing steps:

1. **Triage:** All new data were quickly reviewed to understand what was received, and in what format. We also made sure we had all the required components for NTIA's data model, such as their FRN and advertised speed information. We also screened for any known issues that we might have seen before (such as Excel 2003 spreadsheets that cut off at 32k row).
2. **Ingest:** At this time the data is actually brought into our systems. Each provider is set up with a unique file geodatabase to store their information. Record counts of what was received are logged so that we can validate that we did not drop anything in processing.
3. **Data Processing:** In this step, the data goes through a number of ETL routines to convert the raw proprietary information into a format similar to the NTIA format. The exact routine utilized depends on how the data is received.
   1) When a wireline provider submits a service boundary, we select all the blocks and roads inside that shape.
   2) If a wireline provider submits a customer address list, the points are geocoded, and then the appropriate block or road segment is selected.

3) If a wireline provider submits block and road information using Census data, we just make sure everything is formatted to the appropriate specifications.
4) If the wireline provider submits any type of road or line data that does not directly correlate to the TIGER data set, we convert the lines to TIGER by selecting the road centroid and spatially selecting the closest segment in our data set. If the road is in a block less than 2 sq. miles, then the block is selected. Some manual cleanup is also applied to make sure we do not accidentally drop any road segments that should have been processed.
5) Wireless provider data is formatted to ensure that there are no overlapping polygons with the technology type and spectrum. In addition the data is cropped to the state boundary.
6) After each round of processing, we make sure that we only keep unique records. A unique record is defined as having a unique combination of FRN, Block/Road ID, and technology type. If there are multiple records with different speeds, but all else is equal, than we select the maximum of the advertised speeds.

4. **QC Review:** All data are then sent to a different analyst to perform a thorough quality control review on the processed data set. Record counts are compared to what was submitted. The QC staff also makes sure the ETL scripts and routines populated all of the right fields.
5. **QA Review:** Data are then sent to another team for Quality Assurance Review. In this step the data is not only double checked against what was originally submitted, but it is also brought up inside standardized ArcMap templates that allow us to make sure our results make sense. This often involves comparing the new data set with prior submissions, as well as looking for any possible technology or speed anomalies and verifying against third party datasets as discussed in more details in the next section.
6. **Provider Review:** Processed data is all posted to a customized web-mapping tool we commonly refer to as the Provider Portal. All providers were notified once their data was available on the site, and were given five business days to review the data and respond. In this site, providers can log on and visually see their processed data in a map format. It also allows them to overlay their raw data to help them validate that we did indeed process things correctly. The provider portal also has a suite of markup tools that will allow the providers to edit their data, including adding or removing service areas, and making changes to the data attributes.
7. **Comment Processing:** All comments and feedback received from the provider portal is then reviewed and applied to the processed data set. This updated data set goes back through our QA and QC processes, and if time allows, back out to the Provider Portal, for the provider to review and sign off.
8. **Data Append:** After all of the individual data sets are processed and approved, we run an append process which merges all of the individual provider data sets into one geodatabase. This is also the point where our

team will do any final transformations to get our working data model into the latest NTIA publishing format.

9. **Final QA/QC:** A series of quality checks are run on the final appended data sets to ensure it is ready for submission to NTIA. We also run the NTIA receipt tool at this time. Any last issues are corrected, and the data is sent to the state for their review.
10. **Submission to NTIA.**

2.2.1 Submission 5: NTIA Submission Data Model Schema Changes

The data model released on January 17, 2012 was very similar to the June 30, 2011 data model. No substantive changes were noted and changes related to allowable speed and technology of transmission combinations. Most of these combinations have exceptions to them and hence were not being completely disallowed by NTIA.

2.3 DATA VALIDATION

Sanborn has continued to perform the same validation on the data as the previous four submissions (details in previous reports and a summarized version provided below). Some minor updates to the validation process are discussed below.

1) QC of the data at various steps – this includes when data is received (triage), when it is processed through the various processing steps discussed above, etc.
2) Spatial checks against public and commercial datasets
    a. For OK, we continued to use the following datasets for validation:
        i. Exchange Boundaries: for DSL boundaries
        ii. MediaPrints: for Cable and Fiber boundaries
    b. We did not use speedtest.net speed data that we used previously for validation as we had our own speed test data that was more current and pertinent.
3) Speedtest data and other data collection for verification
    a. We continue to use speedtest data collected through our interactive map and community anchor data crowd-sourced for validation purposes.
    b. For this submission, we added an additional dataset to check against – FCC speed test data. We geocoded the data, used the IP to reverse engineer the provider name and used it to check speeds where possible.
    c. We also incorporated any feedback we received through the interactive map – this included feedback such as incorrect speeds, incorrect boundaries, missing provider, or areas of no service, etc.

4) Verification by providers – processed data are uploaded on our Provider Portal for providers to review both the outcome of data processing and any issues that we found in the third-party and crowd-sourced validation. Issues pertaining to a particular provider are highlighted and shown in the portal for those providers only. Issues that are global and cannot be assigned to a particular provider are shown to all providers (e.g. there are no providers in this area, or we tried to get service here and heard x from A provider, y from B provider, etc.). Previously, we were highlighting these issues through a letter but in this submission, we have integrated the feedback through the Provided Portal. We make additional calls to providers who have issues.
5) Planning workshops and local validation
    a. During this submission, local validation was undertaken by an independent group, the Center for Spatial Analysis at the University Of Oklahoma (OU). OU performed an independent survey gathering data points from CAI's and the GIS community for the State of Oklahoma. Within Sanborn's validation process, OU's points were compared against provider's data. Those data points found in question were taken back to the providers for correction. OU is increasing their efforts to gather more data points and this process will be continued throughout Submission 6.

2.4 UNIVERSE OF CONTACTED PROVIDERS/NON-PROVIDERS

We have identified 92 potential providers, of which 81 are participating in this map to date and 11 have refused to participate. These providers are listed on the Data Package submitted with this submission. In addition, two providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers, and non-providers is provided below. It is to be noted that we contacted several more providers than this and even if some providers were identified as non-providers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.

2.4.1 Non-providers

Atlas Telephone Company
Comcast
LightEdge Solutions Inc.
McLeodUSA Telecom Services Inc. / PaeTec Corp
OKC Broadband (Ideal Advertising Inc.)
Oklahoma 5 Licensee Co., LLC
Qwest Communications Company, LLC
Reach Broadband
Stouffer Communications / Granby Telephone
Telovations, Inc.
United Wireless Communications, Inc.
University Corporation for Advanced Internet

Verizon Business Global LLC dba Verizon Business
Zayo Enterprise Networks, LLC

2.4.2 Resellers

Broadview Networks Holding Inc.
BullsEye Telecom, Inc.
Enventis Telecom Inc. / Hickory Tech Corp
Global Crossing Telecommunications Inc.
Logix Communications, LP
Metropolitan Telecommunications of Oklahoma, Inc.
New Edge Network, Inc.
Telefonica USA, Inc.
Westel, Inc.

2.4.3 Non-Responders/Difficulty Contacting

Fulltel
Utopian Wireless Corporation

Oregon Broadband Mapping Project:
Product Release White Paper

Contact Name Manager:	Bryan Conway
Contact Phone Number:	503-378-6200
Contact E-mail:	**bryan.conway@state.or.us**
Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**

Product Specification:	Spring 2012 NTIA Data Model
Product/Process:	NTIA—April 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

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OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	449
Total Valid Broadband Providers	119
Non-Responsive Providers	10
Non-Cooperative Providers	5
Number of Providers - Supplied Updates for this Submission	73
Number of Providers - Confirmed No Updates	11

- New Providers Since Last Data Submission
    - Frontier Communications of the Northwest Inc
    - Rural Technology Group
    - Silver Star Telecom llc
    - UnwiredWest Internet
    - US Cellular

- Existing Providers – No Updates
    - City of Ashland Fiber Network
    - Comspan Communications
    - Hughes Network Systems
    - Integra Telecom of Oregon Inc
    - J & N Cable Systems, Inc.
    - LEVEL 3 COMMUNICATIONS LLC
    - Monroe Telephone Company
    - NEW EDGE NETWORK INC (Earthlink)
    - Pine Telephone Systems, Inc.
    - Starband Communications Inc / Spacenet
    - Warm Springs Telecommunications Company

- Providers Included (listed by Provider and Holding Company name)

Abovenet Communications Inc	Freewire Broadband	Rural Network
Alyricatel inc	Frontier Communications of America	Rural Technology Group
AT&T Communications of the Pacific Northwest Inc	Gervais Telephone Company	SCIO Mutual Telephone Assn.
Axxis Communication Inc	Gorge Networks	SCS Communications and Security Inc
Bend Broadband	Helix Telephone Company	Silver Star Telecom llc
Broadband Cable Telecommunications LLC Beaver Creek Telephone Company	Hood River Electric Cooperative	Skycasters
Cable One Inc	Hughes Network Systems	Sprint Nextel Corp
Cal-Ore Communications, Inc.	Integra Telecom of Oregon Inc	St Paul Telephone
Canby Telephone Association; Canby Telecom	J & N Cable Systems, Inc.	Starband Communications Inc / Spacenet
Cascade Networks	LEVEL 3 COMMUNICATIONS LLC	Stayton Cooperative Telephone Co (SCTC)
Cascade Utilities (Cascade Access)	Lightspeed Networks Inc.	Stephouse Holdings Company llc
Casco Communications Inc	McMinnville Access Company DBA OnlineNW.	TDS Telecom
CenturyLink (OR)	Molalla Communications	Tillamook - CoastCom, Inc
Chambers Cable	Monitor Cooperative Telephone Company	T-Mobile
Charter Fiberlink OR - CCVII LLC	Monmouth Independence Networks (DBA MINet)	Trans-Cascades Telephone
City of Ashland Fiber Network	Monroe Telephone Company	TW Telecom of Oregon LLC
City of Sandy Oregon	Mount Angel Telephone	Umpqua Indian Development Corporation Telecommunications Division (Rio Net)
Clear Creek Telephone & TeleVision	Nehalem Telecommunications Inc (RTI)	UnwiredWest Internet
Clearwire	NEW EDGE NETWORK INC (Earthlink)	Upward Access Support
COLTONTEL	North-State Telephone Co.	US Cellular
COMCAST CABLE COMMUNICATIONS INC	Oregon Telephone Company	Verizon Wireless
Comspan Communications	Oregonfast.net	Warm Springs Telecommunications Comp
Country Vision Cable	OREGON-IDAHO UTILITIES INC	Wave Division Holdings LLC (Wave Broadband)
Covad Communication	Peoples Telephone Co	Webformix
Crestview Cable	Pine Telephone Systems, Inc.	Whiz to Coho Inc
Cricket Communications	PocketiNet Communications, Inc.	WildBlue Communications Inc.
Douglas Services, Inc/Douglas Cooperative	Qlife	Wtechlink Wireless Broadband
Eastern Oregon Net, Inc (EONI)	Roome Telecommunications, Inc.	Zayo Bandwidth Northwest Inc

- Non-Responsive Providers
    - Air Speed LLC
    - Bendtel Inc.
    - Eagle Telephone System, Inc.
    - Hunter Communications Inc.
    - Nextnet Telecom Inc
    - Preferred Connections Inc NW
    - Tillamook Lightwave
    - Vertex Group Inc.
    - X5 PDX LLC
    - Yellow Knife Wireless

- Non-Cooperative Providers
    - Blue Mt TV Cable Co
    - Cogent Communications Group
    - Gorge Ventures Inc
    - Meritel Group Inc
    - NextGen Internet Systems, Inc.

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

- Other Provider Changes
    - Zayo Bandwidth Northwest Inc. has acquired 360networks and supplied supporting data that replaces them, which was ingested for this data submission.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
  - Casco Communications (TT-10)
  - CenturyLink (TT-10)
  - Covad Communications Company (TT-10 and TT-20)
  - Douglas Services, Inc. (TT-70)
  - Gervais Telephone Company (TT-50)
  - Monitor Cooperative Telephone Company (TT-10)
  - Trans-Cascade Telephone (TT-10)
  - UIDC Telecom (TT-30)

- Technology Changes/Additions -
  - Charter Communications Inc. – Upgraded some of their TT-41 coverage to TT-40

- Coverage Footprint Expansion –
  - AT&T Mobility LLC (TT-80)
  - Cableone (TT-41)
  - Cellco Partnership and its Affiliated Entities (TT-80)
  - Chambers Cable (TT-41)
  - Clearwire (TT-80)
  - CoastCom, Inc (TT-50)
  - Comcast Cable Communications, LLC. (TT-40)
  - Covad Communications Company (TT-30)
  - Douglas Services, Inc. (TT-10)
  - Frontier Communications Northwest Inc. (TT-10)
  - Gervais Telephone Company (TT-10)
  - Helix Telephone Co. (TT-10)
  - Home Telephone Company (TT-10)
  - Leap Wireless International, Inc. (TT-80)
  - Monitor Cooperative Telephone Company (TT-50)
  - Oregon Telephone Corporation (TT-10)
  - Pendleton Fiber Company (TT-50)
  - Sprint Nextel Corporation (TT-80)
  - T-Mobile USA, Inc. (TT-80)
  - Wave Division Holdings LLC (TT-41)

DATA CORRECTIONS

- Per NTIA's guidance on 02/21/12, we updated all Verizon speed data to support the business rules they laid out.

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  All grantees should then apply the following business rule, as some of the speed ranges fall into two tiers:

  3G Speeds:
  Maximum <u>and</u> Typical download speed: 600 kbps to 1.4 Mbps (Speed Tier 3: 768 kbps – 1.5 Mbps)
  Maximum <u>and</u> Typical upload speed: 500 kbps to 800 kbps (Speed Tier 2: 200 – 768 kbps)

  4G LTE Speeds:
  Max Adv Download Speed: 12 Mbps (Speed Tier 7: 10 Mbps – 25 Mbps)
  Max Adv Upload Speed: 5 Mbps (Speed Tier 5: 3 Mbps – 6 Mbps)

  Typical download speed: 8.5 Mbps (Speed Tier 6: 6 Mbps – 10 Mbps)
  Typical upload speed: 2 Mbps to 5 Mbps (Speed Tier 5: 3 Mbps – 6 Mbps)

- The NTIA 3rd Party data review and summary were also compared to the product prior data submission and no changes were required. The Technology/Speed tier differences highlighted were reviewed with the providers and corrected, where needed.

COMMUNITY ANCHOR INSTITUTION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	Broadband Subscriber (1 or 2)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	1616	359	349	318	318
Category 2 - Library	189	185	185	177	177
Category 3 - Medical/Healthcare	342	12	9	5	5
Category 4 - Public Safety	1135	238	114	65	65
Category 5 - Universities/Colleges	69	38	37	34	34
Category 6 - Other: Government	227	43	38	34	34
Category 7 - Other: Non-Government	19	3	1	1	1
Total	**3597**	**878**	**733**	**634**	**634**

CAI CHANGES

- No significant changes for the CAI layer this round.
- The CAI inventory was reviewed again against the database mentioned below for the following categories: Category 1: K-12 Schools, Category 2: Libraries and Category 5: Colleges
  These databases are as follows:
  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**
  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**
  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

OR_2012_3_30.txt

- Error Report
  - The only items flagged in the submission receipt output are as follows, which has been verified as correct entries within the data submission. Please see the ReadMe text file for more details.
  - The exceptions NTIA noted during the 03/27/12 webinar are as follows:
    - Middle Mile Elevation Fails
    - Middle Mile Latitude/Longitude Fails
    - Middle Mile Ownership Fails
    - Address SpeetTier Fails
    - CAI Transtech Fail

Hyperlinks to Grantee Workspace in which the same issues were identified by other Grantees:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

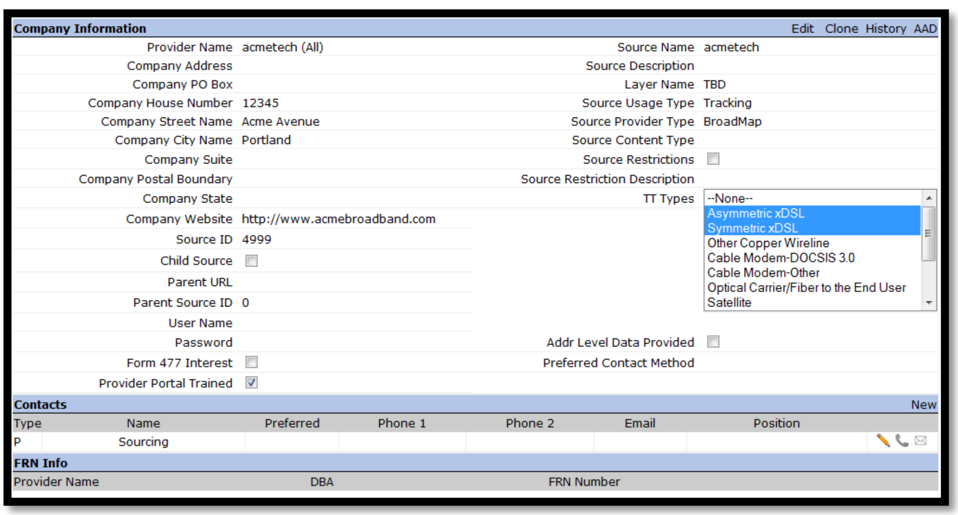
HIGH-LEVEL SUMMARY

DATA GATHERING

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

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

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



Company Information — Edit Clone History AAD

Provider Name: acmetech (All)
Company Address:
Company PO Box:
Company House Number: 12345
Company Street Name: Acme Avenue
Company City Name: Portland
Company Suite:
Company Postal Boundary:
Company State:
Company Website: http://www.acmebroadband.com
Source ID: 4999
Child Source: ☐
Parent URL:
Parent Source ID: 0
User Name:
Password:
Form 477 Interest: ☐
Provider Portal Trained: ☑

Source Name: acmetech
Source Description:
Layer Name: TBD
Source Usage Type: Tracking
Source Provider Type: BroadMap
Source Content Type:
Source Restrictions: ☐
Source Restriction Description:
TT Types: --None--, Asymmetric xDSL, Symmetric xDSL, Other Copper Wireline, Cable Modem-DOCSIS 3.0, Cable Modem-Other, Optical Carrier/Fiber to the End User, Satellite
Addr Level Data Provided: ☐
Preferred Contact Method:

Contacts — New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number

Confidence			New
TT Type	Confidence	Last Modified	Comment

Status Tracking

Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐

Service Provider Details

BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	

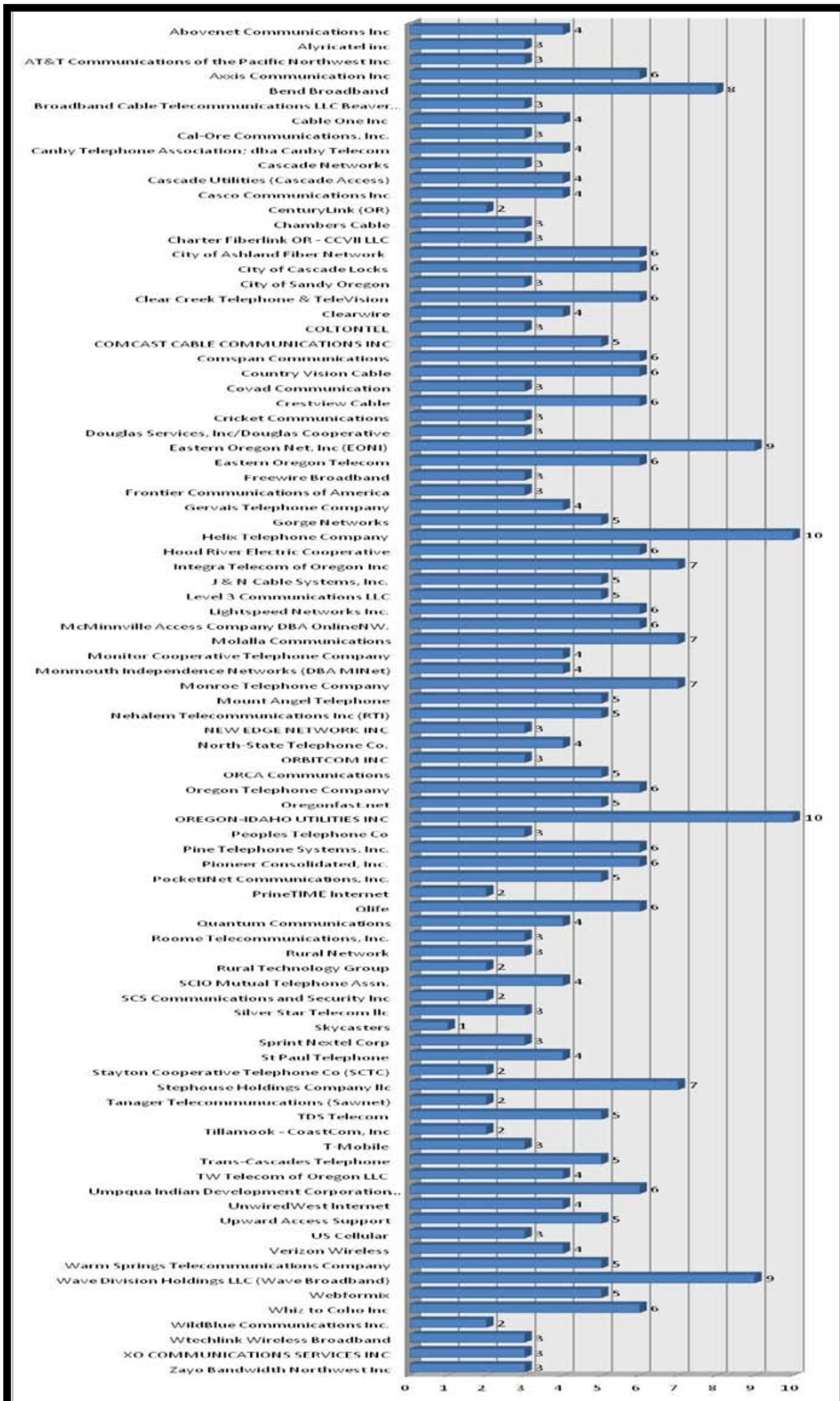
BDIA Delivery 0412 Edit

Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission. The chart below represents that interaction count with each provider.



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

COMMUNITY ANCHOR INSTITUTION (CAI)

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

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

DATA INTEGRATION PROCESS

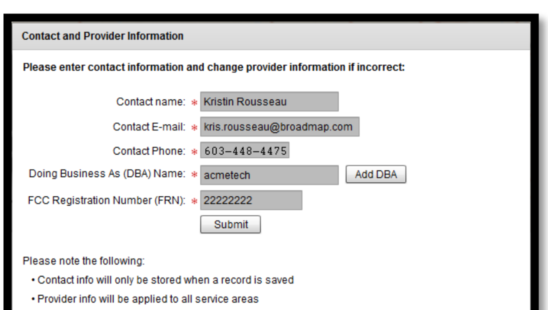
The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

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

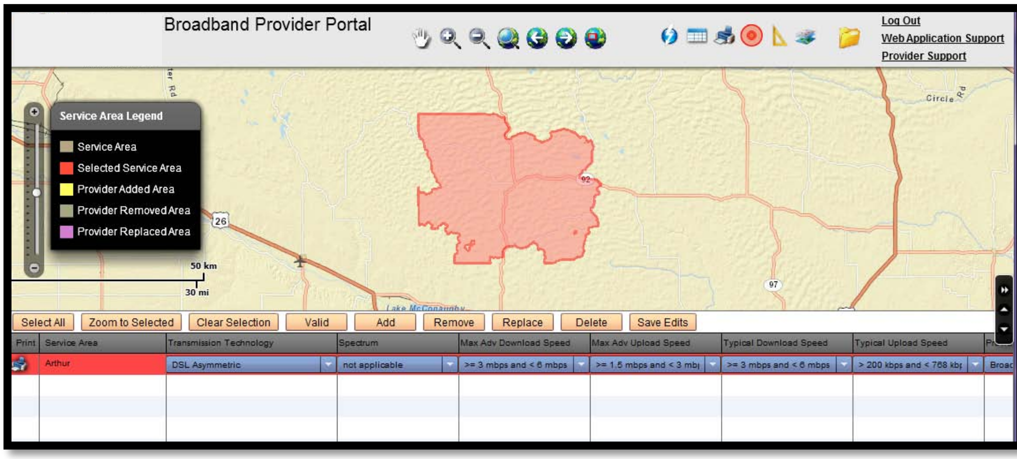
With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is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

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

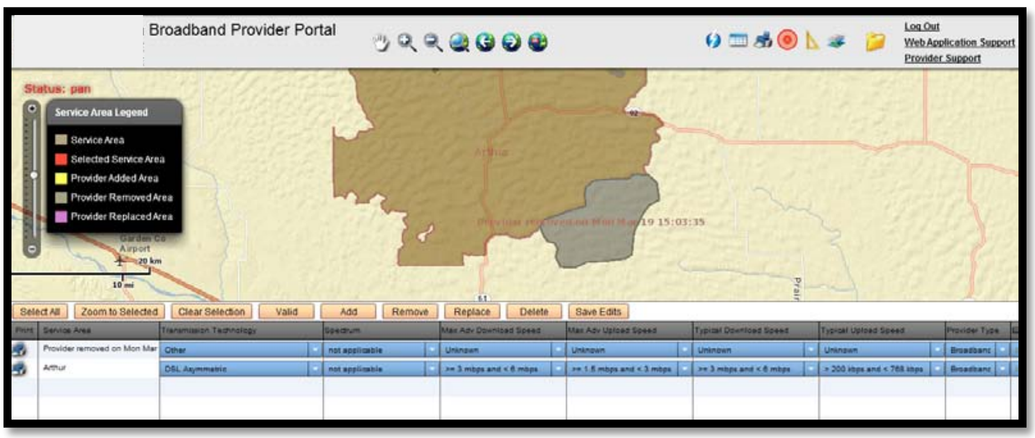
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



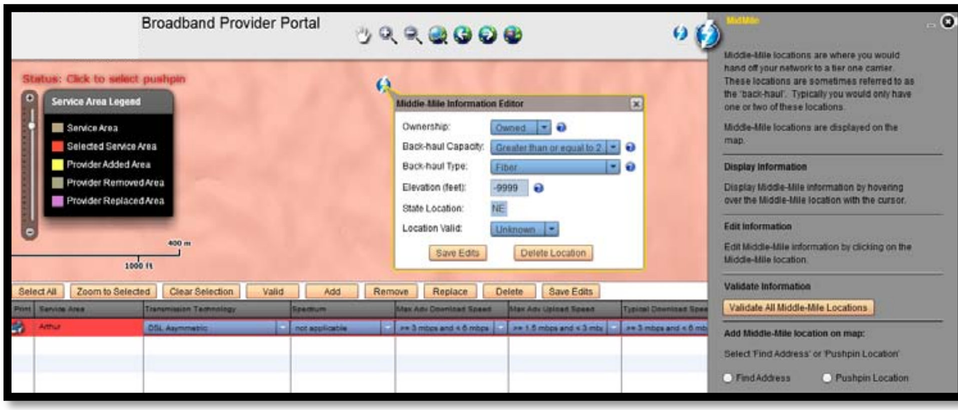
- Capability to review and request changes to the coverage footprint

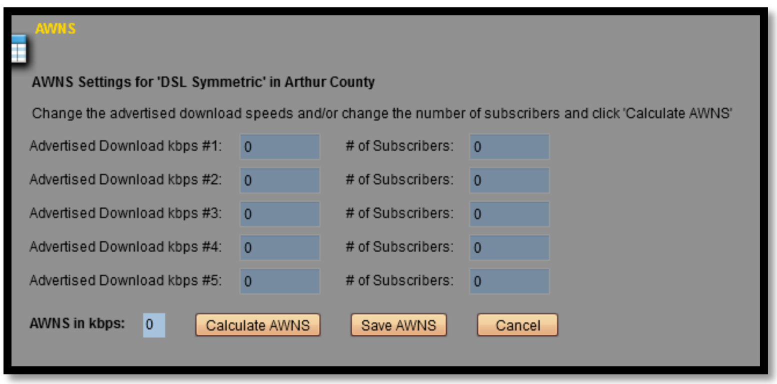


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

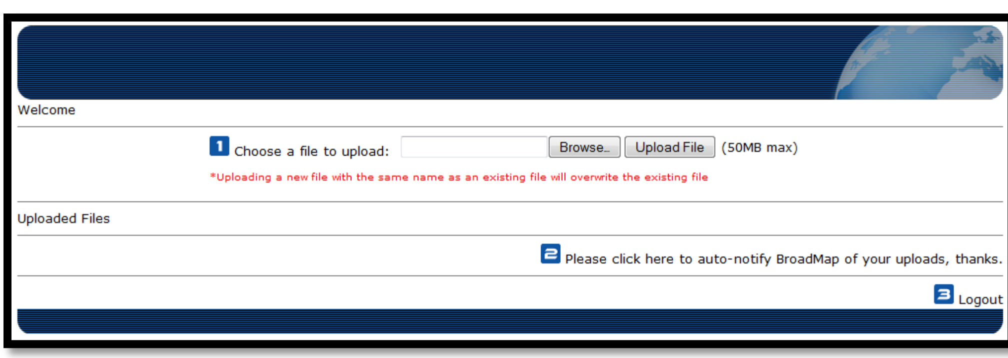


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





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



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

DATA VALIDATION AND VERIFICATION

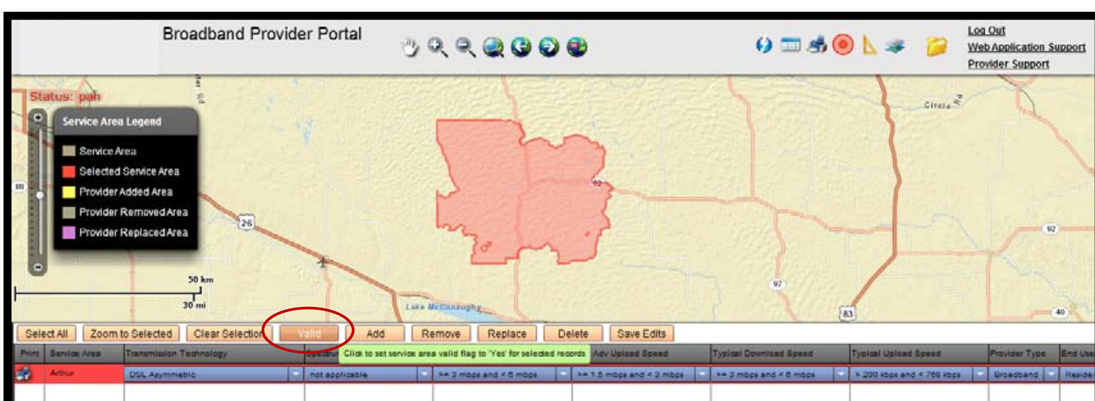
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage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

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

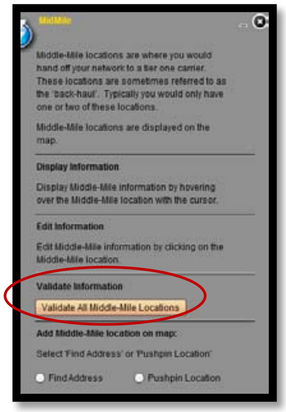
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process**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

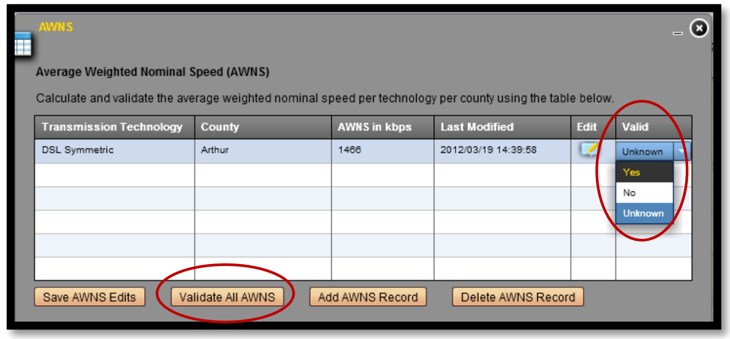
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

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



- Middle Mile & AWNS Validation





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

THIRD-PARTY DATA VERIFICATION

The coverage is visually and programmatically compared against third-party data as new or updated coverage area information is received and ingested from providers. All anomalies identified during this analysis are reviewed with the providers.

3rd Party Source Name	Source Type	Verification Type
Pitney Bowes (PBBI)	Exchange Info Plus (Central Office Locations)	Exchange datasets are used to verify the following Transmission Technologies (TT): Asymmetric xDSL (10), Symmetric xDSL (20), Other Copper Wireline (30), and Optical Carrier/Fiber to the End User (50).
Media Prints	Cable Boundaries	Used to verify the following TT: Cable Modem—DOCSIS 3.0 (40) and Cable Modem—Other (41)
American Roamer	Wireless Coverage Patterns (EVDO, GPRS, WISP, HSPA)	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)
Comsearch	Wireless Spectrum Holdings and Tower Data	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)

PUBLIC VERIFICATION – CROWD SOURCING

Since the last data submission, we have improved the public website - interactive map to collect more detailed feedback on the represented broadband coverage areas. The feedback is also displayed on the map itself, which we're currently using as discussion points with providers during the outreach phases of each data submission. The data collected can be seen at the following path:

Hyperlink: **http://broadband.oregon.gov/StateMap/index.html**

CONFIDENCE VALUES

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

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

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

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

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

List of errors within the script, which will be listed as exceptions, can be found on PB Works – Grantee Workspace at the following link:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

DETAILED PROCESS REVIEW

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

BMap_ProcessDetails
_2012_04_01.docx

PROVIDERS RESEARCHED

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

1-800-RECONEX INC	ForesTel,LLC	NORTHSTAR TELECOM INC
800 RESPONSE INFORMATION SERVICES LLC	France Telecom Corporate Solutions, LLC	NORTHWEST OPEN ACCESS NETWORK
ACCESS ONE INC	FREEDOMSTARR COMMUNICATIONS INC	NOS COMMUNICATIONS INC
ACCESS POINT INC	FRONTIER TELENET	NOSVA LIMITED PARTNERSHIP
Access2Go	GCI COMMUNICATION CORP	OLS INC
ACCESSLINE COMMUNICATIONS CORPORATION	GLOBAL CAPACITY GROUP INC	ONESUITE CORP
ACN COMMUNICATION SERVICES INC	Global Connection Inc. of America	ONLINE NORTHWEST
ADVANCED TEL INC	GLOBAL CROSSING LOCAL SERVICES INC	OPERATOR SERVICE CO
ADVANCED TELCOM INC	GLOBAL CROSSING NORTH AMERICAN NETWORKS INC	OPEX COMMUNICATIONS INC
ADVANTAGE TELECOMMUNICATIONS CORP	GLOBAL CROSSING TELECOMMUNICATIONS INC	ORBITCOM INC
AFFINITY NETWORK INC	GLOBAL CROSSING TELEMANAGEMENT INC	OREGON GOVWORKS
AFFORDABLE VOICE COMMUNICATIONS INC	GLOBAL TEL*LINK CORP	OREGON HEALTH NETWORK
AFN, Inc.	GLOBALCOM INC	OREGON MUNICIPAL ISP COALITION
AGM TELECOM CORPORATION	GLOBALSTAR USA LLC	OREGON TELECOM INC
AIRESPRING INC	GO SOLO TECHNOLOGIES INC	Outdoor DAS - American Tower Corp
AIRNEX COMMUNICATIONS INC	GOLD LINE TELEMANAGEMENT INC	Pac-West Telecomm, Inc.
ALLIANCE GLOBAL NETWORKS LLC	Granite Telecommunications	PACIFIC-SOUTH TELECOM INC
ALLIANCE GROUP SERVICES INC	GROUP SIX COMMUNICATIONS LLC	PACIFIC NORTHWEST TELCO, INC.
AMERICA NET LLC	GTC TELECOM CORP	Pacific West
AMERICAN PHONE SERVICES CORP	HARBOR COMMUNICATIONS LLC	PAETEC Communications, Inc.
American Telecommunications Systems, Inc.	HickoryTech/Eventis Telecom	Peerless Network of Oregon, LLC
AMERICOM TECHNOLOGIES INC	HORIZON TELECOM INC	PELZER COMMUNICATIONS CORPORATION
AMERIVISION COMMUNICATIONS INC	HUGHES COMMUNICATIONS INC / HNS LICENSE LLC	PIC Professional Services
ANDIAMO TELECOM LLC	HYPERCUBE TELECOM LLC	PNG TELECOMMUNICATIONS INC
Applegate Broadband LLC	iBasis	PORTLAND STATE UNIVERSITY
APPLEWOOD COMMUNICATIONS CORPORATION	IBASIS RETAIL INC	PREFERRED LONG DISTANCE INC

ASSOCIATED COOPERATIVE TELECOMMUNICATIONS INC	IBFA ACQUISITION COMPANY LLC	PRIME TIME VENTURES LLC
ASSOCIATED NETWORK PARTNERS INC	IDT AMERICA CORP	PRIMUS TELECOMMUNICATIONS INC
ATC OUTDOOR DAS LLC	INDIGENOUS TELEPHONE INC	Priority ONE Telecommunication, Inc.
ATL COMMUNICATIONS INC	INETWORKS GROUP INC	PRIORITYONE TELECOMMUNICATIONS INC
ATX LICENSING INC	INFOTELECOM LLC	PUBLIC COMMUNICATIONS SERVICES INC
BANDWIDTH.COM CLEC LLC	INLAND DEVELOPMENT CORPORATION	PULSE TELECOM LLC
BCN TELECOM INC	INMARK INC	QUANTUMSHIFT COMMUNICATIONS INC
BELLSOUTH LONG DISTANCE INC	Inmate Calling Solutions, LLC	QUASAR COMMUNICATIONS CORPORATION
BETTERWORLD TELECOM LLC	INMATE COMMUNICATIONS CORP	Radix Networks
BG ENTERPRISES INC	INTEGRATED SERVICES INC A NEVADA CORPORATION	REDUCED RATE LONG DISTANCE LLC
BIGREDWIRE.COM INC	INTELEPOINT LLC	RELIANT COMMUNICATIONS INC
BLUEBIRD WIRELESS BROADBAND SERVICES LLC	INTELLETRACE INC	RIDLEY TELEPHONE CO LLC
BROADBAND DYNAMICS LLC	INTELLICALL OPERATOR SERVICES INC	RRV ENTERPRISES INC
BROADCORE	INTELLIGENT COMMUNITY SERVICES INC	Rural Services Company; dba Ulatilla Electric Cooperative
BROADVIEW NETWORKS INC	Intlepoint, LLC	Sage Telecom, Inc.
BROADWING COMMUNICATIONS LLC	INTRADO COMMUNICATIONS INC	Salem Hospital Regiona Health Center
BT COMMUNICATIONS SALES LLC	IPC NETWORK SERVICES INC	SBC LONG DISTANCE LLC
BUDGET CALL LONG DISTANCE INC	J IRWIN COMMUNITY INFORMATICS CONSULTING	SHARED COMMUNICATIONS INC
BUDGET PREPAY INC	KANSAS INDEPENDENT TELECOMMUNICATIONS LLC	SILV COMMUNICATION INC
BUEHNER FRY INC	KDDI AMERICA INC	SMARTRAK INCORPORATED
BULLSEYE TELECOM INC	KRUSE - MERCANTILE PROFESSIONAL SUITES	SNAKE RIVER PCS
BUSINESS DISCOUNT PLAN INC	Lane Telecommunications Services, Inc.	SNET AMERICA INC
BUSINESS NETWORK LONG DISTANCE INC	LCR TELECOMMUNICATIONS LLC	SNIP LINK LLC
BUSINESS TELECOM INC	LDMI TELECOMMUNICATIONS INC	Spacenet, Inc.
CALIFORNIA OREGON BROADCASTING INC	LEGACY LONG DISTANCE INTERNATIONAL INC	Sprinfield Utility Board
CALL PLAN USA INC	LEGENT COMMUNICATIONS CORP	STARTEC GLOBAL OPERATING COMPANY
Cause Based Commerce Inc., - dba The Sienna Group	LEWIS & CLARK COLLEGE	STELERA WIRELESS
CBEYOND COMMUNICATIONS LLC	LIGHTYEAR NETWORK SOLUTIONS LLC	Sterling Communications
CCI NETWORK SERVICES LLC	Lincoln County	STI PREPAID LLC
CENTEL COMMUNICATIONS INC	LONG DISTANCE CHARGES INC	SUNGARD NETWORK SOLUTIONS INC
CENTRAL TELECOM LONG DISTANCE INC	LONG DISTANCE CONSOLIDATED BILLING CO	TALK AMERICA INC
CENTRAL TELEPHONE INC	LOTEL INC	TCAST COMMUNICATIONS INC
CIMCO COMMUNICATIONS INC	LSSI DATA CORPORATION	TCG JOINT VENTURE HOLDINGS INC
CINCINNATI BELL ANY DISTANCE INC	MAIN STREET TELEPHONE CO	TECHNOLOGY SERVICES INC
CITY OF EUGENE	MALHEUR HOME TELEPHONE CO	TEL WEST COMMUNICATIONS LLC
CITY OF KLAMATH FALLS	Master Call Communications	TELCO PARTNERS INC
CITY OF PORTLAND	MATRIX TELECOM INC	Telecare, Inc.
Clear World Communication Corporation	MCGRAW COMMUNICATIONS INC	Telecom Management - dba Pioneer LD
CLOSECALL AMERICA INC	MCI COMMUNICATIONS SERVICES INC	TELECONNECT LONG DISTANCE SERVICES & SYSTEMS CO
COAST INTERNATIONAL INC	MCIMETRO ACCESS TRANSMISSION SERVICES LLC	TELENATIONAL COMMUNICATIONS INC
COLUMBIA BROADBAND INC	MCLEODUSA TELECOMMUNICATIONS SERVICES INC	TELEQUALITY COMMUNICATIONS INC
COMCAST BUSINESS COMMUNICATIONS LLC	MD Communications	TELMEX USA LLC
COMCAST PHONE OF OREGON LLC	Metropolitan Telecommunications of Oregon - dba MetTel	TELRITE CORPORATION

COMMPARTNERS LLC	MIDCOLUMBIA.NET	TELTRUST CORPORATION
COMMUNICATIONS NETWORK BILLING INC	MIDVALE TELEPHONE EXCHANGE INC	THRESHOLD COMMUNICATIONS INC
ComTech21, LLC	Miracle Communications	TIME WARNER CABLE LLC
COMTEL TELCOM ASSETS LP	Mitel NetSolutions, Inc.	TON SERVICES INC
CONSUMER TELCOM INC	MOBILITIE LLC	TOTAL CALL INTERNATIONAL INC
CONVERGIA INC	MOMENTUM TELECOM INC	TOTAL HOLDINGS INC
COOPERATIVE COMMUNICATIONS INC	Monroe Area Communications	TOUCHTONE COMMUNICATIONS INC
Corban Technoligies, Inc.	MULTILINE LONG DISTANCE INC	TRANS NATIONAL COMMUNICATIONS INTERNATIONAL INC
CORDIA COMMUNICATIONS CORP	MY TEL CO INC	TRANSPAC TELECOM INC
CORE DIGITAL SERVICES	NATIONAL ACCESS LONG DISTANCE INC	TRANSUNION TELEDATA LLC
CoVista	National Brands, Inc.	Tri-M Communications - dba TCM Communications
COVISTA INC	NATIONAL DIRECTORY ASSISTANCE LLC	TRIBAL ONE BROADBAND TECHNOLOGIES
CTC Communications Corp	NationalComtel	TTI NATIONAL INC
CTI LONG DISTANCE INC	NATIONWIDE LONG DISTANCE SERVICE INC	U S TELECOM LONG DISTANCE INC
CUSTOM TELECONNECT INC	Navigator	U.S. Cellular
CYPRESS COMMUNICATIONS OPERATING COMPANY LLC	NECC Telecom	UCN INC
DABNEY/STRAWN LLC	NET ONE INTERNATIONAL INC	UNI-TEL COMMUNICATIONS GROUP INC
DCT Telecom Group, Inc.	NET TALK.COM INC	UNITED AMERICAN TECHNOLOGY INC
DDD CALLING INC	NETLOJIX TELECOM INC	UNITED COMMUNICATIONS INC
DELTACOM INC	NETWORK BILLING SYSTEMS LLC	UNITED TELECOM INC
DELTEL INC	NETWORK COMMUNICATIONS INTERNATIONAL CORP	UTILITY TELEPHONE INC
DIGIZIP.COM INC	NETWORK ENHANCED TECHNOLOGIES INC	Value-Added Communications, Inc.
DIRECT COMMUNICATIONS LONG DISTANCE INC	Network Operator Services	VANCO DIRECT USA LLC
DSLnet Communications, LLC	NETWORK SERVICE BILLING INC	VANCO US LLC
EASTON TELECOM SERVICES LLC	NETWORK US INC	VIDAFON INC
ELECTRIC LIGHTWAVE LLC	NETWORKIP LLC	VOICECOM TELECOMMUNICATIONS LLC
Eltopia Communications, LLC	NEUTRAL TANDEM-OREGON LLC	WESTERN INDEPENDENT NETWORKS INC
ENCOMPASS COMMUNICATIONS LLC	NEW CENTURY TELECOM INC	WHOLESALE CARRIER SERVICES INC
ENHANCED COMMUNICATIONS GROUP LLC	NEW HORIZONS COMMUNICATIONS CORP	WILLAMETTE UNIVERSITY
Enhanced Communications Network	NEWPATH NETWORKS LLC	WILTEL COMMUNICATIONS LLC
ENTRIX TELECOM INC	NextGNetworks	WINDSTREAM COMMUNICATIONS INC
ERNEST COMMUNICATIONS INC	NEXTLINK WIRELESS INC	WIRED OR WIRELESS INC
ESCHELON TELECOM OF OREGON INC	NEXUS COMMUNICATIONS INC DBA NEXUS-TSI	WORKING ASSETS FUNDING SERVICE INC
Evercom Systems, Inc.	NEXUSTEL LLC	WORLD COMMUNICATIONS INC
Extenet Systems	NiTel	WORLDNET COMMUNICATION SERVICES INC
Fiber South Consortium	NOBELTEL LLC	X2COMM INC
FIBERLINK LLC	NobelTel, LLC	YESTEL USA INC
FIRST CHOICE TECHNOLOGY INC	Norlight, Inc.	YMAX COMMUNICATIONS CORP
FIRST COMMUNICATIONS LLC	NORSTAR TELECOMMUNICATIONS LLC	ZEUS TELECOMMUNICATIONS LLC
FLATEL INC	NORTH COUNTY COMMUNICATIONS CORPORATION OF OREGON	

DATA DEVELOPMENT & VALIDATION METHODOLOGIES
WHITE PAPER

Commonwealth of Pennsylvania
State Broadband Initiative (SBI)
Broadband Mapping Project

NTIA Data Submittal
April 1, 2012

Table of Contents

Introduction

The following sections of this document provide an overview of the process used for the SBI Broadband Mapping data development for the Commonwealth of Pennsylvania. The following narrative is depicted in Appendix A, Commonwealth of Pennsylvania SBI Process Workflow, and Appendix B, State Broadband Data Validation Workflow, included at the end of this document.

Broadband Provider Outreach Results

As a result of the outreach to broadband providers and investigating whether a internet service provider (ISP) fits the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

- 280 Total Investigated ISPs
- 121 Total Confirmed Broadband Service Providers (unique Provider/DBAs combinations)
- 92 Broadband Service Providers who Supplied Data (unique Provider/DBAs combinations)

Attachment C, Master Outreach List, contains additional provider information.

Broadband Provider Outreach Procedure

The following outreach procedure provides the framework for communicating with Broadband Service Providers (providers). The primary goals of the outreach approach documented herein are to:

- Promote provider understanding and acceptance of the Broadband Mapping process, results, and benefits
- Clarify NTIA Broadband Mapping requirements
- Facilitate data confidentiality agreements as required
- Minimize the submittal of invalid data
- Enhance provider understanding of the semi-annual update process
- Work with providers to evaluate submittal options to facilitate data submittals

Data Submission Guidelines

Guidelines for the providers' submission of Broadband Mapping Data are documented in the "Data Submission Guidelines". These Guidelines define technical requirements, submission specifications, and coordination and documentation activities.

Pennsylvania Broadband Providers Website

A URL was deployed (http://www.bakergis.com/PABroadbandProvider/) to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letters to providers
- Draft Non-Disclosure/Data Sharing Agreement
- Quick Start Guides
- Data Submission Guidelines

- Data Transmittal Letter
- Broadband Data Submittal Templates
- Census TIGER Data
- Data Submittal Assistance Contact Information

Outreach Delivery Vehicles

- A State Broadband Mapping Initiative Call for Data letter from the Commonwealth of Pennsylvania Department of Community and Economic Development (DCED) was emailed to all providers in the Commonwealth. This initial provider contact letter described the program and the role of Michael Baker Jr., Inc. (Baker) acting on behalf of the DCED for Broadband Data Collection and Mapping.
- Baker distributed a follow-up letter to all providers describing the data submittal requirements and material and help available to aid with the data submittals.
- Submittal assistance was provided to providers that needed help with data submittals.
- Presentations were conducted with various broadband provider associations to present the data submittal requirements and answer questions.
- Email communication and electronic transfer of data was encouraged to facilitate a faster delivery of data and information.
- A URL was deployed and promoted to distribute outreach material and information concerning the Broadband Mapping Project.
- A secure FTP URL was provided for submittal of broadband data by providers.
- A secure Broadband Provider Data Update Webportal was deployed for providers to redline/update their service coverage, rather than supply their updated coverage for the semi-annual data updates.

Inclusion of Resellers

With the request for data current as of December 31, 2011, resellers are being included in all of the outreach, data collection, data aggregation, and verification tasks.

Secure Broadband Provider Data Update Webportal

A secure web-based application for broadband service providers has been deployed to simplify and automate the semi-annual process for collecting and verifying data. The webportal provides an easy-to-use map redlining tool for updating a provider broadband service area and attributes. It is expected that the simplification and automation of the data collection process will increase participation and improve the timeliness of provider response, data accuracy and consistency. Providers are being encouraged to utilize this tool but data is still being accepted through other means and formats.

Figure 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. Picklists of valid database attributes eliminates entry errors and create consistency. It also contains a workflow from initial provider input, saving of a provider's work-in-progress, provider formally submitting edits, aggregation into the master geodatabase, soliciting provider approval of aggregated data, and final approval of the edit.

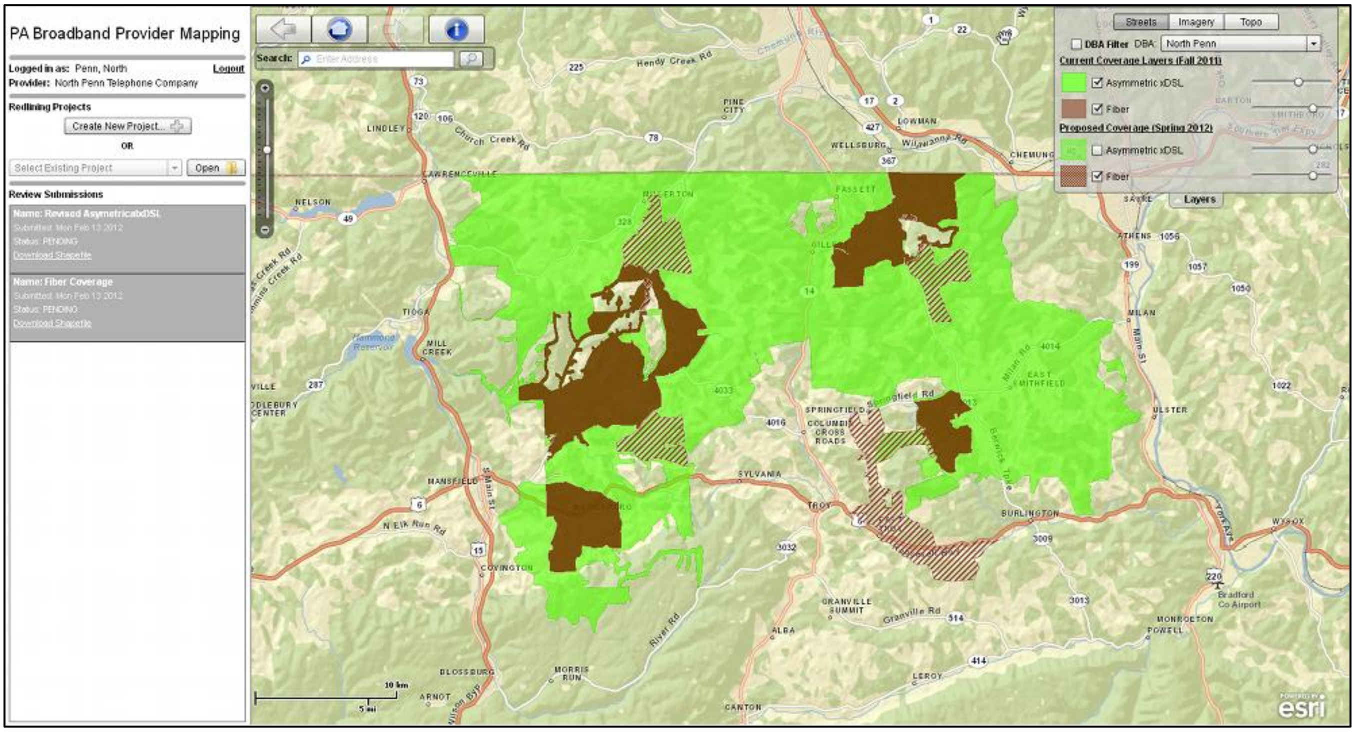


Figure 2 Provider Data Update Webportal –View/Edit Coverage Map Environment

Broadband Outreach Tracker Application

The Tracker application (Figure 3) was utilized to collect all correspondence with providers and feedback on the effectiveness of the outreach activities by tracking items such as:

- The number and content of incoming e-mails and letters submitted from the providers
- The number and source of comments, questions, and suggestions made by providers
- The number and source of comments, questions, and suggestions made by attendees at provider meetings and conference calls
- Provider contact information and data submittal status.

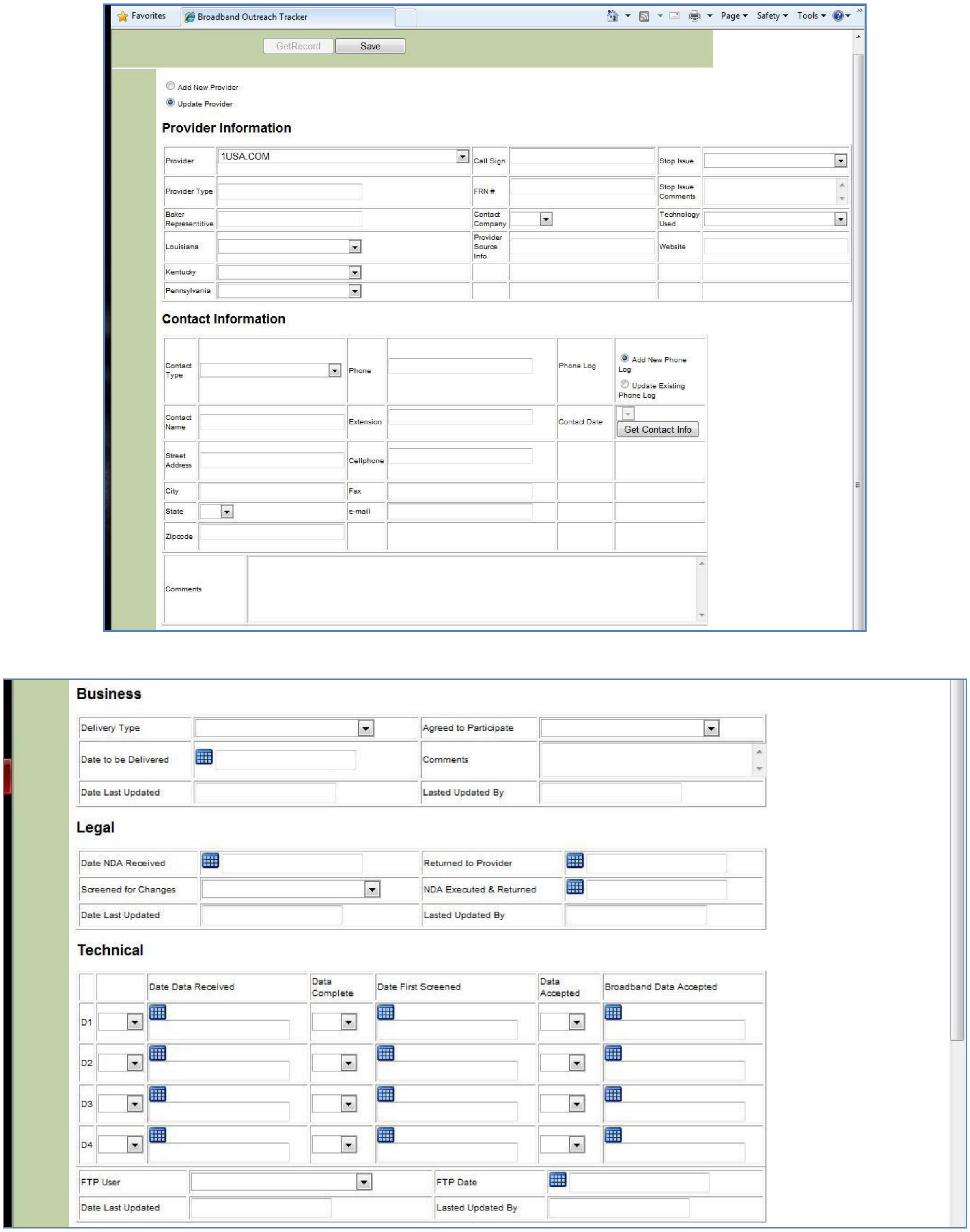


Figure 3 Broadband Outreach Tracker

Provider Submittal Validation

When a data submittal is received from a broadband service provider, it is updated in the Broadband Outreach Tracker and run through an initial validation process to assure that it meets the submittal guidelines.

Validation Checklist

The following items are part of this initial data validation process:

- Verify provider's transmittal letter requested in Data Submission Guideline with is complete and matches submitted data
- Verify the file naming conventions
- Verify each file is machine readable
- Verify data is in the correct GIS or Tabular format/file type
- Verify each field is populated and no empty or NULL values are present for mandatory fields
- Verify all ID (record number points) are unique within the submittal
- Verify all attribute data is formatted according to the submittal guidelines
- Verify topology for all geospatial submissions
- Verify Metadata for all submissions
- Verify the required contact information is included
- Verify adherence to Data Submittal Guidelines (see http://www.bakergis.com/PABroadbandProvider/ to access Data Submittal Guidelines)

  Broadband Service Availability (at least one)
  - Individual Street Addresses (Sec 3.1 & 4.1)
  - Census Blocks < 2 sq mi (Sec 3.3 & 4.3)
  - Street Segments for Census Blocks > 2 sq mi (Sec 3.2 & 4.2)
  - Service Overview (Sec 3.4 & 4.4)
  - Polygonal Boundary Area(s) (Sec 3.8 & 4.8)

  Middle-mile Points (Sec 3.5 & 4.5)
  Community Anchor Institutions (Sec 3.7 & 4.7)
  Last Mile Connection Points (Sec 3.6 & 4.6)
  WISP Antennas (Sec 4.9)

Data Usability Determination

The validation results are evaluated by the outreach and aggregation persons to determine the usability of the data. If the data meets the submission specifications, it is forwarded on for data aggregation. If it is determined to be unusable, it is returned to the provider for resolution. If the data can be manipulated to get it into a usable format, it is manipulated as required, and then forwarded on for data aggregation.

SBI Data Development

Data from the providers may be submitted in various formats as defined in the Data Submittal Guidelines, or in some cases unspecified formats may be accepted to help facilitate provider participation. Depending on the format of the submitted data, it is processed through one of the following processes to upgrade it to the NTIA SBI data standards.

Spatial Data

After validation and any required manipulation of any spatial data submitted by the providers, it is georeferenced and simply loaded into the appropriate NTIA geodatabase feature class.

Address Data Geocoding

If not already in the standard address point template, the provider tabular address data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. ArcGIS geocoding tools are then utilized geospatially locate the address points for the tabular records. Interactive address rematching is performed against two additional street centerline datasets as needed to increase geocoding matching results. The NTIA deliverable is the geocoded address point geodatabase table. The geocoded address points are also subsequently aggregated to the census block or road segment feature class for public web map display.

Census Block Aggregation

If not already in the standard census block template, the provider tabular census block data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider tabular census block records are then joined to the geodatabase 2010 U.S. Census Block. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination. The NTIA deliverable is the census block geodatabase table.

If the list of census blocks contains blocks > 2 sq. miles then these blocks are used to select all the 2010 U.S. Census TIGER centerlines that intersect those blocks. The Census Block record data is aggregated to each Road Segment within the Census Block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination.

Road Segment Aggregation

If not already in the standard road segment template, the provider road segment data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. If the provider submittal included graphic centerline segments, these are migrated into the delivery geodatabase along with the linked attribute records. If the provider submittal was tabular road segment records only, they are then joined to the geodatabase 2010 U.S. Census TIGER centerline feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

If the provider road segment data lie within census blocks <= 2 sq. miles then the road segment data is aggregated to the census block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

Overview Data Aggregation

Provider Service Availability Areas submitted for entire county areas are loaded into the NTIA geodatabase Overview table. If not already in the standard template, the provider data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider overview records are then joined to the geodatabase 2010 U.S. Census County feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination.

Polygonal Boundary Aggregation/Integration

Providers submitting polygonal service area data are handled in two ways. Wireline Provider data is aggregated to the census block feature class for areas where census blocks <= 2 sq. mi., or road segment feature class for areas where census blocks > 2 sq. mi. Wireless Provider Service Availability Areas submitted by polygonal area are simply loaded into the NTIA geodatabase Poly_Bndry feature class.

Wireline Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Depending on the area, census blocks < or => 2 sq. mi., a selection set of either census blocks or road segments that intersect the polygon boundary is created. The attributed polygon boundary is then joined with census blocks or road segments table to attribute accordingly. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination. The NTIA deliverable is the census block or road segment geodatabase table.

Wireless Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Multiple Poly_Bndry records are created for multiple Trans Tech values for each provider. The NTIA deliverable is the polygon boundary geodatabase table.

Middle/Last Mile Data Integration

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. The NTIA deliverable is the middle or last mile geodatabase table.

Community Anchor Institution Integration

Providers supplied some Community Anchor Institution (CAI) data with the data submittals. But the majority of the data was collected from existing GIS Layers maintained by the Commonwealth of Pennsylvania, outreaching to CAIs through state agencies and their contacts, and having CAIs complete an online survey at http://www.bakerbb.com/pa_institution_survey/.

Provider CAIs

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. Address data is used to geocode locations only when lat/long data is not provided.

Commonwealth CAIs

CAI shapefiles were provided through the Commonwealth's other geospatial efforts. The shapefiles were then exported to the NTIA geodatabase CAI feature class. Various sources for obtaining broadband information for the CAIs were utilized. Various state agencies provided some of the information, i.e. Pennsylvania Department of Education (PDE) provided tabular broadband information for schools, PDE provided tabular broadband information for libraries, and Pennsylvania State Police provided tabular broadband information for their facilities. A CAI data survey website was also deployed and the URL distributed by various state agencies to the CAI contacts. Data from all of these sources were then aggregated into the CAI geodatabase table for the NTIA deliverable.

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. In addition, the calculated typical speeds are compared against the Centris average speed verification data to be certain that the calculated typical speeds are within reason. The end result is a more complete data submittal to NTIA.

Propagation Mapping

Because not all fixed wireless broadband providers have participated, may not have a propagation map readily available, or have supplied data of marginal accuracy, the years 3-5 NTIA funding has supplied the means to generate a propagation map for these situations. In addition, the NTIA has also pointed out fixed wireless service coverages with unusual shapes. To generate the propagation mapping, additional information is needed to generate the model to resolve the above mentioned situations and will be resolved over time (ie. beyond the April 2012 deliverable time frame) through coordination and outreach with the Providers.

Data Verification Summary

Pennsylvania's broadband mapping project employs a multi-prong approach to ensure the provider data is accurate and complete.

In summary, the project employs the following validation methodologies and resources:

- Provider Validation
- Data Validation via Market Intelligence Sources
- Data Validation Using State Supplied Data Points
- Field Validation
- Wireless Coverage Analysis
- Topology Validation
- Automated Validation Processing
- Confidence Level/Statistical Modeling
- SBDD Check Submission
- Stakeholder Validation

The remainder of this verification section describes the various methods in greater detail.

Provider Validation

After data development, service availability maps are generated and submitted to the providers to validate their mapping results. This provides a "sign off" on the interpretation of the submitted data and extends the outreach efforts by providing a visual representation of the data to be delivered to the State and the NTIA.

Types of Provider Maps

Provider maps generally consist of the following types.

Outreach Maps

Often, providers will send data which does not contain all the information needed for a NTIA compliant dataset. In such cases, as an aid to the outreach communication, it may be necessary to produce a map to help the provider locate their service area or verify data they have provided. These maps may take many forms, but generally are of two types:

- General Location Maps – these maps are often produced when the provider does not have a list of address or other standard submittal data and needs help defining their service area. A typical map will show counties, major roads, and towns of the general area the provider has stated as their service area. The intent of the map is to give the provider a way to markup or delineate their service area. If a provider has not provided required attribute information such as Technology of Transmission, Speed Data, etc. then it may be necessary to add a visual clue to this data like an information stamp on the map that they can easily fill out. If the provider sends the map back with a service area boundary, this can then be digitized and sent back to the provider for verification.
- Verification of Provider Supplied Boundaries – these maps are produced when the provider has sent service area boundary information which is confusing or otherwise unclear. Often these are produced when providers send CAD maps, hand drawn maps that need digitization, or lists of zip codes or counties served. A typical map will place the interpreted boundary over a location map so the provider can verify the service area. As with the General Location Map, information stamps or other visual clues may be placed on the map.

Initial Verification Maps

Once the provider data has been processed and the census block and road segment feature classes created, an Initial Verification Map (Figure 4) is produced to give the provider a visual representation of their service area by census block. These maps enable the provider to verify their service area and make changes if necessary. Initial Verification Maps are produced using a set of standards and produced at the highest resolution necessary to convey the map information to the provider. Initial Verification Maps are also produced for Wireless Polygon areas.

Detailed Verification Maps

Providers who have questions about their service areas may request additional information to help clarify issues. In these cases, it may be necessary to create a Detailed Verification Map to highlight the areas in question. Detailed Verification Maps provide the same information as Initial Verification Maps only at a higher resolution. Several maps may be needed to accurately portray an area in question.

Revised Maps

Revised maps take two forms:

- Initial or Detailed Verification Maps which have been annotated or marked-up by the provider
- Outreach produced Initial or Detailed Verification Maps incorporating provider changes

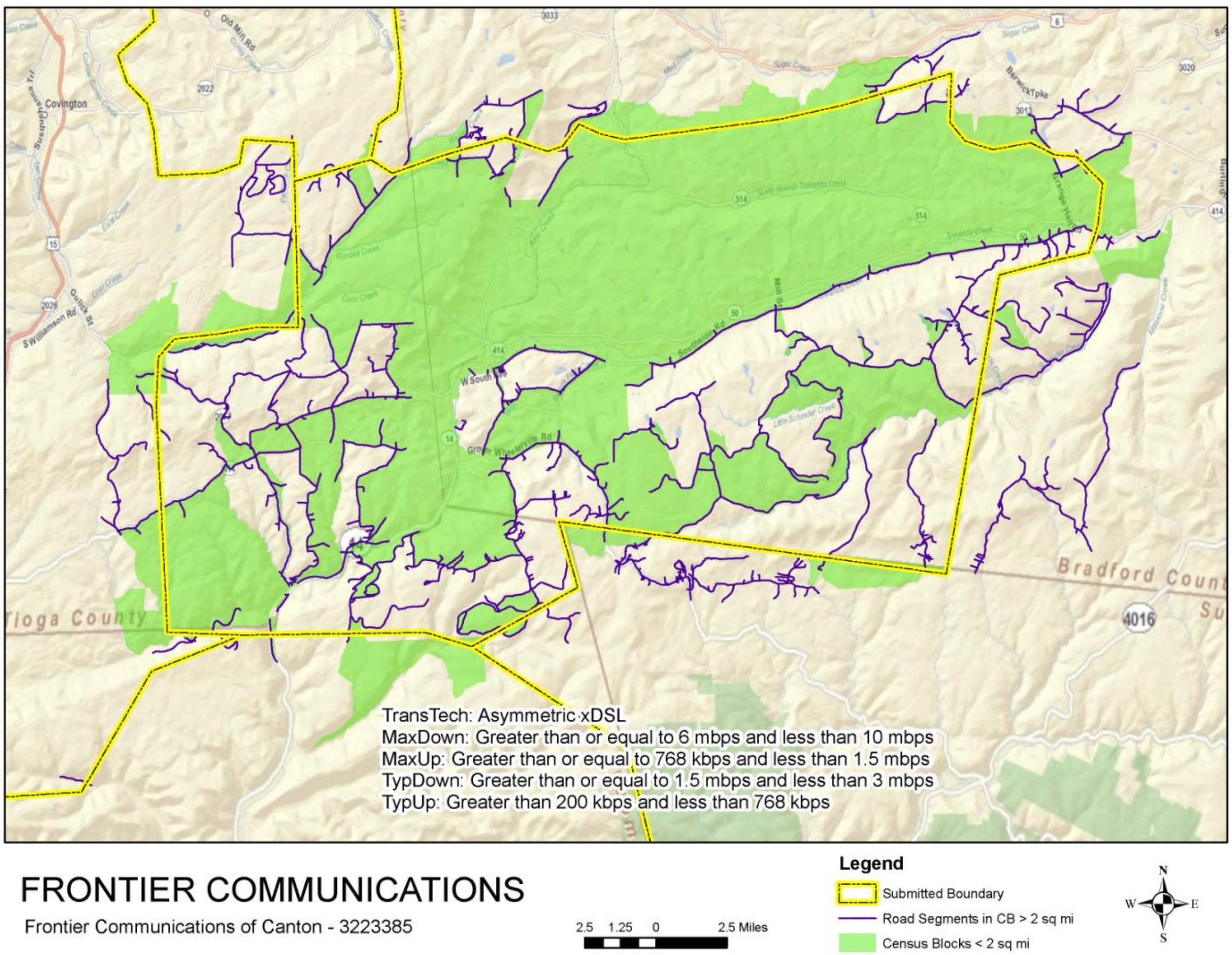


Figure 4 Provider Map

Data Validation

A critical component of the project is the validation of the data submitted by the broadband service providers. Data from various sources, as described in more detail in the following sections, is utilized to develop a level of confidence in the data received from the broadband providers.

Validation Data Set Collection and Development

This validation process employs data sets developed or acquired from different sources as described in the following sections.

Provider Feedback Loop: Maps of completed provider service areas and data are furnished back to the providers for confirmation of the processed/aggregated information. Feedback is integrated into the each provider's dataset.

Telogical Systems Wireline Market Intelligence Data: This commercially available dataset was developed using a methodology that incorporates deep web crawling and additional means, including direct mail harvesting and advertising collaterals (including door to door) to gather cable and telecommunication provider information. This dataset is used as a validation source for wireline provider service area coverage, Technology of Transmission, and Speed.

American Roamer Wireless Market Intelligence Data: This commercially available dataset is used as an independent source to verify information submitted by providers of wireless broadband service. This dataset is used as a validation source for wireless provider service area coverage.

Prior Commonwealth Broadband Mapping Dataset: Under the requirements of the Commonwealth's Act 183 of 2004 legislation, broadband coverage data was previously collected by the Commonwealth. These datasets are used as a validation source for provider service area coverage and Technology of Transmission.

FCC Speed Test: The FCC speed test data includes the IP addresses for each specific speed test conducted. This IP address is queried against a web search engine to determine the provider assigned to that address and is used as a validation source for the provider service coverage and typical speeds.

Fixed Wireless Line of Sight Analysis: Utilizing the existing PAMAP LiDAR for topography generation and determining tower/antennae heights, line of sight analysis is performed to determine areas of reported fixed wireless broadband coverage that is questionable.

Field Data Acquisition: Broadband technicians visited a sampling of census block locations to gather broadband data to be used for validation. The following criteria were taken into account when developing the census block sampling dataset:

- urban vs. rural census block characteristic
- censes block grouping
- land vs. water census block characteristic

The overarching mission of the Federal broadband stimulus program is to expand Broadband service to areas that are currently unserved and underserved. Also, the market intelligence validation sources typically represent some rural, but more urban areas. Thus, our field data collection efforts were targeted more towards the rural areas; split 90% rural, 10% urban.

Additionally, a study by Penn State University (Glasmeier 2002) notes that a large number of census block groups typically fit within any given cable or telephone company service areas. Therefore, our field sample was also based on selection of one census block per block group and a land mass greater than 50% to avoid field visiting areas covered mostly by water. There are a total of 10,387 block groups in PA. Using a statistical sample size calculator based upon the number of block groups in the state and +/- 4% margin of error at a 95% confidence level, the sample size is 568 census block locations statewide. The procedure for selecting the calculated field verification census blocks is provided below.

1. Select one census block per census block group
   a. Convert the census block groups polygon to label points.
   b. Select the census block polygon by doing a spatial selection using census block groups label points.
2. Select from the current selection where the census block land mass is 50% or greater and the block is rural.
3. Export the selected blocks to a new shapefile. This reset the FID for the next step.
4. Select every 2nd, 3rd, 4th, or so on to get the desired number of blocks. Query used to select: MOD("FID",2) = 0. This will select every other record.

The planned census block field locations are shown in Figure 5.

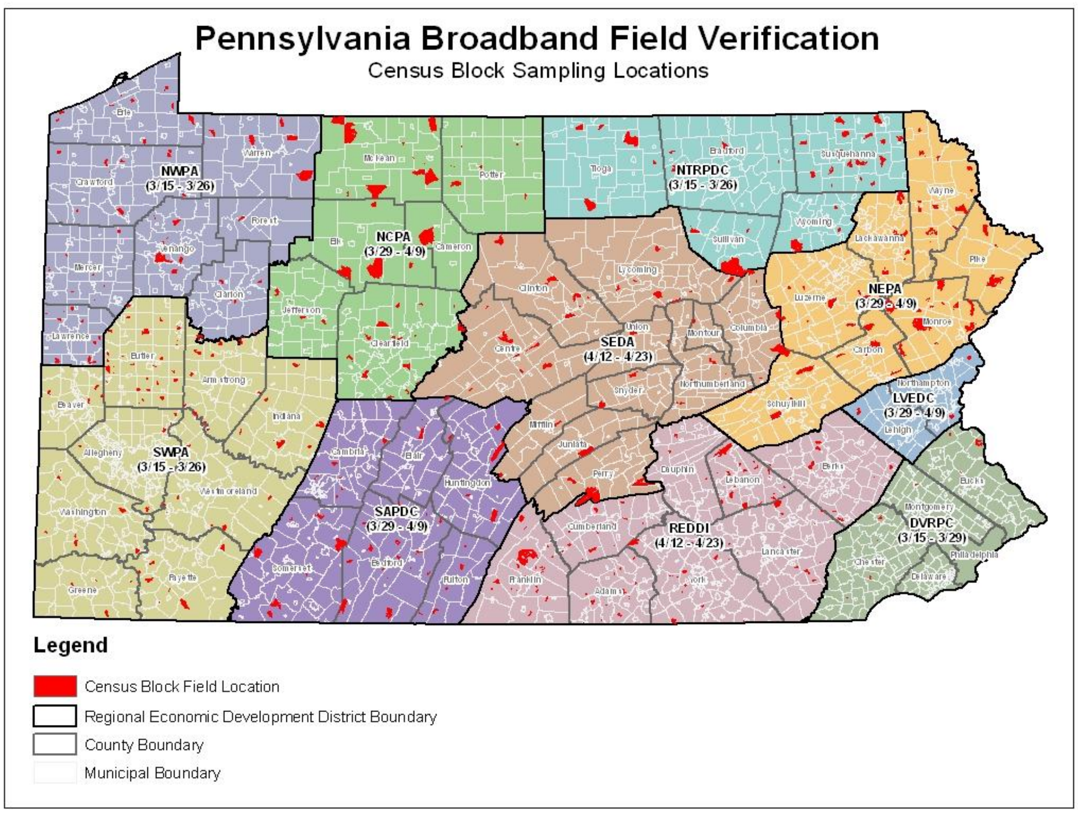


Figure 5 Planned Field Verification Census Block Locations

For each census block in the sample set, broadband technicians collected data using Panasonic Toughbook computers, loaded with MapPoint mapping software, and a customized Microsoft Access data collection form with the ability to automatically import GPS coordinates. The sample census blocks were pre-loaded and directly accessible from MapPoint. Two types of data collection were conducted (infrastructure observation and wireless speed testing) and the results were recorded and linked to the corresponding field location coordinates within the designated sample census block. The information collected by the field broadband technicians includes:

Wireline:

- GPS coordinates
- circuit infrastructure feeding the area (copper, fiber, cable)
- local distribution hut equipment inspection, where allowed/possible
- witness access circuit speed tests, where allowed/possible
- facility elevation (measurement relative to grade), where allowed/possible
- distance from DSLAM measurement where applicable and determine access speed capability with an accuracy within 500ft using mapping software
- collect site pictures

Wireless:

- GPS coordinates
- internet speed test

The map in Figure 6 shows the locations (blue points) of the census block field surveys that were performed.

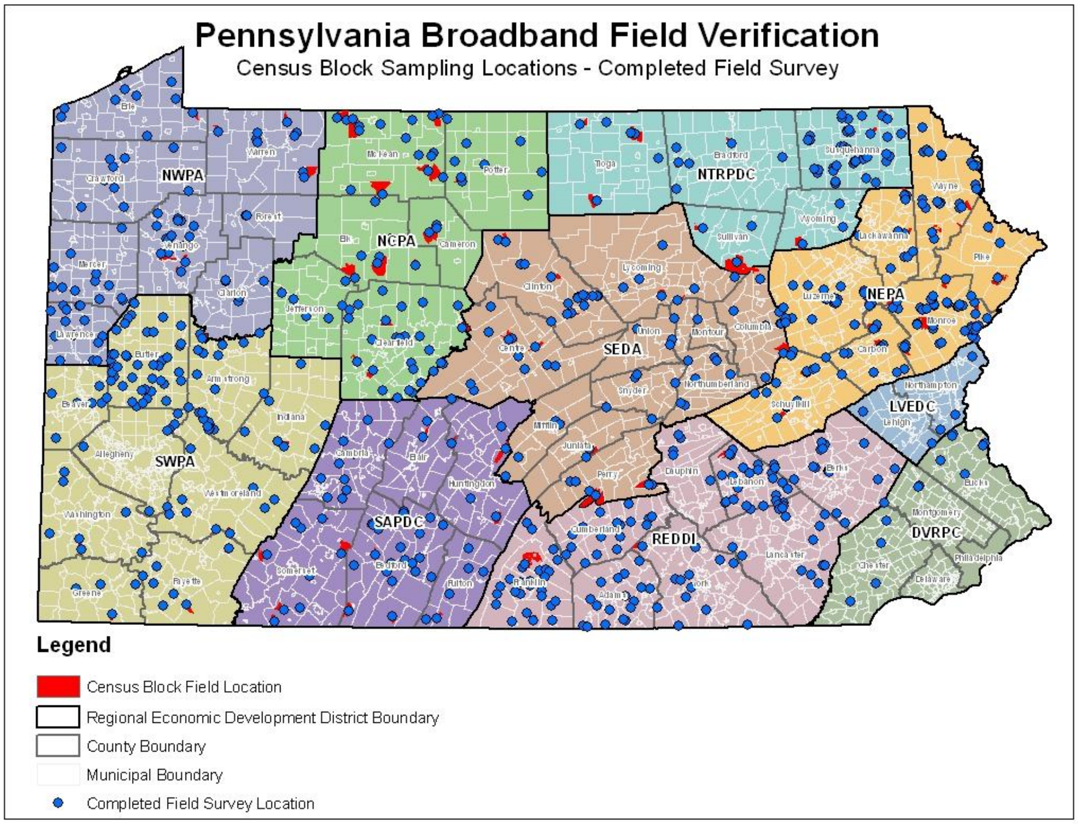


Figure 6 Completed Field Verification Locations

For the 568 census blocks that were visited, 2821 individual wired/wireless data elements were recorded and 3666 pictures were taken at those locations. This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission, middle mile, and wireless speed.

Provider Data Validation Process

Provider Feedback Loop: Feedback received from the providers is visually inspected and integrated directly in the mapping GIS database.

Service Area Validation Data: The Telogical wireline service area data is tabular and contains a separate record for each provider/technology of transmission combination with an associated census block or TIGER road segment, depending on the whether the size of the census block area (=/< or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer wireless service area data is already in and ArcGIS data format. The validation data is then joined to the provider service area data by census block or TIGER road segment ID. Any database records in the provider or validation tables that cannot be joined are output to a separate layer that indicates the areas of discrepancy between the two datasets. The joined tables are then queried to detect any speed discrepancies which are also output to a separate discrepancy layer.

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 such as the regional Economic Development Districts and the public are reviewed and used to validate the provider data submissions.

Validation and Confidence Level Reporting

To facilitate validation and confidence level reporting, Baker deployed a validation application called Statistical Evaluation and Assessment System (SEAS), shown in Figure 7, which automatically compares the multiple independent validation datasets against the broadband service providers' supplied information. The SEAS application uses statistical methodologies to report the confidence level in the spatial and attribute accuracy of the information. Appendix B shows the validation workflow.

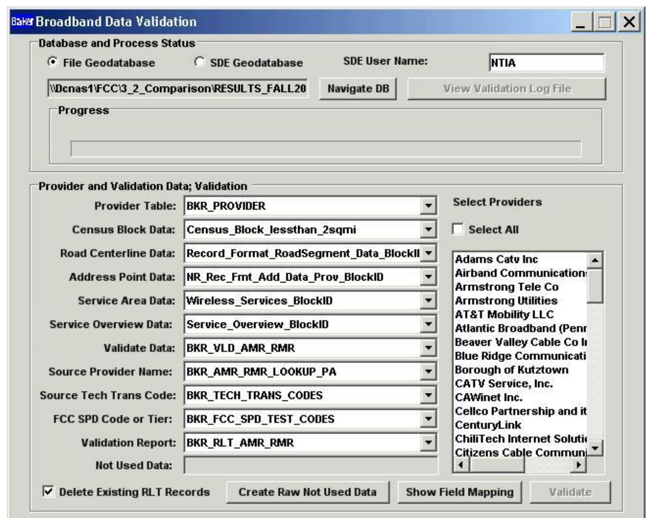


Figure 7 SEAS

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.

After completing all validation data source collections, SEAS is used to automatically compare the multiple validation datasets against the aggregated broadband data which came from the providers. Through the SEAS accumulation table, it produces a match percentage per broadband service record based upon the number of matches that record has against each validation source. The matched percentage for each record is the result of the total count of the matched validations for the record divided by the total validation source being compared against the record. Validation confidence rating/score is assigned on a scale of 1 to 5 based upon the percentage of validation source matches as per the following score results:

- 1 Star = 0% - 19% Match
- 2 Stars = 20% - 39% Match
- 3 Stars = 40% - 59% Match
- 4 Stars = 60% = 79% Match
- 5 Stars = 80% - 100% Match
- “No Analytics” = No validation source available for that provider

The Commonwealth’s public broadband mapping website (www.broadbandinpa.com) is updated with the confidence level results at the record level based upon the queried geographic location and the following shows an example of this representation.

Provider Name	Transmission Technology	Max Download Speed	Max Upload Speed	Confidence Score
AT&T Mobility	Mobile Wireless	Greater than or e…	Greater than or e…	
Verizon	Asymmetric xDSL	Greater than or e…	Greater than or e…	NO ANALYTICS
Comcast	Cable Modem – Other	Greater than or e…	Greater than or e…	

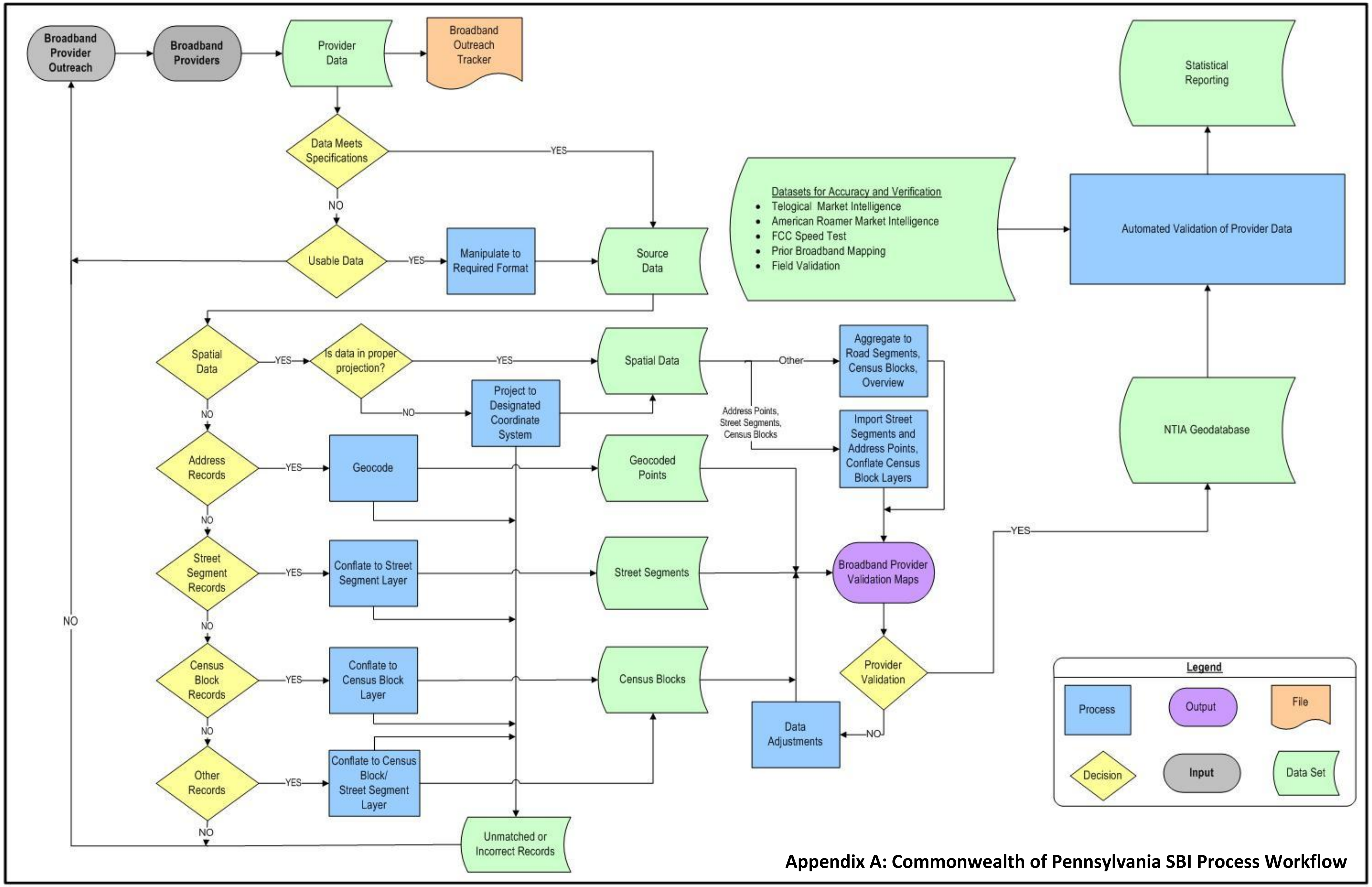
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

Low Confidence Provider Feedback

Provider data which is assigned a low confidence (1 or 2 stars) through the SEAS process is communicated back to the provider through a feedback loop. Generally, the low confidence feedback and reconciliation is a continuous refinement process and usually occurs between update cycles. The goal is to provide this feedback through the Provider Data Update Webportal via a web connection that is available and rolled out to providers in January 2012.

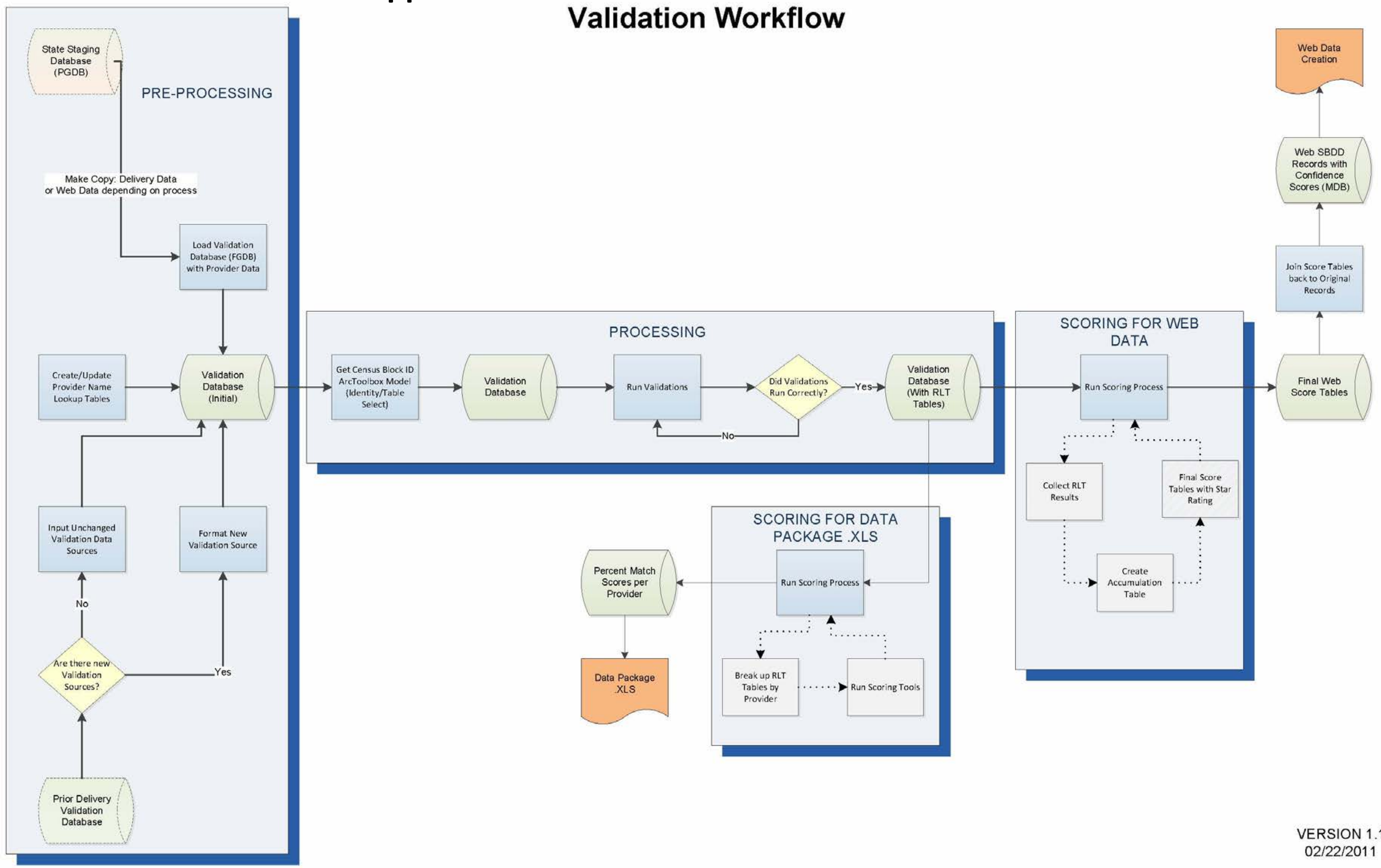
Changes and Corrections Documentation

With each semi-annual NTIA data submittal, changes and corrections documentation is provided. Significant changes in a provider’s status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.



Appendix A: Commonwealth of Pennsylvania SBI Process Workflow

Appendix B: State Broadband Data Validation Workflow



Appendix C: Master Outreach List

Filing Company DBA	Filing Company Name	Status
21st Century Resoration & SLS		Not a Broadband Provider
2s Graphic Design Inc.		Not a Broadband Provider
AboveNet		Not a Broadband Provider
Al's Satellite		Not a Broadband Provider
Alteva Communications		Not a Broadband Provider
Altius Broadband		Not a Broadband Provider
Antietam Cable		Not a Broadband Provider
Buytelco, Inc.		Not a Broadband Provider
CIMCO Communications, Inc.		Not a Broadband Provider
Cincinnati Bell Inc.		Not a Broadband Provider
Citynet Holdings, LLC		Not a Broadband Provider
Clearview Partners		Not a Broadband Provider
Community TV Systems Inc		Not a Broadband Provider
Computer Central		Not a Broadband Provider
Cpudirect Networks, LLC		Not a Broadband Provider
Detwiler Communications Inc (Detwiler Golden Rule Communications, Inc.)		Not a Broadband Provider
DISH		Not a Broadband Provider
DSLBroker.com		Not a Broadband Provider
Dubois Communications Inc		Not a Broadband Provider
Ducom, Inc.		Not a Broadband Provider
EA Media		Not a Broadband Provider
East Palestine Internet		Not a Broadband Provider
Eduro Networks, LLC		Not a Broadband Provider
EZLinx (NEPAdata.com Ventures, LLC)		Not a Broadband Provider
Global Crossing North America, Inc		Not a Broadband Provider
Ground Control		Not a Broadband Provider
Herr Cable		Not a Broadband Provider
Hotwire Communications, Ltd.		Not a Broadband Provider
International Broadband Electric Communications, Inc. (IBEC, Inc)		Not a Broadband Provider
Internet Communications Inc.		Not a Broadband Provider
ISP 1		Not a Broadband Provider
JB Cable		Not a Broadband Provider
Keystone Wireless, LLC d.b.a. Immix Wireless		Not a Broadband Provider
Leap Wireless International, Inc.		Not a Broadband Provider
LightEdge Solutions, Inc.		Not a Broadband Provider
Line Systems, Inc.		Not a Broadband Provider
Metropolitan Telecommunications Holding Co / Netlogic, Inc.		Not a Broadband Provider
Milestone Communications Inc		Not a Broadband Provider

Filing Company DBA	Filing Company Name	Status
Millheim TV Transmission Company		Not a Broadband Provider
MTT First (A/K/A MountainTop Technologies, Inc.)		Not a Broadband Provider
Netrepid		Not a Broadband Provider
OpenRange Communications		Not a Broadband Provider
Optical Telecommunications Inc.		Not a Broadband Provider
PAETEC (formerly Cavalier Telephone LLC)		Not a Broadband Provider
PenTeleData Limited Partnership I		Not a Broadband Provider
Phoenix Cable Incorporated		Not a Broadband Provider
Pitcairn Community Cable		Not a Broadband Provider
Qualcomm (DBA MediaFLO)		Not a Broadband Provider
Qwest		Not a Broadband Provider
Qwest Communications International dba Qwest Communications Company, LLC		Not a Broadband Provider
Reliance Globalcom Services, Inc. (Yipes Communications Group, Inc.)		Not a Broadband Provider
Retel TV Cable		Not a Broadband Provider
SCR Online		Not a Broadband Provider
Snip Link LLC		Not a Broadband Provider
Southside TV (Southside Television Association)		Not a Broadband Provider
Stage 2 Networks, LLC		Not a Broadband Provider
Sunset Net		Not a Broadband Provider
Telovations, Inc.		Not a Broadband Provider
tw telecom inc.		Not a Broadband Provider
Valley Cable Systems		Not a Broadband Provider
Ward Communications		Not a Broadband Provider
Wavecrazy		Not a Broadband Provider
Westfield Community Antenna Assoc.		Not a Broadband Provider
Zampelli Electronics		Not a Broadband Provider
ACC Business	AT&T	Other
Fisk Internet Services, LLC	Getwireless.net, Inc.	Other
Jefferson County Cable	Blue Devil Cable TV, Inc.	Other
Pencor Services, Inc. (PenTeleData)	Blue Ridge Communications	Other
Susquehanna Communications	Comcast Cable Communications, LLC	Other
American Telecharge, Inc.		Potential
BCN Telecom, Inc.		Potential
BetterWorld Telecom, LLC		Potential
Broadband Dynamics, LLC D/B/A Diversified		Potential
Broadstar, LLC		Potential
Broadvox		Potential
Business Automation Technologies, Inc. d/b/a Data Network Solutions		Potential
Cellular One of NEPA (Northeast Pennsylvania)		Potential

Filing Company DBA	Filing Company Name	Status
Cooperative Communications, Inc.		Potential
Country Cable TV		Potential
Covista Communications, Inc.		Potential
cyberMIND		Potential
DSCI Corporation		Potential
DSLOPTIONS		Potential
DynaLink Communications, Inc.		Potential
Easton Telecom Services		Potential
EasyStreet Online Services		Potential
Ernest Communications, Inc.		Potential
FSN Broadband LP		Potential
Interglobe Communications, Inc.		Potential
Interlync Internet Services, Inc.		Potential
LaunchNet		Potential
Layer Four Solutions, LLC		Potential
LocalNet Corp		Potential
Master Vision Cable		Potential
Prescient Worldwide		Potential
Purecom		Potential
SureWire Internet		Potential
Adams Cable Service	Adams Catv Inc	Provider
Armstrong Telephone - North (Duke Center)	Armstrong Tele Co	Provider
Armstrong Telephone- PA (Clinton Area)	Armstrong Tele Co	Provider
Armstrong Utilities	Armstrong Utilities	Provider
AT&T Corp, Inc.	AT&T Corp, Inc.	Provider
AT&T Mobility LLC	AT&T Mobility LLC	Provider
Atlantic Broadband	Atlantic Broadband (Penn), LLC	Provider
Beaver Valley Cable	Beaver Valley Cable Co Inc.	Provider
Bentleyville Communications Corporation	FairPoint Communications	Provider
Blue Devil Cable	Blue Devil Cable TV, Inc.	Provider
Blue Ridge Communications	Blue Ridge Communications	Provider
Broadview Networks Holdings, Inc.		Provider
Brockway Tv Inc		Provider
CABLEVISION	CSC HOLDINGS, INC	Provider
CATV Service	CATV Service, Inc.	Provider
CAWinet	CAWinet, Inc.	Provider
CenturyLink	CenturyTel, Inc.	Provider
ChiliTech Internet Solutions, Inc.	ChiliTech Internet Solutions, Inc.	Provider
Citizens Cable Communications	Citizens Cable Communications	Provider
Citizens of Kecksburg	Citizens of Kecksburg	Provider
Clarity Connect, Inc.	Clarity Connect, Inc.	Provider
Clear.com	Clearwire Corporation	Provider
Coaxial Cable Tv Corp	Coaxial Cable Tv Corp	Provider
Cogent Communications, Inc.	Cogent Communications, Inc.	Provider

Filing Company DBA	Filing Company Name	Status
Comcast	Comcast Cable Communications, LLC.	Provider
Consolidated Communications	Consolidated Communications	Provider
Conterra Ultra Broadband, LLC	Conterra Ultra Broadband Holdings, Inc.	Provider
CONXX	CONXX	Provider
Covad Communications Company	DIECA Communications, Inc.	Provider
Cricket Communications, Inc.	Leap Wireless International, Inc.	Provider
DBSi		Provider
DEPOSIT TELEPHONE COMPANY, INC.	TDS TELECOM	Provider
DirecTV		Provider
EagleZip.com	EagleZipCom LLC	Provider
Evenlink		Provider
Fibertech	Fiber Technologies Networks, L.L.C.	Provider
Frontier Communications	Frontier Communications	Provider
Frontier Communications of Breezewood	Frontier Communications	Provider
Frontier Communications of Canton	Frontier Communications	Provider
Frontier Communications of Oswayo	Frontier Communications	Provider
Full Service Computing Corp		Provider
Gap CableTV	Gap CableTV	Provider
Getwireless.net, Inc.	Getwireless.net, Inc.	Provider
Hancock Telephone Co	Hancock Telephone Co	Provider
Hickory Telephone Company	Hickory Telephone Company	Provider
Hometown Utili-com	Borough of Kutztown	Provider
HughesNet	Hughes Communications, Inc.	Provider
Hydrosoft Internet		Provider
ICON Technologies Inc.		Provider
Innernet, Inc.		Provider
Ironton Telephone Co	Ironton Telephone Co	Provider
KCnet	Keystone Community Network, Inc.	Provider
Kuhn Communications	Kuhn Communications	Provider
Lackawaxen Telephone Co	Lackawaxen Telephone Co	Provider
Lantek	Lantek	Provider
Laurel Highland Telephone Company	Laurel Highland Telephone Company	Provider
Level 3 Communications, LLC	Level 3 Communications, LLC	Provider
Lumos Networks (Formerly Ntelos Media)		Provider
MAHANOY & MAHANTANGO TELEPHONE COMPANY	TDS TELECOM	Provider
Marianna and Scenery Hill Telephone Company	FairPoint Communications	Provider
MetroCast Communications	Gans Communications, LP	Provider
One Communications	One Communications	Provider
Navpoint Internet		Provider
Netcarrier Telecom, Inc.	Netcarrier Telecom, Inc.	Provider
Netconex		Provider

Filing Company DBA	Filing Company Name	Status
Nitel, Inc.		Provider
Nittany Media, Inc.		Provider
Noroc Broadband	Noroc Broadband LLC	Provider
North Penn	North Penn	Provider
Northeastern Telephone	Northeastern Telephone	Provider
One Communications	One Communications	Provider
One Communications		Provider
PaCLEC Corporation		Provider
PAETEC Communications, Inc.	PAETEC Communications, Inc.	Provider
Palmerton Telephone Co	Palmerton Telephone Co	Provider
Pennsylvania Telephone Co	Pennsylvania Telephone Co	Provider
PulseNet		Provider
Pymatuning Indep. Tel. Company	Pymatuning Indep. Tel. Company	Provider
QCOL, Inc	QCOL, Inc	Provider
Raystown Wireless		Provider
Service Electric Cable TV, Inc.	Service Electric Cable TV, Inc.	Provider
Service Electric Cablevision, Inc.	Service Electric Cablevision, Inc.	Provider
Shen-Heights TV Associates, Inc.	Shen-Heights TV Associates, Inc.	Provider
Sidera Networks	Sidera Networks, LLC	Provider
Skycasters	Skycasters, LLC	Provider
SkywayUSA	Skyway	Provider
Smoothstone IP Communications		Provider
South Canaan Telephone Company	South Canaan Telephone Company	Provider
Sprint	Sprint Nextel Corporation	Provider
StarBand Communications Inc.	StarBand Communications Inc.	Provider
StarLinX	StarLinX	Provider
StarTec Global Communications		Provider
Sti Wireless		Provider
Sting Communications	Sting Communications	Provider
SUGAR VALLEY TELEPHONE COMPANY	TDS TELECOM	Provider
Tele-Media	Tele-Media Company of Zion, LLC	Provider
Telnes Broadband		Provider
TIME WARNER CABLE	TIME WARNER CABLE LLC	Provider
T-Mobile	T-Mobile USA, Inc.	Provider
Towerstream Corporation		Provider
Transbeam Inc.		Provider
U.S. Cellular		Provider
Usa Choice Internet Services Company, Llc	Usa Choice Internet Services Company, Llc	Provider
Venus Telephone Corporation	Venus Telephone Corp.	Provider
Verizon Pennsylvania Inc.	Verizon Pennsylvania Inc.	Provider
Verizon Wireless	Cellco Partnership and its Affiliated Entities	Provider
Wave2Wave Communications	Wave2Wave Communications, Inc.	Provider

Filing Company DBA	Filing Company Name	Status
West Side Telecommunications	West Side Telephone Company	Provider
WestPAnet	WestPAnet	Provider
WildBlue Communications, Inc.	WildBlue Communications, Inc.	Provider
Windstream	Windstream Pennsylvania, Inc	Provider
Wire Tele-View Corp.	Wire Tele-View Corp.	Provider
Wireless PA Internet Access		Provider
WorldConnX, Inc.		Provider
XO Communications Services, Inc. (Affiliated Entity)	XO Communications, LLC	Provider
Yukon Waltz Telephone Company	Yukon Waltz Telephone Company	Provider
Zito Media	Zito Media, L.P.	Provider
1USA.COM		Reseller
A P Wireless		Reseller
Access Northeast		Reseller
Advanced Mobile Group		Reseller
Airespring, Inc.		Reseller
American Digital Online Services, Inc. (ADOS)		Reseller
American Telephone Company LLC		Reseller
Bandwidth.com		Reseller
Beacon Technologies		Reseller
Broad Sky Networks		Reseller
Broadband National		Reseller
Broadband.com		Reseller
Budget Prepay, Inc. D/B/A Budget Phone, Inc.		Reseller
BullsEye Telecom, Inc.		Reseller
Cablesat		Reseller
Charter Internet		Reseller
Csolutions, Inc.		Reseller
Cyberonic Internet Communications, Inc.		Reseller
DCT Telecom Group, Inc.		Reseller
Delmarva T1		Reseller
Diehl Michael J Cable Television D/B/A Somerfield Cable TV		Reseller
Digital Connections, Inc.		Reseller
Drizzle		Reseller
DSL Extreme		Reseller
Earthlink (D/B/A New Edge Network, Inc.)		Reseller
Entelegent Solutions, Inc.		Reseller
Graybar		Reseller
Hans Cedardale Satellite Inc.		Reseller
In the Stix Broadband, LCC		Reseller
IPNS		Reseller
Juno Online Services, Inc.		Reseller

Filing Company DBA	Filing Company Name	Status
Matrix Business Tech		Reseller
Meriplex Communciations, Ltd		Reseller
NetZero, Inc.		Reseller
New Edge Holding Company dba New Edge Network, Inc.		Reseller
North Central Internet		Reseller
One-Stop Communications		Reseller
Philadelphia Cable TV Internet Phone		Reseller
Philadelphia High Speed Wireless Internet		Reseller
Presque Isle Technology Solutions		Reseller
RealLinx		Reseller
Satellite Internet Broadband		Reseller
Self Service America, discount ISP		Reseller
Steel City Broadband		Reseller
Telefonica Data Corp SA dba Telefonica USA, Inc.		Reseller
TOAST.net Internet Service		Reseller
Tracon Telecom		Reseller
UHP Wireless Networks		Reseller
USA Digital Communications		Reseller
Virtuallycheap Internet Services		Reseller
Zayo Bandwidth Northeast, LLC		Reseller

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

CONNECT 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
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the Commonwealth of Puerto Rico have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Puerto Rico as a polygon of the 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.

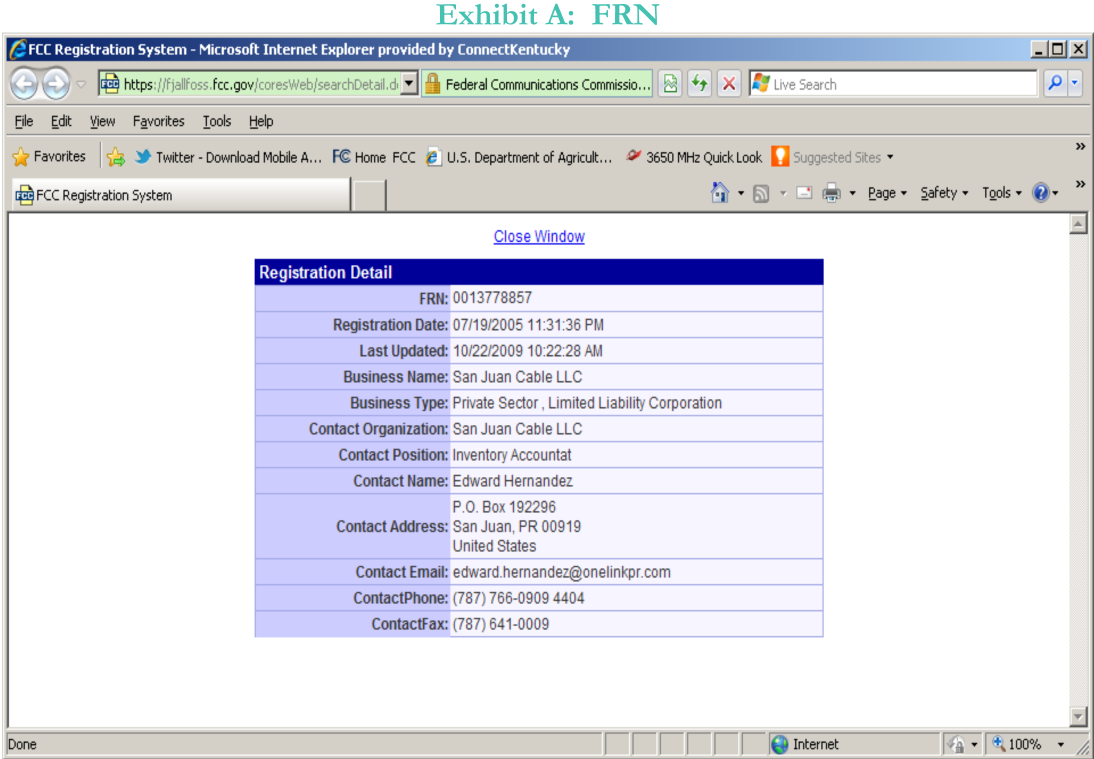
The Issue

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


FCC Registration System - Microsoft Internet Explorer provided by ConnectKentucky

Close Window

Registration Detail	
FRN:	0013778857
Registration Date:	07/19/2005 11:31:36 PM
Last Updated:	10/22/2009 10:22:28 AM
Business Name:	San Juan Cable LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	San Juan Cable LLC
Contact Position:	Inventory Accountat
Contact Name:	Edward Hernandez
Contact Address:	P.O. Box 192296 San Juan, PR 00919 United States
Contact Email:	edward.hernandez@onelinkpr.com
ContactPhone:	(787) 766-0909 4404
ContactFax:	(787) 641-0009

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

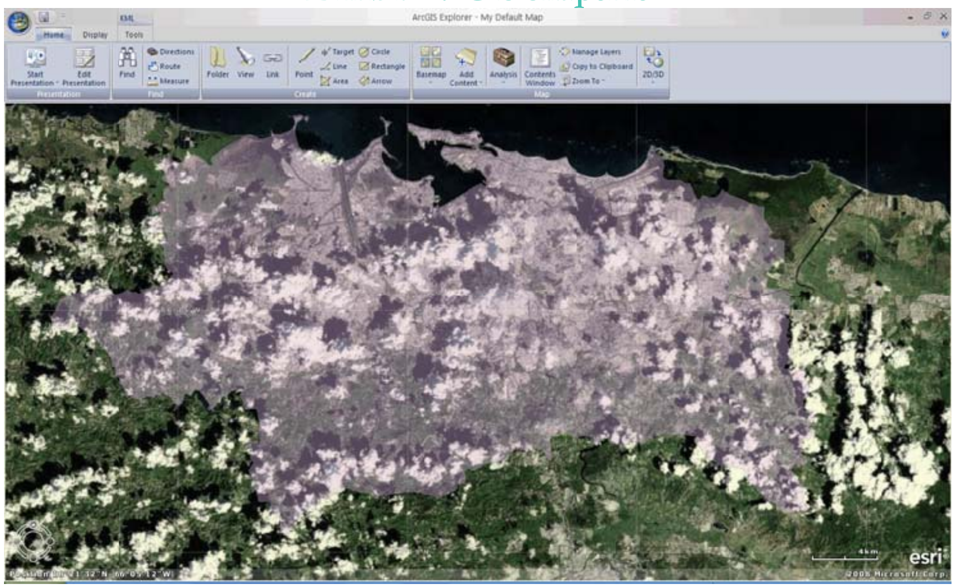
State Broadband Data Submission				FCC Form 477 (June 2009)		
FRN	**Company Name**	**Doing Business As**	**#**	**FRN**	**Company Name**	**Doing Business As**
4979233	AT&T Mobility LLC	AT&T Mobility LLC	1	0003756532	AT&T Inc.	New Cingular Wireless Services, Inc.
001731470	America Movil	Puerto Rico Telephone 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	0018453073	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	0003605953	Qwest Communications Internation	Qwest Communications Company, LLC
			10	0013778857	San Juan Cable Holding, LLC	San Juan Cable LLC
			11	0003774593	Sprint Nextel Corporation	Sprint Nextel Corporation
			12	0005087457	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.

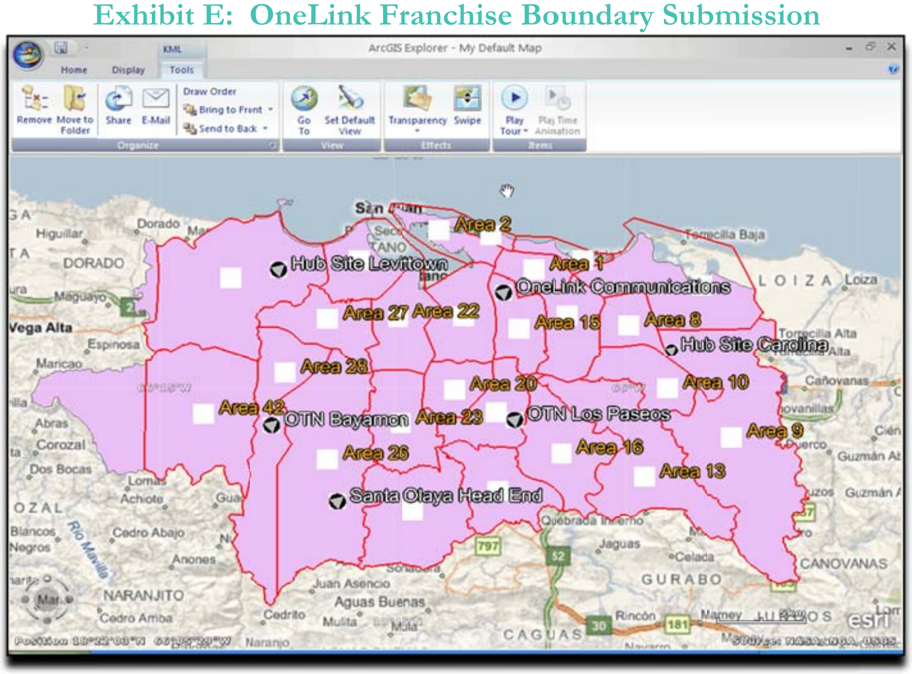
Exhibit C: Municipal Boundaries

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

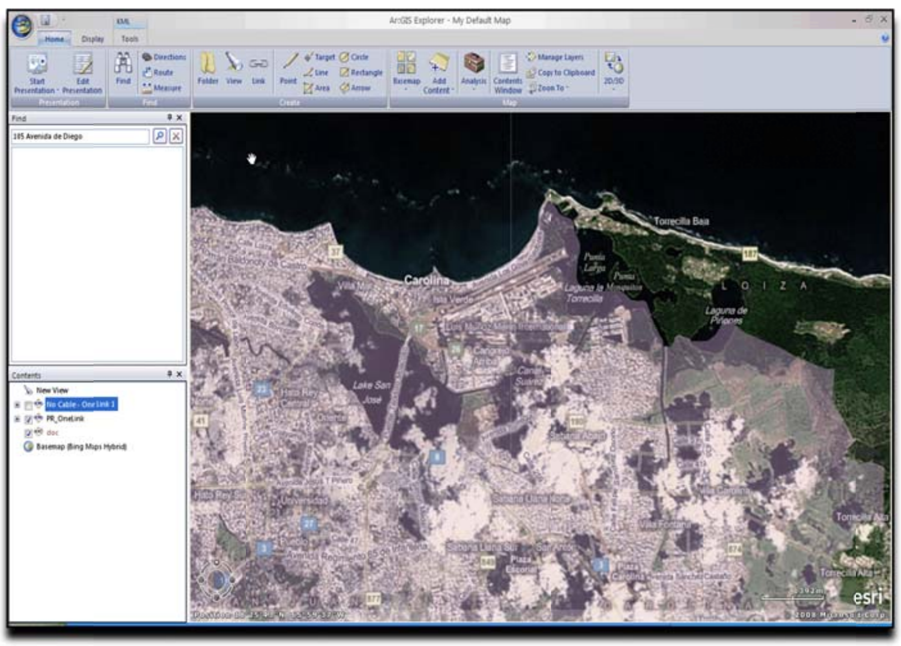


Using this combined coverage polygon as the basis for further investigation, Connected Nation set out on an exploratory "drive test" to determine where cable plant existed and estimate where cable modem likely existed in the greater San Juan area. During the period of February 7-11, 2011, Connected Nation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

Testing Techniques

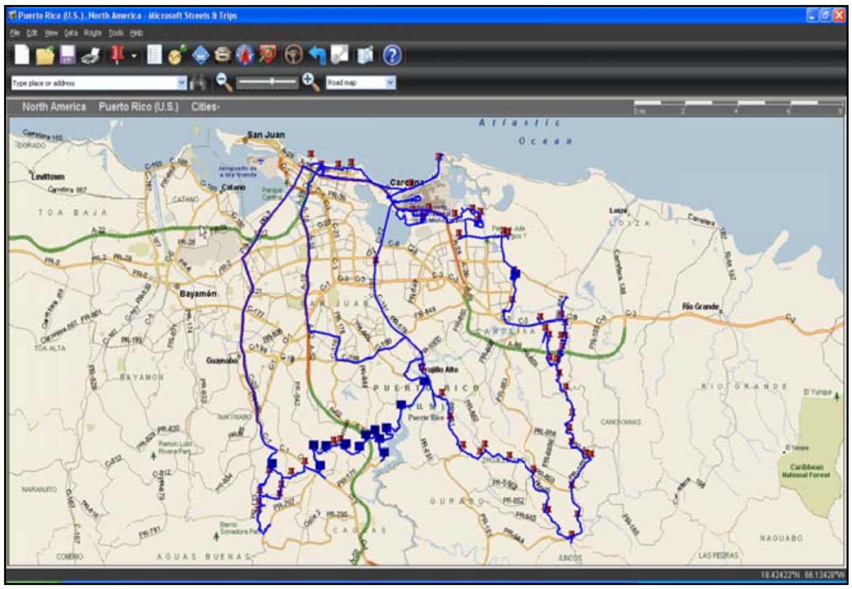
Specific quadrants **(Exhibit F)** were assigned to each of the validation teams on a daily basis. The goal was to drive through each of the areas and determine the existence (or lack thereof) of CATV plant – whether fiber or coaxial.

Exhibit F: Sample Quadrant



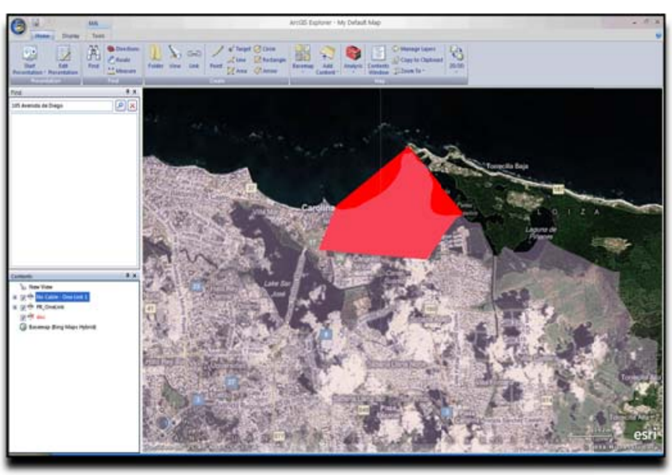
Test points were pre-selected and entered into Microsoft's *Streets & Trips* software **(Exhibit G)**, which also created a GPS-enabled "trace route" of each day's drive testing activities. As cable plant was identified, markers were placed within *Streets & Trips*, pinpointing the areas where service 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

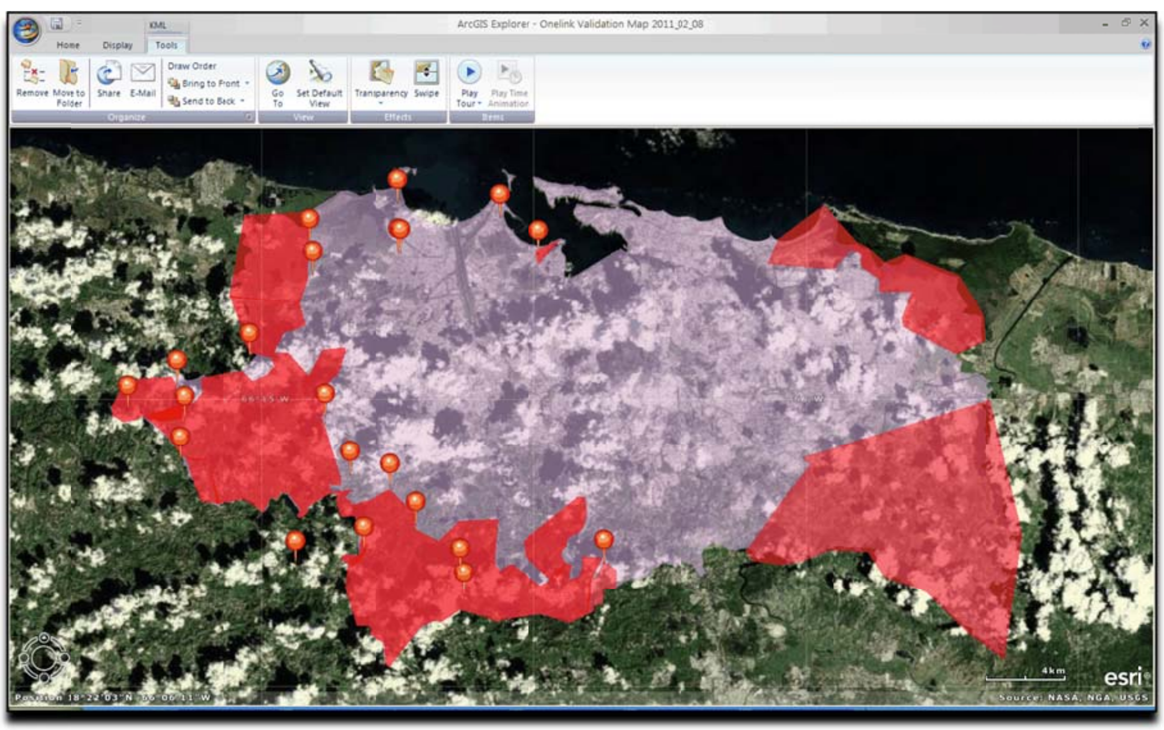
Exhibit K: Above Ground Pedestal

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.

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		

Rhode Island
Broadband Mapping Project
March 2012 Data Submission - Summary and Processes

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Broadband Rhode Island
An initiative of the RIEDC

RECOVERY.GOV

EA Engineering, Science, and Technology, Inc.

Section A: The Broadband Rhode Island Mapping Team Overview

In support of the national broadband initiatives undertaken by President Obama and the Federal Government through the American Recovery & Reinvestment Act of 2009 (Recovery Act), Public Law No. 111-5, and the Broadband Data Improvement Act (BDIA), title I of Public Law No. 110-385, 122 Stat. 4096, the Rhode Island Economic Development Corporation (RIEDC), as the entity assigned by former Governor Donald Carcieri, has been awarded grant funds from the United States Department of Commerce – National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program.

Project Description
EA Engineering, Science, and Technology, Inc. (EA), has been selected by RIEDC, through their Broadband Initiative for Rhode Island (BBRI) to provide a data management and retrieval system for RIEDC. RIEDC and EA entered into a contractual agreement on January 15, 2010 for a base period of 2 (two) years with 3 (three) optional years. The work assignment consists of negotiating non disclosure agreements (NDA) with the State's broadband providers, collecting provider broadband data, verifying data submitted, combining and updating data collected, developing and implementing a broadband website with mapping application, and reporting findings to RIEDC and the NTIA.

This program has created a statewide broadband map which will be maintained for five (5) years, that assesses broadband infrastructure in Rhode Island and distinguishes between served, underserved, and un-served communities as per the definition specified by NTIA. The data has been made available to the public, with certain restrictions to account for confidentiality of supplier information, through a state website and is linked to a Federal Department of Commerce webpage. The goal of this project is to meet the RIEDC's broadband mapping needs and in doing so provide maps and information that will be used to lend guidance and assistance in the planning of future broadband infrastructure development, as well as provide numerous broadband options to the end users.

The BBRI is a comprehensive effort aimed at producing a high level of detailed inventory of broadband services provided to residential, government and business consumers within the State of Rhode Island. The project is not only a Geographical Information Systems (GIS) mission but a project that needs expertise in GIS, contracting and legal issues, Quality Assurance/Quality Control (QAQC), and project management. In order to acquire, collect, process, analyze and display the data that represents these services it was necessary to combine the resources of several professional firms. Each team member provides unique set of strengths and capabilities needed to create the system that is in place. The team is made up of Rhode Island Economic Development Corporation (RIEDC), EA Engineering (EA), University of Rhode Island (URI), Adler Pollock & Sheehan P.C. (AP&S), Eastern Shore Regional GIS Cooperative (ESRGC), and Mapping

& Planning Services (M&PS). The following paragraphs provide information on each team member and their role the project.

The RIEDC is leading the project efforts for the State of Rhode Island (RI). Led by Mr. Stuart Freiman, they oversee all facets of the project and teams involved. The RIEDC coordinates schedules, communicates directly with the National Telecommunications Information Agency (NTIA), reviews and approves all project deliverables, and ensure all project deadlines are met. With their high visibility in the RI business community they are instrumental in arranging meetings between broadband providers and BBRI Team members. The relationship and communication RIEDC has with the State's providers was and continues to be instrumental in making the process of collecting and verifying information from the providers as effortless as possible.

EA is the prime contractor selected to lead the State's data collection, verification, reporting, and mapping efforts. EA has been providing scientific and engineering technical solutions to a wide range of government and industrial clients since 1973. Serving IT and GIS solutions via the web has become a standard business solution for EA's clients. As the prime contractor EA works closely with the RIEDC on all phase of the BBRI project. Included in the work EA has done to date, is the creation of the State's broadband website and mapping application (Digital Atlas). The website provides information on the project, links to related sites, custom mapping capabilities, and user speed test and feedback forms. The site can be viewed at the following address; http://broadband.ri.gov/.

M&PS has been providing GIS consulting services in RI for over 20 years. For the RI Broadband Mapping project, M&PS assisted in the development of a verification and analysis process which is used to perform the QA/QC of the data prior to submitting to the NTIA. Prior to each bi-annual NTIA submittal M&PS uses this process to review and check the data. During this process MP&S checks for positional and attribute accuracy of the data by using a random sampling methodology. The service MP&S provides insures data going to the NTIA is of the highest accuracy and precision. Additional M&PS provides data analysis and static maps displaying the data status at each delivery date.

The GIS laboratory in the URI's Department of Natural Resources is the center of technical expertise in the GIS field for the State of RI. On this project URI manages all GIS data report by EA to the RIEDC. They also serve as an additional tier of QA/QC on the data that is collected and submitted to the NTIA. URI provides technical input to the data processes and the types of maps and data to be displayed on the website. Additionally, several data layers including Community Anchor Institute locations and base map layers being used on the Digital Atlas are provided by URI.

The Eastern Shore Regional GIS Cooperative (ESRGC) is an organization that provides technical support, training, and GIS services to local governments on the Eastern Shore of Maryland. In addition to supporting the BBRI project, ESRGC is leading the broadband mapping efforts for the state of Maryland. For the BBRI project, the ESRGC's provides the project team technical advisor support. They provide guidance on the project's technical approach and peer review support based on knowledge gained from their work in Maryland. ESRGC provided assistance in defining requirements for the QA/QC process, database design, and data verification tasks. The ESRGC provides the Team with a "lessons learned" from the Maryland Broadband project which guided the BBRI Team around common mistakes made on broadband mapping projects.

AP&S is a local RI law firm providing legal advice and representation and has been servicing RI residents and firms for 50 years. The role AP&S plays on this project is providing the necessary legal advice and contracting that is necessary between the RIEDC and the broadband providers. To date, AP&S has brokered the Non-Disclosure Agreements (NDA's) between the RIEDC and 16 broadband providers. These agreements were imperative and had to be in place before any data was submitted by the broadband providers. All provider broadband information that is made public is based on what the NDAs state. AP&S became the State's expert as to what information was legal for the team to make available to the public and modeled the NDAs off of the guidance provided in the NOFA.

Project Contacts

Contact	Project Role	Phone	Email
Rhode Island Economic Development Corp (RIEDC)			
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Brian Lesinski	Senior Technical	401-736-3440	blesinsk@eaest.com

	Advisor		
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Adler Pollock & Sheehan (APS)			
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Kristen Sherman, Esq.	Legal Team	401-274-7200	KSherman@apslaw.com
Mapping & Planning Services (M&PS)			
Mary Hutchinson., GISP	Verification Analyst	401-423-3841	mhutch@mappingplanning.com
Eastern Shore Regional GIS Cooperative (ESRGC)			
Michael Scott, Ph.D., GISP	Senior Technical Advisor	410-543-6083	msscott@salisbury.edu

BROADBAND PROVIDER DATA VERIFICATION REPORT
RHODE ISLAND DATA SUBMITTAL #4
MARCH 30, 2012

General Findings:

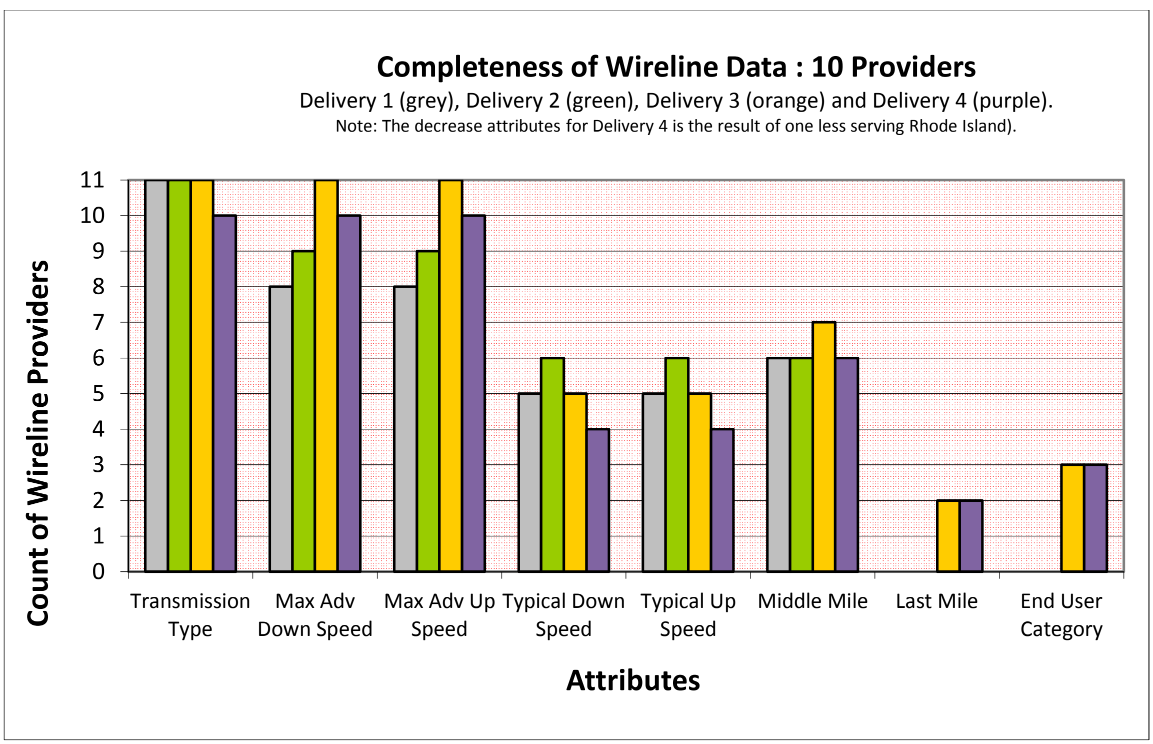
- Rhode Island has extensive broadband coverage from 18 providers. These 18 providers offer broadband coverage for the entire state of Rhode Island.

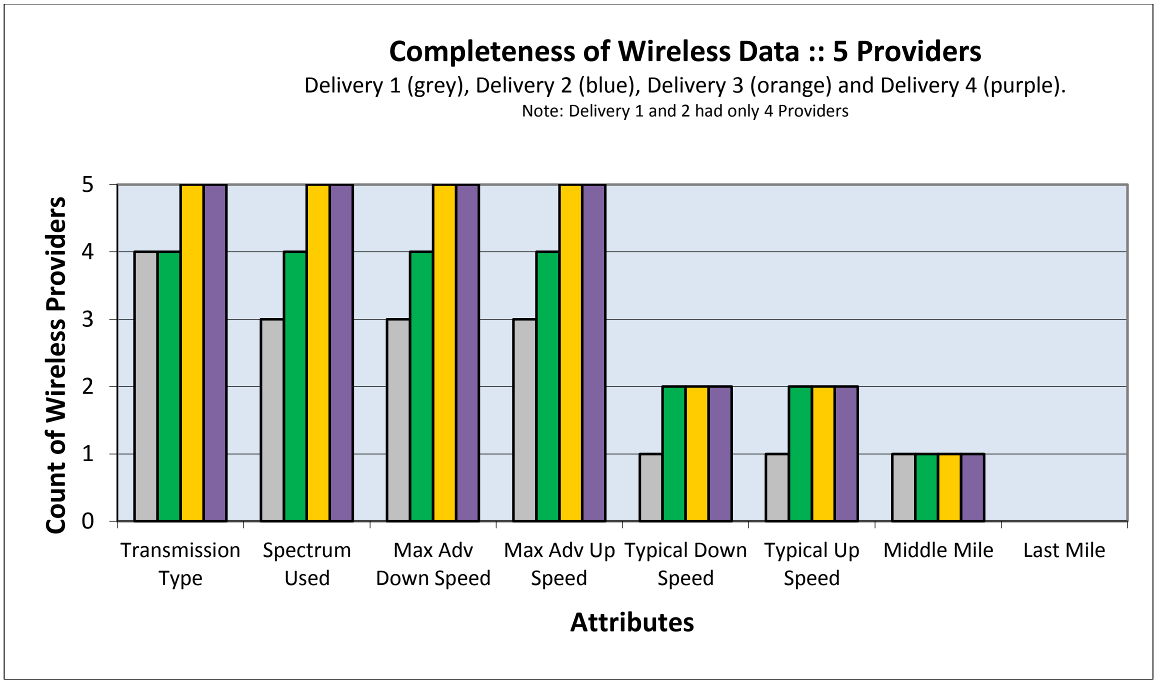
- Broadband availability on a census block basis is summarized in the Figure below:

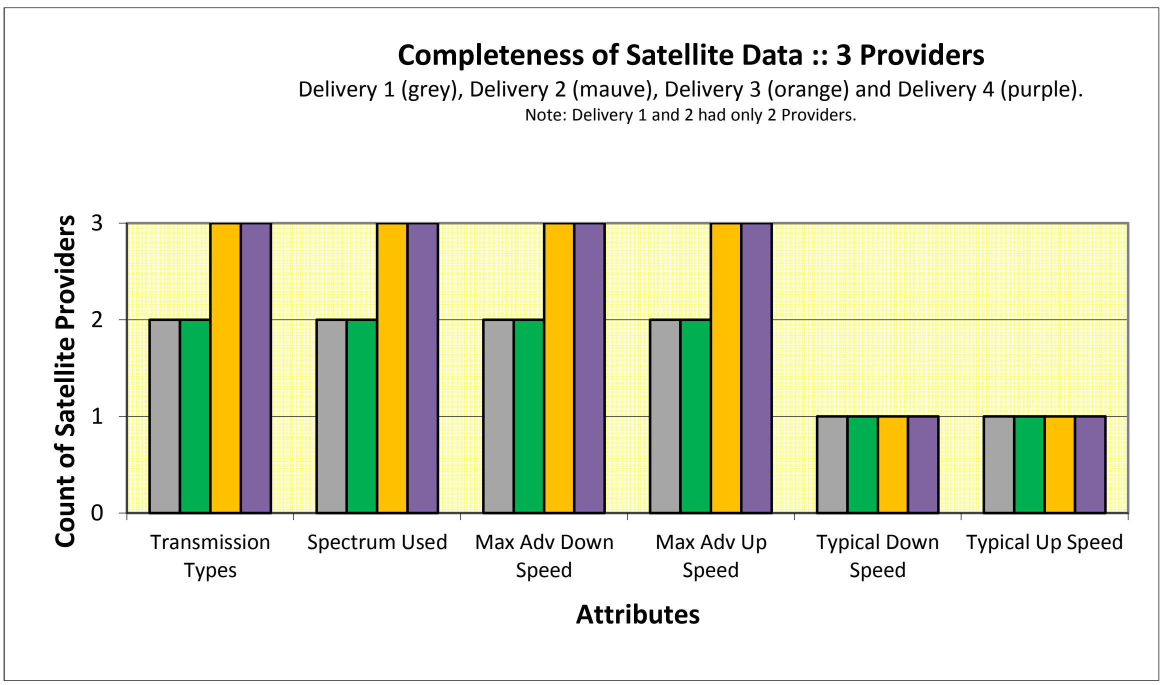
Broadband Availability	Census Blocks	% of Total
Unserved; census block has no access to broadband	0	0
Underserved: Two to three broadband providers	123	<1
Competitive: Four to Six broadband providers	316	<1
Seven to Nine broadband providers	9,675	38
Ten to Thirteen broadband providers	15,056	60
Fourteen to Sixteen broadband providers	11	<1
Total	**25,181**	**100**

Note: Several of the Provider datasets do not show coverage of some census blocks in Rhode Island coastal waters (for example, the satellite providers). This results in some over-reporting of the availability results at the low end, in particular, the underserved figures. Broadband is defined as being wireline, wireless and satellite service for this table.

- A total of 18 broadband Providers submitted data; 10 wireline, 5 wireless, and 3 satellite. The completeness of the attributes in the 18 providers' datasets is summarized in the Figures below. (Statistics for NTIA Delivery 1, 2, and 3 are included for comparison purposes).







- Middle Mile data was provided by 7 broadband providers. There were a total of 23 facilities (13 owned and 10 leased).
- Last Mile data was provided by 2 broadband providers.

- A total of 983 Community Anchor Institutions (CAIs) are identified. These were verified with available Rhode Island Geographic Information System (RIGIS) datasets and 204 RIEDC and FCC speed tests.

- The RIEDC collected 2,177 speed tests in 498 (2%) of the census blocks within the State. These tests are for the period 3/1/2011 to 3/1/2012.

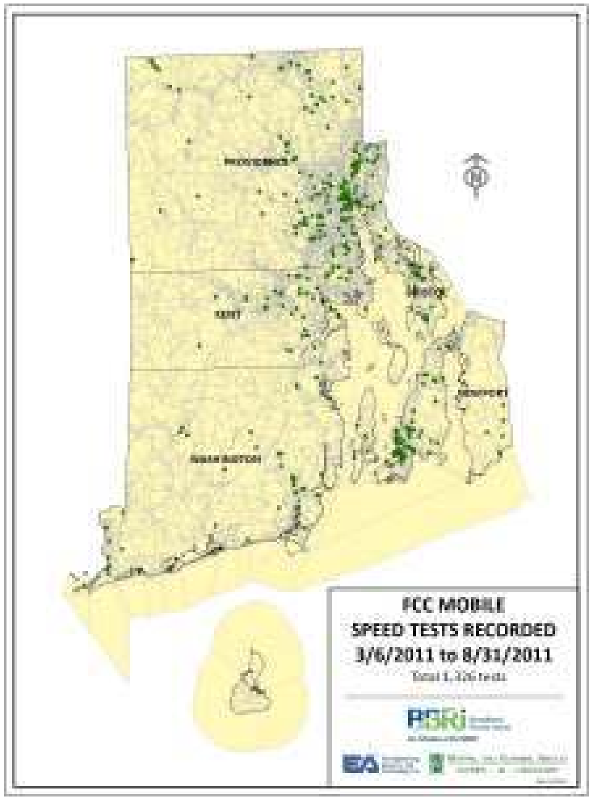
- A total of 228 wireline speed tests from FCC were used for the verification. These tests are for the period 3/1/2011 to 8/25/2011 and cover 110 (<1%) of the census blocks within the State. Tests were collected by OOKLA and MLAB.

- FCC tests for Mobile Applications (accessing Cellular and Wi-Fi) are also used for the verification. These 1,326 speed tests are recorded for the period 3/6/2011 to 8/31/2011 and cover 360 (1.4%) of the census blocks within the State. These tests were collected by OOKLA.

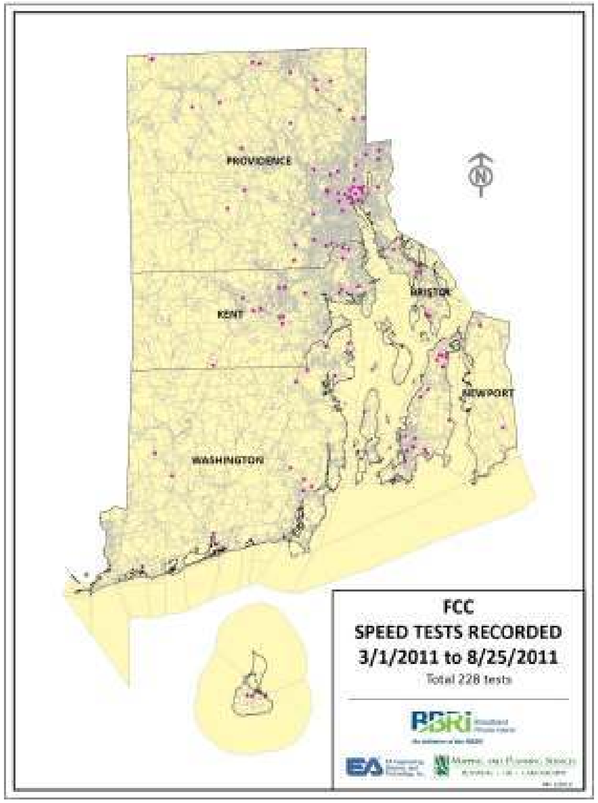
- A total of 3,732 speed tests (RIEDC, FCC, and FCC Mobile Applications) were used for verification purposes. These were distributed within 924 (3.7%) of the 2010 US Census Bureau's 25,181 census blocks in the state. The distribution of each of these sources/types of tests is similar and follows population and household patterns across the State. The distribution of the speed tests are shown in the Figures on the following page.

- A total of 56 census blocks are greater than 2 sq. miles, with 28 over land and 28 over open water areas. Road Segment data was provided by 1 provider. Service Address data was provided by 1 provider. All land-based census blocks greater than 2 sq. miles had road segment or service address data submitted by the respective providers.

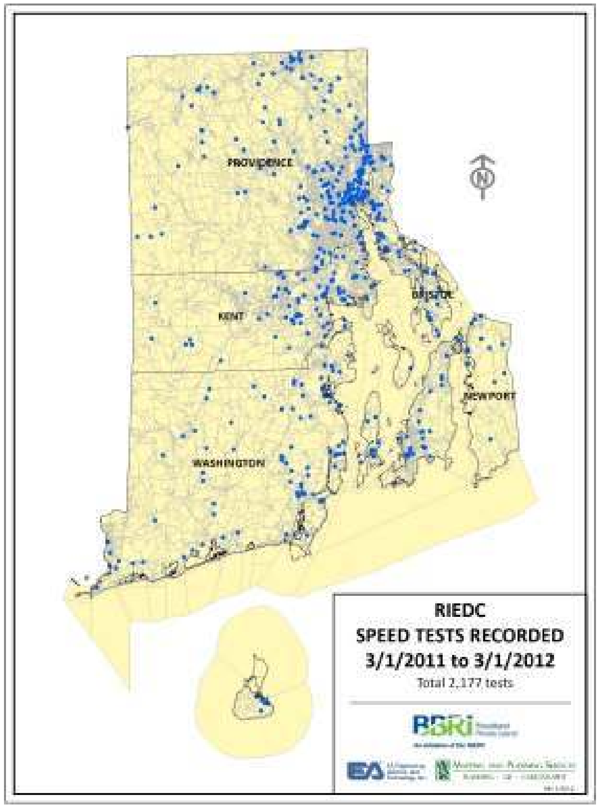
The Figures below show the distribution of speed tests used for verification purposes.



FCC Collected Speed Test - Mobile

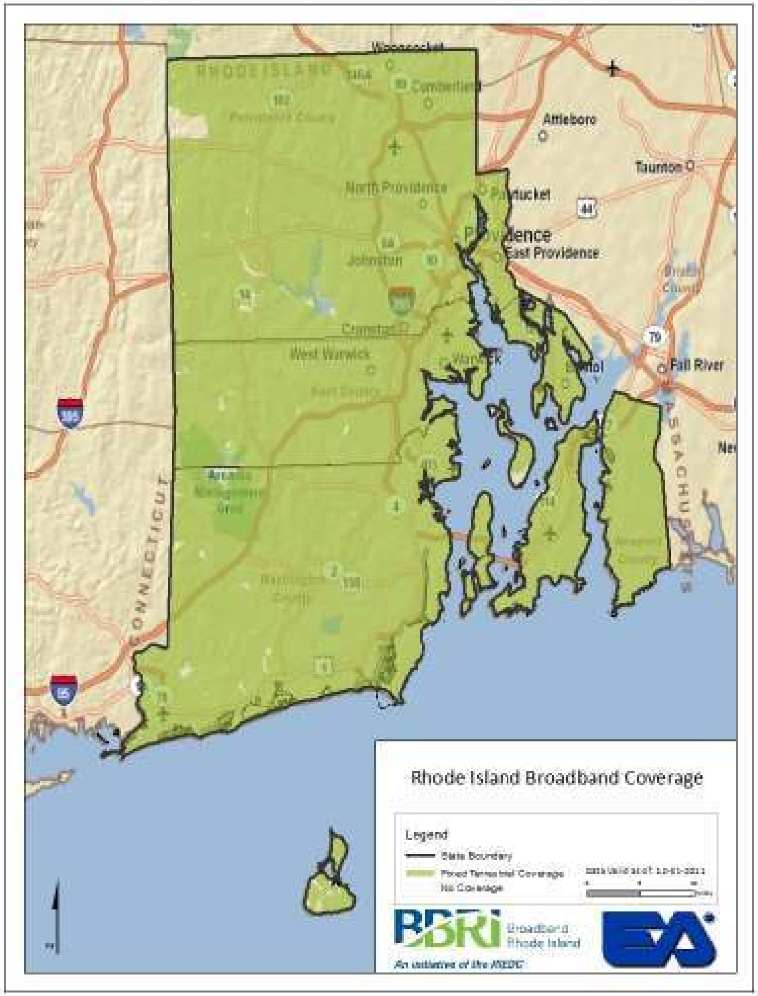


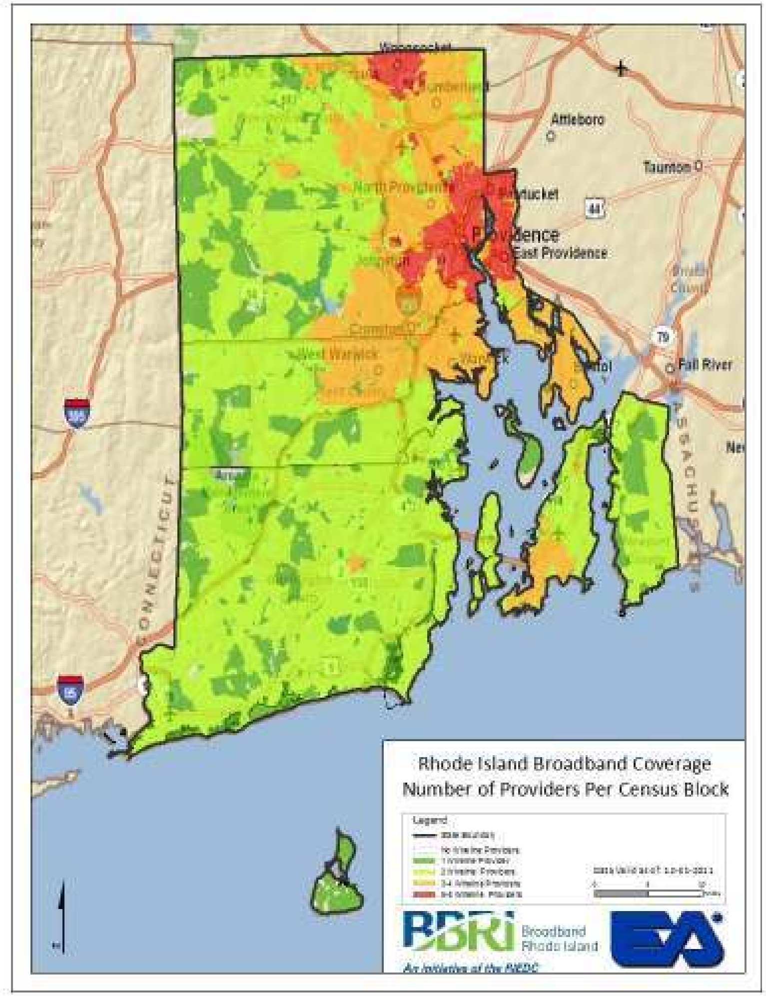
FCC Collected Speed Test - Wireline



RIEDC Collected Speed Test

The Figures below display the wireline coverage areas reported in Rhode Island and the number of providers available per census block.





Rhode Island Broadband Wireline Coverage Map

Number of Providers Available Per Census Block

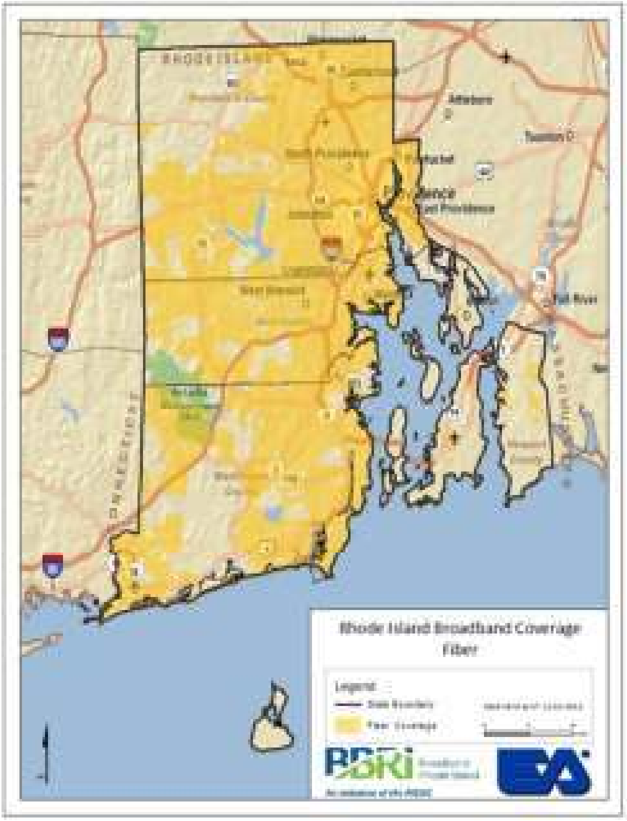
The Figures below display the availability of each technology types offered in Rhode Island.

Satellite Coverage

Copper Wireline Coverage

Cable Coverage

The Figures below display the availability of each technology types offered in Rhode Island.



Fiber Optic Coverage

Wireless Coverage

DSL Coverage

Provider Name: Above Net Communications Inc.
DBA: AboveNet

Data Characteristics

FRN:	0000820598
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	2
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	YES
Provided End User Category:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: Not provided

Number of technology transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 1, 6

Count and Capacity of Last Mile Facilities: 1, 9

End user Category: 2

Data Verification:

Counties served by provider and number of census blocks with service. A total of 2 census blocks are served.

County	Census Block per County
Bristol	0
Kent	0
Newport	0
Providence	2
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Application [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0

Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

Middle Mile facilities outside of reported service area: Facility is located within the reported service area.

Last Mile facilities outside of reported service area: Facility is located within the reported service area.

%/# of census blocks verified by RIEDC & FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	2
% of served census blocks confirmed by speed test	0

Footnotes:
1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: AT&T Mobility LLC
DBA: AT&T Mobility LLC

Data Characteristics

FRN:	0004979233
Type of Data Submitted:	Wireless
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	NO
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
4	3

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types and spectrums reported by provider: 1, with 2 spectrums

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,989 census blocks are served.

County	Census Blocks per County
Bristol	1,087
Kent	4,173
Newport	2,343
Providence	13,148
Washington	4,238

Greatest down/upload speed from RIEDC [1] speed tests: 9,8
Greatest down/upload speed from FCC [2] speed tests: No FCC speed tests were taken
Greatest down/upload speed from FCC [3] Mobile Application speed tests: 7, 7

Count of RIEDC speed tests: 1
Count of FCC speed tests: 0
Count of FCC Mobile Application speed tests: 20

Speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	8
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,989
% of served census blocks confirmed by speed test	<1%

Middle mile facilities outside of reported service area: No middle mile facilities.

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Broadview Networks, Inc.
DBA: Broadview Networks, Inc.

Data Characteristics

FRN:	0003775285
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	9,952
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	Partial
Provided Typical Upload Speed:	Partial
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq. miles:	NO
Provided Address Points for census block greater than 2 sq. miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category	Count
10	5	5	3
20	5	5	7
30	10	10	7,149
50	11	11	4,755

Typical down/upload speeds reported by provider: No speeds were provided

Number of technology transmission types reported by provider: 4

Count of Middle Mile Facilities: 8

End user Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 9,952 census blocks are served.

County	Census Block per County
Bristol	4
Kent	1,110
Newport	959
Providence	7,872
Washington	7

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: 4, 4
Greatest down/upload speed from FCC Mobile Application [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 1
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

Middle mile facilities outside of reported service area: All are centrally located within the reported census blocks.

%/# of census blocks verified by RIEDC & FCC speed tests:

Confirmation of census block served	1
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	9,952
% of served census blocks confirmed by speed test	<1%

Footnotes:
1. RIEDC Date Range: 3/1/2011 to 3/1/2012
2. FCC Date Range: 3/1/2011 to 8/25/2011
3. FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Cellco Partnership
DBA: Verizon Wireless

Data Characteristics

FRN:	0003290673
Type of Data Submitted:	Wireless
Census Block Count:	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
7	5

Typical down/upload speeds reported by provider: 6, 5

Number of technology of transmission types and spectrums reported by provider: 1, with 4 spectrums

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,960 census blocks are served.

County	Census Blocks per County
Bristol	1,087
Kent	4,153
Newport	2,341
Providence	13,146
Washington	4,233

Greatest down/upload speed from RIEDC [1] speed tests: 3, 2
Greatest down/upload speed from FCC [2] speed tests: <3, 1
Greatest down/upload speed from FCC Mobile Application [3] speed tests: 4, 3

Count of RIEDC [1] speed tests: 4
Count of FCC [2] speed tests: 6
Count of FCC Mobile Applications [3] speed tests: 146

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	62
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,960
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Clearwire
DBA: Clearwire

Data Characteristics

FRN:	0017775628
Type of Data Submitted:	Wireless
Census Block Count:	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	NO
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
5	3

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types and spectrums reported by provider: 1, with 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 11,542 census blocks are served.

County	Census Blocks per County
Bristol	62
Kent	2,874
Newport	7
Providence	8,546
Washington	53

Greatest down/upload speed from RIEDC [1] speed tests: 4, 2
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Application [3] speed tests: 6, 3

Count of RIEDC [2] speed tests: 4
Count of FCC [3] speed tests: 0
Count of FCC Mobile Applications [4] speed tests: 1

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	4
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	11,542
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Cogent Communication, Inc.
DBA: Cogent Communication

Data Characteristics

FRN:	0004654042
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	2
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	YES
Provided Road Segments for census blocks greater than 2 sq. miles:	NO
Provided Address Points for census block greater than 2 sq. miles:	NO
Provided End User Category:	YES

Maximum down/upload speeds reported by provider:

Max Download Category	Count	Max Upload Category	Count
11	2	11	2

Typical down/upload speeds reported by provider: Not Provided

Number of technology of transmission types reported by provider: 1

Count of Middle Mile Facilities: 1

Count and Capacity of Last Mile Facilities: 1, 4

End User Category: 2

Data Verification:

Counties served by provider and number of census blocks with service. A total of 2 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	0
Newport	0
Providence	2
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] Speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: No speed tests were taken

Middle mile facilities outside of reported service area: Facility is within the reported census blocks.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	2
% of served census blocks confirmed by speed test	0%

Footnotes:
1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: CoxCom, Inc.
DBA: Cox Communications, Inc.

Data Characteristics

FRN:	0001524461
Type of Data Submitted:	Census Blocks, Address Points
Census Block Count (unique):	24,407
Service Address Point Count (unique):	2,267
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq. miles:	NO
Provided Address Points for census block greater than 2 sq. miles:	YES
Provided End user Category:	NO

Maximum advertised down/upload speeds reported by provider:

Data Type	Max Download Category	Max Upload Category	Count
Census Blocks	9	5	24,407
Service Address Points	9	5	2,267

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 1

Count of Middle Mile Facilities: 1

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,430 census blocks are served (24,407 by census block data and 23 by service address data).

County	Census Blocks per County
Bristol	1,083
Kent	4,116
Newport	2,286
Providence	12,888
Washington	4,057

Greatest down/upload speed from RIEDC [1] speed tests: 10, 7 and 9, 9
Greatest down/upload speed from FCC [2] speed tests: 6, 6
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 7, 6

Count of RIEDC [1] speed tests: 1,441
Count of FCC [2] speed tests: 123
Count of FCC Mobile Applications [3] speed tests: 486

RIEDC and FCC speed tests outside of reported service area: 2 of 2,050 speed tests were recorded outside of the coverage area reported by provider. (Both tests show as being in CT, but within 15' of the RI/CT State border).

Middle mile facilities outside of reported service area: All are located within the reported census blocks.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	520
Census blocks served, not reported by provider	2
Total number of served census blocks reported by provider	24,430
% of served census blocks confirmed by speed test	2%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: DIECA Communications, Inc.
DBA: Covad Communications Company

Data Characteristics

FRN:	0003753753
Type of Data Submitted:	Census Blocks
Census Block Count: (unique)	10,610
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq. miles:	NO
Provided Address Points for census block greater than 2 sq. miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category	Count
10	6	3	2,543
20	5	5	1,571
30	5	5	6,024

Typical down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category	Count
10	5	2	2,543
20	4	4	2,884
30	5	5	6,024

Number of technology of transmission types reported by provider: 3

Count of Middle Mile Facilities: 0

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 10,610 unique census blocks are served.

County	Census Blocks per County
Bristol	2
Kent	2,606
Newport	2
Providence	8,000
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: No speed tests were taken

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	10,610
% of served census blocks confirmed by speed test	0%

Footnotes:
1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Fiber Technologies Networks, LLC.
DBA: FiberTech

Data Characteristics

FRN:	0006797849
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	13
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq. miles:	NO
Provided Address Points for census block greater than 2 sq. miles:	NO
Provided End User Category:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category	Count
10	10	10

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 1

Count of Middle Mile Facilities: 0

End User Category: 2

Data Verification:

Counties served by provider and number of census blocks with service. A total of 13 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	2
Newport	0
Providence	11
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: 7, 4
Greatest down/upload speed from FCC [2] speed tests: No FCC speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 1
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	1
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	13
% of served census blocks confirmed by speed test	8%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Full Channel TV, Inc.
DBA: Full Channel

Data Characteristics

FRN:	0004973731
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	1,089
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq. miles:	NO
Provided Address Points for census block greater than 2 sq. miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category	Count
6	4	1,089

Typical down/upload speeds reported by provider: 6, 4

Number of technology of transmission types reported by provider: 1

Count of Middle Mile Facilities: 1

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 1,089 census blocks are served.

County	Census Blocks per County
Bristol	1,089
Kent	0
Newport	0
Providence	0
Washington	0

Greatest down/upload speed from RIEDC 2010[1] speed tests: 6, 4
Greatest down/upload speed from FCC 2010[2] speed tests: 5, 4
Greatest down/upload speed from FCC 2010[3] Mobile Applications speed tests: 6, 4

Count of RIEDC [1] speed tests: 10
Count of FCC [2] speed tests: 3
Count of FCC Mobile Applications [3] speed tests: 4

RIEDC and FCC speed tests outside of reported service area: 1 (This mobile speed test was within 340' of serviced area).

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	10
Census blocks served, not reported by provider	1
Total number of served census blocks reported by provider	1,089
% of served census blocks confirmed by speed test	<1%

Footnotes:
1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Hughes Network Systems, LLC
DBA: Hughes

Data Characteristics

FRN:	0009559881
Type of Data Submitted:	Satellite
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
5	2

Typical down/upload speeds reported by provider: 5, 1

Number of technology of transmission types reported by provider: 1, with 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,181 census blocks are served.

County	Census Blocks per County
Bristol	1,092
Kent	4,183
Newport	2,452
Providence	13,157
Washington	4,297

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Application [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,181
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Level 3 Communications, LLC
DBA: Broadwing

Data Characteristics

FRN:	0003723822
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	6
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq. miles:	NO
Provided Address Points for census block greater than 2 sq. miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category	Count
11	11	6

Typical down/upload speeds reported by provider: 11, 11

Number of technology of transmission types reported by provider: 1

Count of Middle Mile Facilities: 8

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 6 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	0
Newport	0
Providence	6
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: 3, 1
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No FCC Mobile speed tests were taken

Count of RIEDC [1] speed tests: 2
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 2 of 2 speed tests were recorded outside the coverage area reported by provider (within the Town of New Shoreham).

Middle mile facilities outside of reported service area: None of the 8 facilities reported are located within the reported service areas.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	0
Census blocks served, not reported by provider	1
Total number of served census blocks reported by provider	6
% of served census blocks confirmed by speed test	0%

Footnotes:
1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Lightower Fiber Networks
DBA: Lightower Fiber Networks

Data Characteristics

FRN:	00017625567
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	8,405
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq. miles:	NO
Provided Address Points for census block greater than 2 sq. miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category	Count
11	11	8,405

Typical down/upload speeds reported by provider: 11, 11

Number of technology of transmission types reported by provider: 1

Count of Middle Mile Facilities: 0

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 8,405 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	4
Newport	0
Providence	8,401
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: No speed tests were taken

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	8,405
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Sprint Nextel Corporation
DBA: Sprint

Data Characteristics

FRN:	0003774593
Type of Data Submitted:	Wireless
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
5	3

Typical down/upload speeds reported by provider: 5, 3

Number of technology of transmission types reported by provider: 1, with 2 spectrums

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,101 census blocks are served.

County	Census Blocks per County
Bristol	1,087
Kent	3,969
Newport	2,201
Providence	12,789
Washington	4,055

Greatest down/upload speed from RIEDC [1] speed tests: 8, 7
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 5, 5

Count of RIEDC [1] speed tests: 66
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 171

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	29
Census blocks served, not reported by provider	1
Total number of served census blocks reported by provider	24,101
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: StarBand Communications, Inc.
DBA: StarBand Communications, Inc.

Data Characteristics

FRN:	0005087457
Type of Data Submitted:	Satellite
Census Block Count:	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
3	2

Typical down/upload speeds reported by provider: Not reported

Number of technology of transmission types reported by provider: 1, with 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,181 census blocks are served:

County	Census Block per County
Bristol	1,092
Kent	4,183
Newport	2,452
Providence	13,157
Washington	4,297

Greatest down/upload speed from RIEDC [1] speed test: No speed tests were taken
Greatest down/upload speed from FCC [2] speed test: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed test: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed test: 0

RIEDC and FCC speed tests outside of reported service area: **0**

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,181
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: T-Mobile USA, Inc.
DBA: T-Mobile

Data Characteristics

FRN:	0006945950
Type of Data Submitted:	Wireless
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category
80	7	4

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 1, with 1 spectrum

Total count of Middle Mile facilities: 3

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,627 census blocks are served.

County	Census Blocks per County
Bristol	1,088
Kent	4,018
Newport	2,351
Providence	12,935
Washington	4,235

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: 3, 2
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 5, 3

Count of RIEDC 2010 [2] speed tests: 0
Count of FCC 2010 [3] speed tests: 1
Count of FCC 2010 Mobile Applications [4] speed tests: 26

RIEDC and FCC speed tests outside of reported service area: 0

Middle mile facilities outside of reported service area: The two facilities are within the reported service area.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	24
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,627
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Verizon New England Inc.
DBA: Verizon

Data Characteristics

FRN:	0003628971
Type of Data Submitted:	Census Blocks, Road Segments
Census Block Count (unique):	18,518
Road Segment Count (unique):	664
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq. miles:	YES
Provided Address Points for census blocks greater than 2 sq. miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category	Count
10	6	3	10,288
50	9	7	14,194

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 2

Total count of Middle Mile facilities: Not provided

End user Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 18,546 census blocks are served (18,518 by census block data and 28 by road segment service data).

County	Census Blocks per County
Bristol	894
Kent	3,236
Newport	1,638
Providence	10,231
Washington	2,547

Greatest down/upload speed from RIEDC 2010 [1] speed tests: 10, 7
Greatest down/upload speed from FCC 2010 [2] speed tests: 8,7
Greatest down/upload speed from FCC 2010 [3] Mobile Application speed tests: 8, 7

Count of RIEDC [1] speed tests: 444
Count of FCC [2] speed tests: 80
Count of FCC Mobile Application [4] speed tests: 214

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	478
Census blocks served, not reported by provider	00
Total number of served census blocks reported by provider	18,546
% of served census blocks confirmed by speed test	3%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Provider Name: Wild Blue Communications, Inc.
DBA: Wild Blue Communications, Inc.

Data Characteristics

FRN:	0007843766
Type of Data Submitted:	Satellite
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
4	2

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 1, and 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,049 census blocks are served.

County	Census Blocks per County
Bristol	1,089
Kent	4,181
Newport	2,389
Providence	13,145
Washington	4,245

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Application [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,049
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Community Anchor Institutions: All categories

Data Characteristics

Type of Data Submitted:	Point
Feature Count:	983
Provided Technology of Transmission:	YES, INCOMPLETE (3386 of 983)
Provided Subscribe Downstream Speed:	YES, INCOMPLETE (368 of 983)
Provided Subscribe Upstream Speed:	YES, INCOMPLETE (810 of 983)
Provided Street Address:	YES, COMPLETE
Provide Public Wi-Fi:	YES, COMPLETE
Provided URL:	YES, INCOMPLETE (637 of 983)
Provided CAIID:	YES, INCOMPLETE (651 of 983)

Count of Community Anchor Institutions by category:

CAI Category	Count of Features
1 – School K through Grade 12	518
2 - Library	91
3 – Medical/healthcare	56
4 – Public safety	242
5 – Univ., college, other post-secondary	24
6 – Other govt support - govt	48
7 – Other govt support - nongovt	4

Maximum Subscribe down/upstream speeds reported by institutions:

CAI Category	Max Downstream Category	Max Upstream Category	Count
1	10	10	1
2	10	10	1
3	11	11	3
4	10	10	3
5	11	11	2
6	11	11	1
7	7	6	1

Number of technology of transmission types reported by provider: 9

Data Verification:
Greatest down/upload speed from RIEDC [1] **speed test**: 10, 8
Greatest down/upload speed from FCC [2] **speed test:** 7, 7
Greatest down/upload speed from FCC Mobile Applications [3] **speed tests:** 7, 7

Count of RIEDC speed tests: 167
Count of FCC speed tests: 12
Count of FCC Mobile Applications speed tests: 25

Footnotes:

1 RIEDC Date Range: 3/1/2011 to 3/1/2012
2 FCC Date Range: 3/1/2011 to 8/25/2011
3 FCC Mobile Application Date Range: 3/6/2011 to 8/31/2011

Section C: Data Processes and Submission Overview

Submission Summary

The Broadband Rhode Island Mapping (BBRI) Team, led by EA Engineering, Science & Technology, Inc. (EA), in its role as primary technical lead for the BBRI project, contacted 22 potential facilities-based broadband service providers (BSPs) and received data from 18 providers for this round of data collection. An overall summary of the data submission is described below:

- 22 potential facilities-based broadband service providers were contacted for this round of data collection
- 2 BSPs responded but did not provide data
- 2 BSPs were identified as resellers of data
- 18 BSPs responded and provided data

Of those that provided data:

- 8 provided only census block information
- 1 provided census blocks and addresses
- 1 provided census blocks and road segments
- 8 provided wireless coverage areas

In addition, 7 of the 18 responsive BSPs provided middle mile infrastructure points and 2 of 18 responsive BSPs provided last mile infrastructure points.

Besides the 22 providers contacted during the current round of broadband data collection, the BBRI team has previously reached out to an additional 121 potential broadband providers. These 121 broadband providers did not provide data because they were either broadband resellers, their data was being collected under a different provider's dataset, they were non-responsive, they chose not to participate, or they did not offer service in Rhode Island. The 121 providers previously researched and contacted are listed below:

1. 360 networks (USA) Inc.
2. A.R.C. Networks, Inc. / ATX Licensing, Inc. /
3. Access Point, Inc.
4. ACN Communication Services, Inc.
5. Ad-Base Systems Inc. (DBA GlobalPOPS)
6. Airespring, Inc.
7. AmeriVision Communications d/b/a Affinity 4
8. Apogee Telecom
9. ATC Outdoor DAS, LLC
10. Bandwidth.com CLEC, LLC
11. BBN Communications

12. BCN Telecom, Inc.
13. Bell South Long Distance, Inc.
14. Bellsouth.Net
15. BLC Management, LLC d/b/a Angles Communications Solutions
16. Broadview Networks, Inc.
17. Broadvox-CLEC, LLC
18. Budget PrePay, Inc. d/b/a Budget Phone
19. BullsEye Telecom, Inc.
20. CCG Communications, LLC d/b/a Veroxity Technical Partners, Inc.
21. CERFnet
22. Charter Communications
23. Cleartel Telecommunications, Inc. (acquired by Birch)
24. CloseCall America, Inc.
25. Comcast Business Communications
26. Comcast Cable
27. CommPartners, LLC
28. Commrail (Access Northeast)
29. Computer Sciences Corporation
30. ComTech21, LLC
31. Comtel Telcom Assets LP d/b/a Clear Choice Communication
32. Conversent Communications (d/b/a Earthlink Business III)
33. Covista, Inc.
34. Cricket Communications
35. CTC Communications (d/b/a One Communications)
36. DSCI Corporation
37. DSL.net
38. EasyNet
39. Entelegent Solutions, Inc.
40. Ernest Communications, Inc.
41. Evercom Systems, Inc.
42. ExteNet Systems, Inc.
43. FAIRPOINT COMMUNICATIONS
44. Global Capacity Group, Inc.
45. Global Crossing Telecommunications, Inc.
46. Global NAPS, Inc.
47. Granite Telecommunications, LLC
48. Hickory Tech. Corp. / Enventis Telecom, Inc.
49. Hosttech Communications, LLC
50. IDT America, Corp.
51. inContact, Inc. (f/k/a UCN, Inc.)
52. Intap, LLC (dba Big Dog Technologies, Inc.)
53. Internap Network Services
54. International Telecom, Ltd.

55. Internet & Telephone, LLC
56. Intrado Communications, Inc.
57. ISP Alliance (ZCorum)
58. Key3Media Events (Media Live International)
59. LexMark International
60. Lightyear Network Solutions, LLC
61. Macross Information Systems
62. Magellan Hill Technologies, LLC
63. Masergy Communications
64. Matrix Telecom, Inc.
65. Meganet Communications
66. Melita PLC (fka Melita Cable Cable plc)
67. MetroCast Cablevision
68. Metropolitan Telecommunications of Rhode Island
69. Mitel NetSolutions, Inc.
70. Mobile Beacon
71. Mobilitie Investments, LLC
72. MTS Allstream
73. Mzima Networks
74. NationalNet
75. Navigator Telecommunications, LLC
76. "NEON Connect, Inc. / RCN New York Communications, LLC
77. Neutral Tandem – Rhode Island, LLC
78. New Edge Networks
79. New Horizons Communications Corp.
80. Nextel Communications
81. NextG Networks of NY
82. Nextira One, LLC d/b/a Black Box Network Services
83. Nextlink Wireless, Inc.
84. nFrame
85. Nortel Networks
86. North Atlantic Networks, LLC
87. Norwood Light Broadband
88. Pac-West Telecomm, Inc.
89. PAETEC
90. Pipeline Wireless LLC
91. Primus Telecommunications, Inc.
92. ProvDotNet LLC
93. Qwest Communications Company, LLC / Qwest Communications of Delaware
94. RCN Corporation
95. REON Broadband Corporation
96. RNK, Inc.
97. SAVVIS Communications Corporation

98. SBA Communications Corp. (acquired National Grid Communications)
99. SBC Internet Services
100. Secured Network Services
101. Serbia Broadband-Srpske Kablovske mreze dcc
102. SpeakEasy
103. Spectrotel, Inc.
104. STSN GENERAL HOLDINGS
105. TDS TELECOM
106. Telrite Corporation
107. Thames Valley Communications
108. The Internet Connection
109. Total Communications Inc.
110. Towerstream Inc.
111. Trans National Communications International
112. United Systems Access Telecom, Inc. d/b/a/ USA Telephone
113. Virgin Media
114. Wayport
115. Wholesale Carrier Services, Inc.
116. WilTel Communications Group, LLC
117. Wireless Data Service Provider
118. XO Communications Services, Inc.
119. Ymax Communications Corp.
120. Zone Four
121. Zone Telecom, Inc.

Rhode Island Broadband Mapping Data Processes

Data Received From Providers – The process begins by receiving data from each provider that offers service in the State of Rhode Island (RI). Broadband data is currently received from 18 broadband facility based service providers within the State who have signed Non-Disclosure Agreements with RIEDC. Once all of the available data is received from a provider it is reviewed and archived in its native format. While the same data is requested from each provider the information often comes in different formats and with missing attribute and or spatial data. If attributes are missing from the dataset the provider is contacted to see if the missing information is available.

Data Evaluated & Processed – The EA project team gives the data spatial attributes through geocoding to the RI E911 data or by joining the data to the 2010 census block data. The attribute data is then formatted so that the database can easily be entered in the Broadband Rhode Island geodatabase. Speeds reported below broadband levels are removed from the dataset and archived. Data that is located in census blocks great than 2 square miles are loaded into either the address or street segment feature classes. All remaining data is loaded into the census block feature class. The data is loaded using Esri tools and software. The Broadband Rhode Island, or our data analysis geodatabase, stores the most recent broadband information.

Data is extracted from this geodatabase and formatted as needed to be used for the State's web map and our biannual NTIA submittals. Data is pulled from this analysis database, formatted to meet the web and NTIA formatting requirements, and loaded into either the NTIA transfer database or the web mapping database using custom built data extraction and loading tools.

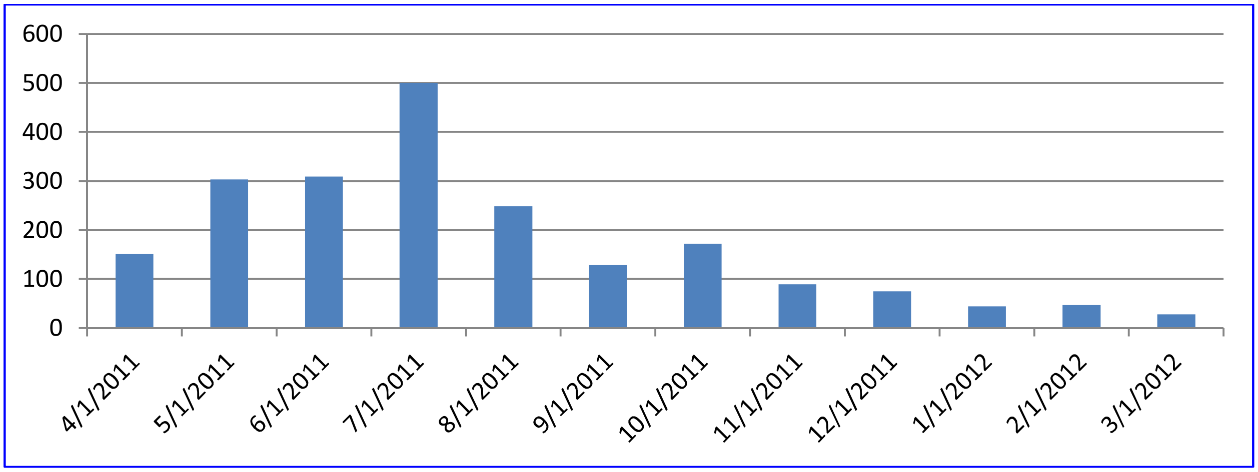
- Community Anchor Institute (CAI) Data: The initial list of CAIs were received from the University of Rhode Island and populated into the BBRI database. This data was then compared to and updated using 3rd party datasets in order to create the most comprehensive CAI list available for RI. In order to collect the broadband data for the CAIs, the BBRI Team utilized a top down approach. The agencies that oversaw a large number of CAIs such as RINET and OSHEAN were contacted regarding the data collection. CAIs that still had missing attribute data after contacting these agencies were contact directly via phone and email. Once contacted, the CAIs were directed to an online survey. The online survey walked the user through a short questionnaire that collected the required CAI broadband data. At the end of the survey the user was directed to take a speed test in order to help with the data collection and verification process.

Data Verification – Once the data is loaded into the geodatabase the verification process can begin. This process is comprised of several steps to ensure that the actual facilities and services provided to the public match the provider's data being reported. The steps are listed below, followed by a detailed description of each step.

1. Compared to Available Datasets
    a. Speed test
    b. User feedback
    c. 3rd party dataset analysis
2. Spatial Analysis of Coverage Area
3. Physical Infrastructure Survey
4. Provider Meetings
5. 3rd Party Verification

- Compared to Available Datasets -
    - Speed test – Using Ookla's speed test application, EA has been collecting speed test data for RI since March 2010. A breakdown of speed tests collected over the past year by EA, displayed by month, can be found in the table below. EA uses both the FCC speed tests collected for RI and the speed tests collected on the RI broadband website to get a better view of the actual speeds and coverage area providers are offering the public. The speed tests are geocoded and mapped by provider. (FCC speed test providers are identified by the speed test's IP address) Each provider's speed test data is compared to their stated coverage area. Discrepancies are noted and reported back to the provider. The provider either

gives a reason for the discrepancy or instructs us to modify their coverage area to match the speed test data.



- User feedback - user feedback information is captured by both the FCC and RI's broadband mapping website. This information is reviewed on a case by case basis. Changes are made as needed to the data and reported to the provider, similar to the speed test data update process.

- Best practices for final data quality checks include the review and comparison to 3rd party datasets (such as the FCC's 477 data) with the information received from the providers. The FCC's data is used to check for previously unknown providers, perform spatial analysis and comparisons on the data, and to give a better understanding of our confidence in the data. Since FCC data is broken out by census tract the provider's data must be converted to the tract level in order to perform a full data comparison.

- Spatial Analysis of Coverage Area– Spatial Analysis is performed on each provider's data set. The analysis checks for small areas in populated sections of the state that are surrounded by coverage areas but do not show coverage. These "donut holes" in the data are reviewed and reported to the provider if we feel they have a high probability of actually being covered by the providers' broadband services.

- Physical Infrastructure Survey - As part of the expanding need to verify broadband coverage within RI, a physical infrastructure survey pilot project was performed for the Town of Foster. The physical infrastructure survey verified the physical broadband facilities present within the Town. EA performed the survey utilizing GPS equipment and industry knowledge to capture the actual location of strategic infrastructure facilities throughout Foster. The data was then mapped and analyzed to determine where wireline broadband service is theoretically available within the town. Structures outside of the identified theoretical service area were mailed surveys to determine if broadband was actually available at their location as well as collect additional broadband usage information from the residents.

- Provider Meetings - The BBRI Team held conference calls with broadband providers that had significant changes in their current data submittals or had identified issues that required a review. These conference calls were used as working sessions to review reasoning behind changes being made, discuss findings, address questions, and review edits being made to the provider's submitted dataset. Following the meetings, edits to the data were made final based on the information agreed upon. The reason for making each edit to the data was documented in case issues or questions arose in the future.

- 3rd Party Verification – A 3rd party, Mapping & Planning Services (M&PS), is used to do provide an independent review and a report on the status of each provider's data. These reports summarize the data collected and provide a second review of the verification steps listed above.

Data Analysis – In addition to the data verification steps, a complete summary of each provider's data and static broadband coverage maps are created for RIEDC. These maps are used to analyze existing data availability and plan for future broadband development and outreach projects.

Geodatabase Checks– Once the data is processed and verified the database is checked prior to submittal to the NTIA. This process is comprised of several steps to ensure that the information in the geodatabase is as accurate and complete and possible.

- Visual Checks - These visual checks inspect the data to ensure completeness, accuracy, and engineering logic. The visual inspection process employs random sampling techniques to validate feature placement and attribution. The random sampling is performed in accordance with ANSI standards for attribute inspection.

- Automated Checks – These checks are performed on 100% of the data. ESRI's Production Line Tool Set (PLTS) and the NTIA's QC toolbox are utilized for the automated check of the data. PLTS check for both schema and logical errors in the data. The following checks are performed on the data.

    - Geodatabase Format - Verify that the geodatabase's name and feature classes are correct per the corresponding RIEDC data model and NOFA requirements.
    - Coordinate System Errors - Check for proper projection definition.
    - Validity Checks - Verify the attribution fields in the tables and field values fall within the domain specified in the geodatabase.
    - Duplicate Item Values - Verify the uniqueness of attribute values within a user-specified item (such as Feature IDs).

  - Invalid Item Values - Checks for invalid codes using discrete values and ranges defined in the appropriate domain tables.
  - Spatial Logic Checks - Checks the geodatabase to validate minimum size polygons, minimum length lines, and dangles in line feature classes.

- If the geodatabase has passed all tests listed above, and has met the acceptance criteria, the dataset is considered passed and can be processed for delivery to RIEDC and the NTIA. If the geodatabase fails any test and does not meet acceptance criteria, the data is considered failed and will be returned with error reports to the data processing team for correction. Additional follow-up with the providers may be necessary to correct the issue(s). Once edits are completed or exceptions are documented, the geodatabase will be returned to the QC team for an additional sequence of all QC procedures. This process will be repeated until all tests have received a passing status or exceptions have been documented.

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

CONNECT south carolina®

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:

As the State Broadband Designated Entity, Connected Nation, in cooperation with South Carolina's broadband provider community and state-based partners, is pleased to present this submittal of the state of South Carolina's State Broadband Initiative (SBI) Grant Program, known as Connect South Carolina.

It is with highest regard that the collective stakeholders of Connect South Carolina 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 South Carolina has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit not just South Carolinians 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 South Carolina: 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 South Carolina 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.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of a new section pertaining to industry mergers and acquisitions – specifically this section will detail any and all mergers or acquisitions that have taken place in South Carolina, since the October 2011 submission. The intent of this new section is to provide a better understanding of how the broadband provider landscape has changed over time.

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 91.67 percent of the South Carolina provider community, or 44 of 48 total providers. Of the 44 participating providers, 22 supplied an update to their network or coverage area(s), while 20 have reported no change. The remaining 2 represent providers who previously supplied data but were 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. Of the 4 providers that are not represented in the attached datasets, 2 have refused to participate in the voluntary program or were non-responsive to multiple contact attempts, and 2 providers 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 South Carolina principals that all commercially reasonable efforts were made to account for 100 percent of the known Connect South Carolina broadband provider community, pursuant to this semi-annual data update submission.

Connect South Carolina has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect South Carolina conducts field validation efforts. To date, 28 (58.33 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

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

As an indicator of stakeholder penetration, the Connect South Carolina website encountered 3,446 unique visits during this reporting period (13,368 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 16 broadband inquiries over this same reporting period (113 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 South Carolina website and the Connect South Carolina 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 South Carolina mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect South Carolina to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect South Carolina 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.

Outreach was conducted during this data update reporting period by Connect South Carolina to continue identification of existing, centralized sources for CAI connectivity data. Connect South Carolina continues to work extensively with the South Carolina Division of State Information Technology to secure robust data for K-12 schools and libraries that subscribe to services provided through their state-managed broadband connectivity contract in addition to other institutions on their MetroE and MPLS connections. Additionally, outreach was coordinated to distribute a CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect South Carolina website. During this reporting period Connect South Carolina continued to develop relationships with statewide associations such as State Library of South Carolina to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. Connect South Carolina will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

During this reporting period a Connect South Carolina CAI newsletter was distributed to the South Carolina schools, libraries, healthcare, public safety, and government institutions to assist with outreach and highlight the innovations taking place at libraries within the state. From our work in South Carolina, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect South Carolina efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect South Carolina program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of South Carolina, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead.

Respectfully submitted,

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

DATA ACQUISITION: SOUTH CAROLINA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this fifth reporting period of the SBI, Connect South Carolina, working in close coordination with the state of South Carolina, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. During this reporting period Connect South Carolina has continued to focus efforts on conducting outreach and raising awareness of this important project.

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

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

The survey can be accessed at this link: http://www.surveymonkey.com/s/RJH5DMW.

Connect South Carolina conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect South Carolina continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity.

Connect South Carolina has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. During this reporting period Connect South Carolina continued to develop relationships with statewide associations such as State Library of South Carolina to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. Moreover, Connect South Carolina continues to work extensively with the South Carolina Division of State Information Technology to secure robust data for K-12 schools.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect South Carolina project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect South Carolina will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI.

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

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	1765	1765	1764	1099	1098	1098
Libraries	230	230	230	185	184	184
Healthcare	296	296	296	199	200	200
Public Safety	834	834	829	333	330	329
Higher Ed Institutions	198	198	196	139	137	137
Other Government	930	930	921	850	850	850
Other Non-Government	95	95	95	84	84	84
Total	**4348**	**4348**	**4331**	**2889**	**2883**	**2882**

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

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 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 state of South Carolina.

Inventory of Deliverables, Connect South Carolina: 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.

The provider data collected by CN on behalf of the state of South Carolina have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

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

Mergers and Acquisitions

Throughout the course of the SBI program, CN has maintained a repository of electronic records related to its provider outreach activities. Recently, due to the high volume of mergers and acquisitions (M&A) within the provider community, CN elected to create a listing of M&A activities for this mapping cycle as a way of supplementing the Provider Changes and Corrections section of this document. M&A activities for this state are listed below with a brief description and date as obtained through public records or provider disclosure.

- **Level 3 Acquired Global Crossing**
  The Global Crossing website confirmed that Level 3 and Global Crossing joined forces under the brand name Level 3 on October 4, 2011.

- **Windstream Acquired PAETEC**
  The News section of the Windstream website dated December 1, 2011, announced that it had completed the acquisition of PAETEC Holding Corp. in a transaction valued at approximately $2.3 billion.

SOUTH CAROLINA FIELD VALIDATION METHODOLOGY

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

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets 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 South Carolina on the following providers: AT&T, Inc.; Atlantic Broadband; CenturyLink; Charter Communications; Chester Telephone Company; Clearwire Corporation; Electronics Service Company of Hamlet LLC; Family View Cable; Farmers Telephone Company Cooperative, Inc. (d.b.a. FTC Communications); Frontier Communications of the Carolinas; Harron Communications; Home Telephone Company, Inc.; NTInet, Inc.; Palmetto Rural Telephone (d.b.a. Low Country); Pee Dee Online; Pee Dee Net; PRT Communications; Rock Hill Telephone (d.b.a. Comporium; PBT Communications); Sandhill Telephone Cooperative; Sky Runner; Southern Coastal Cable LLC; Sprint Nextel Corporation; Time Warner Cable, Inc.; T-Mobile; tw telecom; US Cellular; Verizon South; and Windstream.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 28 companies (out of a universe of 48 viable providers) totaling 58.33 percent within the state of South Carolina.

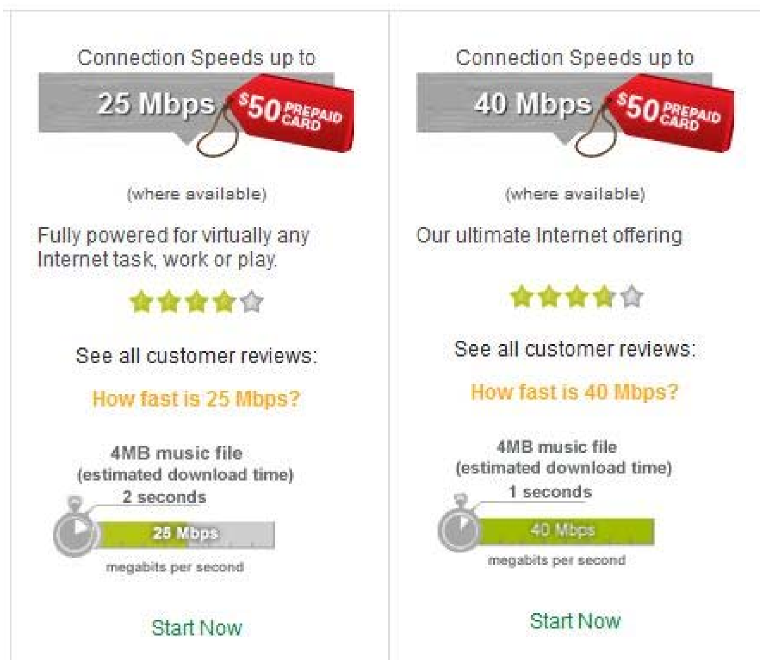
CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters. Any providers whose submitted coverage and attributes are anticipated to come into question have been further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

AT&T Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 24 Mbps service; screenshot below.

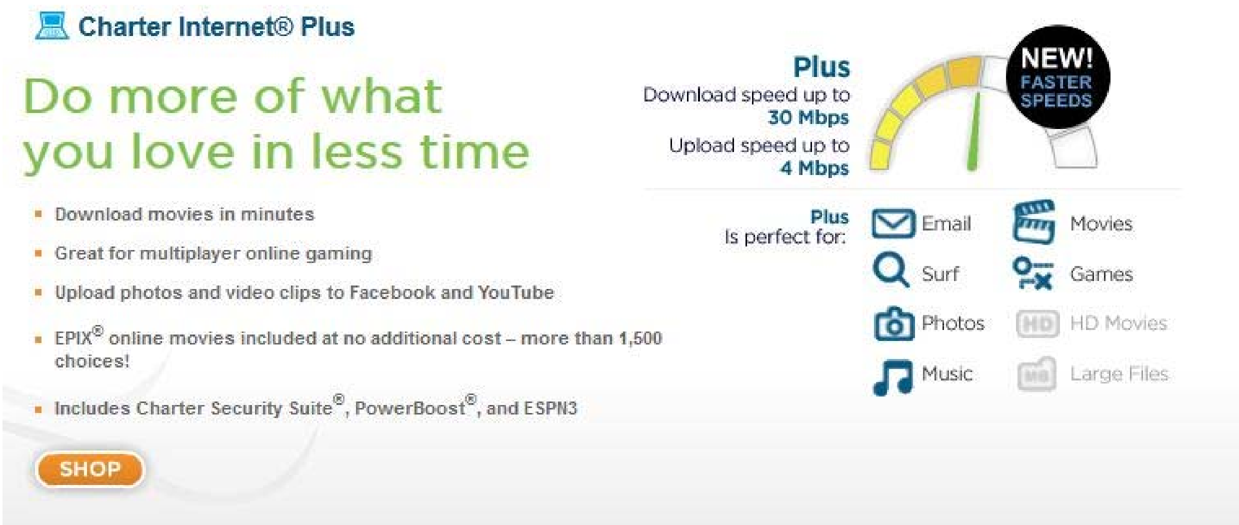
Compare Internet Packages

	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

CenturyLink
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 25 and 40 Mbps service; screenshot below.



Charter Communications, Inc.
Issue: Technology of transmission 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.



Chester Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

Comcast Cable Communications, LLC
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Confirmed use of DOCSIS 3.0 with speed tier 7. Speeds are kept lower currently to be backwards compatible.

Farmers Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15.1 Mbps service; screenshot below.

Residential Services

1.5 Mbps down / 512 Kbps up	4.0 Mbps down / 1.0 Mbps up	6.0 Mbps down / 1.0 Mbps up	15.1 Mbps down / 1.0 Mbps up
$19.95/mo.*	$39.95/mo.	$44.95/mo.	$54.95/mo.
5 Free E-mail Accounts	10 Free E-mail Account	10 Free E-mail Account	10 Free E-mail Account

Hargray Communications Group, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Add Hargray High-Speed Internet service for the very best in fast, reliable connections to the World Wide Web.

Choose the Speed That's Right for You	
3Mbps	3Mbps downstream/Up to 1Mbps upstream
5Mbps	5Mbps downstream/Up to 1Mbps upstream
10Mbps	10Mbps downstream/Up to 1Mbps upstream

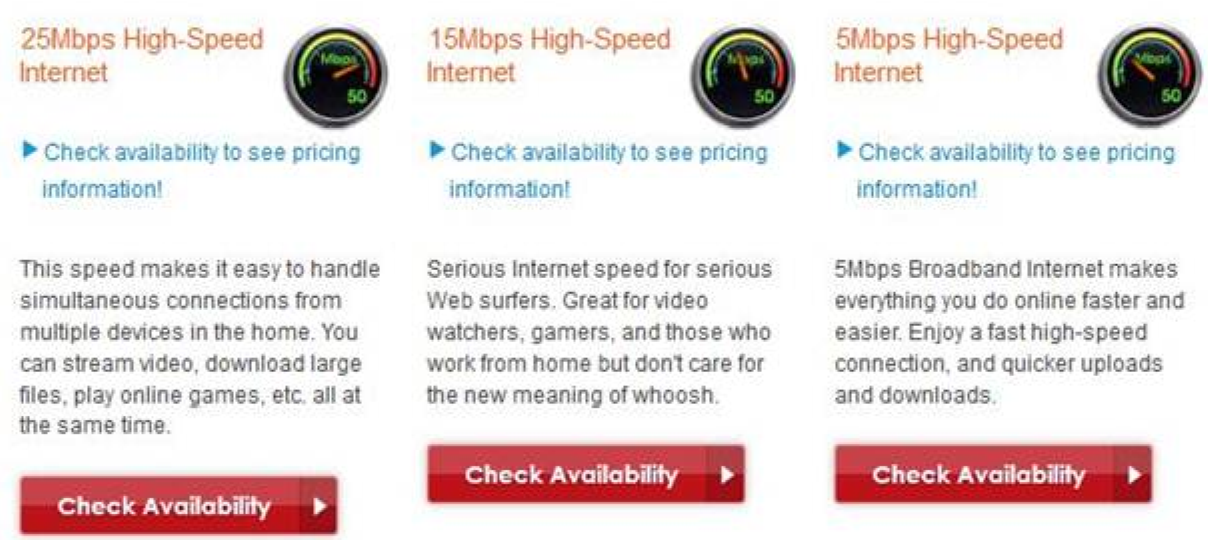
Home Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed that tier 7 speeds are indeed available.

Pee Dee Online Consulting
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed that 10 Mbps service is available and advertised locally, but not advertised on the website.

Piedmont Rural Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Rock Hill Telephone Company (Comporium)
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Provider representative confirmed that DOCSIS 3.0 is in use across entire service area, even with lower speeds; it is just now transitioning to higher speeds after the completion of its rebuild.

TDS Telecommunications Corporation
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 15 and 25 Mbps service; screenshot below.



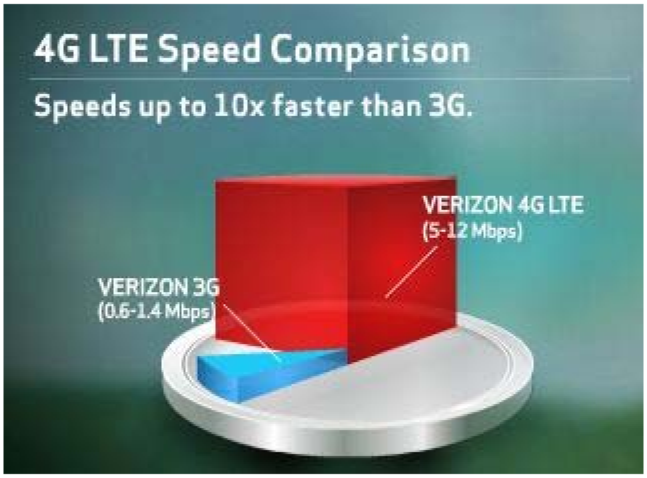
T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises that download speeds greater than tier 6 are available; screenshot below.

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.

Windstream Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

See which of our speeds matches your online activities. Choose the right Internet speed (WATCH VIDEO)	3 Mbps (Basic Use)	6 Mbps (Most Popular)	12 Mbps (Fastest Option)
E-mail friends	x	x	x
Browse the Internet	x	x	x
Bank online	x	x	x
Shop for deals	x	x	x
Download music	x	x	x
Connect with friends on Facebook and Twitter	x	x	x
Use wireless home networking	x	x	x
Download large files		x	x
Stream video		x	x
Watch TV shows online			x
Play online games			x

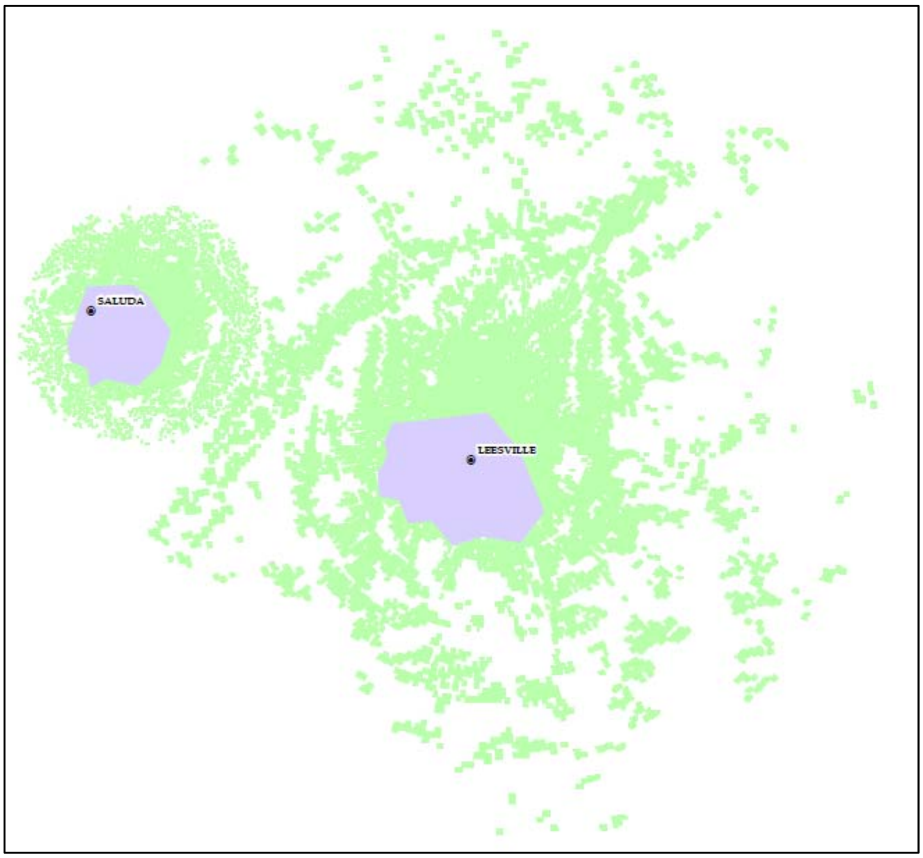
Verizon South Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



As requested of SBI grantees through e-mail correspondence on February 22, 2012, CN has also reviewed the fixed wireless coverage of providers in the state that NTIA has recognized as "having an unusual shape" that does not appear to be propagated service. Descriptions on the data collection and methodology used for each provider are supplied below.

PBT Communications, Inc.
Background: This provider offers fixed wireless service to a small geographic region only. Prior to this submission, the boundaries of the coverage area were provided and translated to a GIS format. Model propagations were not submitted.

Resolution: Fixed wireless propagations were created based on equipment parameters, then were clipped to the geographic boundaries in order to more accurately portray provider's fixed wireless service area. While the wireless signal extends beyond the boundaries presented, the company does not provide service to households outside these areas; screenshot below.



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.

Estimates derived from provider-validated data indicate that approximately 3.25 percent of South Carolina households do not have terrestrial fixed broadband service available, and approximately 0.21 percent[1] of South Carolina households have neither mobile nor fixed broadband service available.[2]

Within rural areas of the state, results derived from provider-validated data indicate that approximately 4.16 percent of rural South Carolina households do not have terrestrial fixed broadband service available, and approximately 0.28 percent[3] of rural South Carolina households

[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 state.

[3] See footnote 1.

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).
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. 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).

[4] See footnote 2.

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

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information 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 South Carolina project has received a total of 16 inquiries (113 grant inception to date). As more inquiries are submitted to Connect South Carolina, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

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 South Carolina project launched BroadbandStat on May 21, 2010, and has received a total of 6,381 visits to date, of which 1,192 occurred this reporting period.

SPEED TEST METHODOLOGY

The 34 speed tests that are represented in the Connect South Carolina Speed Test Report during this reporting period (455 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect South Carolina speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

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

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 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	ACSinc.net	www.acsinc.net	This company does not provide residential Internet service.
2	Aerolina Wireless Networks	www.aerolina.com	This company provides commercial services only.
3	Airespring, Inc.	www.airespring.com	This company is a nonfacilities-based reseller.
4	Broadview Networks Holdings, Inc.	www.broadviewnet.com	Nonfacilities-based reseller to businesses.
5	Conterra Ultra Broadband Holdings	www.conterra.com	National wireless and wireline backhaul provider.
6	County of Oconee	www.oconeefocus.com	BIP recipient whose funding promotes the construction of a fiber optic broadband network in the county.
7	Genesis Telecommunications	www.genesistelcom.com	Dial-up services in Greenwood only.

8	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com	Acquired by another company.
9	Hickory Tech Corporation	www.enventis.com	B2B services.
10	Hotwire Communications	www.gethotwired.com	Offers residential service to one multi-dwelling unit.
11	LightEdge Solutions, Inc.	www.lightedge.com	Illinois provider; no service in SC.
12	Lightyear Network Solutions, LLC	www.lightyear.net	Nonfacilities-based reseller.
13	Main Street Wireless	http://www.mainstreetsc.com	Provider may no longer be in business.
14	Metropolitan Telecommunications Holding Company	www.mettel.net	Nonfacilities-based reseller of business services.
15	Navacore.net	www.navacore.net	Dial-up only.
16	Net Doctors	www.netmds.com	This company does not offer high-speed Internet; dial-up only.
17	New Edge Network, Inc.	www.newedgenetworks.com	Acquired by Earthlink. Company does not offer residential service; resells backhaul.
18	Open Range Communications, Inc.	http://www.openrangecomm.com	No longer in business.
19	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
20	Personally Complete	www.personallycomplete.com	This company does not provide Internet access.
21	Pine Tree Cablevision	www.ptc-me.net	This company is out of business.
22	PM Broadband	www.pmcol.com	This company is out of business.
23	Qwest Communications Company, LLC	www.qwest.net	Acquired by CenturyLink.
24	Shentel Converged Services, Inc.	www.shentel.com	This company is a private cable provider serving a few campuses and related MDUs, but not public residences.

25	Smartresort Co, LLC	www.discoverbeyond.com	This provider offers service to select MDUs and HOAs, but not to public communities; non-responsive to mutiple attempts.
26	Techcore Consultants II	www.almega.com	This company is no longer in business in South Carolina.
27	TeleSouth Wireless	www.telesouth1.com	The company appears to be out of business.
28	Telovations, Inc.	www.telovations.com	This company does not provide residential Internet services.
29	University Corporation for Advanced Internet Development	www.internet2.edu	This consortium is a BIP/BTOP recipient with no Internet network.
30	WilTel Communications, LLC.	n/a	Acquired by Level3.
31	WP Media	www.wpmedia.com	This company is a consulting firm.

Broadband Provider Log

Complete	100
Non-Responsive/Refused	2
In Progress	5
Count of Datasets by Status	**107**
Total Unique Providers Represented	**48**

Provider Name	Platform	Status	NDA Execution Date	Notes
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-22-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-14-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[MAR-01-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Chester Telephone Company	Cable	Data Added to Statewide Inventory	1/25/2010	[FEB-08-12 Matthew Brunt] Change: Provider expanded coverage area.
Chester Telephone Company	DSL	Data Added to Statewide Inventory	1/25/2010	[FEB-08-12 Matthew Brunt] Change: Provider expanded coverage area.
Chester Telephone Company	Fiber	Data Added to Statewide Inventory	1/25/2010	[FEB-08-12 Matthew Brunt] Change: Provider expanded coverage area.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/17/2011	[JAN-27-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission. [MAR-12-12 Terry Holmes] Provider supplied additional information on coverage for substantial service sites in October 2011, however requested that CN not submit or publish this coverage since they do not market to these areas.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-23-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Electronics Service Company of Hamlet, LLC	Fixed Wireless	Data Added to Statewide Inventory	3/24/2010	[FEB-22-12 Matthew Brunt] Change: Provider expanded fixed wireless service area and can now provide tier 6 download speeds.
Family View CableVision	Cable	Data Added to Statewide Inventory		[FEB-06-12 Matthew Brunt] Change: Provider expanded cable service area.
Farmers Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-07-12 Matthew Brunt] Change: Provider expanded coverage area.
Farmers Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-07-12 Matthew Brunt] Change: Provider expanded coverage area.
Farmers Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[FEB-07-12 Matthew Brunt] Change: Provider expanded coverage area.
Farmers Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[FEB-07-12 Matthew Brunt] Change: Provider started offering fiber coverage in portions of their service area.
Farmers Telephone Cooperative, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/22/2010	[FEB-07-12 Matthew Brunt] Change: Provider expanded coverage area.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[JAN-26-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Horry Telephone Cooperative, Inc.	Cable	Data Added to Statewide Inventory	1/22/2010	[JAN-26-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Horry Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	1/22/2010	[JAN-26-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Horry Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[JAN-26-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Horry Telephone Cooperative, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/22/2010	[JAN-26-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.

Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-16-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
NTInet, Inc	Fixed Wireless	Data Added to Statewide Inventory	2/9/2010	[FEB-20-12 Matthew Brunt] Change: Provider expanded fixed wireless service area.
Pee Dee Online Consulting	Fixed Wireless	Data Added to Statewide Inventory	2/24/2010	[JAN-23-12 Matthew Brunt] Change: Provider expanded fixed wireless service area.
Piedmont Rural Telephone Cooperative, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/28/2010	[FEB-20-12 Matthew Brunt] Change: Provider added an additional mobile wireless tower.
Piedmont Rural Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	1/28/2010	[FEB-20-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 9 maximum advertised download speeds.
Rock Hill Telephone Company	Cable	Data Added to Statewide Inventory	1/25/2010	[MAR-12-12 Matthew Brunt] Change: Carolina Telecom and Catawba Services subsidiary names changed to Rock Hill Telephone.
Rock Hill Telephone Company	Cable	Data Added to Statewide Inventory	1/25/2010	[JAN-03-12 Daryl Coffey] Change: This subsidiary platform was changed from Video Vision to Lancaster Telephone.
Rock Hill Telephone Company	Cable	Data Added to Statewide Inventory	1/25/2010	[JAN-03-12 Daryl Coffey] Change: This subsidiary platform name changed from Palmetto Cable to Fort Mill Telephone.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[MAR-01-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-14-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[FEB-23-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Time Warner Cable LLC	Cable	Data Added to Statewide Inventory	12/21/2009	[FEB-21-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Verizon South Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-16-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Charter Communications, Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/15/2009	
Conterra Ultra Broadband Holdings	Backhaul	Backhaul Provider Only Processing Complete	11/8/2011	
TDS Telecommunications Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/27/2010	
AT&T Inc.	DSL	Approval for Update Not Received – Data Still Submitted	12/16/2009	[MAR-06-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission. Dataset not officially approved, but provider representative instructed CN to proceed with using the new dataset for the April 2011 submission.
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Atlantic Broadband, LLC	Cable	No Update to Provide	2/3/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Chesnee Telephone Company, Inc.	DSL	No Update to Provide	1/25/2010	
Chesnee Telephone Company, Inc.	Cable	No Update to Provide	1/25/2010	
Chester Telephone Company	Backhaul	No Update to Provide	1/25/2010	
DeltaCom, Inc.	Backhaul	No Update to Provide	2/16/2010	
DISH Network Corporation	Satellite	No Update to Provide	1/27/2010	
Farmers Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
Farmers Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
Frontier Communications Corporation	Fiber	No Update to Provide	1/22/2010	
Hargray Communications Group, Inc.	Backhaul	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Backhaul	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Backhaul	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Cable	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	DSL	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Cable	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	DSL	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Fiber	No Update to Provide	1/25/2010	
Harron Communications LP	Cable	No Update to Provide		
Home Telephone Company, Inc.	Cable	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	DSL	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Fiber	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Cable	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Fiber	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Backhaul	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Backhaul	No Update to Provide	1/22/2010	
Horry Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
Knology of South Carolina, Inc.	Cable	No Update to Provide	7/13/2011	
Northland Communications Corp.	Cable	No Update to Provide		
Palmetto Rural Telephone Cooperative, Inc.	DSL	No Update to Provide	1/22/2010	
Palmetto Rural Telephone Cooperative, Inc.	DSL	No Update to Provide	1/22/2010	
Pee Dee Net	Fixed Wireless	No Update to Provide	2/23/2010	

Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fiber	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fiber	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fiber	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Cable	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fiber	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Mobile Wireless	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fixed Wireless	No Update to Provide	1/25/2010	[MAR-15-12 Matthew Brunt] Correction: Provider provides fixed wireless service to a small geographic region only. Fixed wireless propagations were clipped to this geographic area in order to more accurately portray provider's fixed wireless service area.
Sandhill Telephone Coop., Inc.	DSL	No Update to Provide	1/25/2010	
Sandhill Telephone Coop., Inc.	Backhaul	No Update to Provide	1/25/2010	
Skyrunner, Inc.	Fixed Wireless	No Update to Provide		
Southern Coastal Cable, LLC	Cable	No Update to Provide	6/30/2010	
Sprint Nextel Corporation	Backhaul	No Update to Provide	1/14/2010	
tw telecom of south carolina, llc	Backhaul	No Update to Provide	4/26/2010	
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	[FEB-16-12 Matthew Brunt] Change: ViaSat has acquired WildBlue and coverage will be represented as ViaSat, Inc. starting with the April 2012 submission.
West Carolina Rural Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
West Carolina Rural Telephone Cooperative, Inc.	Fiber	No Update to Provide	1/22/2010	
West Carolina Rural Telephone Cooperative, Inc.	DSL	No Update to Provide	1/22/2010	
Windstream Communications	Backhaul	No Update to Provide	1/20/2010	
Windstream Communications	DSL	No Update to Provide	1/20/2010	
ATG Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	1/14/2010	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Aero Networks, LLC	Satellite	Solicited Initial Data	11/22/2010	
Knology of South Carolina, Inc.	Backhaul	Solicited Initial Data	7/13/2011	
Atlantic Tele-Network, Inc.	Mobile Wireless	Initial Conversation		
Verizon South Inc.	Backhaul	Other	12/14/2009	[MAR-06-12 Wes Kerr] A company representative sent a message noting that these sites have been decommissioned and shouldn't be submitted any longer.
Windstream Communications	Backhaul	Other	1/20/2010	[FEB-01-12 Wes Kerr] Company representative notified us that they do not have the ability at this time to provide data for the acquired company.
Birch Communications, Inc.	Backhaul	Refused to Participate		[NOV-03-11 Daryl Coffey] A company representative sent an email saying the company "declines to participate."
Countrywide Wireless	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during the last mapping period, 6 additional attempts were made this period.

South Dakota Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Jim Edman
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Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**
Product Specification:	Spring 2012 NTIA Data Model
Product/Process:	NTIA—April 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's April 1, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	98
Total Valid Broadband Providers	48
Non-Responsive Providers	0
Non-Cooperative Providers	0
Number of Providers - Supplied Updates for this Submission	35
Number of Providers - Confirmed No Updates	12

- New Providers Since Last Data Submission
    - Cable One, Inc.
    - Data Truck
    - Fibercomm
    - Hughes Network Systems
    - Skycasters
    - WildBlue Communications Inc.
    - Zayo Group LLC

- Existing Providers – No Updates
    - Consolidated Telecom
    - DigitalBridge Communications (BridgeMaxx)
    - Faith
    - Frontier Communications
    - Interstate Telecommunications Cooperative
    - Midstate Communications
    - MNW Wireless
    - New Edge Network, Inc.
    - Santel Communications

- Sioux Valley Wireless
- StarBand Communications Inc.
- Valley Telephone

- Providers Included (listed by Provider and Holding Company name)

Alliance Communications Cooperative	MNW Wireless
AT&T MOBILITY	New Edge Network, Inc.
Beresford Municipal Telephone	Northern Valley Communications
Cable One, Inc.	Northern Wireless
CenturyLink (SD)	RC Communications
Cheyenne River Sioux Tribe	RC Technologies, Inc.
Consolidated Telecom	Roberts County Telephone Cooperative
Data Truck	Santel Communications
DigitalBridge Communications (BridgeMaxx)	SDN Communications
Faith	Sioux Valley Wireless
Fibercomm	Skycasters
Fort Randall	Sprint
Frontier Communications	StarBand Communications Inc.
Golden West Communications	Swiftel Communications
Hughes Network Systems	Triotel / McCook Cooperative
Interstate Telecommunications Cooperative	Valley Telecommunications Cooperative
Kennebec Telephone Company	Valley Telephone
KeyOn Communications Inc.	Venture Communications
Knology, Inc.	Verizon Wireless
Long Lines	West River Cooperative
Mediacom Communications Corporation	West River Telecommunications Cooperative
Midcontinent Communications	Western Telephone Company
Midstate Communications	WildBlue Communications Inc.
Mitchell Telecom (Sancom, Inc. dba Mitchell Telecom)	Zayo Group LLC

- Non-Responsive Providers/Non-Cooperative Providers
  - None

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
  - Midcontinent Communications (TT-40)
  - South Dakota Network (TT-50)
  - Venture Communications (TT-10)
  - CenturyTel, Inc. (TT-10)
  - West River Cooperative Telephone Company (TT-10)
  - Golden West Telecommunications Cooperative Inc (TT-10)
  - Interstate Telecommunications Cooperative, Inc. (TT-10)
  - West River Cooperative Telephone Company (TT-50)

- Coverage Footprint Expansion –
  - Knology, Inc. (TT-40)
  - Sprint Nextel Corporation (TT-80)
  - Verizon Wireless (TT-80)
  - Mitchell Telecom (TT-50)
  - AT&T Mobility LLC (TT-80)
  - Interstate Telecommunications Cooperative, Inc. (TT-50)
  - Fort Randall Telephone Company (TT-10)
  - Midstate Communications (TT-10)
  - Golden West Telecommunications Cooperative Inc   (TT-50)
  - Venture Communications Coop. (TT-50)

DATA CORRECTIONS

- Beresford Municipal Telephone
  - We identified through our internal QC and verification efforts that Beresford was reporting different upload and download speeds, with a transmission technology assignment of TT-20 (Symmetric - xDSL). After reviewing the error with the provider, their coverage areas were updated to a TT-10 (Asymmetric - xDSL).

- Per NTIA's guidance on 02/21/12, we updated all Verizon speed data to support the business rules they laid out.

  ~~

  All grantees should then apply the following business rule, as some of the speed ranges fall into two tiers:

  3G Speeds:
  Maximum <u>and</u> Typical download speed: 600 kbps to 1.4 Mbps (Speed Tier 3: 768 kbps – 1.5 Mbps)
  Maximum <u>and</u> Typical upload speed: 500 kbps to 800 kbps (Speed Tier 2: 200 – 768 kbps)

  4G LTE Speeds:
  Max Adv Download Speed: 12 Mbps (Speed Tier 7: 10 Mbps – 25 Mbps)

Max Adv Upload Speed: 5 Mbps (Speed Tier 5: 3 Mbps – 6 Mbps)

Typical download speed: 8.5 Mbps (Speed Tier 6: 6 Mbps – 10 Mbps)
Typical upload speed: 2 Mbps to 5 Mbps (Speed Tier 5: 3 Mbps – 6 Mbps)

- The NTIA 3rd Party data review and summary were also compared to the product prior data submission and no changes were required. The Technology/Speed tier differences highlighted were reviewed with the providers and corrected, where needed.

COMMUNITY ANCHOR INSTITUTION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	Broadband Subscriber (Yes)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	701	336	320	316	316
Category 2 - Library	125	28	24	17	16
Category 3 - Medical/Healthcare	215	40	35	26	25
Category 4 - Public Safety	476	72	58	32	32
Category 5 - Universities/Colleges	49	30	31	35	35
Category 6 - Other: Government	626	424	404	363	361
Category 7 - Other: Non-Government	19	5	4	3	3
Total	**2211**	**935**	**876**	**792**	**788**

CAI CHANGES

- The State Information Technology Bureau, the Bureau of Information and Telecommunications, extracted broadband service details from their circuit inventory system regarding the broadband capabilities of the k-12 schools, universities, and state/county/local government offices to which it provides services.

- The CAI inventory was review again against the database mentioned below for the following categories: Category 1: K-12 Schools, Category 2: Libraries and Category 5: Colleges
These databases are as follows:

  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**

  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**

- For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

SD_2012_04_01.txt

- Error Report
  - All items flagged within the submission receipt where confirmed with either the provider or with NTIA that the values are valid. One item that was identified, but not within any commentary from the PBWorks or the NTIA webinar is as follows:
    - Speed Tier: FAILED   Go check data and keep only Maximum Advertised Speeds
      - This record is due to a provider coverage having two footprints that mostly overlap with each other, with different speeds and the same technology. The script is not taking the residential and business-only flags into consideration here.
  - The exceptions NTIA noted during the 03/27/12 webinar are as follows:
    - Middle Mile Elevation Fails
    - Middle Mile Latitude/Longitude Fails
    - Middle Mile Ownership Fails
    - Address SpeetTier Fails
    - CAI Transtech Fail

Hyperlinks to Grantee Workspace in which the same issues were identified by other Grantees:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

https://sbdd-granteeworkspace.pbworks.com/w/file/49939449/December%202011%20Submission.zip

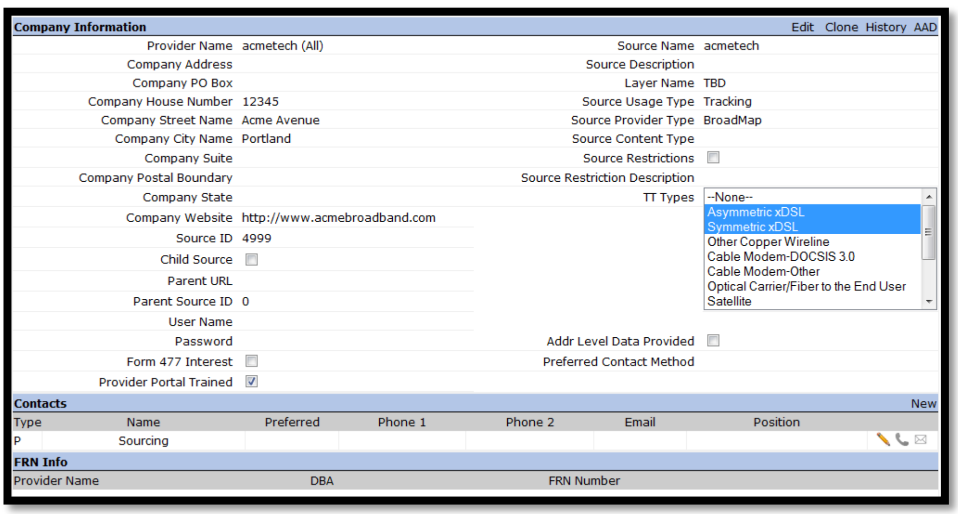
HIGH-LEVEL SUMMARY

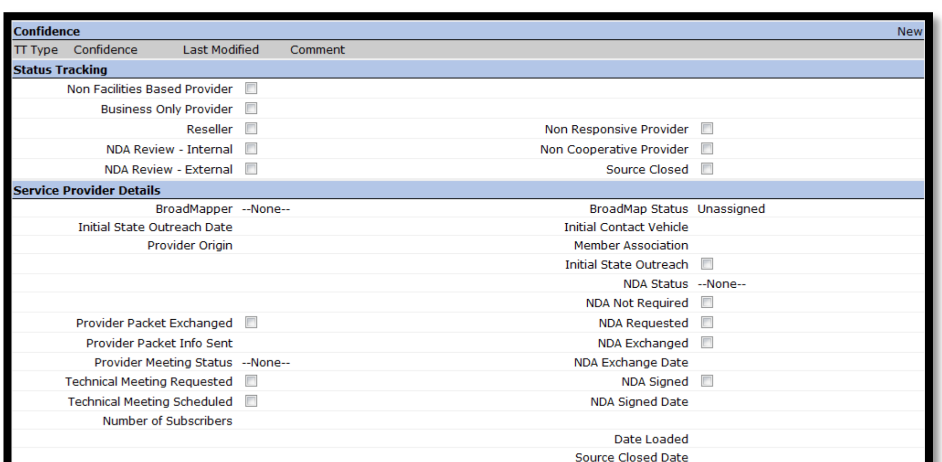
DATA GATHERING

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

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

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





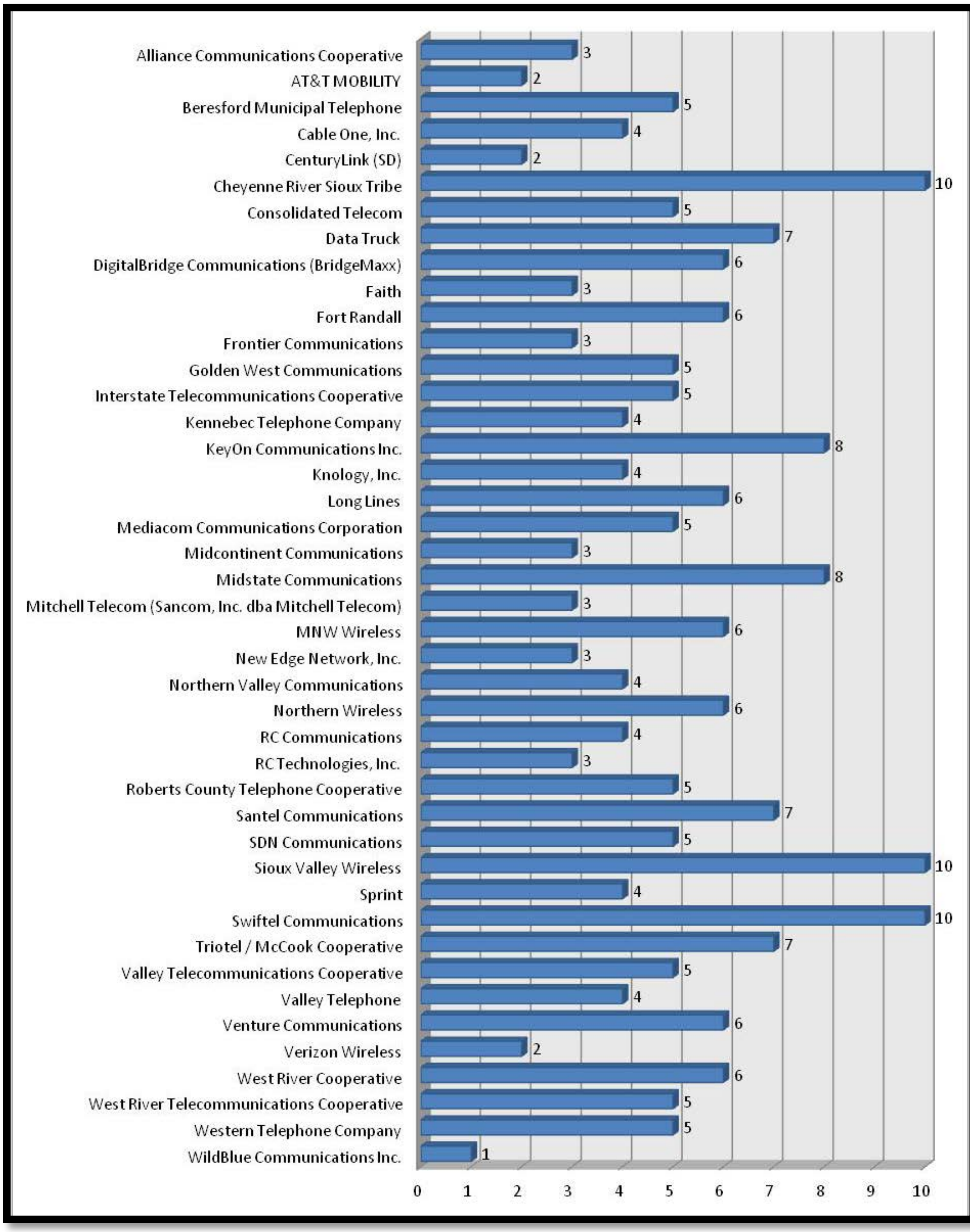
BDIA Delivery 0412 Edit

Status	--None--	Provider Data Reviewed	
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive		Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission. The chart below represents that interaction count with each provider.



- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.

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

COMMUNITY ANCHOR INSTITUTION (CAI)

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

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

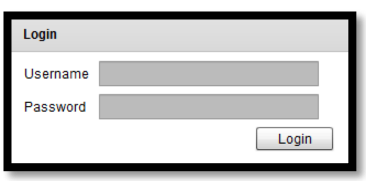
DATA INTEGRATION PROCESS

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

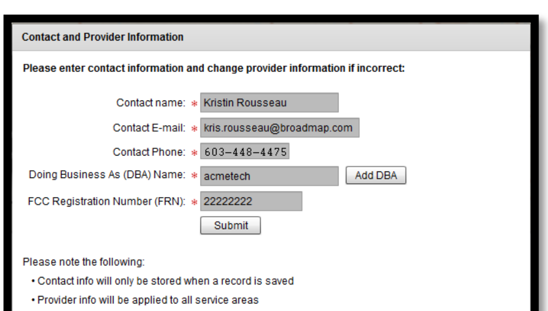
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type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

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

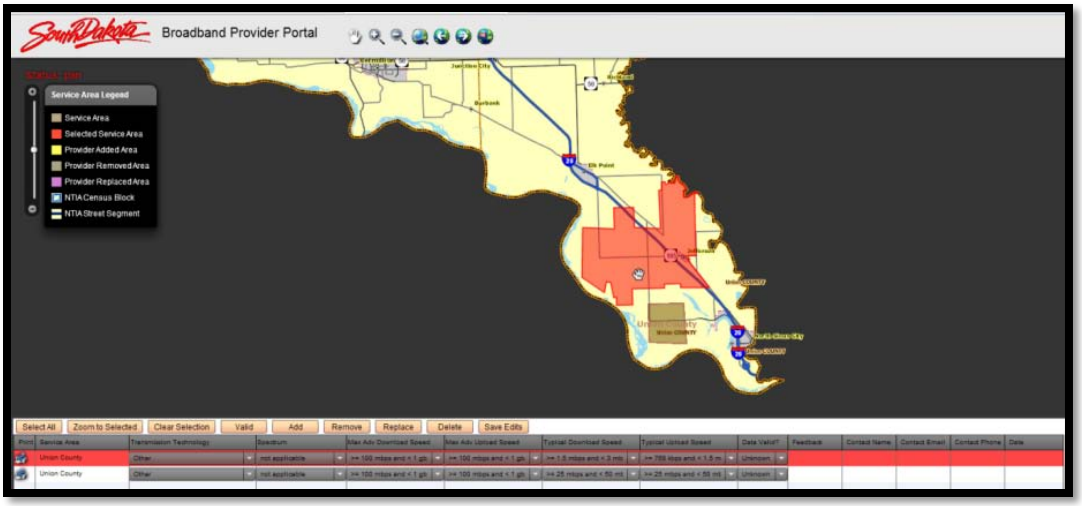
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



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

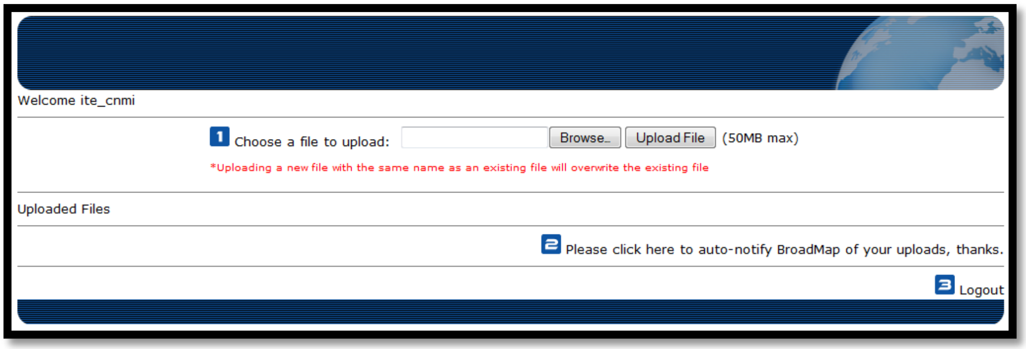


- Capability to review and request changes to the coverage footprint



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

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



- Once the provider has reviewed completed changes to their coverage, they can then validate them by signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

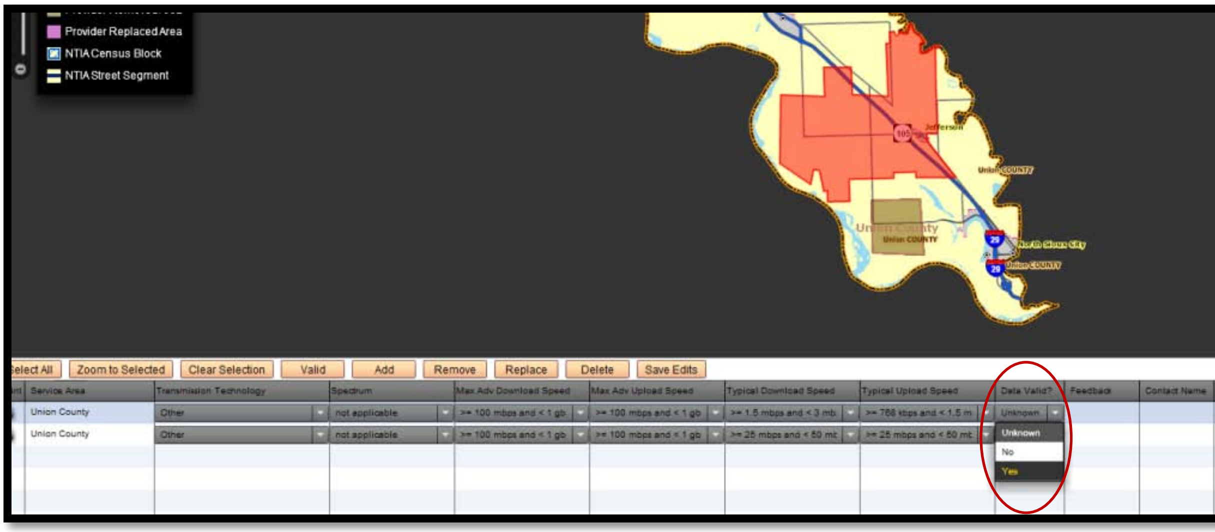
To ensure the data collected and processed is as accurate and as comprehensive as possible, South Dakota broadband verification encompasses many efforts. The methodologies employed are documented below:

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

First and foremost, all providers are given access to, and are trained in the use of, a web application we call the "provider portal". After each data collection and ingestion of provider data, representatives from the provider are able to review the polygons, segments, speeds, technologies, and other attribution that our GIS teams have developed based on the submitted data. Providers are given the opportunity to make changes to the data's attributes (speeds, technology, spectrum, etc…) as well as add/change/move/delete coverage areas. The requested changes are delivered to the GIS teams for full ingestion in our broadband database. This process is repeated until the provider representatives confirm that all aspects of the coverage areas are accurate and complete.

This portal is available 24/7/365 for providers to utilize, allowing those companies without GIS or mapping staff access to those technologies and benefits for review, presentations, and other business opportunities. This process has proven both successful and popular in the provider community.

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



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

INDUSTRY KNOWLEDGE – SUBJECT MATTER EXPERTS

South Dakota's technology and telecommunications businesses are highly consolidated, with the State of South Dakota often being the largest consumer of services in the state. Given that, relationships and partnerships often already exist between the State of South Dakota and the broadband providers, giving a first-hand look at the services offered and where they are offered. In addition, the South Dakota broadband team has ready access to industry experts within the SD Public Utilities Commission, telecommunications association's boards, and technology industry experts in the fields of telecommunications and data networking.

Our office has met and consulted with these experts regarding provider data as issues were found. Examples of these consultations are the review of provider coverage areas against telecommunications exchange areas with the Public Utilities Commission and against known technological capabilities. Any anomalies or questioned material is relayed to the providers for review.

FIELD VERIFICATION

A number of field verification efforts have taken place during the last six months.

- For newly discovered fixed wireless providers, we have sent remote office staff out to document and photograph the tower infrastructure reported by the provider.

- For mobile wireless providers, broadband staff and other team members have completed over 40,000 miles of drive testing utilizing mobile wireless phones collecting information on coverage and broadband performance. This drive testing has collected over 1.5 million data points across the state that confirm the availability of wireless broadband signal at a geographic location by coordinates, with the data collected every 10 seconds during the drive testing. Tower location information and wireless speed test results were also collected during this drive testing, with other 20,000 test results collected.

An important point to note is that with the development of an automated toolset that allows team members to start data collection upon entering the vehicle and not need any further intervention, a number of staff members have been volunteering time to drive untested roads and territories of the state during vacations, other state business, or leisure time at no cost to the program.

Due to the nature of our organization being a centralized IT group for government and education, we are uniquely positioned to request field verification by our remote office staff. As technicians travel the state, they have performed speed tests at businesses, homes, and government offices, as well as surveyed remote office staff on availability of coverage areas at their homes.

THIRD-PARTY DATA VERIFICATION

The South Dakota broadband team has collected data from the FCC CBT and Mobile tests, the FCC dead zone reporting tool, FCC ASR datasets, our own hosted speed test application, provider speed test results, census data, provider exchange boundaries and commercially available datasets from Ookla to confirm the availability of broadband service. Of particular interest to our program were datasets that tied a specific address to the broadband data, as we have found other location-based services (IP geolocation) to be woefully inaccurate in our state.

Collected third-party data is overlaid against provider coverage areas for comparison. Most valuable has been our hosted speed test server (speedtest.sd.gov). This test collects specific address location information and provider details, while providing consumers the ability to directly provide more accurate location information via a clickable map in the event that their address is not geocoded correctly. This provides benefits to our verification effort as well as our Improved Address Files grant program.

Recently added to our verification efforts have been more accurate provider exchange boundaries and 2010 Census information on population density. Provider coverage areas are compared against known exchange boundaries, and census population density information is used to explain any possibly gaps in coverage.

CROWD SOURCING

In addition to our Crowd sourced speed test system, our state broadband website broadband.sd.gov offers consumers the ability to report broadband dead zones, take surveys on available broadband and related topics, report inaccuracies in our online static/interactive maps, as well as any other relevant feedback about the broadband environment of South Dakota. This feedback is compared against provider coverage areas, with relevant information reported to the providers for comments and/or correction.

CONFIDENCE VALUES

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

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

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

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

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

List of errors within the script, which will be listed as exceptions, can be found on PB Works – Grantee Workspace at the following link:

https://sbdd-granteeworkspace.pbworks.com/w/page/50162555/December%202011%20Data%20Package%20Issues

DETAILED PROCESS REVIEW

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

BMap_ProcessDetails
_2012_04_01.docx

PROVIDERS RESEARCHED

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

5LINX Enterprises, Inc.
Airespring, Inc.
Apptix, Inc.
Aptela, Inc.
Bandwidth.com, Inc.
Birch Communications Inc.
Broadvox Go!, LLC
BullsEye Telecom, Inc.
Cause Based Commerce Inc.
CommPartners Holding Corporation
CommPartners Holding Corporation
Consolidated Telcom
Dickey Rural Telephone Cooperative
DigitalBridge Communications Corp.
Evertek, Inc.
Farmers Mutual Telephone Company (MN & SD)
Fionda VoIP, LLC
Granite Telecommunications, LLC
Great Plains Communications, Inc.
GreatCall, Inc.
Hickory Tech Corporation
iCore Networks, Inc.
InPhonex.com, LLC
Kosmaz Technologies, LLC
Level 3 Communications, LLC

LY Holdings, LLC
Matrix Telecom, inc.
Megapath, Inc.
Metropolitan Telecommunications Holding Company
Millicorp
Minnesota Valley Television Improvement Corporation
Mitel Netsolutions Inc.
MobilePro Corp.
New Edge Holding Company
NextWave Wireless Inc.
nexVortex, Inc.
Northeast Nebraska Telephone Company
NOS Communications, Inc.
OrbitCom, Inc
PaeTec Corporation
Phone.com, LLC
Proximiti Technologies, Inc.
Siouxland WISP
Trans National Communications International, Inc.
tw telecom inc.
VoIP360, Inc.
VoIPStreet, Inc.
Vonage Holdings Corp.
Wave2Wave Communications, Inc.

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

CONNECTED Tennessee

THE TRAIL TO INNOVATION®

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:

As the State Broadband Designated Entity, Connected Tennessee, in partnership with the Department of Finance and Administration's Office of Information Resources and the Department of Economic and Community Development and other agencies, please accept this submission from Connected Tennessee on behalf of the State of Tennessee's State Broadband Initiative (SBI) Grant Program, known as Connected Tennessee.

It is with highest regard that the collective stakeholders of Connected Tennessee 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 Connected Tennessee has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit not just Tennesseans, 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, Connected Tennessee: 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 (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2011 SBI data submission for the Connected Tennessee program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 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.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of a new section pertaining to industry mergers and acquisitions – specifically this section will detail any and all mergers or acquisitions that have taken place in Tennessee, since the October 2011 submission. The intent of this new section is to provide a better understanding of how the broadband provider landscape has changed over time.

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 92.13 percent of the Tennessee provider community, or 82 of 89 total providers. Of the 82 participating providers, 28 supplied an update to their network or coverage area(s), while 45 have reported no change. The remaining 9 represent providers who previously supplied data but were 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. Of the 7 providers that are not represented in the attached datasets, 6 have refused to participate in the voluntary program or were non-responsive to multiple contact attempts, and one provider is currently in some form of progress toward data submission but was not able to submit coverage areas at the time of this submission.

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

Connected Tennessee has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connected Tennessee conducts field validation efforts. To date, 46 (51.69 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

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

As an indicator of stakeholder penetration, the Connected Tennessee website encountered 5,811 unique visits during this reporting period (39,656 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 115 broadband inquiries over this same reporting period (1,446 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 Connected Tennessee website and the Connected Tennessee 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 Connected Tennessee mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connected Tennessee to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connected Tennessee 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.

Outreach was conducted during this data update reporting period by Connected Tennessee to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connected Tennessee website. Connected Tennessee received updates from institutions connected to the State of Tennessee's network and has reached out to two different medical associations (the Tennessee Medical Association and Tennessee Hospital Association) in an effort to gather more CAI data to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. The healthcare focus is ongoing and will show results in future reporting periods. Connected Tennessee will continue to build upon these relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

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

The Connected Tennessee program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great State of Tennessee, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead.

Respectfully submitted,

Michael Ramage
Executive Director
Connected Tennessee

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

DATA ACQUISITION: TENNESSEE COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this fifth reporting period of the SBI, Connected Tennessee, working in close coordination with the State of Tennessee, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. During this reporting period Connected Tennessee has continued to focus efforts on conducting outreach and raising awareness of this important project.

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

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

The survey can be accessed at this link: http://www.surveymonkey.com/s/RJK59FP.

Connected Tennessee conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connected Tennessee continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity.

Connected Tennessee has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. Connected Tennessee identified and reached out to 2 different medical associations to gather CAI data, the Tennessee Medical Association and Tennessee Hospital Association.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connected Tennessee project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connected Tennessee will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI.

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	2452	2452	2432	1199	1199	1196
Libraries	257	257	257	229	229	229
Healthcare	826	826	824	120	119	119
Public Safety	748	748	740	266	113	113
Higher Ed Institutions	302	302	300	156	159	104
Other Government	1294	1294	1260	1225	1188	1188
Other Non-Government	164	164	162	73	69	69
Total	**6043**	**6043**	**5975**	**3268**	**3076**	**3018**

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

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 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 State of Tennessee.

Inventory of Deliverables, Connected Tennessee: 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.

The provider data collected by CN on behalf of the State of Tennessee have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

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

Mergers and Acquisitions

Throughout the course of the SBI program, CN has maintained a repository of electronic records related to its provider outreach activities. Recently, due to the high volume of mergers and acquisitions (M&A) within the provider community, CN elected to create a listing of M&A activities for this mapping cycle as a way of supplementing the Provider Changes and Corrections section of this document. M&A activities for this state are listed below with a brief description and date as obtained through public records or provider disclosure.

- **Level 3 Acquired Global Crossing**
  The Global Crossing website confirmed that Level 3 and Global Crossing joined forces under the brand name Level 3 on October 4, 2011.

- **MSouth Equity Acquired United Telephone Company**
  On August 23, 2011, MSouth Equity Partners, an Atlanta-based private equity firm, announced the completion of its acquisition of United Telephone Company. United has over 13,000 access lines and a state-of-the-art network that provides services to underserved rural communities located south of Nashville, Tennessee. United provides superior broadband coverage when compared to many other rural telephone companies and plans to introduce a video service offering in the coming months.

- **Time Warner Acquired NewWave**
  On November 2, 2011, BusinessWire reported that Time Warner Cable completed the acquisition of NewWave Communications Systems in Kentucky and Tennessee for approximately $260 million. With the completion of this transaction, Time Warner Cable adds systems in Kentucky and western Tennessee to its existing operations.

- **Windstream Acquired PAETEC**
  The News section of the Windstream website dated December 1, 2011, announced that it had completed the acquisition of PAETEC Holding Corp. in a transaction valued at approximately $2.3 billion.

- **Zayo Acquired American Fiber Systems**
  On October 1, 2011, Zayo Group, a provider of telecom and Internet infrastructure services, announced that it had closed its previously announced transaction to purchase American Fiber Systems (AFS) a leading provider of metropolitan fiber network and telecom services. The acquisition adds approximately 1,000 route miles of metropolitan fiber footprint and over 600 incremental buildings. AFS operated in nine markets, six of which are new markets for Zayo Group and three of which bolster Zayo's network in existing markets.

Tennessee Field Validation Methodology

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

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;

- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets 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 Tennessee on the following providers: Ardmore Telephone Company, Inc.; AT&T, Inc.; Aurora Cable TV; Beasley Wireless; Ben Lombard Rural Telephone Cooperative, Inc.; Cable ONE, Inc.; Cellular South, Inc.; Charter Communications; Clarksville Department of Electricity (d.b.a. CDE Lightband); Clearwire Corporation; Columbia Power & Water Systems; Comcast; CRU Enterprises; DotSpot Wireless; ECSIS.NET; FiberNET; Frontier Communications Corporation; High Country Online; Infostructure Cable; Jackson Energy Authority; Ken-Tenn Wireless LLC; Leap Wireless International (d.b.a. Cricket Communications, Inc.); Level 3 Communications; Loretto Telephone Company, Inc.; Mediacom Southwest LLC (d.b.a. Mediacom Communications Corporation; Rapid Communications LLC and Mediacom); Millington Telephone Company (also d.b.a. Big River); Morristown Utilities; NetEase; OrbWireless.net; Planet Connect Internet; QuickRelay Wireless Communications; Sprint Nextel Corporation; SurfMore; TDS Telecom; TEC of Jackson, Inc.; Tele-Page, Inc.; Time Warner Cable (formerly under New Wave Communications); T-Mobile USA, Inc.; Trenton TV Cable Company; U.S. Cellular; Ultra High Speed Internet; UltraNet; United Telephone Company; Verizon Communications, Inc.; West Kentucky Rural Telephone; and Xpansion Networks.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 46 companies (out of a universe of 89 viable providers) totaling 51.69 percent within the State of Tennessee.

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.

AT&T Inc.

Issue: DSL platform with a maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises download speeds up to 24 Mbps; screenshot below.

Compare Internet Packages

	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

Ben Lomand Rural Telephone Coop., Inc.

Issue: DSL platform with a maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises download speeds at 10 Mbps; screenshot below.

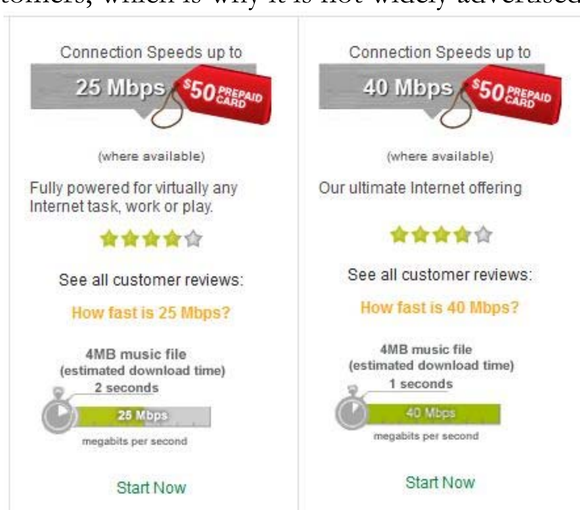
Xtreme (10.0 / 768) $69.95

Ideal for individuals and businesses sending and receiving large files, downloading movies and maximizing your gaming experience.

CenturyLink

Issue: DSL platform with a maximum advertised download speed in tiers 7, 8, and 9, higher than expected value range for the technology.

Resolution: Provider website advertises download speeds packages at 25 and 40 Mbps; screenshot below. In addition, a provider representative indicated that tier 9 DSL service is indeed available, but to less than 10% of its customers, which is why it is not widely advertised.

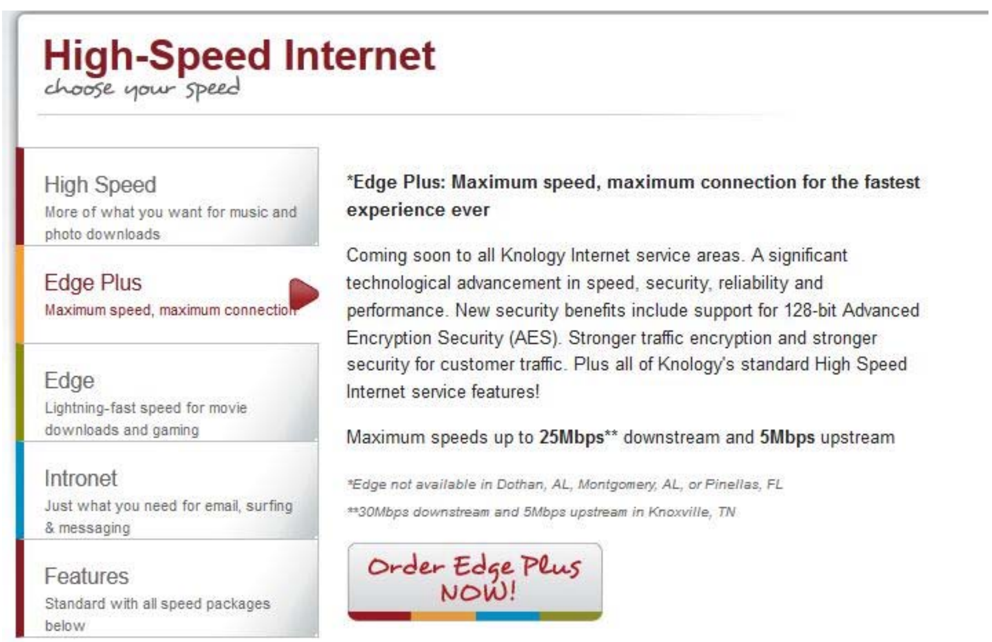


Comcast Cable Communications, LLC
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Confirmed use of DOCSIS 3.0 with speed tier 7. Speeds are kept lower currently to be backwards compatible.

DeKalb Telephone Cooperative, Inc.
Issue: DSL platform with a maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps; screenshot below.

(Max Download / Max Upload)
1M down / 512k up
3M down / 512k up
6M down / 512k up
12M down / 512k up

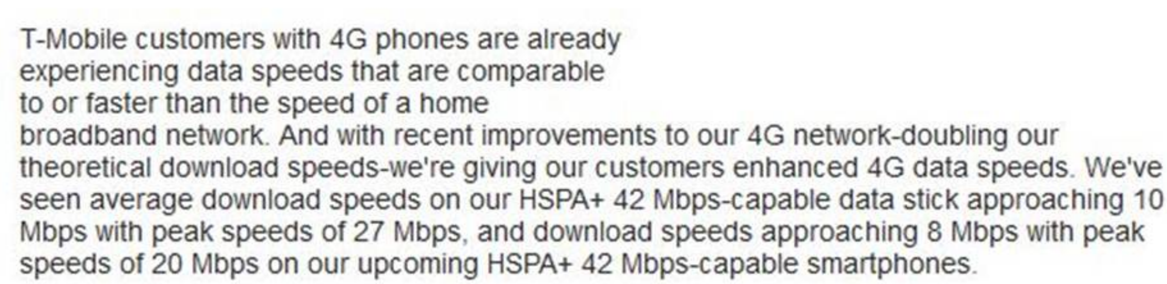
Knology of Tennessee, Inc.
Issue: Cable platform with maximum advertised download speed in tier 8.
Resolution: Provider website advertises 30 Mbps for Knoxville area; screenshot below.



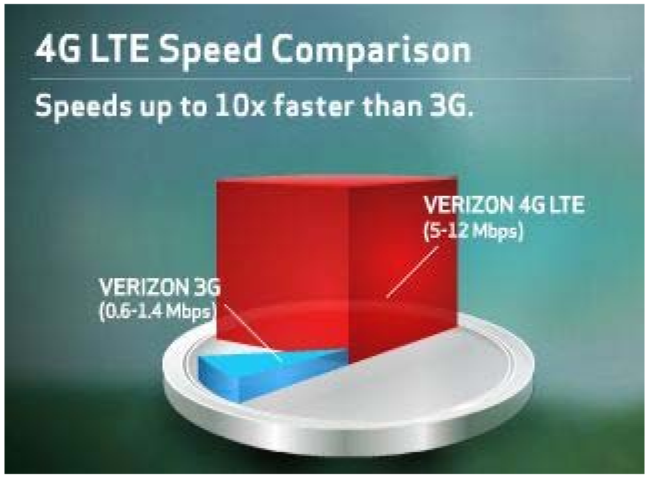
OnWav, Inc.
Issue: Fixed wireless platform with maximum advertised download speed in tier 7.
Resolution: Provider representative confirmed that 10 Mbps download and upload speeds are available to residential customers, but it is not readily advertised.

TDS Telecommunications Corporation
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8.
Resolution: Provider website advertises speeds at 15 and 25 Mbps; screenshot below.

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised speed in tier 7.
Resolution: Provider website advertises 4G services with speeds greater than speed tier 6.


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.

Verizon Communications, Inc.
Issue: Mobile wireless platform with maximum advertised speed in tier 7.
Resolution: Provider website advertises 4G LTE service at 12 Mbps.



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.

Estimates derived from provider-validated data indicate that approximately 4.94 percent of Tennessee households do not have terrestrial fixed broadband service available, and approximately 0.28 percent[1] of Tennessee households have neither mobile nor fixed broadband service available.[2]

Within rural areas of the state, results derived from provider-validated data indicate that approximately 8.50 percent of rural Tennessee households do not have terrestrial fixed broadband service available, and approximately 0.53 percent[3] of rural Tennessee 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).

[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 state.

[3] See footnote 1.

[4] See footnote 2.

6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. 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 Connected Tennessee website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information 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 Connected Tennessee project has received a total of 115 inquiries (1,446 grant inception to date). As more inquiries are submitted to Connected Tennessee, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

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 Connected Tennessee project launched BroadbandStat on February 10, 2010, and has received a total of 7,539 visits to date, of which 916 occurred this reporting period.

Speed Test Methodology

The 3,000 speed tests that are represented in the Connected Tennessee Speed Test Report during this reporting period (12,708 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connected Tennessee speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

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

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 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	21Globe, Inc.	www.21globe.com	General reseller of DSL and backhaul
2	A 007 Access	www.a007.com	General reseller of Quest DSL and mobile wireless; DSL does not qualify as the max advertised speed is 768 kbps x 128 kbps
3	Aaccess Network Communications	www.aaccess.net	Not a broadband provider; installs and maintains WiFi systems
4	Access123.net	www.access123.net	URL no longer in service
5	ACERX.NET	www.acerx.net	General reseller but no contact information listed on website; requests for information were never returned
6	Adelphia	n/a	No longer in business; assets liquidated
7	Aeneas Communications, LLC	www.aeneas.com	Facilities-based CLEC that resells dial-up, DSL, and VoIP to consumers and business accounts
8	Airespring, Inc.	www.airespring.com	General reseller of VOIP, long distance and data circuits (non-residential)
9	Airewaves Broadband, LLC	www.airewaves.com	URL no longer in service
10	Airmail247.com	www.airmail247.com	Business mailing list search site; not a broadband provider
11	America Internet & Communications	www.americainter.net	Offers high-speed business DSL and wireless point-to-point wireless services to business accounts
12	Antioch Wireless Broadband	www.antiochwirelessbroadband.com	Resells DSL and cellular service in Antioch, IL only
13	Arrowheadnet.com	www.arrowheadnet.com	Domain registration and web hosting company
14	Atris	www.atris.biz	Offers VoIP, data, and softphone services to business accounts
15	bargainisp.net	www.bargainisp.net	Generic web directory site; company does not offer broadband

16	BeaDun Communications	www.beasleywireless.net	Subsidiary of Beasley Wireless; services offered to business accounts fall below NTIA's definition of "broadband"
17	Broadband National	www.broadbandnational.com	Nonfacilities-based general reseller of DSL and satellite for 36 companies (e.g. ACC Business, HughesNet et al.)
18	Broadcore, Inc.	www.broadcore.com	Provides business solutions such as VOIP and network integration services
19	Broadview Networks Holdings, Inc.	www.broadviewnet.com	Wholesale reseller of partners' communication products and services; company is nonfacilities -based
20	Broadwing Communications	www.level3.com	Acquired by Level 3
21	BullsEye Telecom, Inc.	www.bullseyetelecom.com	Integrated suite of telecommunications services for businesses and general reseller of backhaul
22	Business Telecom, Inc.	www.earthlinkbusiness.com	B2B services only
23	Camino-Net Internet Services	www.camino-net.com	No longer in business; was dial-up only
24	CCIS.net	www.ccis.net	Now owned by Beacon Technologies; offers dial-up and is general reseller of DSL in Pennsylvania
25	Cebridge Connections	suddenlink.net	Acquired by SuddenLink
26	Celito Communications	www.celito.net	Offers dial-up and wireless in North Carolina
27	Cinergy Communications Company	n/a	Acquired by Windstream
28	Cleartouch.Com	www.cleartouch.com	Bad URL; out of business
29	Cognisurf	www.cognisurf.com	Offers dial-up only
30	Deltaforce	www.deltaforce.net	Dial-up and webhosting services only
31	deluxehost.com	deluxe-host.com	Offers web hosting only
32	DGUI	www.dgui.com	No longer in business; domain name for sale
33	Dial National	www.dialnational.com	Bad URL; out of business
34	Dialer.net	www.dialer.net	Offers international dial-up services
35	DIECA Communications, Inc.	n/a	Acquired by Covad; then acquired by MegaPath
36	Dixie-Net, Incorporated	www.dixie-net.com/wireless	Offers fixed wireless and DSL in Mississippi only
37	Dresden Cable	n/a	Provider does not offer broadband; limited to CATV and satellite services only

38	DSL @ Interlync	www.interlync.com	General reseller of DSL, wireless, VoIP, dial-up, web hosting etc.
39	DTS-NET.COM	www.dts-net.com	Provider of wholesale and retail telecommunications services
40	Eagle One Wireless	www.e1w.com	Offers direct connect wireless internet services to businesses in northeast Mississippi, south central Tennessee, and northwest Alabama
41	Endless Sphere Technology	www.endless-sphere.com	Electric Vehicle Technology Forums
42	Enventis Telecom Inc.	www.enventis.com	Doing business as Hickory Tech; general reseller in Iowa and Minnesota area; local agent claimed they do not offer "broadband services"
43	ETI - Connecting Your World	www.cyberenet.net	General reseller of DSL services from infrastructure owned by Verizon, AT&T, and Covad
44	Fast Dependable Access	www.fda.net	Not a broadband provider
45	Gainesboro CATV	n/a	Does not offer broadband, CATV only
46	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com/	Acquired by another company
47	Haywood Cablevision	www.cbvnol.com	Out-of-state provider; offers service in the Carolina Mountain area
48	Highertech.Net	www.highertech.net	Appears to have been acquired by Chattanooga Net
49	Hubwest Protected Networks LLC	www.hubwest.com	Dial-up and web hosting only
50	Imbris, Inc.	www.imbris.com	Provides fixed wireless in Idaho only
51	IMGISP.NET	www.imgisp.net	Search engine
52	Incredible Networks	n/a	Bad URL; out of business
53	Inercom Communications Inc.	www.inercom.com	Bad URL; out of business
54	Interactiveinfo.com Inc.	www.rocketbroadband.com	Offers cable television services in NY only
55	iRadical	n/a	Bad URL; out of business
56	ISPartner.net	n/a	Bad URL; out of business
57	Jenco Speed Web	www.jencospeed.net	Offers wireless service in Ohio only
58	LARIAT.NET	www.lariat.net	Offers fixed wireless services in Wyoming only
59	LCSisp.com	www.lcsisp.com	Offers national dial-up services only

60	Lightyear Network Solutions, LLC	www.lightyear.net	Nonfacilities-based general reseller
61	LinkAmerica.Net	www.linkamerica.net	Bad URL; out of business
62	MacWebTown.Net Works	www.macwebtown.net	McIntosh web services and technical assistance
63	MainBoard	www.mainboard.cc	General reseller in Virginia
64	Maine Cable and Wireless	www.mainecableandwireless.com	Bad URL; out of business
65	Marcin Company	n/a	Bad URL; out of business
66	Metropolitan Telecommunications Holding Company	www.mettel.net	MetTel provides facilities-based and resold services (certified CLEC in some states).The company provides a variety of voice, including wireless, and data services to commercial customers
67	Millenicom Inc.	www.millenicom.com	General reseller of dial-up and mobile broadband (Sprint network)
68	MYWEBSTAR	www.mywebstar.com	Bad URL
69	Nanomega.Com	www.nanomega.com	Bad URL; out of business
70	NetAccess, Inc.	www.nas.net	Offers wireless B2B services only
71	NetFire	n/a	No longer in business
72	NetSpeed Online	www.netspeed-online.net	Bad URL; out of business
73	NetStar Communications	n/a	Offers virtual ISP services and web hosting
74	New Edge Network, Inc.	www.newedgenetworks.com	Company has no residential service and re-sells backhaul; acquired by Earthlink
75	NewWave Communications	http://www.newwavecom.com/	Acquired by another company
76	Northwest ISP	www.northwestisp.com	Bad URL; out of business
77	NTCH, Inc.	www.cleartalkwireless.net	Acquired by Cleartalk Wireless
78	NuVox, Inc.	www.windstream.com	Acquired by Windstream
79	Overarch Broadband	n/a	Offers services in Idaho only
80	Pacific Internet Exchange	www.pie.us	Bad URL; company appears to have gone out of business
81	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company
82	Paknet Limited	www.ptcl.com.pk	Subsidiary of Pakistan Telephone Company; no services offered in the U.S.
83	Planet Online	www.planetonline.net	Offers website hosting services

84	Point2Point	www.p2p-innovations.com	Out of business
85	PremoWeb	www.premoweb.com	Offers national dial-up services only
86	Qwest Communications Company, LLC	www.centurylink.com	Acquired by CenturyLink
87	Rapid Communications, LLC	n/a	Acquired by Mediacom; subsequently acquired by Comcast
88	Renaissance Networks	www.renaissancenetworks.com	Offers IT support to small businesses in New Mexico
89	Rural Tennessee Wireless Broadband (RTWB)	http://www.rtwb.net/	No longer in business.
90	Scott County Telephone Cooperative	www.sctc.org	CLEC offering business class services only
91	Shentel Converged Services, Inc.	www.shentel.com	Shentel Converged Services is classified as a Private Cable Operator and offers service to MDU housing facilities
92	SI Wireless	www.siwirelessco.com	Resells Sprint 3G services
93	Simply Dialup A Metrogeek Company	www.simplydialup.com	Offers dial-up only
94	Sling Broadband	www.slingbroadband.com	Out-of-state provider; offers DSL and wireless services to business accounts in Florida
95	Smartresort Co, LLC	www.baldwincountyinternet.com	General reseller of local ISP services
96	Solutions IT Consulting, LLC	www.solutionsitc.com	Technology consulting firm
97	Sparkplug Chicago, Inc.	www.airband.com	Offers point-to-point wireless and business solutions in Illinois
98	Spring City Cable	n/a	Out-of-state provider; offers services in Utah only
99	Surferz.Net	www.surferz.net	Offers dial-up in upstate NY only
100	T1 Shopper	www.t1shopper.com	Search engine for general reseller
101	Talk America Inc.	www.cavtel.com	Acquired by Cavalier Business Communications
102	Telovations, Inc.	www.telovations.com	IT and IP solutions consultant
103	The Nexus Group, Inc.	www.nxs.net	General reseller of AT&T DSL
104	TNWEB, LLC	http://www.tnweb.com/	Found to be not eligible; appears to only offer wifi services.
105	Total Access Networks, Inc.	www.totalaccess.net	Bad URL
106	TSISP.NET	www.tsisp.net	Bad URL; out of business

107	Two Rivers Media	n/a	Bad URL; acquired by MediaCom
108	University Corporation for Advanced Internet Development	www2.ntia.doc.gov/grantee/university-corporation-for-advanced-internet-development	BIP/BTOP recipient proposes a comprehensive 50-state network benefitting approximately 121,000 CAIs; the project proposes a large-scale, public-private partnership to interconnect more than 30 existing research and education networks, creating a dedicated 100-200 Gbps nationwide fiber backbone with 3.2 terabits per second (TBps) total capacity that would enable advanced networking features such as IPv6 and video multicasting
109	UNUM Telecommunications, Inc.	www.utinet.net	Bad URL; out of business
110	VOLstate, Inc.	www.volstate.net	Offers Internet solutions and technical support to business accounts
111	Waypoint Wireless	n/a	Consulting firm
112	WilTel Communications, LLC.	www.level3.com	Acquired by Level 3
113	Wireless Roanoke, Inc.	www.wirelessroanoke.com	Bad URL; out of business
114	wisbin	www.wisbin.com	No longer in business
115	WorldCom Broadband	n/a	Acquired by Verizon
116	Worldspice.net	www.worldspice.net	Offers web hosting and connectivity to business accounts
117	www.AmericanAngel.us	www.americanangel.us	Bad URL; out of business
118	XTN	www.xtn.net	URL redirects to Jones Media
119	YEYZOO.NET	www.yeyzoo.net	Bad URL; out of business
120	YLISP (Your Local ISP)	www.itsyournet.com	Resells DSL and dial-up
121	YourT1Wifi.com	yourt1wifi.com	Offers wireless service in Idaho only
122	ZOOM Internet Services, LLC	n/a	Michigan-based dial-up provider and web hosting company

Broadband Provider Log

Complete	100
Non-Responsive/Refused	7
In Progress	6
Count of Datasets by Status	**113**
Total Unique Providers Represented	**89**

Provider Name	Platform	Status	NDA Execution Date	Notes
Ardmore Telephone Company Inc	DSL	Data Added to Statewide Inventory	2/16/2010	[MAR-12-12 Ashley Littell] Correction: Received more granular speed information for the service area.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Cable ONE Inc.	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Capshaw Enterprises, LLC	Fixed Wireless	Data Added to Statewide Inventory	10/20/2011	[JAN-25-12 Ashley Littell] Change: This is a brand new broadband provider in the market.
Cellular South Licenses, LLC	Mobile Wireless	Data Added to Statewide Inventory	4/12/2010	[JAN-25-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/3/2010	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission. [MAR-12-12 Terry Holmes] Provider supplied additional information on coverage for substantial service sites in October 2011, however requested that CN not submit or publish this coverage since they do not market to these areas.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[FEB-14-12 Ashley Littell] Change: Provider activated seven new DSLAMs.
InfoStructure Inc.	Cable	Data Added to Statewide Inventory	10/2/2009	[MAR-16-12 Ashley Littell] Change: Provider has migrated service to DOCSIS 3.0 and upgraded speeds to 50 Mbps download and 5 Mbps upload.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Millington CATV, Inc.	Cable	Data Added to Statewide Inventory	10/19/2009	[FEB-24-12 Ashley Littell] Changes and/or Corrections: While there was some expansion, other areas had the boundaries refined to show a more detailed display.
Millington CATV, Inc.	DSL	Data Added to Statewide Inventory	10/19/2009	[JAN-25-12 Ashley Littell] Change: Provider expanded service to additional area in Tipton County.
Monster Broadband, Inc.	Fixed Wireless	Data Added to Statewide Inventory	11/6/2009	[JAN-25-12 Ashley Littell] Change: Provider activated new tower.
Skyline Telephone Membership Corporation	Fiber	Data Added to Statewide Inventory	2/2/2010	[JAN-25-12 Ashley Littell] Change: Provider indicated that all previous DSL service has been switched to FTTH and the copper plant has been decommissioned. Fiber coverage is being submitted for the first time.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.

TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
TDS Telecommunications Corporation	Fiber	Data Added to Statewide Inventory	1/27/2010	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
TEC of Jackson, Inc	DSL	Data Added to Statewide Inventory	7/29/2010	[FEB-24-12 Ashley Littell] Change: Speed updates were received and processed.
TEC of Jackson, Inc	DSL	Data Added to Statewide Inventory	7/29/2010	[FEB-24-12 Ashley Littell] Change: Speed updates were received and processed.
TEC of Jackson, Inc	DSL	Data Added to Statewide Inventory	7/29/2010	[FEB-24-12 Ashley Littell] Change: Speed updates were received and processed.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-24-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Ardmore Telephone Company Inc	Backhaul	Backhaul Provider Only Processing Complete	2/16/2010	
Conterra Ultra Broadband, LLC	Backhaul	Backhaul Provider Only Processing Complete		
Iris Networks	Backhaul	Backhaul Provider Only Processing Complete	1/5/2010	
MegaPath Inc.	Backhaul	Backhaul Provider Only Processing Complete	2/15/2010	
Skyline Telephone Membership Corporation	Backhaul	Backhaul Provider Only Processing Complete	2/2/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
TDS Telecommunications Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/27/2010	
Zayo Group, LLC	Backhaul	Backhaul Provider Only Processing Complete		
AT&T Inc.	DSL	Approval for Update Not Received – Data Still Submitted	12/16/2009	[MAR-07-12 Ashley Littell] Changes and/or Corrections: possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission. Dataset not officially approved, but provider representative instructed CN to proceed with using the new dataset for the April 2011 submission.
ECSIS.NET	Fixed Wireless	Approval for Update Not Received – Data Still Submitted	10/29/2009	[MAR-01-12 Ashley Littell] Change and Correction: Additional towers added into service; speeds were revised to only include residential offerings.
Ultranet High-Speed Internet	Fixed Wireless	Approval for Update Not Received – Data Still Submitted	2/23/2010	[MAR-06-12 Chip Spann] Change: New tower sites added for this mapping cycle.
West Kentucky and Tennessee Telecommunications Cooperative Inc	DSL	Approval for Update Not Received – Data Still Submitted	1/7/2010	[FEB-24-12 Ashley Littell] Change: Service expanded into Weakley County.
Access Cable Television, Inc.	Cable	No Update to Provide		
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Aurora Cable TV	Cable	No Update to Provide	3/12/2010	
Beasley Wireless	Fixed Wireless	No Update to Provide	1/19/2010	
Ben Lomand Rural Telephone Coop., Inc.	Fiber	No Update to Provide	10/21/2009	
Ben Lomand Rural Telephone Coop., Inc.	DSL	No Update to Provide	10/21/2009	
Bledsoe Telephone Cooperative Inc	DSL	No Update to Provide	1/20/2010	
BreezeAir.net	Fixed Wireless	No Update to Provide	8/17/2010	
Bristol Tennessee Essential Services	Fiber	No Update to Provide	9/1/2010	
Celina Cable Communications, Inc.	Cable	No Update to Provide	1/15/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Clarksville Department of Electricity	Fiber	No Update to Provide		
Columbia Power & Water Systems	Cable	No Update to Provide		
CRU Enterprises, Inc.	Fixed Wireless	No Update to Provide	2/4/2010	
DeltaCom, Inc.	Backhaul	No Update to Provide	2/16/2010	
DISH Network Corporation	Satellite	No Update to Provide	1/27/2010	
Electric Power Board for the City of Chattanooga	Fiber	No Update to Provide		
ETC Communications, LLC	Cable	No Update to Provide	10/14/2009	
Fayetteville Public Utilities	Cable	No Update to Provide		
High Country Online LLC	Fixed Wireless	No Update to Provide	3/4/2010	
Highland Telephone Cooperative, Inc.	DSL	No Update to Provide	3/14/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
iGiles.net	Fixed Wireless	No Update to Provide	2/25/2010	
Info-Ed Inc	Fixed Wireless	No Update to Provide	2/9/2010	
Jackson Energy Authority	Fiber	No Update to Provide	3/17/2010	
James Cable LLC	Cable	No Update to Provide	1/11/2010	
Knology of Tennessee, Inc.	Cable	No Update to Provide	7/13/2011	
Mediacom Southeast LLC	Cable	No Update to Provide	1/12/2010	
MidSouth Satellite, LLC	Backhaul	No Update to Provide	7/7/2010	
MidSouth Satellite, LLC	Fixed Wireless	No Update to Provide	7/7/2010	
Morristown Utilities Commission	Fiber	No Update to Provide	3/25/2010	
NetEase	Fixed Wireless	No Update to Provide	2/3/2010	
North Central Communications	DSL	No Update to Provide	2/5/2010	
OnWav, Inc.	Fixed Wireless	No Update to Provide	3/15/2010	
Pickwick Cablevision, Inc.	Cable	No Update to Provide		
Planet Connect Internet	Fixed Wireless	No Update to Provide		
Pulaski Electric System	Fiber	No Update to Provide	12/30/2009	
QuickRelay Wireless Communications	Fixed Wireless	No Update to Provide		
Softek, Inc.	Fixed Wireless	No Update to Provide	1/14/2010	
Sprint Nextel Corporation	Backhaul	No Update to Provide	1/14/2010	
Surfmore.Net, Inc.	Fixed Wireless	No Update to Provide	1/25/2010	
TEC of Jackson, Inc	Backhaul	No Update to Provide	7/29/2010	
TEC of Jackson, Inc	Backhaul	No Update to Provide	7/29/2010	
TEC of Jackson, Inc	Backhaul	No Update to Provide	7/29/2010	
TELE-PAGE Inc.	Fixed Wireless	No Update to Provide	1/26/2010	
Trenton TV Cable Company	Cable	No Update to Provide		

Tullahoma Utilities Board	Fiber	No Update to Provide		
tw telecom of tennessee, llc	Backhaul	No Update to Provide	3/31/2010	
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
United Telephone Company, Inc.	DSL	No Update to Provide	2/25/2010	
United Telephone Company, Inc.	Fiber	No Update to Provide	2/25/2010	
ViaSat, Inc.	Satellite	No Update to Provide	1/8/2010	[MAR-07-12 Ashley Littell] ViaSat has acquired WildBlue and coverage will be represented as ViaSat, Inc. starting with the April 2012 submission.
Windstream Communications	Backhaul	No Update to Provide		
Zito Midwest, LLC	Cable	No Update to Provide	2/17/2011	
DeKalb Telephone Cooperative, Inc.	DSL	No Update Provided - Use Last Submission Data	2/24/2010	
Ken-Tenn Wireless, L.L.C.	Fixed Wireless	No Update Provided - Use Last Submission Data	1/25/2010	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Loretto Telephone Company, Inc.	DSL	No Update Provided - Use Last Submission Data	3/16/2010	
OrbWireless.net	Fixed Wireless	No Update Provided - Use Last Submission Data		[MAR-02-12 Ashley Littell] Provider representative indicated that they are "declining to participate in this mapping project at this time." Since coverage has previously been collected and approved by this provider, we will submit it again. However, any updates past this submission will need to be collected via field validation.
Spirit Broadband	Cable	No Update Provided - Use Last Submission Data	3/29/2010	
Twin Lakes Telephone Cooperative Corporation	DSL	No Update Provided - Use Last Submission Data	1/14/2010	
Wave2Wave Communications Inc.	Backhaul	No Update Provided - Use Last Submission Data	4/28/2010	
XO Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	2/12/2010	
Tennessee Wireless, LLC	Fixed Wireless	Solicited Initial Data		
Skyline Telephone Membership Corporation	DSL	Other	2/2/2010	[JAN-11-12 Ashley Littell] Provider indicated that all previous DSL service has been switched to FTTH and the copper plant has been decommissioned. DSL coverage will no longer be submitted.
Time Warner Cable LLC.	Cable	Other	12/21/2009	[FEB-24-12 Ashley Littell] Received entirely new dataset for Time Warner, which was formerly NewWave Communications in Tennessee. However, the new coverage is not being submitted as there are questions about the accuracy; the previous NewWave dataset is being submitted under the Time Warner name.
Twin Lakes Telephone Cooperative Corporation	Fiber	Other	1/14/2010	[FEB-24-12 Ashley Littell] The fiber service has been built, but it is not yet active. Data will likely be submitted in October 2012.
Verizon Communications, Inc.	Backhaul	Other	12/14/2009	[MAR-06-12 Wes Kerr] A company representative sent a message noting that these sites have been decommissioned and shouldn't be submitted any longer.
West Kentucky and Tennessee Telecommunications Cooperative Inc	Fiber	Other	1/7/2010	[FEB-24-12 Ashley Littell] While fiber coverage was received from provider as they have built out, the service is not yet available, nor have available speeds been set by the company's marketing division. Fiber coverage will likely be submitted in October 2012.
Windstream Communications	Backhaul	Other		[FEB-24-12 Ashley Littell] While Windstream acquired PAETEC, Windstream does not have any of the information on PAETEC backhaul yet to report.
Birch Communications, Inc.	Backhaul	Refused to Participate		[NOV-09-11 Chip Spann] A representative of the company sent an e-mail declining participation.
Birch Communications, Inc.	DSL	Refused to Participate		[NOV-09-11 Chip Spann] A representative of the company sent an e-mail declining participation.
ABG Wireless, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.
TNets Internet	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 5 additional contact attempts were made this period.
Trinity Communications LLC	Cable	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.
Utopian Wireless Corporation	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.

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

CONNECTED TEXAS®

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:

As the State Broadband Designated Entity, in partnership with the Texas Department of Agriculture, please accept this submission from Connected Nation on behalf of the state of Texas' State Broadband Initiative (SBI) Grant Program, known as Connected Texas.

It is with highest regard that the collective stakeholders of Connected Texas 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 Connected Texas has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit not just Texans, 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, Connected Texas: 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 (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2011 SBI data submission for the Connected Texas program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for April 1, 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.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of a new section pertaining to industry mergers and acquisitions – specifically this section will detail any and all mergers or acquisitions that have taken place in Texas, since the October 2011 submission. The intent of this new section is to provide a better understanding of how the broadband provider landscape has changed over time.

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 81.03 percent of the Texas provider community, or 158 of 195 total providers. There are 152 participating providers and 6 additional non-participating provider(s) whose estimated coverage areas have been submitted. Of the 152 participating providers, 58 supplied an update to their network or coverage area(s), while 66 have reported no change. The remaining 28 represent providers who previously supplied data but were 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 37 providers that are not represented in the attached datasets have refused to participate in the voluntary program or were non-responsive to multiple contact attempts.

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

Connected Texas has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connected Texas conducts field validation efforts. To date, 120 (61.54 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

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

As an indicator of stakeholder penetration, the Connected Texas website encountered 5,285 unique visits during this reporting period (40,183 total to date for the life of the grant awarded on January 1, 2010). Additionally, this pronounced Web activity netted 39 broadband inquiries over this same reporting period (513 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 Connected Texas website and the Connected Texas 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 Connected Texas mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connected Texas to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connected Texas 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 Texas Department of Agriculture, outreach was conducted during this data update reporting period by Connected Texas to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connected Texas website. Connected Texas had the most success capturing CAI data by working with the Texas Department of Agriculture's State Office of Rural Health. Moreover, the CAI survey was also shared with the Texas Broadband Taskforce in an effort to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. Connected Texas will continue to build upon these relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

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

The Connected Texas program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Texas, as well as the United States through contribution to the National Broadband Map. We look forward to the continuing work ahead.

Respectfully submitted,

Tom Ferree

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

DATA ACQUISITION: TEXAS COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this fifth reporting period of the SBI, Connected Texas, working in close coordination with the state of Texas, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. During this reporting period Connected Texas has continued to focus efforts on conducting outreach and raising awareness of this important project.

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

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

The survey can be accessed at this link: http://www.surveymonkey.com/s/2S72YFV.

Connected Texas conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connected Texas continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connected Texas works with the Texas Department of Agriculture and other members of the Texas Broadband Taskforce to identify existing relationships that can support CAI outreach.

Connected Texas has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. Members of the Texas Broadband Taskforce have been essential resources for identifying and distributing the CAI survey. One such example is Peggy Rudd, the director and librarian for the Texas State Library and Archives Commission, who regularly provides updated lists of librarians across Texas.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connected Texas project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connected Texas will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. The Texas Department of Agriculture will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state. These regular updates support a continued conversation about CAI and their role in broadband expansion. The Texas Department of Agriculture recommended outreach to the Director, State Office of Rural Health within the Department. This outreach supported significant progress in the healthcare sector.

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	10,604	10,604	10,601	78	71	71
Libraries	1131	1131	1131	103	261	100
Healthcare	870	870	865	96	178	96
Public Safety	2904	2904	2870	256	543	254
Higher Ed Institutions	420	420	420	36	106	35
Other Government	705	705	705	464	92	43
Other Non-Government	1	1		1	1	1
Total	**16,635**	**16,635**	**16,592**	**1034**	**1252**	**600**

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

SBI Data Submission Methodology

The submission of the broadband dataset for April 1, 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 state of Texas.

Inventory of Deliverables, Connected Texas: 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.

The provider data collected by CN on behalf of the state of Texas have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

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

MERGERS AND ACQUISITIONS

Throughout the course of the SBI program, CN has maintained a repository of electronic records related to its provider outreach activities. Recently, due to the high volume of mergers and acquisitions (M&A) within the provider community, CN elected to create a listing of M&A activities for this mapping cycle as a way of supplementing the Provider Changes and Corrections section of this document. M&A activities for this state are listed below with a brief description and date as obtained through public records or provider disclosure.

- **Baja Broadband Acquired US Cable Systems**
  On Wednesday, August 24, 2011, US Cable sold cable systems in Texas, Colorado, and New Mexico, serving 60k revenue generating units to South Carolina-based Baja Broadband.

- **eNet Industry Services, LLC Acquired Element Networks LLC**
  There was no public announcement of the acquisition of Element Networks LLC.

- **Gores Group Acquired Alpheus Communications**
  On September 21, 2011, the Gores Group, a Los Angeles-based private equity firm, announced that, through an affiliate, it has signed an agreement to acquire Alpheus Communications, one of the largest fiber network and data center operators in Texas. The Gores Group is considering a plan to combine Alpheus with First Communications, an existing Gores portfolio company.

- **JAB Acquired Eccentrix Technologies, LLC**
  Eccentrix announced to its customers in a letter dated October 19, 2011, that it had been acquired by Skybeam, a wholly owned subsidiary of JAB Broadband.

- **TelePacific Acquired Tel West**
  On June 28, 2011, the TelePacific Communications website announced that U.S. TelePacific Corp, which does business as TelePacific Communications, a communications and network services company, had executed a definitive agreement to acquire Tel West Network Services Corporation. On October 25, 2011, FierceWireless reported that TelePacific had officially added Texas to its serving territory by completing its acquisition of Austin, Texas-based Tel West.

- **Time Warner Acquired Cobridge Operation**
  The Time Warner Cable website announced the acquisition of the Cobridge Cable System in the Rockport, Texas area.

- **Windstream Acquired PAETEC**
  The News section of the Windstream website dated December 1, 2011, announced that it had completed the acquisition of PAETEC Holding Corp. in a transaction valued at approximately $2.3 billion.

- **Zayo Acquired 360networks**
  On December 2, 2011, the Zayo website announced that it had completed its transaction to purchase 360networks. The resulting company is one of the largest bandwidth infrastructure companies in North America with an estimated annualized pro forma revenue of $393 million.

TEXAS FIELD VALIDATION METHODOLOGY

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

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets 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 Texas on the following providers: Alenco Communications, Inc.; Allegiance Communications; Alpheus (d.b.a. Aspen Communications); AMATechTel; AT&T, Inc.; AwesomeNet, Inc.; Basin 2 Way Radio, Inc.; Basin Broadband, Inc.; Big Bend Telephone Company, Inc.; Blossom Telephone; Border to Border Communications, Inc.; Broadband Data Services of Texas LLC; Broadcomm.US; Broadwaves; Buffalo Cable TV; Cable One, Inc.; Cameron Telephone Company LLC; Cap Rock Telephone Cooperative, Inc.; Central Texas Cable Partners, Inc.; Central Texas Telephone Cooperative, Inc.; CenturyLink; Cequel Communications (also d.b.a. Cebridge, Suddenlink); Charter Communications; CKS Wireless, Inc.; Clearwire Corporation; Coleman County Telephone Cooperative LLC; Colorado Valley Telephone Cooperative LLC; Comcast Cable Communications LLC; Community Telephone Company, Inc.; Consolidated Communications; Cumby Telephone Company, Inc.; DCT Texas.Net; Dell Telephone Cooperative, Inc.; Digitex.com; East Texas Broadband; East Texas DSL; Eastex Telephone Cooperative, Inc.; ECTISP; ELC Internet Services, Inc.; Electra Telephone Company; eNet; ENMR Telephone Cooperative, Inc. (d.b.a. ENMR Plateau Communications, Inc.); ERF Wireless; ETAN Industries; Etex Communications LP; ETS Cablevision Company, Inc.; Farm to Market Broadband LP; Five Area Telephone Company, Inc.; Ganado Telephone Company, Inc.; GEUS; Gilmer Cable; Gower Computer Support, Inc.; GoZoe Wireless, LLP; Grande Communications Network LLC; Grayson CableRocket, LLC; Greasy Bend Ventures, Inc. (d.b.a. Live Air Networks); GTEK Communications; Guadalupe Valley Communications Systems; GVEC.net; Hill Country Telephone Cooperative; Iguana Net; Industry Telephone Company; JAB Wireless; KeyOn Communications, Inc.; La Ward Telephone Exchange, Inc.; Lake Livingston Telephone Company; Leap Wireless International, Inc.; Livingston Telephone Company, Incorporated; Maverick Internet; McDonald Group; Mid-Plains Rural Co-op, Inc.; NetWest Online, Inc.; Neu Ventures, Inc.; Nortex Communications; North Texas Broadband LLC; North Texas Cellular, Inc.; Northland Communications; NTS Communications; Panhandle Telephone Cooperative, Inc.; Phantom Wave (d.b.a. Argon Technologies); Poka Lambro Telephone Cooperative, Inc.; Presidio Community Wireless Network; Promptwireless LLP; RB3 LLC; Ridgewood Cable; Rioplex Wireless Ltd.; Riviera Telephone Company, Inc.; Rock Solid Internet & Telephone; Rodzoo Wireless; Santa Rosa Telephone Cooperative, Inc.; Smithville System; South Plains Telephone Cooperative, Inc.; Southwest Arkansas Telephone Cooperative, Inc.; Southwest Texas Telephone Company; Speed of Light Broadband, Inc.; Sprint Nextel Corporation; Stelera Wireless LLC; Tatum Telephone; Taylor Telephone Cooperative, Inc.; Texas Broadband, Inc.; Texas CellNet; Texas Wireless Internet; Texhoma Wireless; TierOne Converged Networks, Inc.; Time Warner Cable, Inc.; TISD; T-Mobile USA, Inc.; Totalcom Communications, Inc.; Valley Telephone Cooperative, Inc.; Verizon Southwest, Inc.; WEHCo Video (d.b.a. Kilgore Video, Kilgore Cable); West Texas Rural Telephone Cooperative; Wes-Tex Telecommunications Ltd.; Wharton County Electric Cooperative, Inc.; Windjammer Communications, LLC; Windstream Communications; XIT Telecommunications & Technology Ltd.; Zito Midwest LLC (d.b.a. Galaxy Cable); and Zulu Internet.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 120 companies (out of a universe of 195 viable providers) totaling 61.54 percent within the state of Texas. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters. 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.

Alenco Communications, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider representative indicated that tier 7 speeds are indeed available to all customers in the Knippa exchange.

AT&T Communications of Texas, 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 24 Mbps; screenshot below.

Compare Internet Packages

	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

Baja Broadband Holding Company
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than the expected value range for the technology.
Resolution: Provider website confirms that DOCSIS 3.0 is in use, but the speeds have not been turned up and are currently advertised at 12 Mbps; screenshot below.

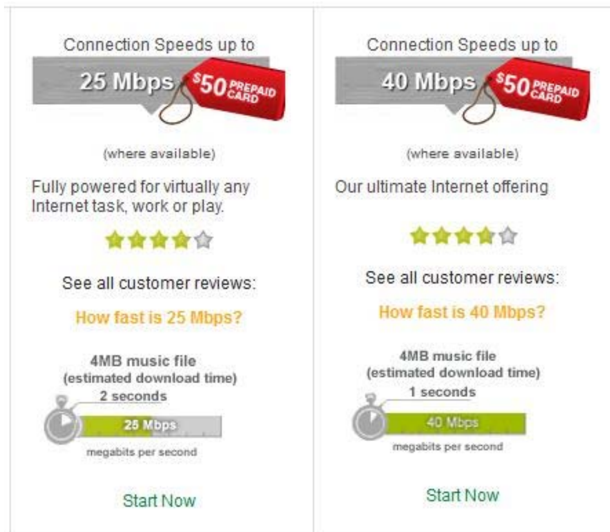
Cable Modem. Our residential and commercial Internet service requires connection of a cable modem and/or cable router to our network. You can obtain a cable modem/router from us or you may purchase one from most retail electronics sellers. Only devices that have been fully certified by CableLabs as compliant with the DOCSIS 2.0 or DOCSIS 3.0 specifications may be used. Commercially-available DOCSIS 3 compliant modems are currently being tested by Baja Broadband. Commercially-available DOCSIS 3 compliant modems are currently being tested by Baja Broadband. For a recommended list of DOCSIS 3 devices please contact Baja Customer Service at (877) 422-5282.

Baja's High-Speed Internet Service lets you surf and download huge files at blazing fast speed without the hassle of dialing-up to access the Internet.

- Fatest speeds around, up to 12 MB!

Buffalo Cable TV
Issue: Technology of transmission 40 with maximum advertised download speed in tier 5, lower than the expected value range for the technology.
Resolution: Provider representative confirmed that service area is DOCSIS 3.0, but lower speeds are still advertised and in use.

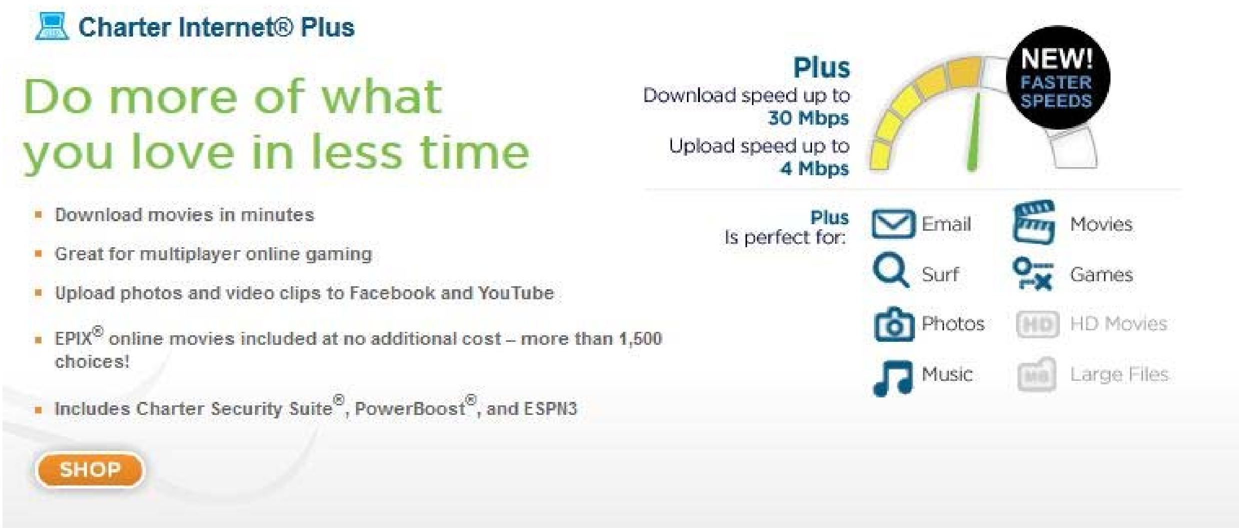
CenturyLink
Issue: DSL platform with maximum advertised download speed in tiers 7, 8, and 9, higher than the expected value range for the technology.
Resolution: Provider website advertises 15 and 40 Mbps service; screenshot below. In addition, provider representative indicated that tier 9 DSL service is indeed available, but to less than 10% of its customers, which is why it is not widely advertised.



Cequel Communications
Issue: Technology of transmission 40 with maximum advertised download speed in tiers 7 and 8, lower than the expected value range for the technology.
Resolution: Provider representative confirmed that DOCSIS 3.0 is indeed in use, but speeds have not been turned up higher at this time.

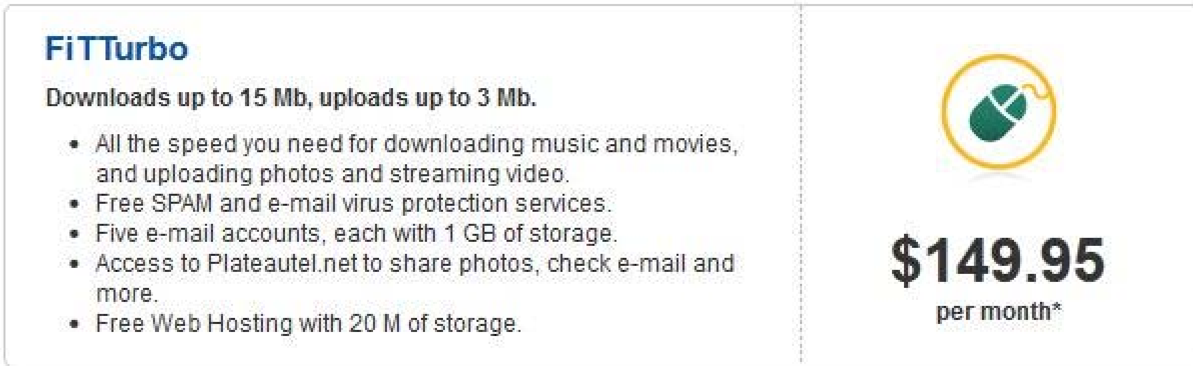
Charter Communications, Inc.
Issue: Technology of transmission 41 with maximum advertised download speed in tier 8, higher than the expected value range for the technology.

Resolution: Provider website advertises 30 Mbps; screenshot below.



Consolidated Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

ENMR Telephone Cooperative, 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 15 Mbps service; screenshot below.



Guadalupe Valley Communications Systems
Issue: DSL platform with maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

GVTC Broadband	768Kbps 128Kbps	1.5Mbps 384Kbps	5Mbps 512Kbps	8Mbps 1Mbps	12Mbps 1.5Mbps
Month to Month	$29.95	$34.95	$39.95	$44.95	$59.95
Double Play	$24.95	$29.95	$34.95	$39.95	$54.95
Triple Play	**$19.95**	**$24.95**	**$29.95**	**$34.95**	**$49.95**

Millennium Telcom, LLC
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than the expected value range for the technology.
Resolution: Use of DOCSIS 3.0 throughout service area was confirmed, even at lower speeds.

Nortex Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Package	Max Speeds	Monthly Price	Mail Boxes	Web Page	IP Address	Dial Up Account	DNS Hosting
DSL 3.0	3.0Mb x 512k	$39.95 $29.95 with Choice pkg.	5	5mb personal	1 dynamic	1	No
DSL 5.0	5.0Mb x 768k	$49.95 $39.95 with Choice pkg.	5	5mb personal	1 dynamic	1	No
DSL 8.0	8.0Mb x 1.0Mb	$59.95 $49.95 with Choice pkg.	5	5mb personal	1 dynamic	1	No
DSL 15.0	15.0Mb x 2.0Mb	$69.95 $59.95 with Choice pkg.	5	5mb personal	1 dynamic	1	No

Nortex Communications
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than the expected value range for the technology.
Resolution: Confirmed use of DOCSIS 3.0 throughout service area; however, speeds are kept lower currently to be backwards compatible.

North Texas Broadband, LLC
Issue: Technology of transmission 40 with maximum advertised download speed in tier 6, lower than the expected value range for the technology.
Resolution: Use of DOCSIS 3.0 throughout service area was confirmed, even at lower speeds.

Panhandle Telephone Cooperative, 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 12 Mbps service; screenshot below.

Speed	Residential
12 Mbps download**/1 Mbps up*	$59.99
6 Mbps download/1 Mbps up*	$54.99
3 Mbps download/384 Kbps up*	$44.99

South Plains Telephone Cooperative, 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 20 Mbps service; screenshot below.

SPTC is pleased to offer broadband internet service packages with speeds up to 20Mg download for residence and business.
We are confident you will find an option that will meet your needs and provide you good value for the price.

Stelera Wireless, LLC
Issue: Mobile 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; screenshot below.

Fast Facts

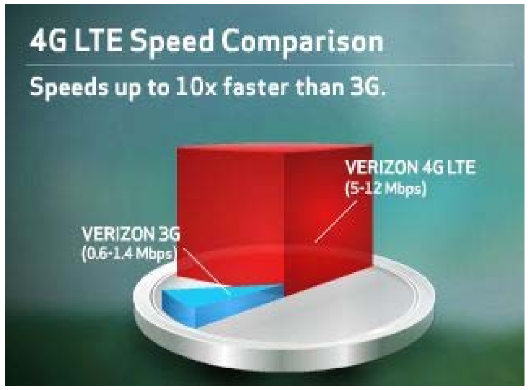
Network Technology:	HSPA (High-Speed Packet Access)
Frequency:	1700/2100 MHz FCC licensed spectrum
Current Speeds:	Up to 10mbps on downloads, UP to 2mbps on uploads
Headquarters:	Oklahoma City, OK

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 that speeds higher 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.

Time Warner Cable LLC
Issue: Technology of transmission 41 with maximum advertised download speed in tier 8, higher than the expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.

Verizon Southwest, 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 advertises 12 Mbps service; screenshot below.



Windstream Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

See which of our speeds matches your online activities. Choose the right Internet speed (WATCH VIDEO)	3 Mbps (Basic Use)	6 Mbps (Most Popular)	12 Mbps (Fastest Option)
E-mail friends	x	x	x
Browse the Internet	x	x	x
Bank online	x	x	x
Shop for deals	x	x	x
Download music	x	x	x
Connect with friends on Facebook and Twitter	x	x	x
Use wireless home networking	x	x	x
Download large files		x	x
Stream video		x	x
Watch TV shows online			x
Play online games			x

DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDER

AMA TechTel

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 provides detail regarding the recent data collection activities related to AMA TechTel, a wireless Internet service provider (WISP), located in Amarillo, Texas with a service area around the Central Panhandle, including but not limited to, the city of Amarillo and multiple surrounding towns and rural areas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 26 instances of communication via telephone and e-mail sessions since September 9, 2009, through August 4, 2011. Communication reply received from a company representative on February 4, 2011, with a response of electing not to participate due to the nationwide providers' involvement in the mapping project. Additionally, a CN staff member visited the AMA TechTel office on October 4, 2011, to discuss the broadband mapping project in person with AMA TechTel staff but decision-making staff members were not available.

The Issue

AMA TechTel, by its lack of responsiveness since September 9, 2009, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.amatechtel.com/) and called the AMA TechTel office to determine the residential service plans offered to Residential as 1.1 Mbps download and 512 Kbps upload, which is well within the website speeds and OOKLA data sample (Over 2,800 total speed tests) in service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) **(Exhibit C)** system yielded an FRN of 0008064941 and 0013822721 with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN's were referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded license WQJC218 **(Exhibit D)**, Radio Service: WQJC218 with 10 unique locations.

Exhibit A: Service Plans

Services

High-Speed Internet Access

512Kb up to 45Mb

Web Site Hosting

Dedicated and Shared (virtual) hosting plans available

Collocation

By collocating your servers in our Network Operating Center (NOC), you are free from the cost of expensive routers, hubs, switches and firewalls.

Network Administration

Affordable network administration is provided by a company who knows networking. You can choose to pay by the hour or purchase discounted service plans.

Virtual Private Networking (VPN)

Virtual Private Networking provides secures network access to home or remote business sites.

Internet & Network Security

We offer a security level that provides the IPSec 168 bit 3DES encryption needed to meet OCC and HIPAA requirements to

test_date	download_k	upload_kbp	latency	server_nam	isp_name	client_cit	client_lat	client_lon	miles_betw	CNTY_FIPS	FULLNAME
40173	996	282	73	Clovis, NM	AMA Communications, LLC	Canyon	34.9511	-101.897	84.278	381	Randall County
40173	1020	291	73	Clovis, NM	AMA Communications, LLC	Canyon	34.9511	-101.897	84.278	381	Randall County
40174	909	343	63	Clovis, NM	AMA Communications, LLC	Canyon	34.9511	-101.897	84.278	381	Randall County
40252	1086	346	42	Clovis, NM	AMA Communications, LLC	Canyon	34.9511	-101.897	84.278	381	Randall County
40309	1467	682	88	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40309	1461	697	88	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40309	1467	697	88	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40316	1374	471	104	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40317	1358	460	113	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40317	1275	468	104	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40120	936	271	26	Dallas, TX	AMA Communications, LLC	Lubbock	33.5663	-101.883	299.241	303	Lubbock County
40316	1132	316	123	Muleshoe, TX	AMA Communications, LLC	Lubbock	33.5663	-101.883	66.7461	303	Lubbock County
40259	923	212	166	Muleshoe, TX	AMA Communications, LLC	Lubbock	33.5663	-101.883	66.7461	303	Lubbock County

Exhibit B: Service Area

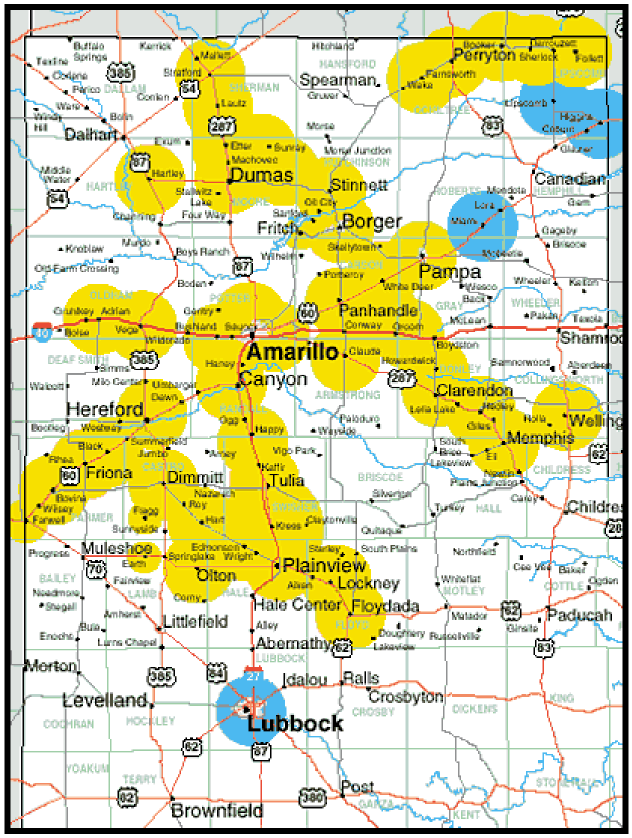


Exhibit C: Federal Registration Number

FRN:	0013822721
Registration Date:	07/29/2005 06:14:25 PM
Last Updated:	
Business Name:	AMA Communications
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	AMA TechTel
Contact Position:	VP
Contact Name:	Mr Douglas Campbell
Contact Address:	4909 Canyon Dr Amarillo, TX 79110-2329 United States
Contact Email:	dcampbell@amatechtel.com
ContactPhone:	(806) 242-3500 545
ContactFax:	(806) 352-3327

FRN:	0008064941
Registration Date:	12/10/2002 03:34:18 PM
Last Updated:	08/31/2011 05:08:38 PM
Business Name:	AMA Communications, L.L.C.
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	AMA Communications, L.L.C.
Contact Position:	Regulatory Compliance
Contact Name:	Mr Dell Purdy
Contact Address:	4630 50th Street Amarillo, TX 79414 United States
Contact Email:	dpurdy@amatechtel.com
ContactPhone:	(806) 722-2247
ContactFax:	

Exhibit D: WQJC218 License Reference

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Con

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

3650-3700 MHz License - WQJC218 - AMA Communications, LLC

Locations Summary

New Search | Refine Search | Printable Page | Reference Copy | Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQJC218	Radio Service	NN - 3650-3700 MHz

22 Total Locations
10 Locations per Summary Page

1 2 3 [Next >>]

	Location	Latitude,Longitude	Transmitter Azimuth
1	Panhandle	35-20-26.8 N, 101-22-48.6 W	240.0 degrees
2	WHITE DEER	35-26-12.5 N, 101-10-14.3 W	185.0 degrees
3	CLARENDON	34-56-26.9 N, 100-53-24.0 W	130.0 degrees
4	STINNETT	35-50-45.1 N, 101-27-13.6 W	137.0 degrees
5	MIAMI	35-42-22.8 N, 100-38-43.6 W	153.0 degrees
6	Gruver Tower	36-16-02.7 N, 101-24-27.7 W	128.0 degrees
7	Hart Tower	34-23-12.2 N, 102-07-01.9 W	170.0 degrees
8	LEFORS	35-25-59.8 N, 100-47-53.6 W	327.0 degrees
9	MAY	31-58-01.2 N, 098-55-48.7 W	60.0 degrees
10	MAY	31-58-01.2 N, 098-55-48.7 W	180.0 degrees

22 Total Locations
10 Locations per Summary Page

1 2 3 [Next >>]

Done | Internet

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For C

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

3650-3700 MHz License - WQJC218 - AMA Communications, LLC

Locations Summary

New Search | Refine Search | Printable Page | Reference Copy | Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQJC218	Radio Service	NN - 3650-3700 MHz

22 Total Locations
10 Locations per Summary Page

[<<Previous] 1 2 3 [Next >>]

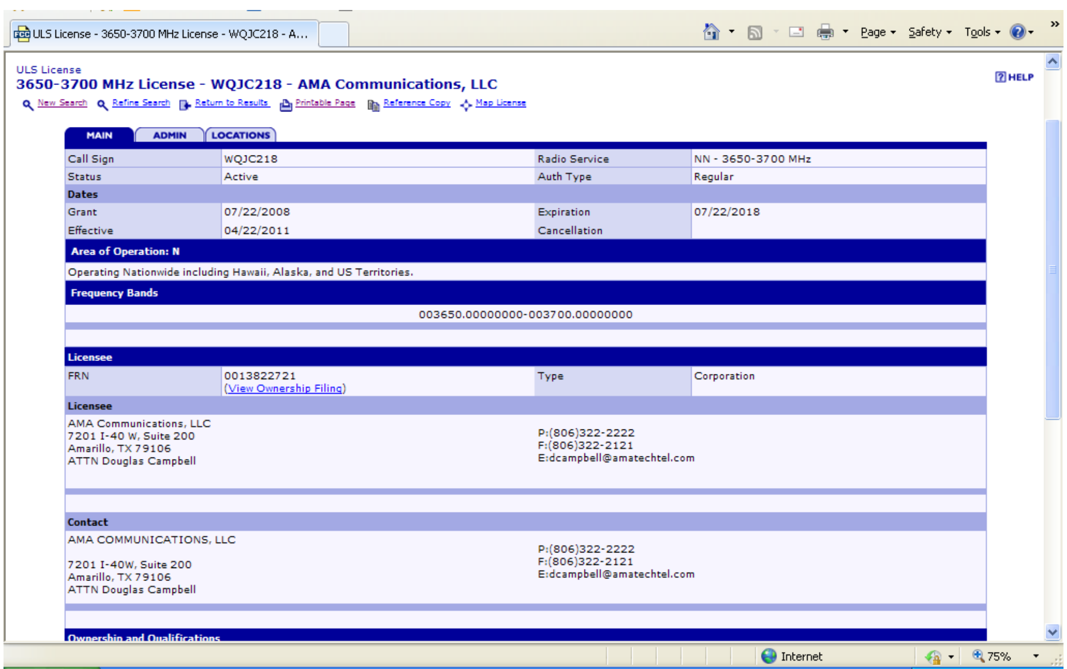
	Location	Latitude,Longitude	Transmitter Azimuth
11	MAY	31-58-01.2 N, 098-55-48.7 W	300.0 degrees
12	CROSS PLAINS FD	32-07-54.0 N, 099-09-34.0 W	90.0 degrees
13	CROSS PLAINS	32-07-54.0 N, 099-09-34.0 W	180.0 degrees
14	CROSS PLAINS	32-07-54.0 N, 099-09-34.0 W	270.0 degrees
15	CROSS PLAINS FD	32-07-34.6 N, 099-09-57.4 W	270.0 degrees
16	RISING STAR	32-05-47.0 N, 098-58-16.0 W	90.0 degrees
17	RISING STAR	32-05-47.0 N, 098-58-16.0 W	180.0 degrees
18	RISING STAR	32-05-47.0 N, 098-58-16.0 W	270.0 degrees
19	BLACKWELL	32-05-30.0 N, 100-18-54.0 W	165.0 degrees
20	BLACKWELL	32-05-30.0 N, 100-18-54.0 W	180.0 degrees

22 Total Locations
10 Locations per Summary Page

[<<Previous] 1 2 3 [Next >>]

Internet


FCC Federal Communications Commission
FCC Home | Search | Updates | E-Filing | Initiatives | For C
Universal Licensing System
FCC > WTB > ULS > Online Systems > License Search
3650-3700 MHz License - WQJC218 - AMA Communications, LLC
Locations Summary
New Search Refine Search Printable Page Reference Copy Map License
MAIN ADMIN LOCATIONS
Call Sign WQJC218 Radio Service NN - 3650-3700 MHz
22 Total Locations
10 Locations per Summary Page
[<<Previous] 1 2 3
Location Latitude,Longitude Transmitter Azimuth
21 BLACKWELL 32-05-30.0 N, 100-18-54.0 W 195.0 degrees
22 MCLEAN 35-14-28.5 N, 100-36-36.8 W 135.0 degrees
22 Total Locations
10 Locations per Summary Page
[<<Previous] 1 2 3
ULS Help ULS Glossary - FAQ - Online Help - Technical Support - Licensing Support
ULS Online Systems CORES - ULS Online Filing - License Search - Application Search - Archive License Search
About ULS Privacy Statement - About ULS - ULS Home
Basic Search By Call Sign = SEARCH
FCC | Wireless | ULS | CORES
Internet

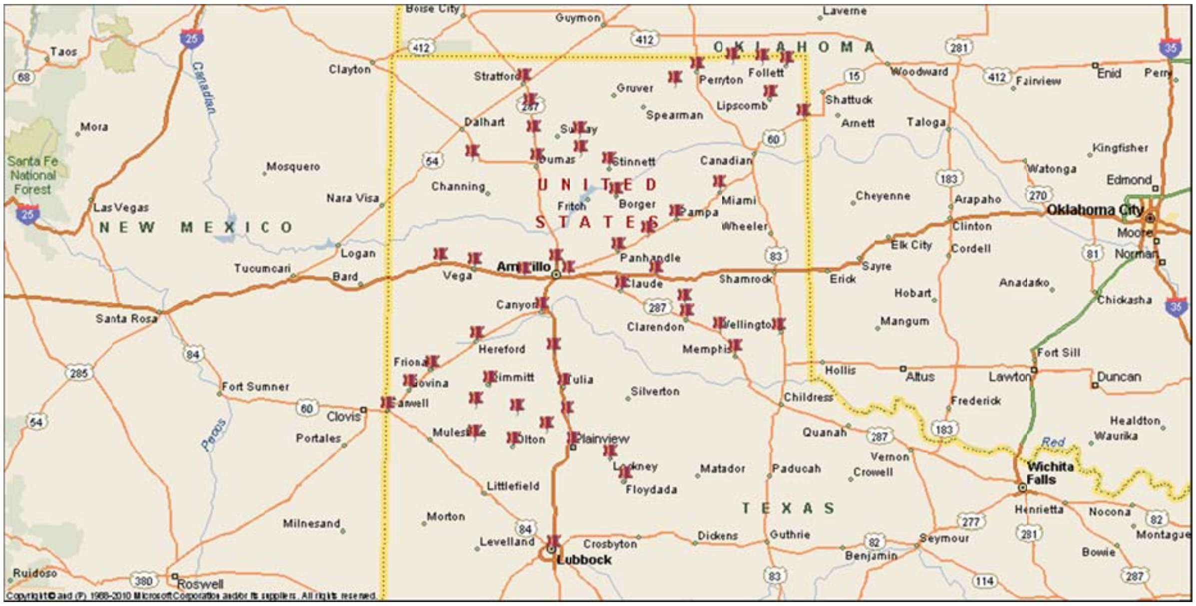

ULS License - 3650-3700 MHz License - WQJC218 - A...
Page Safety Tools
ULS License
3650-3700 MHz License - WQJC218 - AMA Communications, LLC
HELP
New Search Refine Search Return to Results Printable Page Reference Copy Map License
MAIN ADMIN LOCATIONS
Call Sign WQJC218 Radio Service NN - 3650-3700 MHz
Status Active Auth Type Regular
Dates
Grant 07/22/2008 Expiration 07/22/2018
Effective 04/22/2011 Cancellation
Area of Operation: N
Operating Nationwide including Hawaii, Alaska, and US Territories.
Frequency Bands
003650.00000000-003700.00000000
Licensee
FRN 0013822721 (View Ownership Filing) Type Corporation
Licensee
AMA Communications, LLC
7201 I-40 W, Suite 200
Amarillo, TX 79106
ATTN Douglas Campbell
P:(806)322-2222
F:(806)322-2121
E:dcampbell@amatechtel.com
Contact
AMA COMMUNICATIONS, LLC
7201 I-40W, Suite 200
Amarillo, TX 79106
ATTN Douglas Campbell
P:(806)322-2222
F:(806)322-2121
E:dcampbell@amatechtel.com
Ownership and Qualifications
Internet
75%

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the AMA TechTel service area map from its website and the information through the FCC ULS database in reference to license WQJC218. The website service area was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .5 mile (2640 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by tower symbols as shown in **Exhibit B**. Using the coordinates (10 unique locations) available through the FCC ULS license search an accuracy validation of the image overlay was conducted to determine the feasibility of utilizing the tower symbols for identifying coordinates of the remaining 40 locations. The 10 licensed locations' coordinates were inputted into Google Earth and examined utilizing the zoom option of the aerial imagery. Six locations structures were identified within the provider's website defined coverage area. This provided a means of establishing coordinates for the 44 remaining access point locations. All 50 locations were entered into the *Streets and Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: AMA TechTel's Service Area Image Overlay

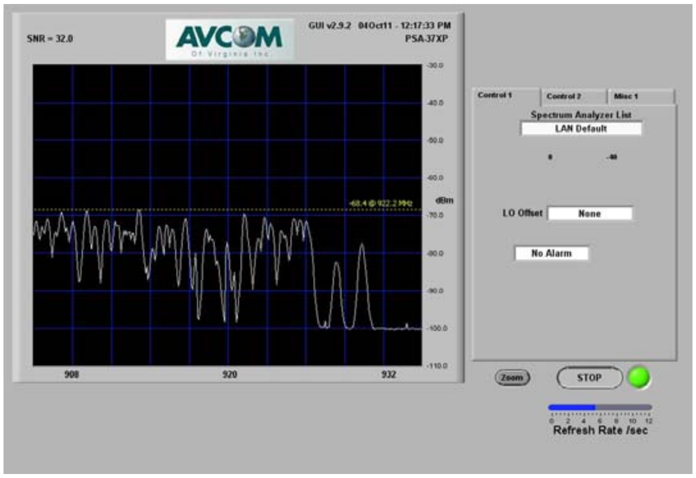
Exhibit F: Validation Points for AP Structures

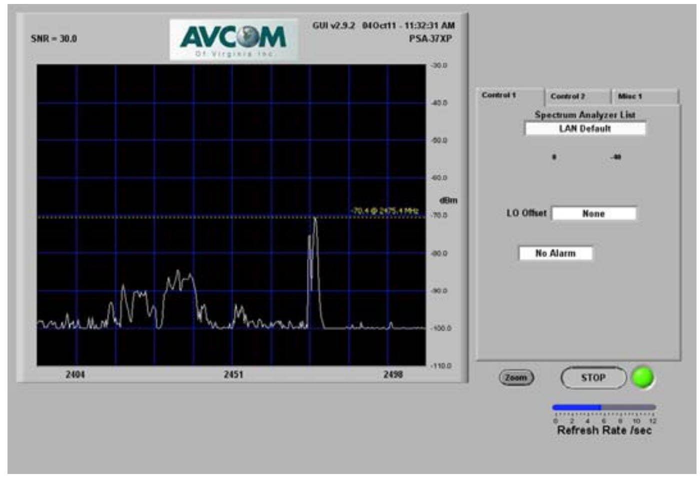


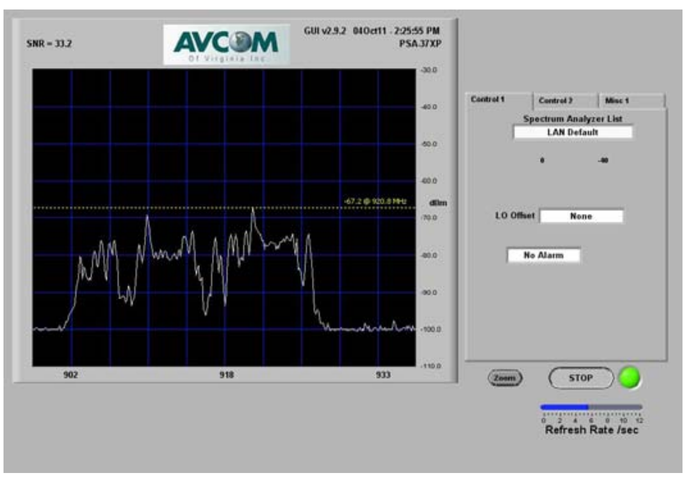
Testing Techniques

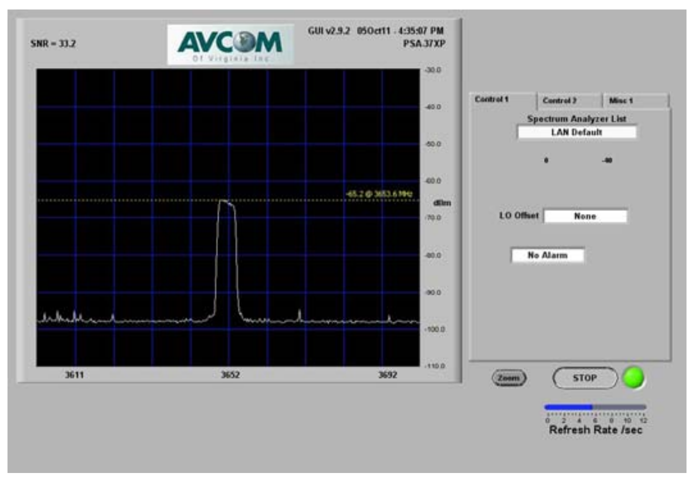
Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay and publicly available data through the FCC ULS database for AMA TechTel WQJC218 radio service. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored) and photographs were taken of the access points. Exhibit G begins on the following page.

Exhibit G: Field Data for AMA TechTel Hub Location

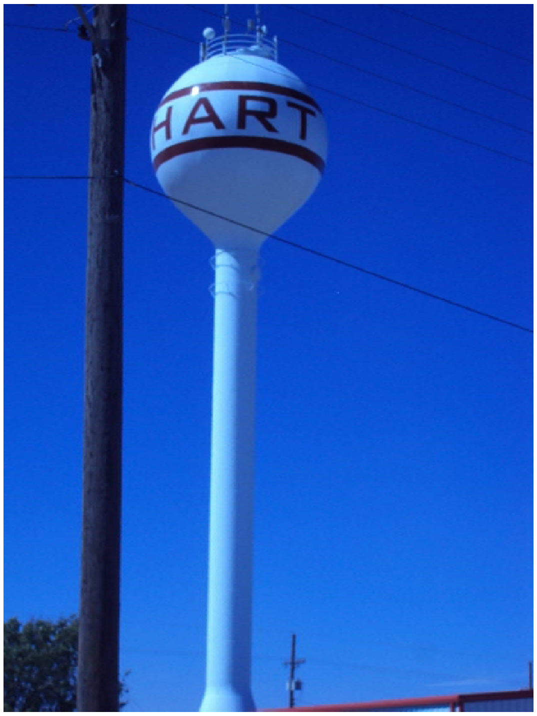









Attebury Grain
AMA·TECHTEL
4909 Canyon Drive


HART

Primary Population Center Covered by Service (city, county, etc.)	**Transmission Location** (water tank, tower, silo, rooftop or other structure)	**Decimal Degree Conversion** (automatically converted here if you completed columns K, L and M)	**Decimal Degree Conversion** (automatically converted here if you completed columns O, P and Q)	**Is the Transmit Antenna Omni-Directional?**	**Transmit Frequency** (MHz)	**Polarity** (V or H)	**Antenna Elevation** (feet above ground)	**Comments:** Tell us anything you feel is important for us to know about your system (e.g., foliage).
Lubbock	**Rooftop**	***33.585520***	***-101.849920***	☐ Yes ☑ No	**900 - 2400**	☐ V ☑ H	**200**	**Urban area**
Farwell	**Elevator**	***34.387820***	***-103.043420***	☐ Yes ☑ No	900	☐ V ☑ H	130	Small trees 5%
Bovina	Elevator	***34.523310***	***-102.887500***	☑ Yes ☐ No	2400	☐ V ☑ H	140	Small trees 5%
Friona	Elevator	***34.635050***	***-102.717690***	☑ Yes ☐ No	900	☐ V ☑ H	140	Small trees 5%
Adrain	Elevator	***35.271730***	***-102.665370***	☐ Yes ☐ No	900	☐ V ☑ H	140	Small trees 5%
Earth, Lamb	Water Tower	***34.233700***	***-102.409220***	☑ Yes ☐ No	2400	☐ V ☑ H	130	Small trees 5%
Flagg	Elevator Leg	***34.425840***	***-102.410200***	☐ Yes ☑ No	900	☐ V ☑ H	100	Small trees 1%
Olton	Elevator Leg	***34.189360***	***-102.140120***	☑ Yes ☐ No	900	☐ V ☑ H	180	Small Trees 5%
Hart	Water Tower	***34.386770***	***-102.116700***	☐ Yes ☑ No	900	☐ V ☑ H	120	Small trees 5%
Dimmitt	Water Tower	***34.547030***	***-102.306830***	☑ Yes ☐ No	900	☐ V ☑ H	120	Small trees 5%
Hereford	Elevator	***34.811465***	***-102.400090***	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 5%
Edmonson	Elevator	***34.283195***	***-101.901593***	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 1%
Plaimview	Elevator	***34.194420***	***-101.706450***	☑ Yes ☐ No	2400	☐ V ☑ H	200	Small trees 5%
Kress	Elevator	***34.368290***	***-101.748610***	☐ Yes ☑ No	900	☐ V ☑ H	120	Small trees 1%
Floydada	Elevator	***33.986200***	***-101.331000***	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 5%
Lockney	Elevator	***34.117660***	***-101.440040***	☑ Yes ☐ No	900	☐ V ☑ H	160	small trees 5%
Tuila	Elevator	***34.534060***	***-101.777460***	☐ Yes ☑ No	900-2400	☐ V ☑ H	140	Small trees 5%
Happy	Elevator	***34.745530***	***-101.854480***	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 5%
Canyon	Elevator	***34.983140***	***-101.938020***	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 10%
Claude	Elevator	***35.112500***	***-101.361216***	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 5%
Vega	Elevator	***35.244530***	***-102.425120***	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 1%
Bushland	Elevator	***35.192220***	***-102.064260***	☐ Yes ☑ No	2400	☐ V ☑ H	140	Small trees 5%
Hartley	Water tower	***35.883056***	***-102.451944***	☐ Yes ☑ No	900	☐ V ☑ H	140	small trees 10%
Dumas	Elevator	***35.862778***	***-101.978333***	☐ Yes ☑ No	900	☐ V ☑ H	160	small trees 10%
Catus	Elevator	***36.027500***	***-102.001667***	☐ Yes ☑ No	900	☐ V ☑ H	150	Low foliage 1 % trees
Rural Strafford	Elevator	***36.185833***	***-102.032222***	☑ Yes ☐ No	900	☐ V ☑ H	140	Low foliage 1 % trees
Strafford	Elevator	***36.333333***	***-102.071389***	☑ Yes ☐ No	900	☐ V ☑ H	120	Low foliage 1 % trees
N Amerillo	Tower 1212262	***35.269167***	***-101.839167***	☐ Yes ☑ No	900	☐ V ☑ H	150	Rural 15% Foliage
Amerillo	Elevator	***35.203700***	***-101.742610***	☑ Yes ☐ No	900	☐ V ☑ H	130	Low Foliage 5%
Panhandle	Elevator	***35.340833***	***-101.380556***	☐ Yes ☑ No	900	☐ V ☑ H	200	Low foliage 10 %
Stinnett	Tower	***35.844722***	***-101.447222***	☐ Yes ☑ No	900	☐ V ☑ H	160	Low foliage some terrain
Borger	Tower	***35.664722***	***-101.397222***	☑ Yes ☐ No	900	☐ V ☑ H	100	Urban area
Sumray	Elevator	***36.023333***	***-101.663611***	☑ Yes ☐ No	900	☐ V ☑ H	130	Low foliage 1% trees
Morton-Dumas Rura	Elevator	***35.910276***	***-101.650666***	☑ Yes ☐ No	900	☐ V ☑ H	180	Low foliage 1% trees
Howardwick	Pole	***35.035370***	***-100.906330***	☑ Yes ☐ No	900	☐ V ☑ H	60	Low foliage 5% trees
Claredon	Elevator	***34.940730***	***-100.890790***	☐ Yes ☑ No	900	☐ V ☑ H	160	Urban trees small
Hedley	Water tower	***34.868560***	***-100.662710***	☐ Yes ☑ No	900	☐ V ☑ H	140	Small town
Memphis	Water Tower	***34.731940***	***-100.540150***	☐ Yes ☑ No	2400	☐ V ☑ H	120	Small town
Wellington	Tower	***34.852640***	***-100.225980***	☑ Yes ☐ No	900	☐ V ☑ H	200	Small town 20% foliage
White Deer	Elevator	***35.436750***	***-101.170650***	☐ Yes ☑ No	900	☐ V ☑ H	140	Small Town Low Foliage
Groom	Elevator	***35.200100***	***-101.109090***	☐ Yes ☑ No	900	☐ V ☑ H	180	Small Town Low foliage
Pampa	Elevator	***35.528370***	***-100.965100***	☐ Yes ☑ No	900	☐ V ☑ H	170	South Part of Town foliage 10%
Miami	Tower	***35.703730***	***-100.652150***	☐ Yes ☑ No	3650	☑ V ☐ H	100	North part of town
Farnsworth	Elevator	***36.319940***	***-100.969550***	☑ Yes ☐ No	900	☐ V ☑ H	160	Small town foliage 5%
Perrytown	Elevator	***36.399900***	***-100.803740***	☐ Yes ☑ No	900	☐ V ☑ H	180	Small town foliage 5%
Booker	Elevator	***36.455890***	***-100.535690***	☐ Yes ☑ No	900	☐ V ☑ H	160	Small town low foliage 5%
Liscomb	Tower	***36.233490***	***-100.270500***	☐ Yes ☑ No	2400	☐ V ☑ H	70	Low tower on county land small town no homes
Darrouzett	Elevator	***36.442890***	***-100.327810***	☐ Yes ☐ No	900	☐ V ☑ H	140	Small town lowfoliage
Higgins	Water tower	***36.117450***	***-100.028933***	☐ Yes ☑ No	900	☐ V ☑ H	160	two locations on Tank opucipied
Follett	Elevator	***36.430419***	***-100.142424***	☐ Yes ☑ No	2400	☐ V ☑ H	160	Small town

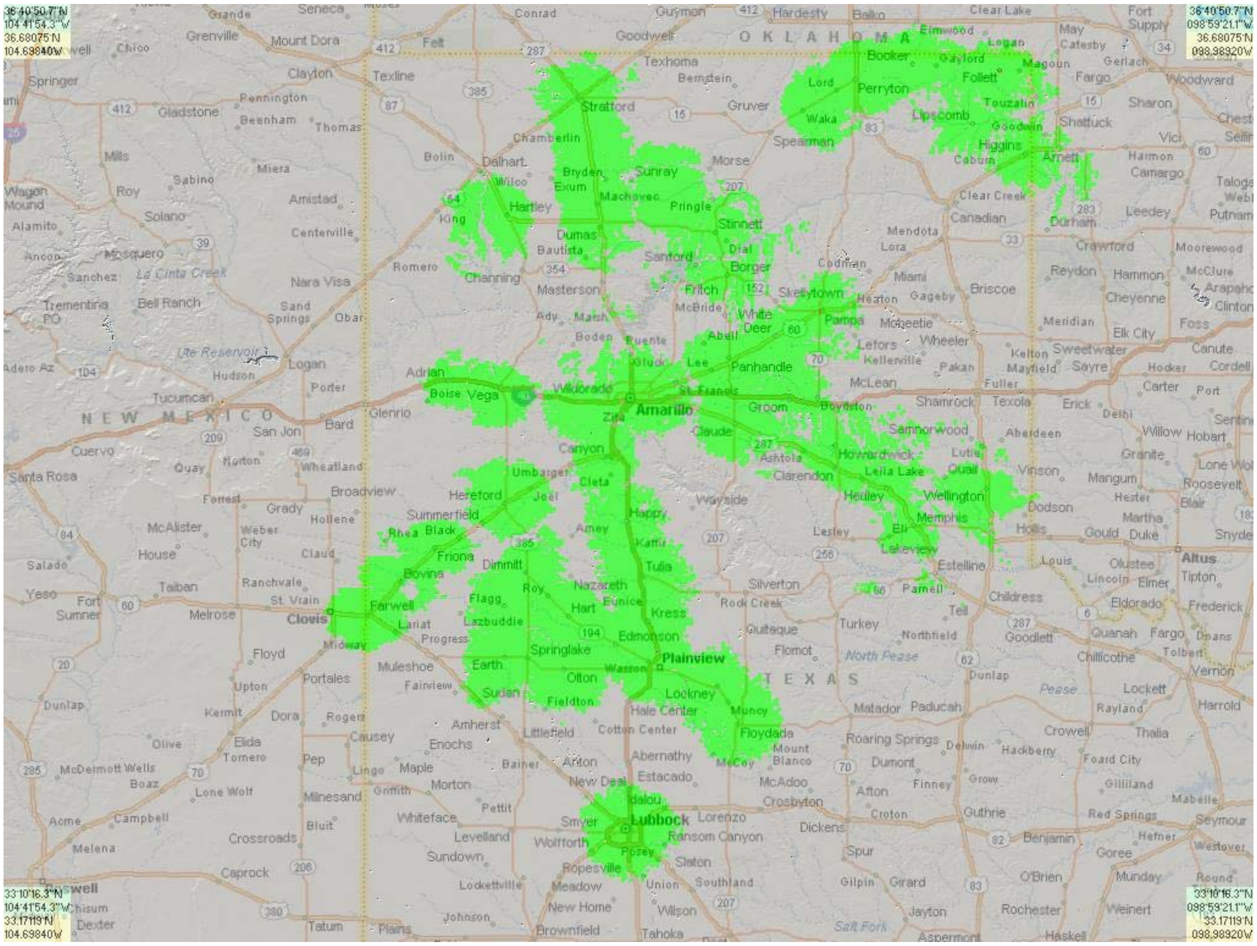
Results and Submission for April 2012

Of the 50 locations visited during the validation point route, 50 access points were identified and relative information was logged into the AMA TechTel field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to AMA TechTel and advised the information will be submitted to Connected Texas and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit H: Field Validation Notes

Test City	Test State	Location Description	(N) Lat Decimal	(-)(W) Long Decimal	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Images	
Lubbock	TX	Rooftop	33.585520	-101.849920	900 - 2400	-68	Avcom PSA-37XP	Yes	**Urban area**
Farwell	TX	Elevator	34.387820	-103.043420	900	-70	Avcom PSA-37XP	Yes	Small trees 5%
Bovina	TX	Elevator	34.523310	-102.887500	2400	-68	Avcom PSA-37XP	Yes	Small trees 5%
Friona	TX	Elevator	34.635050	-102.717690	900	-70	Avcom PSA-37XP	Yes	Small trees 5%
Adrian	TX	Elevator	35.271730	-102.665370	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Earth	TX	Water Tower	34.233700	-102.409220	2400	-70	Avcom PSA-37XP	Yes	Small trees 5%
Flagg	TX	Elevator Leg	34.425840	-102.410200	900	-68	Avcom PSA-37XP	Yes	Small trees 1%
Olton	TX	Elevator Leg	34.189360	-102.140120	900	-70	Avcom PSA-37XP	Yes	Small Trees 5%
Hart	TX	Water Tower	34.386770	-102.116700	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Dimmitt	TX	Water Tower	34.547030	-102.306830	900	-70	Avcom PSA-37XP	Yes	Small trees 5%
Hereford	TX	Elevator	34.811465	-102.400090	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Edmonson	TX	Elevator	34.283195	-101.901593	900	-70	Avcom PSA-37XP	Yes	Small trees 1%
Planview	TX	Elevator	34.194420	-101.706450	2400	-74	Avcom PSA-37XP	Yes	Small trees 5%
Kress	TX	Elevator	34.368290	-101.748610	900	-70	Avcom PSA-37XP	Yes	Small trees 1%
Floydada	TX	Elevator	33.986200	-101.331000	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Lockney	TX	Elevator	34.117660	-101.440040	900	-70	Avcom PSA-37XP	Yes	small trees 5%
Tulia North	TX	Elevator	34.534060	-101.777460	900-2400	-74	Avcom PSA-37XP	Yes	Small trees 5%
Happy	TX	Elevator	34.745530	-101.854480	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Canyon	TX	Elevator	34.983140	-101.938020	900	-70	Avcom PSA-37XP	Yes	Small trees 10%
Claude	TX	Elevator	35.11249988	-101.3612162	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Vega	TX	Elevator	35.24453	-102.42512	900	-71	Avcom PSA-37XP	Yes	Small trees 1%
Bushland	TX	Elevator	35.19222	-102.06426	2400	-73	Avcom PSA-37XP	Yes	Small trees 5%
Hartley	TX	Water tower	35.88305556	-102.4519444	900	-68	Avcom PSA-37XP	Yes	small trees 10%
Dumas	TX	Elevator	35.86277778	-101.9783333	900	-70	Avcom PSA-37XP	Yes	small trees 10%
Cactus	TX	Elevator	36.0275	-102.0016667	900	-74	Avcom PSA-37XP	Yes	Low foliage 1 % trees
Rural Strafford	TX	Elevator	36.18583333	-102.0322222	900	-70	Avcom PSA-37XP	Yes	Low foliage 1 % trees
Strafford	TX	Elevator	36.33333333	-102.0713889	900	-68	Avcom PSA-37XP	Yes	Low foliage 1 % trees
Amerillo N	TX	Tower 1212262	35.26916667	-101.8391667	900	-70	Avcom PSA-37XP	Yes	Rural 15% Foliage
Amarillo E	TX	Elevator	35.2037	-101.74261	900	-74	Avcom PSA-37XP	Yes	Low Foliage 5%
Panhandle	TX	Elevator	35.34083333	-101.3805556	900	-68	Avcom PSA-37XP	Yes	Low foliage 10 %
Stinnett	TX	Tower	35.84472222	-101.4472222	900	-70	Avcom PSA-37XP	Yes	Low foliage some terrain
Borger	TX	Tower	35.66472222	-101.3972222	900	-68	Avcom PSA-37XP	Yes	Urban area
Sunray	TX	Elevator	36.02333333	-101.6636111	900	-68	Avcom PSA-37XP	Yes	Low foliage 1% trees
Dumas Rural	TX	Elevator	35.91027622	-101.650666	900	-70	Avcom PSA-37XP	Yes	Low foliage 1% trees
Howardwick	TX	Pole	35.03537	-100.90633	900	-68	Avcom PSA-37XP	Yes	Low foliage 5% trees
Claredon	TX	Elevator	34.94073	-100.89079	900	-68	Avcom PSA-37XP	Yes	Urban trees small
Hedley	TX	Water tower	34.86856	-100.66271	900	-70	Avcom PSA-37XP	Yes	Small town
Memphis	TX	Water Tower	34.73194	-100.54015	2400	-74	Avcom PSA-37XP	Yes	Small town
Wellington	TX	Tower	34.85264	-100.22598	900	-68	Avcom PSA-37XP	Yes	Small town 20% foliage
White Deer	TX	Elevator	35.43675	-101.17065	900	-70	Avcom PSA-37XP	Yes	Small Town Low Foliage
Groom	TX	Elevator	35.2001	-101.10909	900	-68	Avcom PSA-37XP	Yes	Small Town Low foliage
Pampa	TX	Elevator	35.52837	-100.9651	900	-70	Avcom PSA-37XP	Yes	South Part of Town foliage 10%
Miami Blue	TX	Tower	35.70373	-100.65215	3650	-74	Avcom PSA-37XP	Yes	North part of town
Farnsworth	TX	Elevator	36.31994	-100.96955	900	-71	Avcom PSA-37XP	Yes	Small town foliage 5%
Perrytown	TX	Elevator	36.3999	-100.80374	900	-68	Avcom PSA-37XP	Yes	Small town foliage 5%
Booker	TX	Elevator	36.45589	-100.53569	900	-70	Avcom PSA-37XP	Yes	Small town low foliage 5%
Liscomb Blue	TX	Tower	36.23349	-100.2705	2400	-68	Avcom PSA-37XP	Yes	Low tower small town no homes
Darrouzett	TX	Elevator	36.44289	-100.32781	900	-68	Avcom PSA-37XP	Yes	Small town lowfoliage
Higgins Blue	TX	Water tower	36.11745	-100.0289332	900	-70	Avcom PSA-37XP	Yes	Two locations on Tank occupied
Follett	TX	Elevator	36.43041903	-100.1424236	2400	-74	Avcom PSA-37XP	Yes	Small town

Exhibit I: AMA TechTel Composite Coverage



Broadwaves

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 State Broadband Initiative (SBI) program.

For the October 1, 2011, mapping update, CN submitted a white paper detailing the determination of the coverage area for Broadwaves, a wireless Internet service provider (WISP), located in Brenham, Texas, with a service area in and around Washington County. This information accounts for updates to the coverage area for this mapping cycle. The narrative included information relative to the June 30, 2011, cut-off date, with notes related to changes made to the provider's website subsequent to June 30. This information serves as an update to the October 1, 2011, submission of Broadwaves' advertised service area.

Background

Subsequent to the accumulation of research related to the service area for Broadwaves (as of June 30, 2011) the CN technician most familiar with this provider noted changes to the coverage information on the provider's website. The new advertised coverage area includes nine tower access points (instead of the previous seven), some of the original coverage circles were moved to suggest a changed center point/tower location, and all of the circles are differently-sized, presumably based on preferred operating parameters specific to each site **(Exhibit A)**. In early September 2011 the CN technician plotted the likely center points for each circle and, in October and November of 2011, performed field research at more than 30 locations in Washington County to determine the actual tower locations **(Exhibit B)**.

The CN technician spoke extensively with the owner of Broadwaves on October 26, 2011, in regard to the mapping project. The provider refused to provide assistance (e.g. tower locations) or other useful information. When asked if all the advertised tower sites were active, the provider indicated some of them were but would not specify which sites were inactive. Further, the provider stated that he did not want to be part of the state map, and remarked that the state should be told that the company was going out of business in a couple of months so as to eliminate the need to collect required information. Further conversation suggested that the company was not actively pursuing buyers for the business, and would not be terminating service in the near term.

Exhibit A: Broadwaves Advertised Coverage Subsequent to June 30, 2011

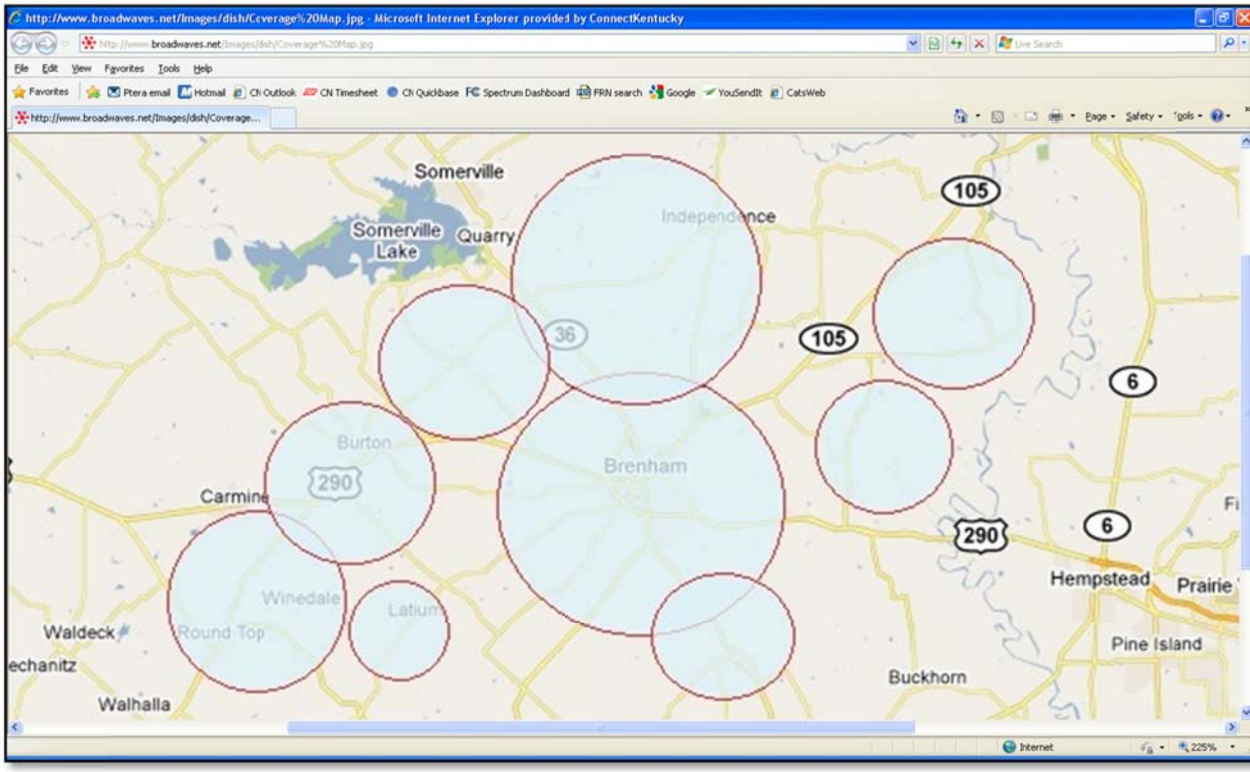
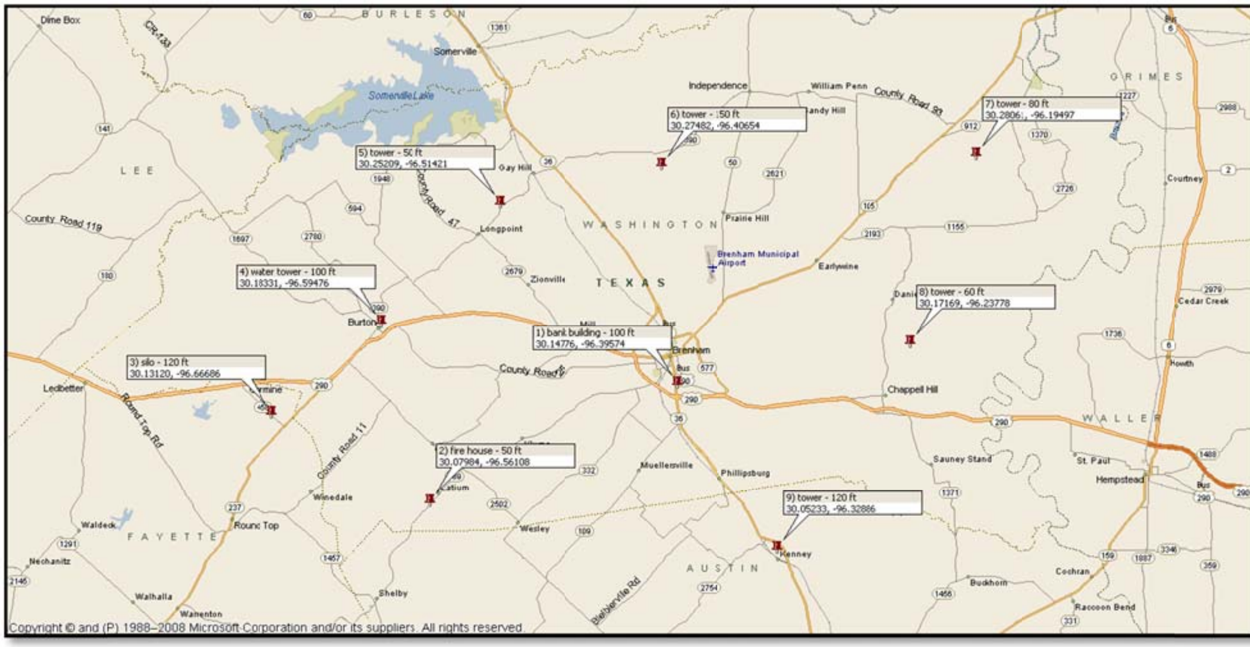


Exhibit B – Actual Tower Locations

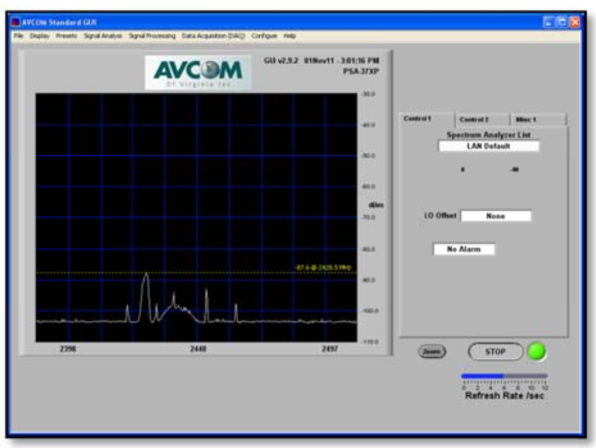


Field Testing Techniques

Where possible, the CN technician confirmed (through a third party or by other independent means) that the tower location was actually being utilized by Broadwaves. Confirmation from a bank representative that Broadwaves' equipment was operational on the rooftop of the Brenham Bank, a customer in Kenney pointing out the tower on which Broadwaves provides service, and comparison of network nomenclatures between markets all support this known tower location. In other instances, the presence of identical wireless transmission gear (on multiple tower locations) added confidence to the identification of the likely Broadwaves tower sites. Photographs were taken at each tower site of (i) the equipment, and (ii) the support structure.

Having established the tower location for each circular coverage area represented on the Broadwaves website, the CN technician then performed signal tests for the detection of active wireless frequencies. The CN technician was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. At each signal test location, the CN technician attempted to be isolated from Wi-Fi networks in the test area, facilitated spectrum readings from the AVCOM analyzer, and captured the results of the frequency tests as validation data for wireless tower transmissions. One such sample is illustrated below as **Exhibit C**.

Exhibit C – Signal Test Results for the Washington Service Area



Signal Propagation Maps

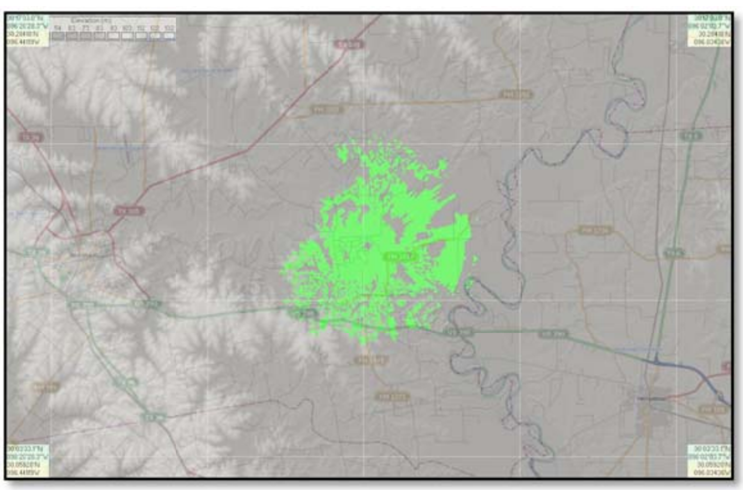
Upon making a reasonable confirmation that the tested tower site was a Broadwaves tower site, the CN technician estimated the antenna height, determined the GPS coordinates for the tower, and recorded this and other information into the standard Excel provider data collection format. With the objective of reasonably representing the provider's practical service area, the CN technician catalogued information for each tower site **(Exhibit D)**, and prepared propagation maps **(Exhibit E)** based on that information as well as the provider's own advertised service area representations.

Exhibit D – Tower Research and Propagation Data

Wireless Provider Information	
Provider Name (Legal entity)	**Broadwaves**
DBA ("Doing Business As") Name	N/A
FRN # (10-digit FCC Registration Number)	not found

Name of Location	Status	Pop Center	Structure	Latitude	Longitude	Omni?	Radius	Frequency	Gain	Power	Elevation
Brenham	Active	Brenham	bank building	30.14776	-96.39574	Yes	10	2400	12	26	100
Latium	Active	Latium	side-mount tower	30.07984	-96.56108	Yes	5	2400	12	23	50
Carmine	Active	Carmine	silo	30.1312	-96.66686	Yes	10	2400	12	26	120
Burton	Active	Burton	water tower	30.18331	-96.59476	Yes	10	2400	12	26	100
Longpoint	Active	Longpoint	tower	30.25209	-96.51421	Yes	10	2400	12	26	50
Independence	Active	Independence	tower	30.27482	-96.40654	Yes	10	2400	12	26	150
Washington	Active	Washington	tower	30.28061	-96.19497	Yes	10	2400	12	26	80
Chappell Hill	Active	Chappell Hill	tower	30.17169	-96.23778	Yes	10	2400	12	23	60
Kenney	Active	Kenney	tower	30.05233	-96.32886	Yes	10	2400	12	26	120

Exhibit E: Updated Propagation Map for the Chappell Hill Tower Location



Results and Submission for April 2012

After driving several hundred miles combing the highways, streets, and county roads of the provider's overall service area, nine access points were identified, eight of which were confirmed independently, and one which was confirmed through common network nomenclature. The composite propagation study **(Exhibit F)** reasonably represents the researched service area based on all new information. Additionally, the provider's website lists maximum advertised downstream speeds and pricing structures which are represented herein as **Exhibit G**.

Exhibit F: Broadwaves Updated Estimated Coverage Area

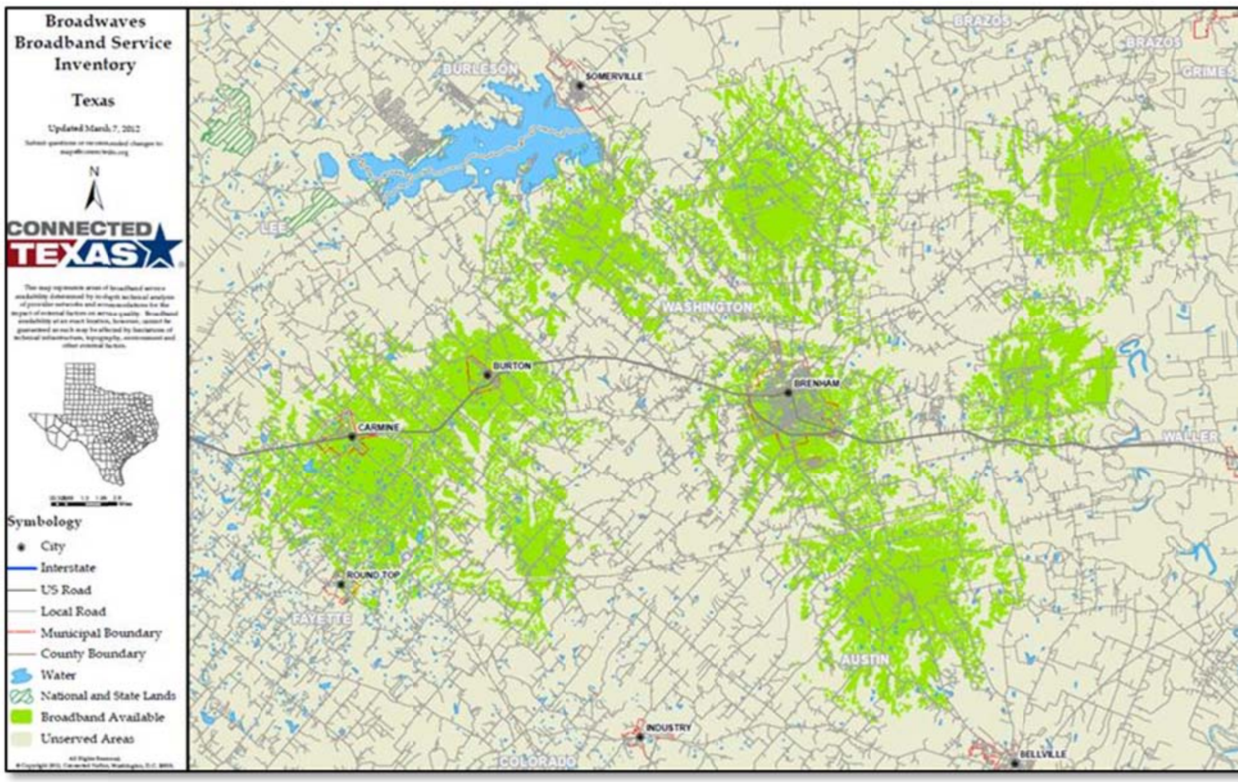


Exhibit G: Broadwaves Speed Tiers & Pricing Structures

Call 979-451-3332 for Satellite or Internet Service

Internet Service Pricing

No Contracts	
No Equipment Rental	**No Hidden Fees**
128 kbps	$19.95
256 kbps	$29.95
512 kbps	$39.95
1 Mbps	$49.95
1.5 Mbps	$59.95
2 Mbps	$69.95
2.5 Mbps	$79.95
3 Mbps	$89.95
For speeds above 3 Mbps please call 979-451-3332 for quote	

CKS Wireless, Inc.

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 provides detail regarding the recent data collection activities related to CKS Wireless, Inc., a wireless Internet service provider (WISP), located in Jacksonville, Texas with a service area around Mount Selman, Ponta, Jacksonville, and Rusk, Texas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

April 2012 Submission Commentary

Connected Nation created this coverage estimation document during the October 2011 submission period as a result of the ongoing non-participatory status of the provider. In addition to the 5 instances of e-mail and/or telephone communication during the October 2011 submission period (as previously reported), CN made 3 additional attempts to contact the provider during this mapping cycle.

CN closely monitored the provider's website to identify any changes in the coverage area or maximum advertised speeds but did not locate evidence of any recent changes. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data.

The Issue

CKS Wireless, Inc. by its lack of responsiveness since May 13, 2010, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.ckswireless.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") the system yielded an FRN of 0006165625 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded license WQJW906 **(Exhibit D)**, Radio Service: NN-3650-3700MHz with 5 unique locations.

Exhibit A: Service Plans

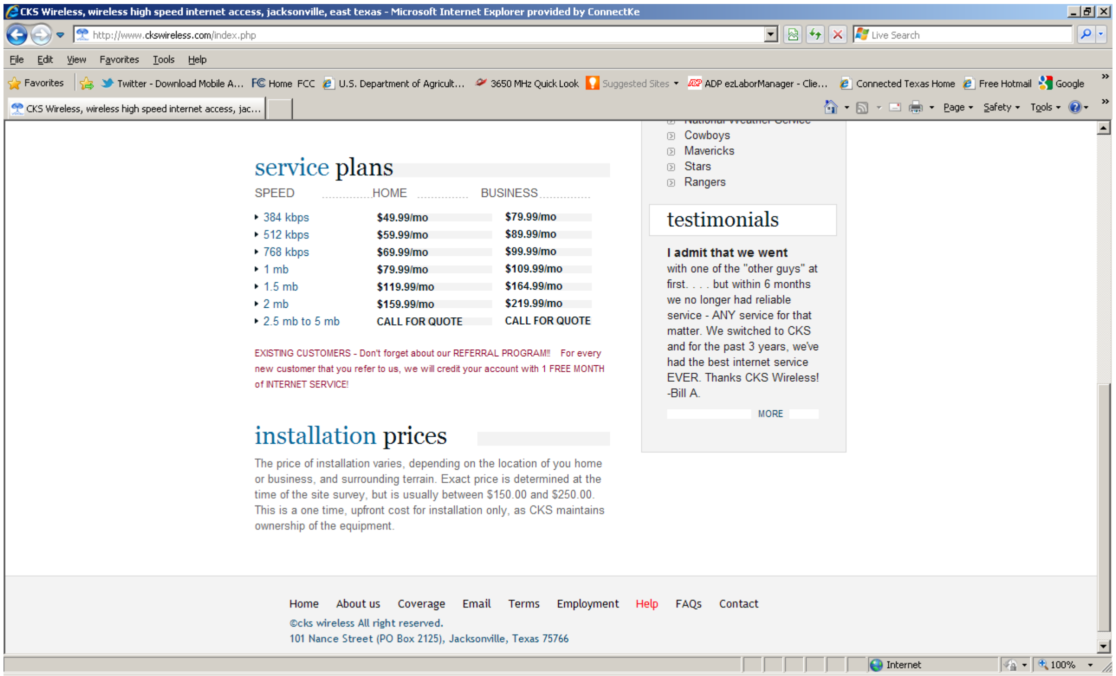


Exhibit B: Service Area

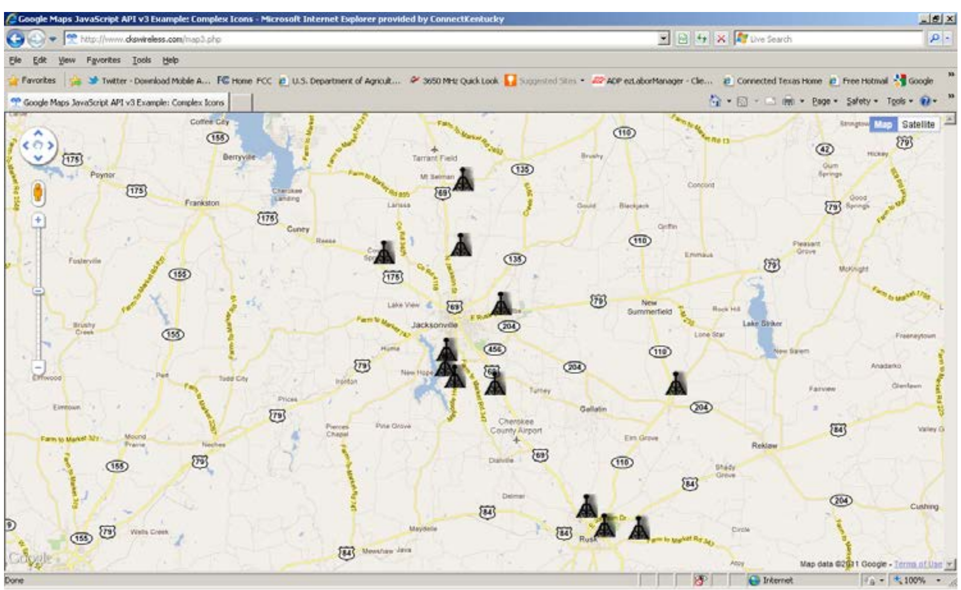
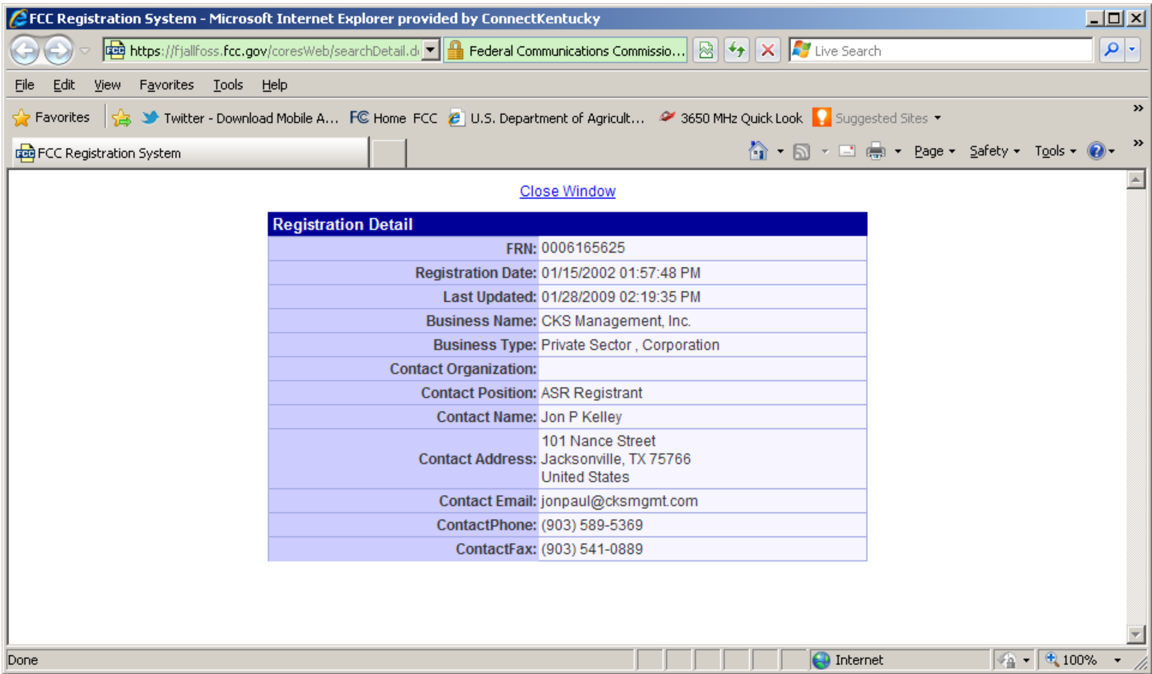


Exhibit C: Federal Registration Number



Close Window

Registration Detail	
FRN:	0006165625
Registration Date:	01/15/2002 01:57:48 PM
Last Updated:	01/28/2009 02:19:35 PM
Business Name:	CKS Management, Inc.
Business Type:	Private Sector , Corporation
Contact Organization:	
Contact Position:	ASR Registrant
Contact Name:	Jon P Kelley
Contact Address:	101 Nance Street Jacksonville, TX 75766 United States
Contact Email:	jonpaul@cksmgmt.com
ContactPhone:	(903) 589-5369
ContactFax:	(903) 541-0889

Exhibit D: WQJW906 License Reference

License Search - Search Results - Microsoft Internet Explorer provided by ConnectKentucky

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Consumers | Find People

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search | FCC Site Map

License Search

Search Results

New Search | Refine Search | Printable Page | Query Download | Map License | HELP

Specified Search

Call Sign like **wqjw906**

Matches **1- 1** (of **1**)

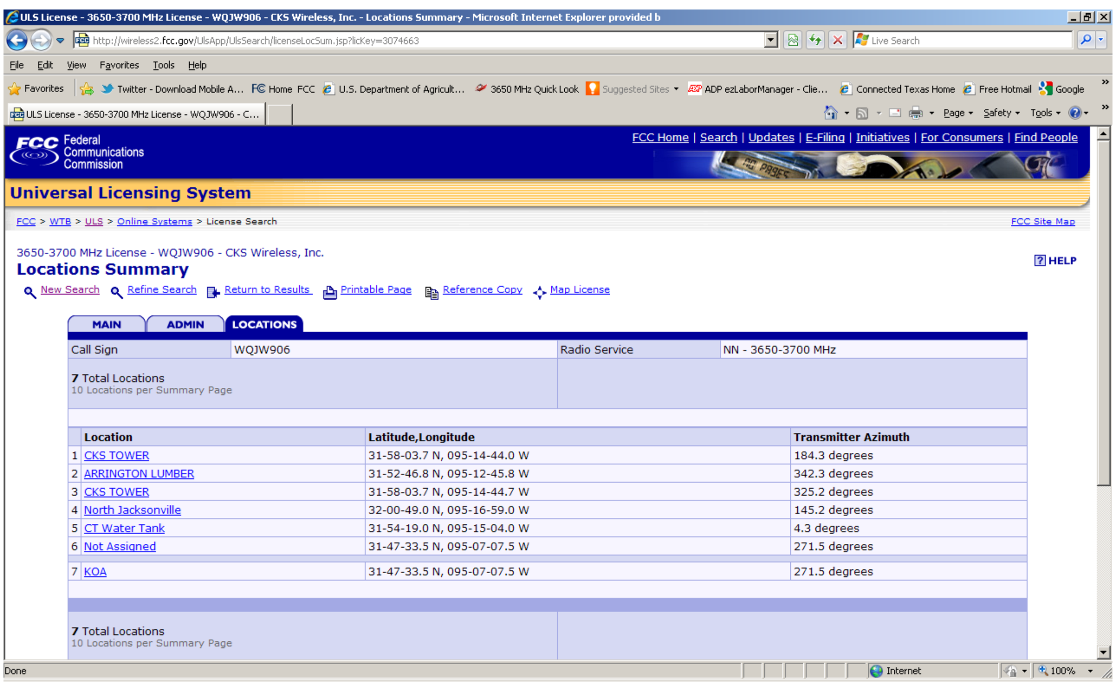
PA = Pending Application(s)
TP = Termination Pending
L = Lease

Page 1

	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
1	WQJW906	CKS Wireless, Inc.	0006165625	NN	Active	01/29/2019

Page 1

ULS Help	ULS Glossary - FAQ - Online Help - Technical Support - Licensing Support
ULS Online Systems	CORES - ULS Online Filing - License Search - Application Search - Archive License Search
About ULS	Privacy Statement - About ULS - ULS Home
Basic Search	By Call Sign = SEARCH



ULS License - 3650-3700 MHz License - WQJW906 - CKS Wireless, Inc. - Locations Summary - Microsoft Internet Explorer provided b

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Consumers | Find People

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search | FCC Site Map

3650-3700 MHz License - WQJW906 - CKS Wireless, Inc.

Locations Summary

New Search | Refine Search | Return to Results | Printable Page | Reference Copy | Map License | HELP

MAIN | ADMIN | LOCATIONS

Call Sign	WQJW906	Radio Service	NN - 3650-3700 MHz

7 Total Locations
10 Locations per Summary Page

	Location	Latitude,Longitude	Transmitter Azimuth
1	CKS TOWER	31-58-03.7 N, 095-14-44.0 W	184.3 degrees
2	ARRINGTON LUMBER	31-52-46.8 N, 095-12-45.8 W	342.3 degrees
3	CKS TOWER	31-58-03.7 N, 095-14-44.7 W	325.2 degrees
4	North Jacksonville	32-00-49.0 N, 095-16-59.0 W	145.2 degrees
5	CT Water Tank	31-54-19.0 N, 095-15-04.0 W	4.3 degrees
6	Not Assigned	31-47-33.5 N, 095-07-07.5 W	271.5 degrees
7	KOA	31-47-33.5 N, 095-07-07.5 W	271.5 degrees

7 Total Locations
10 Locations per Summary Page

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the CKS Wireless, Inc. service area map from its website and the information through the FCC ULS database in reference to license WQJW906. The website service area was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .1 mile (528 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by tower symbols as shown in Exhibit B. Using the coordinates (5 unique locations) available through the FCC ULS license search an accuracy validation of the image overlay was conducted to determine the feasibility of utilizing the tower symbols for identifying coordinates of the remaining 7 locations. The five licensed locations' coordinates were inputted into Google Earth and examined utilizing the zoom option of the aerial imagery. All five locations structures were identified. This provided a means of establishing coordinates for the remaining access point locations. All 12 locations were entered into the Microsoft *Streets & Trips* software program **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth - Provider's Service Area Image Overlay

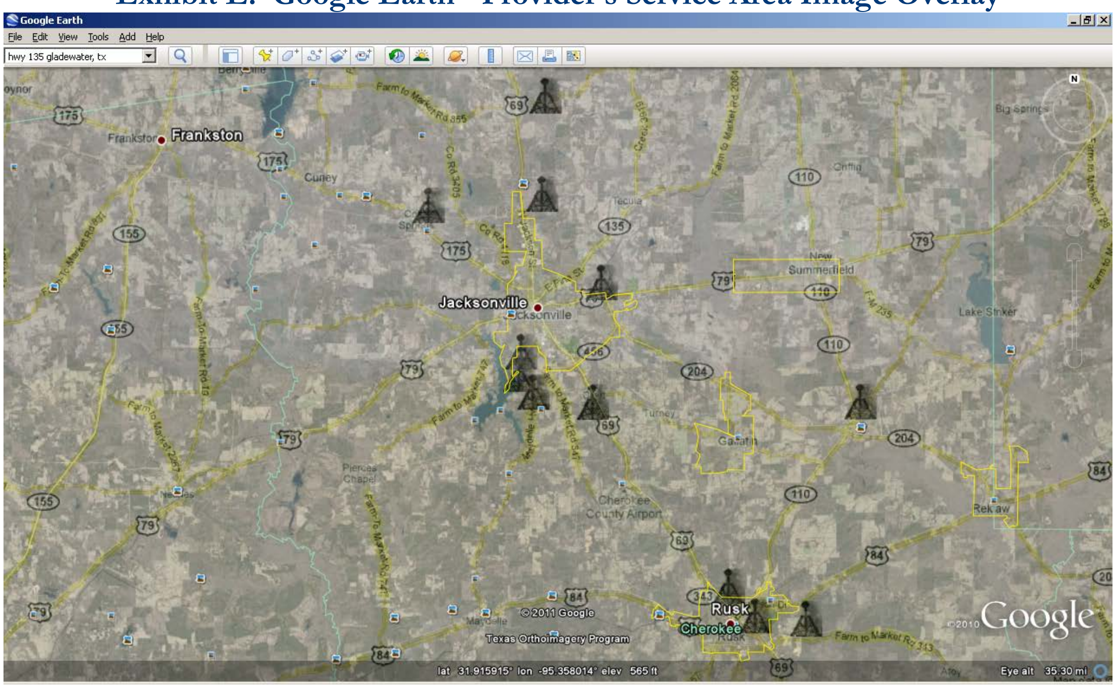
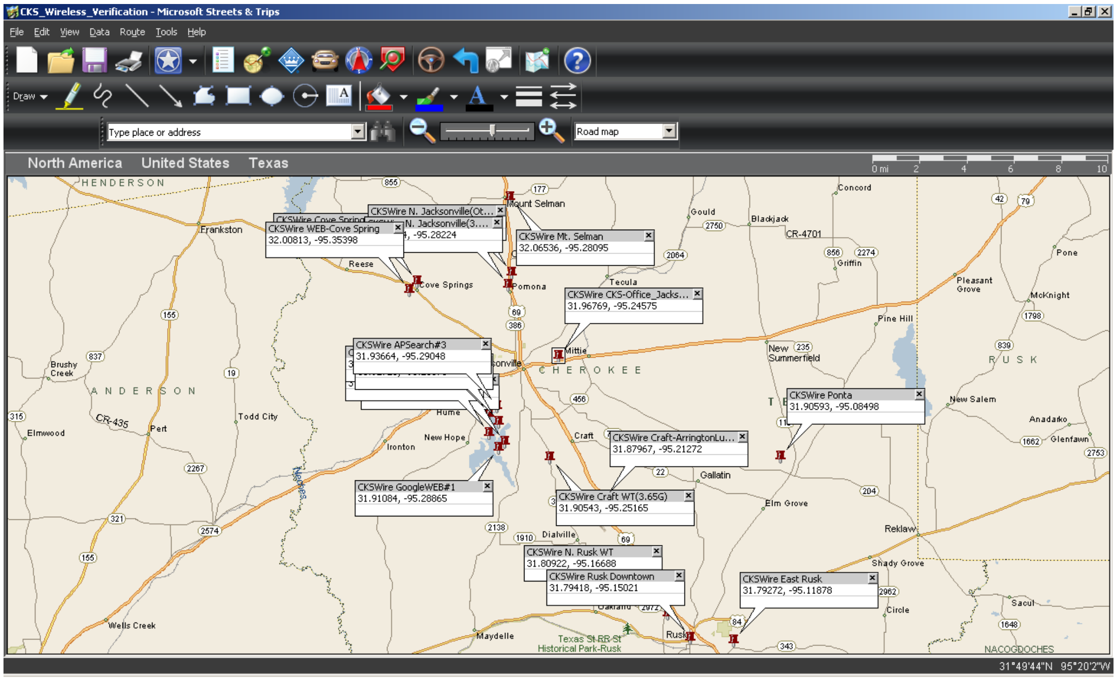


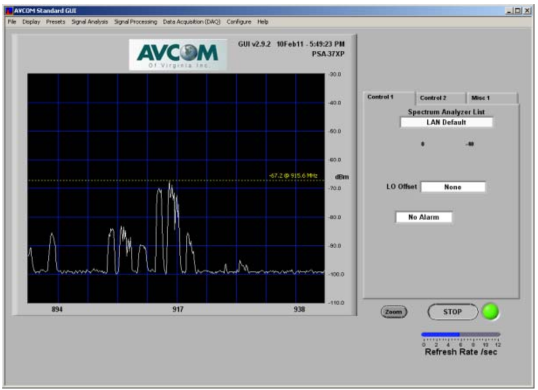
Exhibit F: Validation Points for AP Structures

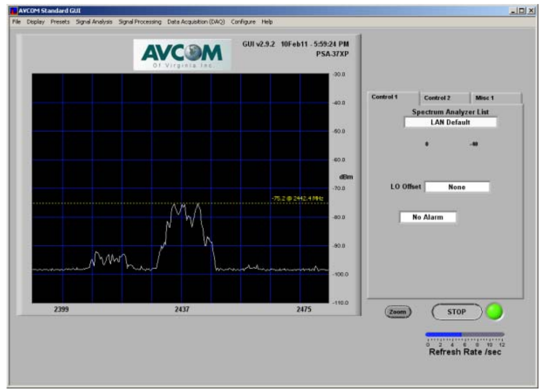


Testing Techniques

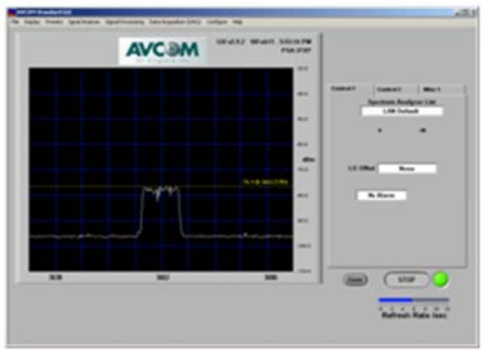
Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay and publicly available data through the FCC ULS database for CKS Wireless, Inc. 3650-3700MHz radio service. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored) and photographs were taken of the access points.

Exhibit G: Field Data for CKS Wireless, Inc. Office/Hub Location





Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
CKSWire	CKS-Office_Jacksonville(3.65G)	31.967694	-95.245750			X		Tower	39 meters	3.65GHz, azimuth 184 degrees, vertical polarity-39 meters/azimuth 325 degrees, horizontal polarity-39 meters (serving as backhaul)
				X					120 ft.	Estimated height. Omni antenna.
					X				120 ft.	Estimated height. Sector array-120 degrees.



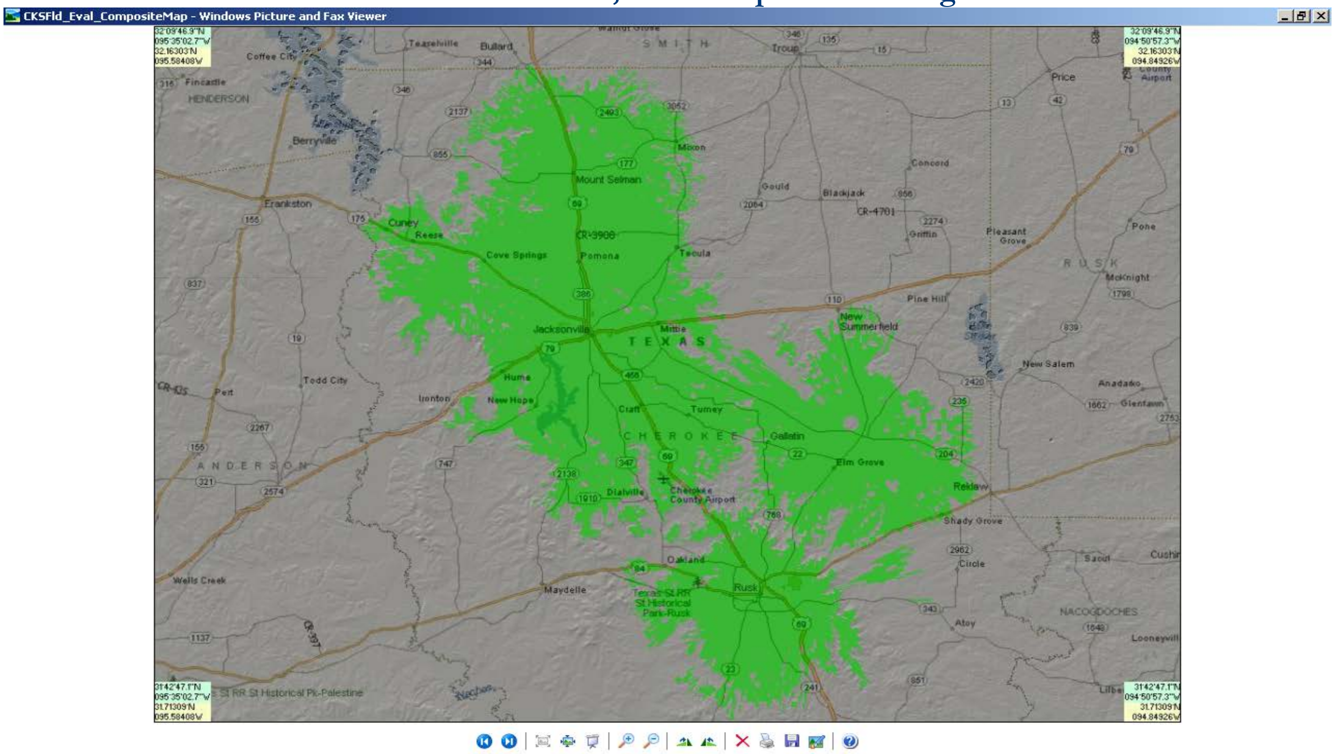
Background Results and Submission for April 2012

Of the 18 locations visited during the validation point route, 12 access points were identified and relative information was logged into the CKS Wireless, Inc. field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to CKS Wireless, Inc. and advised the information will be submitted to Connected Texas and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period. Despite that aforementioned call-to-action and the 3 additional contact attempts during this mapping cycle, the provider continues to be non-responsive.

Exhibit H: Field Validation Notes

Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
CKSWire	**Mt. Selman**	**32.065356**	**-95.280947**	**X**				Tower	180 ft.	Estimated height.
CKSWire	**N. Jacksonville(3.65G)**	**32.011444**	**-95.282236**			X		Tower	115 meters	3.65GHz, azimuth 145 degrees, horizontal polarity-115 meters (serving as backhaul)
				X					300 ft.	Estimated height.
CKSWire	N. Jacksonville(Other)	32.018719	-95.279750							Mobile providers structure. No CKS assets.
CKSWire	Cove Spring WT	32.013108	-95.347769							Did not observe any antenna structures.
CKSWire	**WEB-Cove Spring**	32.008128	-95.353983	**X**				Rohn-Residential	90 ft.	Coordinates approximated; Rohn tower structure visible while driving. Could not locate a safe location to park to capture a picture.
CKSWire	**CKS-Office_Jacksonville(3.65G)**	31.967694	-95.245750			X		Tower	39 meters	3.65GHz, azimuth 184 degrees, vertical polarity-39 meters/azimuth 325 degrees, horizontal polarity-39 meters (serving as backhaul)
				X					120 ft.	Estimated height. Omni antenna.
					X				120 ft.	Estimated height. Sector array-120 degrees.
CKSWire	**Craft WT(3.65G)**	31.905431	-95.251653			X		Water Tank	160 meters	3.65GHz, azimuth 4 degrees, vertical polarity-160 meters
				X					140 ft.	Omni-approximate height.
					X				140 ft.	2.4GHz sector array; approximate height.
							5.3GHz			Serving as backhaul.
CKSWire	Craft-ArringtonLumber(3.65G)	31.879667	-95.212722			X		Pole	18 meters	3.65GHz, azimuth 342 degrees, vertical polarity-18 meters. The 3.65GHz serves as a business application for the lumber yard. The lumber yard operates a 2.4GHz WiFi system routed through the 3.65GHz access.
CKSWire	APSearch#1	31.914639	-95.284536							Search location.
CKSWire	**SE LakeJack**	**31.910836**	**-95.288650**	**X**				Rohn-Residential	90 feet	Identified; approximated coordinates-private land. Estimated height.
CKSWire	APSearc#2	31.927233	-95.28871111							Search location.
CKSWire	**SW LakeJack**	**31.920053**	**-95.295992**	**X**				Rohn-Residential	90 feet	Identified; approximated coordinates-private land. Estimated height.
CKSWire	APSearch#3	31.936639	-95.290475							Search location.
CKSWire	**NW LakeJack**	**31.93175**	**-95.295992**	**X**					90 feet	Identified; approximated coordinates-private land. Estimated height.
								Rohn-Residential		
CKSWire	**N. Rusk WT**	**31.809217**	**-95.16687778**	**X**					150 ft.	900MHz omni; approxmate height.
CKSWire	**Rusk Downtown(Police and Fire Dept. Station)**	**31.794183**	**-95.15021389**		**X**			Rohn	80 ft.	WEB site illustrates tower for coverage; photo identifies BH connectivity mounted on ROHN atop the fire department. Assuming 2.4GHz operation in the area. Height assumption 80 ft.
CKSWire	**East Rusk-KOA(3.65GHz)**	**31.792722**	**-95.11878333**			X		Tower	127 meters	3.65GHz, azimuth 271 degrees, horizontal polarity-127 meters (serving as backhaul)
					X				120 ft.	Sector array approximate height. Tower FCC ASR: 1058081
CKSWire	**Ponta**	**31.905928**	**-95.084975**		**X**			Tower	130 ft.	2.4GHz sector array; approximate height.
				X					100 ft.	900MHz omni; approximate height. FCC ASR: 1024425

Exhibit I: CKS Wireless, Inc. Composite Coverage



East Texas Broadband

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 provides detail regarding the recent data collection activities related to East Texas Broadband, a wireless Internet service provider (WISP), located in Palestine, Texas, with a service area around Palestine, Elkhart, and Elmwood, Texas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

April 2012 Submission Commentary

Connected Nation created this coverage estimation document during the October 2011 submission period as a result of the ongoing non-participatory status of the provider. In addition to the 4 instances of e-mail and/or telephone communication during the October 2011 submission period (as previously reported), CN made 3 additional attempts to contact the provider during this mapping cycle.

CN closely monitored the provider's website to identify any changes in the coverage area or maximum advertised speeds but did not locate evidence of any recent changes. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data.

The Issue

East Texas Broadband, by its lack of responsiveness since February 4, 2011, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

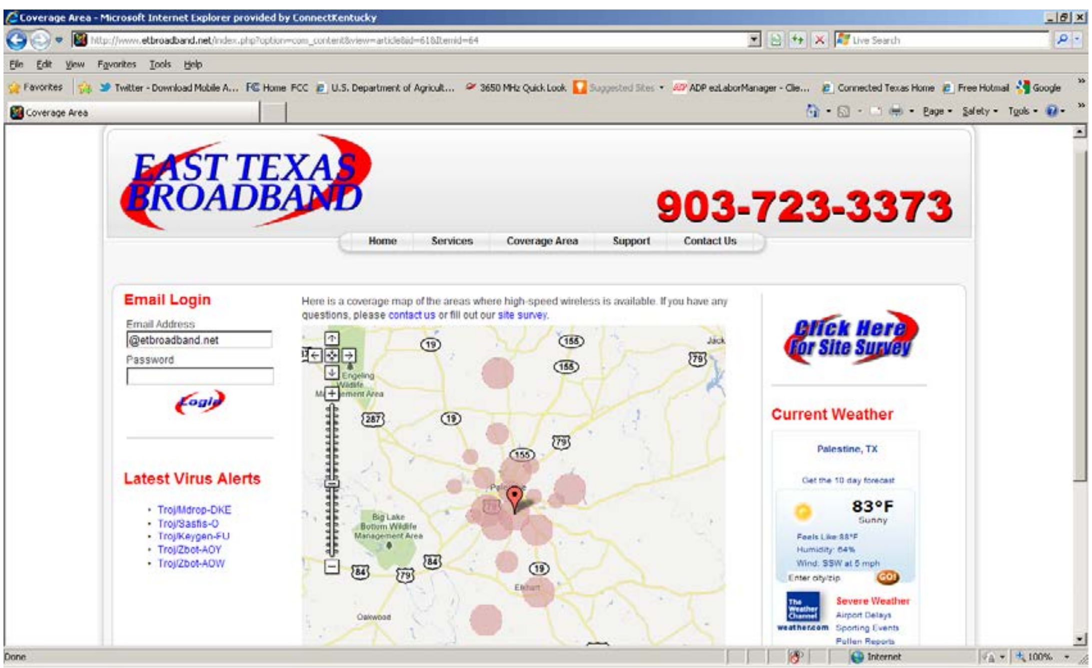
Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and as time progressed, enriched the file with information obtained through the public domain or by phone inquiry through the provider's customer support line. For example, CN reviewed the provider's website (http://www.etbroadband.net/) to determine the residential service plans. However, the website did not identify the residential service plans. A telephone call was placed through customer support and the residential plans were quoted over the phone **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network was identified. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded no FRN for East Texas Broadband. Also, to support field validation of access points, the FCC Universal Licensing System (ULS) was utilized to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded no licensed frequencies associated to East Texas Broadband, indicating the provider's broadband delivery is by way of the unlicensed Wi-Fi frequencies band (900 MHz, 2.4 GHz, and 5 GHz).

Exhibit A: Service Plans

Speed Tier Offerings		Residential Service Price
Download	Upload	
512Kbps	256Kbps	$24.95
1Mbps	512Kbps	$39.95
2Mbps	1Mbps	$54.95
3Mbps	1Mbps	$69.95

Exhibit B: Service Area



Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the East Texas Broadband service area map from its website. The website service area was utilized to create a Google Earth image overlay **(Exhibit C).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .1 mile (528 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by circular type polygons as shown in Exhibit B. Based on the provider's website coverage depiction there are nineteen (19) locations identified as possible locations for access point structures. Utilizing Google Earth with the provider's coverage overlay (Exhibit C), coordinates were established of the circular polygons center points for route development. Further enhancement for possible structure identification was completed by a satellite aerial imagery and street level session with the Google Earth application. Possible structure locations were identified around the center points. This provided a means of establishing coordinates for the access point locations. Twenty-one (21) locations were entered into the *Streets & Trips* software program **(Exhibit D)** to develop a route for the validation process.

Exhibit C: Google Earth - Provider's Service Area Image Overlay

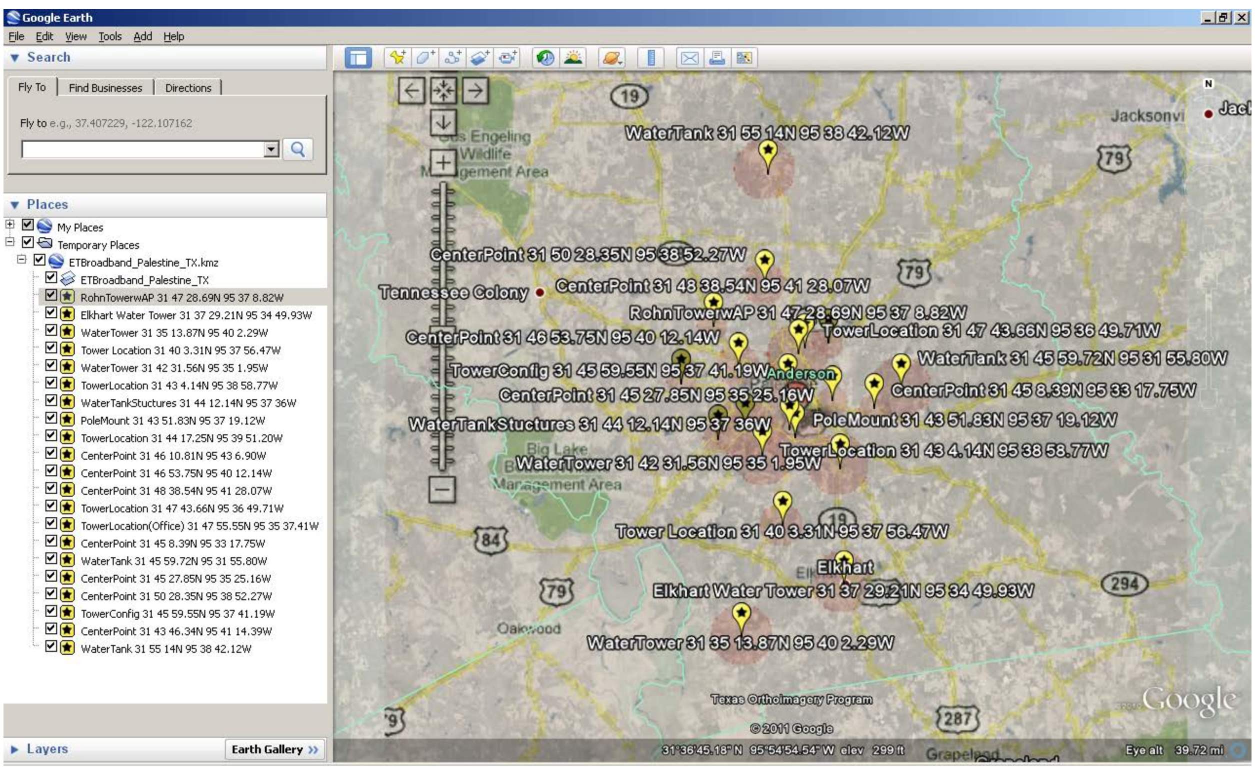
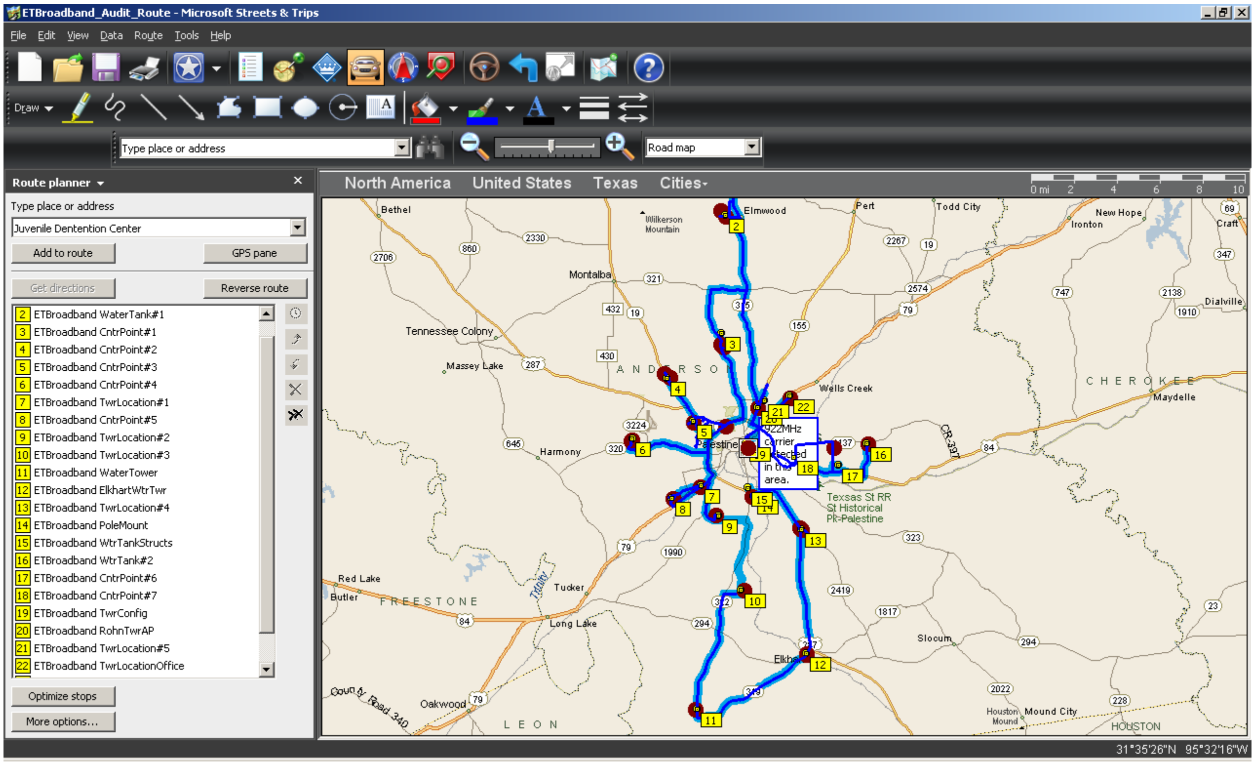


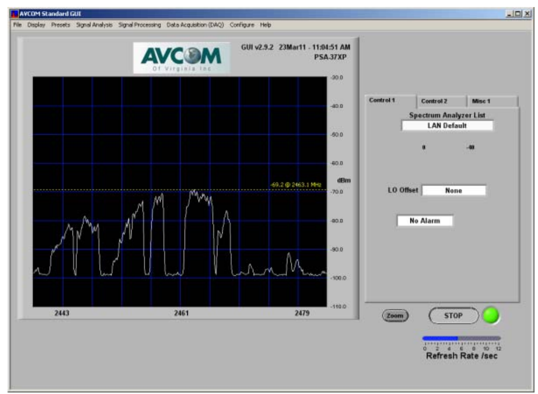
Exhibit D: Validation Points for AP Structures



Testing Techniques

Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay and publicly available data through East Texas Broadband's website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit E)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, and antenna type (omni or sectored), and photographs were taken of the access points.

Exhibit E: Sample Field Data for East Texas Broadband CR433-ROHN (CntrPoint#2) Location



Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
East Texas BB	CR433-ROHN (CntrPoint#2)	31.813611	-95.693056		X			Residential Rohn	80	

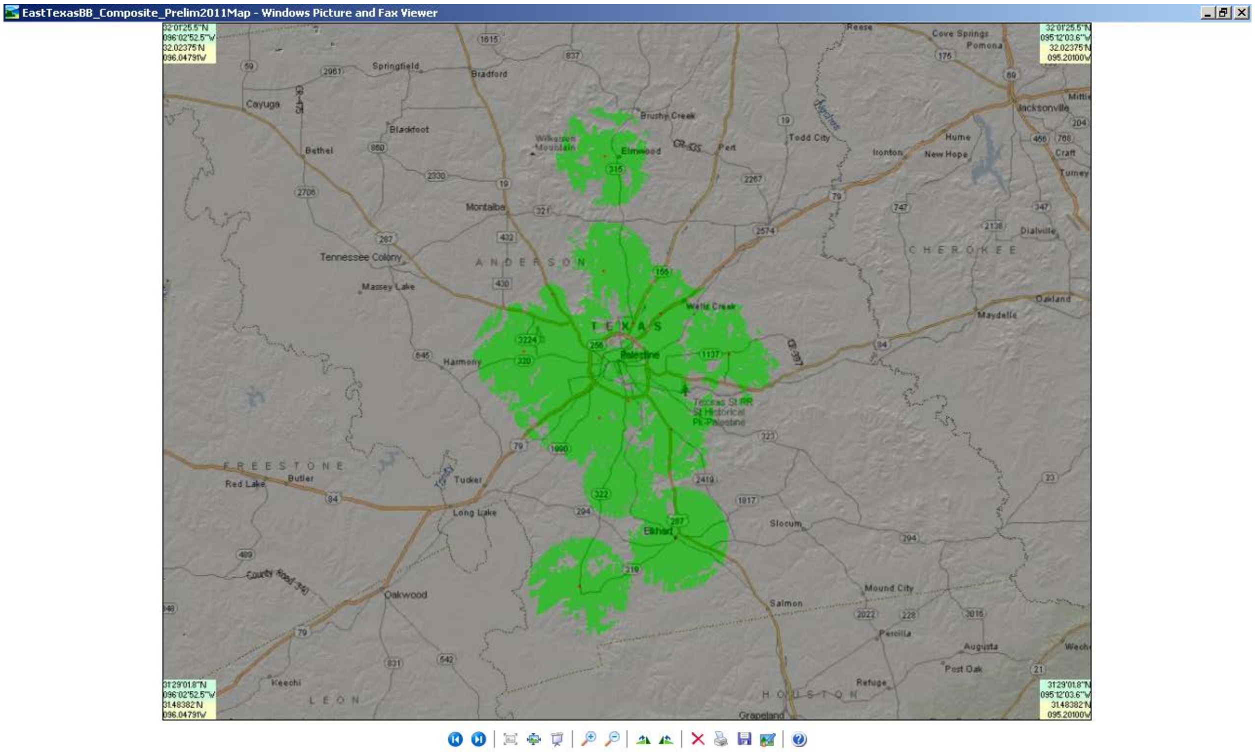
Background Results and Submission for April 2012

Of the 21 locations visited during the validation point route, 17 access points were identified and relative information was logged into the East Texas Broadband field validation notes file **(Exhibit F)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit G)**. Both documents were forwarded to East Texas Broadband and advised the information will be submitted to Connected Texas and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period. Despite that aforementioned call-to-action and the 3 additional contact attempts during this mapping cycle, the provider continues to be non-responsive.

Exhibit F: Field Validation Notes

Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
East Texas BB	Elmwood-WaterTank#1	31.920556	-95.645033	X				Water Tank	100	
East Texas BB	CR404 WT (CntrPoint#1)	31.831667	-95.645833	X				Water Tank	100	
East Texas BB	CR433-ROHN (CntrPoint#2)	31.813611	-95.693056		X			Residential Rohn	80	
East Texas BB	CR419-ROHN (CntrPoint#3)	31.780833	-95.670000	X				Residential Rohn	70	
East Texas BB	BroylesChapel-ROHN (CntrPoint#4)	31.769444	-95.718611	X				Residential Rohn	80	
East Texas BB	Hwy79SW-Lattice (TwrLocation#1)	31.738125	-95.664222	X				Lattice	120	
East Texas BB	Larkspur Ln-ROHN (CntrPoint#5)	31.729167	-95.685833	X				Residential Rohn	60	
East Texas BB	CR2012B-GuyedTwr (TwrLocation#2)	31.717817	-95.649658	X				Commercial Guyed	100	No FCC Registration sign posted at location.
East Texas BB	TwrLocation#3	31.667586	-95.632353							No WIFI RF detection observed. Used coordinates as a ETBB web coverage depiction point.
East Texas BB	Hwy322-WaterTower	31.587222	-95.667778	X				Water Tank	120	
East Texas BB	Elkhart-WaterTower	31.624781	-95.580536	X				Water Tower	150	
East Texas BB	PoleMount	31.731064	-95.621978							No WIFI RF detection observed.
East Texas BB	WtrTankStructs	31.736706	-95.626667							No WIFI RF detection observed.
East Texas BB	FM3266 WtrTwr (WtrTank#2)	31.766944	-95.531389	X				Water Tank	80	
East Texas BB	CntrPoint#6	31.752331	-95.554931							
East Texas BB	CntrPoint#7	31.757736	-95.590322							
East Texas BB	CntrPoint#6and#7 Approximation	31.756111	-95.597222	X					90	Identified a WIFI carrier at 922MHz; could not obtain a visual on AP structure due to heavy foliage in immediate area. Approximated lat/long to represent provider's ring map coverage for the location.
East Texas BB	N. Church-BldgROHN (TwrConfig)	31.763889	-95.626667		X			3 story w 40Ft. Rohn	80	
East Texas BB	Hwy155 (RohnTowerAP)	31.791303	-95.619117		X			Residential Rohn	100	
East Texas BB	TwrLocation#5	31.795461	-95.613808							No WIFI RF detection observed.
East Texas BB	Hwy79N_ROHN (TwrLocationOffice)	31.798764	-95.593725	X				Residential Rohn-G	120	
East Texas BB	WalstonSpringsWT (TwrLocation#4)	31.708767	-95.583875	X				Water Tower	80	
East Texas BB	ETBB Office	31.730833	-95.623333		X		5.1	Commercial Guyed	150	

Exhibit G: East Texas Broadband Composite Coverage



GoZoe Wireless

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 State Broadband Initiative (SBI) program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to GoZoe Wireless, a wireless Internet service provider (WISP), located in Marshall, Texas, with a service area around Marshall, Texas, Harrison County. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 12 instances of communication via telephone and e-mail sessions since October 17, 2011, through February 2, 2012. Only one communication reply was received from a company representative on December 4, 2011, with a response of electing not to participate. Additionally, a CN staff member attempted on 2 occasions to arrange an office visit to discuss the broadband mapping project in person with GoZoe Wireless owner; however, the requests were never acknowledged.

The Issue

GoZoe Wireless, by its lack of responsiveness since October 17, 2011, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.gozoe.com/) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded an FRN of 0019577873 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded license WQMG924 **(Exhibit D)**, Radio Service: NN-3650-3700MHz with 0 active locations.

Exhibit A: Service Plans

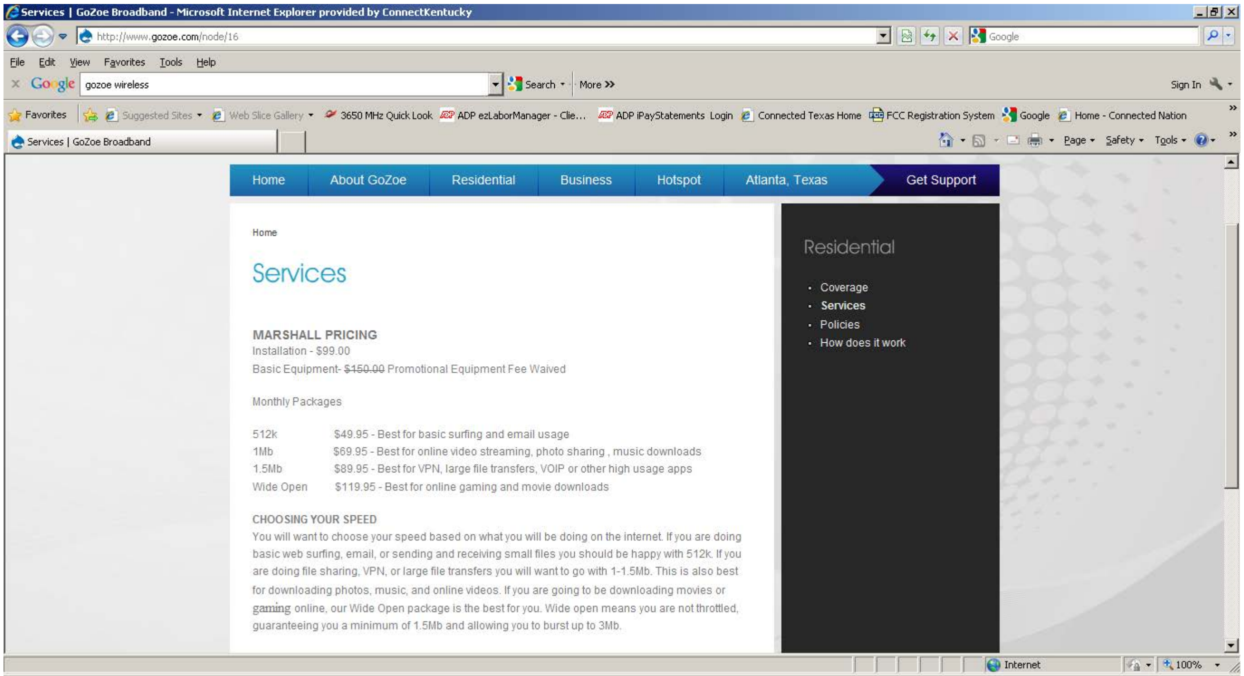


Exhibit B: Service Area

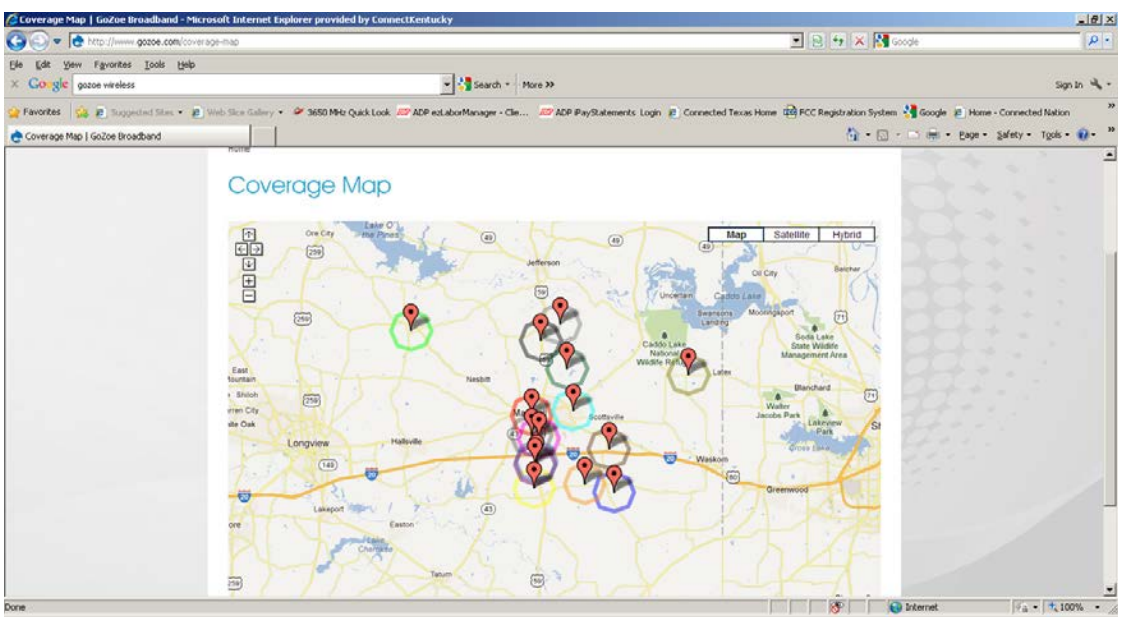
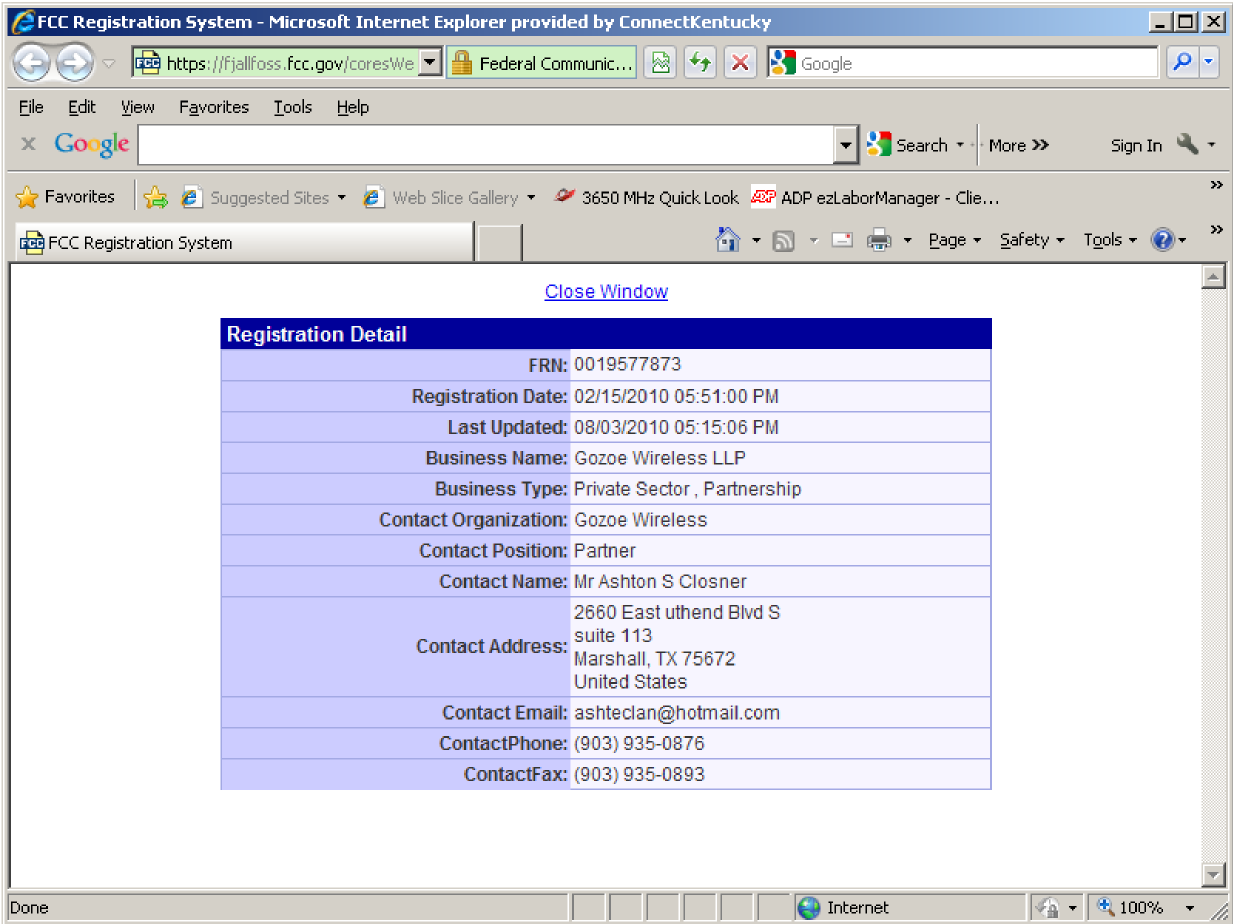


Exhibit C: Federal Registration Number

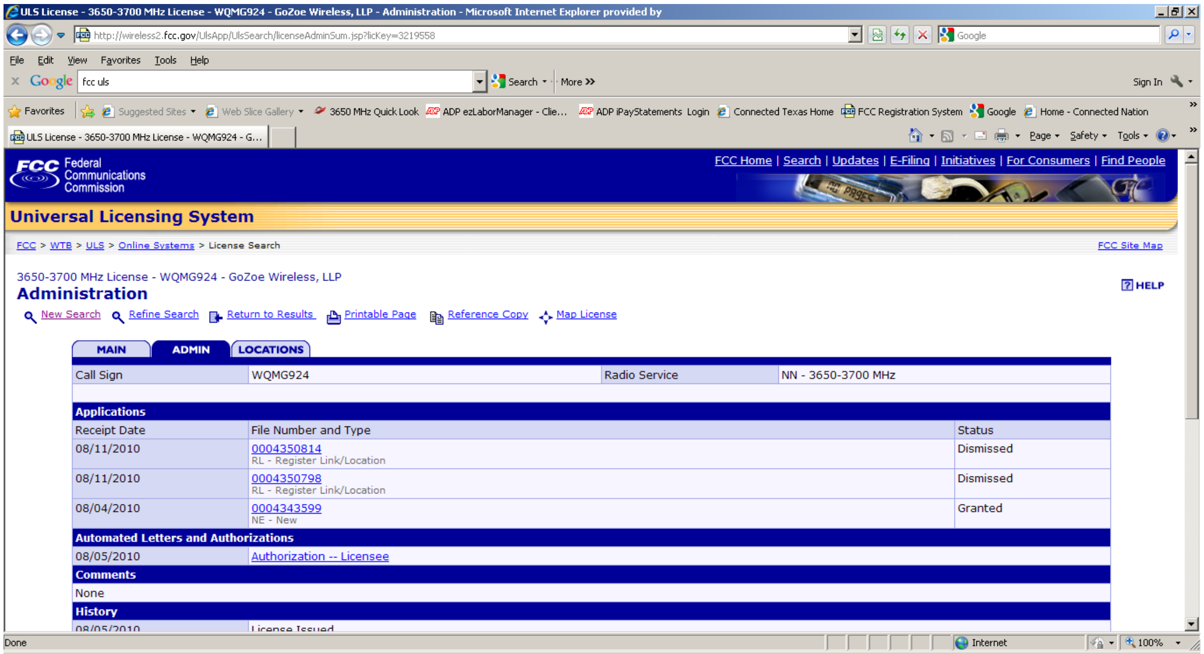


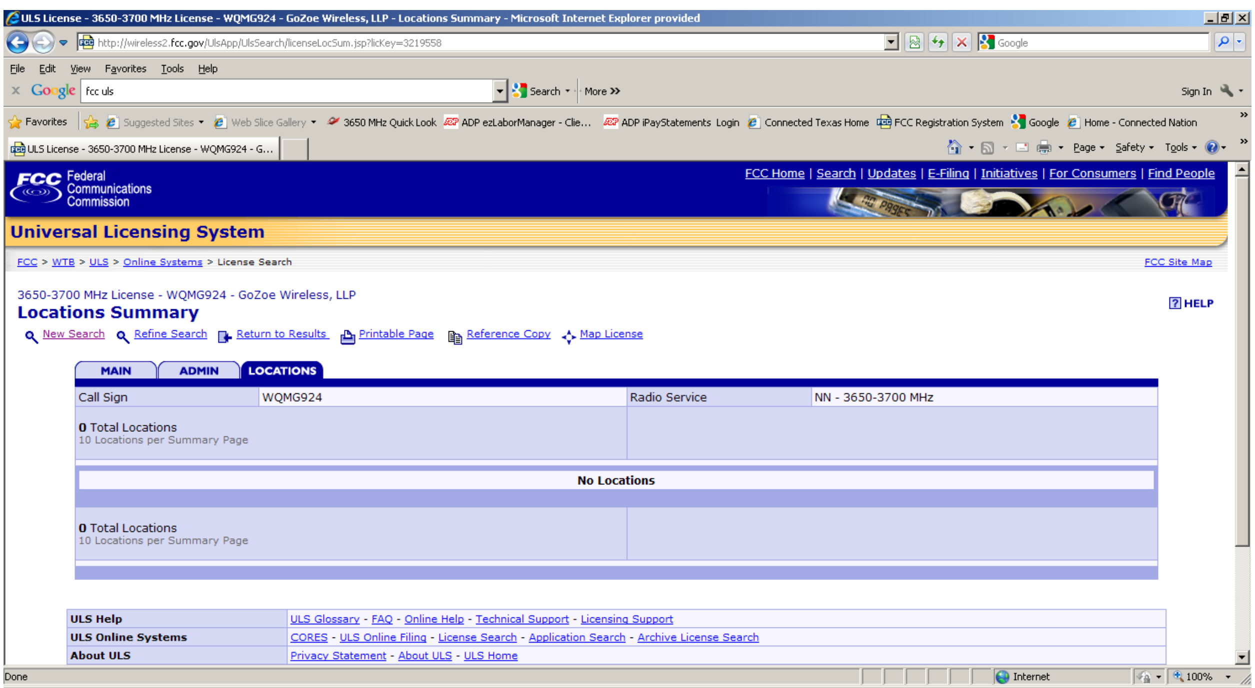
FCC Registration System - Microsoft Internet Explorer provided by ConnectKentucky

Close Window

Registration Detail	
FRN:	0019577873
Registration Date:	02/15/2010 05:51:00 PM
Last Updated:	08/03/2010 05:15:06 PM
Business Name:	Gozoe Wireless LLP
Business Type:	Private Sector , Partnership
Contact Organization:	Gozoe Wireless
Contact Position:	Partner
Contact Name:	Mr Ashton S Closner
Contact Address:	2660 East uthend Blvd S suite 113 Marshall, TX 75672 United States
Contact Email:	ashteclan@hotmail.com
ContactPhone:	(903) 935-0876
ContactFax:	(903) 935-0893

Exhibit D: WQMG924 License Reference





Preliminary Identification of Provider's Coverage Area: CN extracted the GoZoe Wireless service area map directly from the provider's website. Information from that website was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .1 mile (528 ft.) to establish a minimum search criteria of a given wireless access point. The provider's service area depiction is represented by polygons as shown in **Exhibit B**. Using the Google Earth image overlay each location was examined via an aerial zoom and street level observation to identify possible wireless access point structures at the center points of the polygons. This process provided a means of establishing coordinates for 15 validation points to identify structures with operational wireless transmit equipment. All 15 locations were entered into Microsoft *Streets & Trips* **(Exhibit F)** to develop a route for the data collection and validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

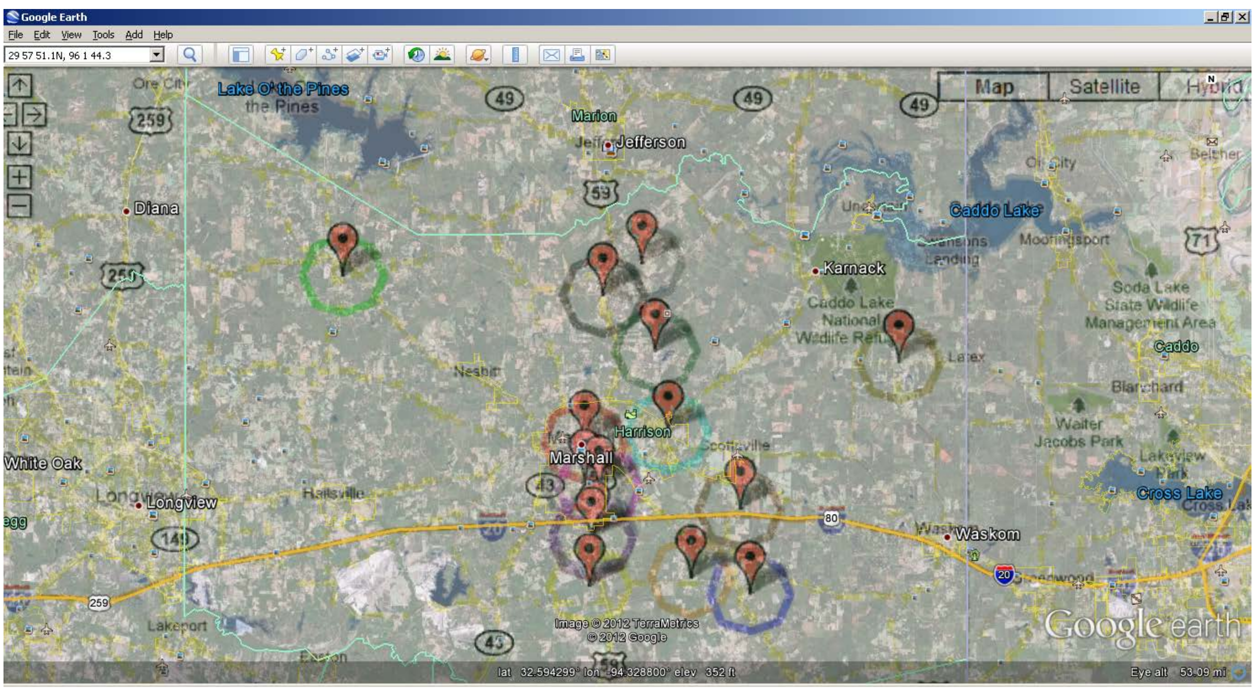
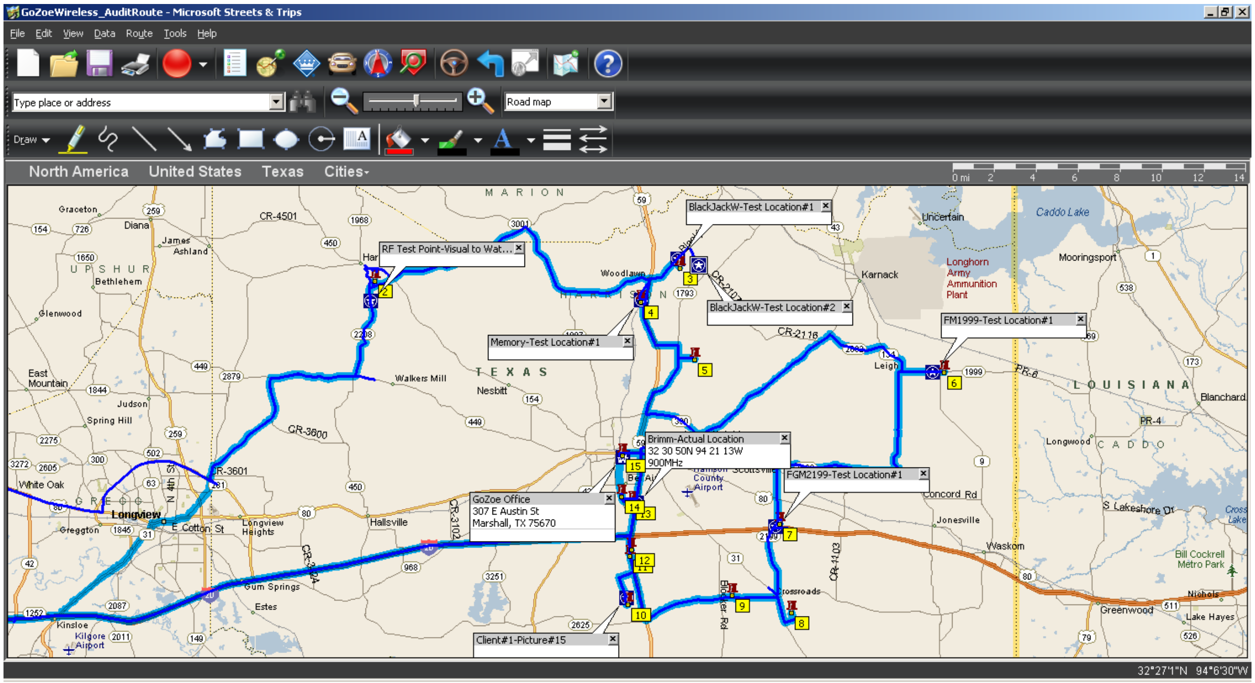


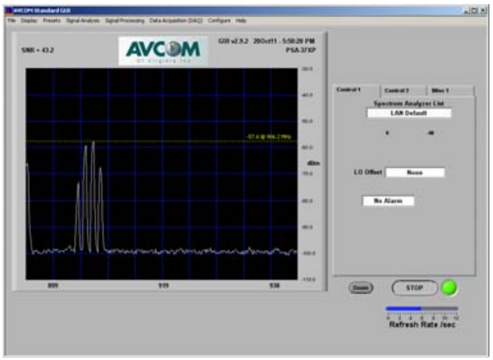
Exhibit F: Validation Points for AP Structures

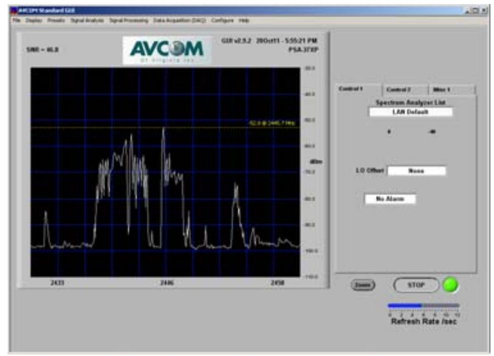


Testing Techniques

CN staff developed a data collection and site validation route based on information derived from the Google Earth image overlay of GoZoe Wireless' publicly available coverage on its website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored) and photographs were taken of the access points.

Exhibit G: Field Data for GoZoe Wireless Office/Hub Location





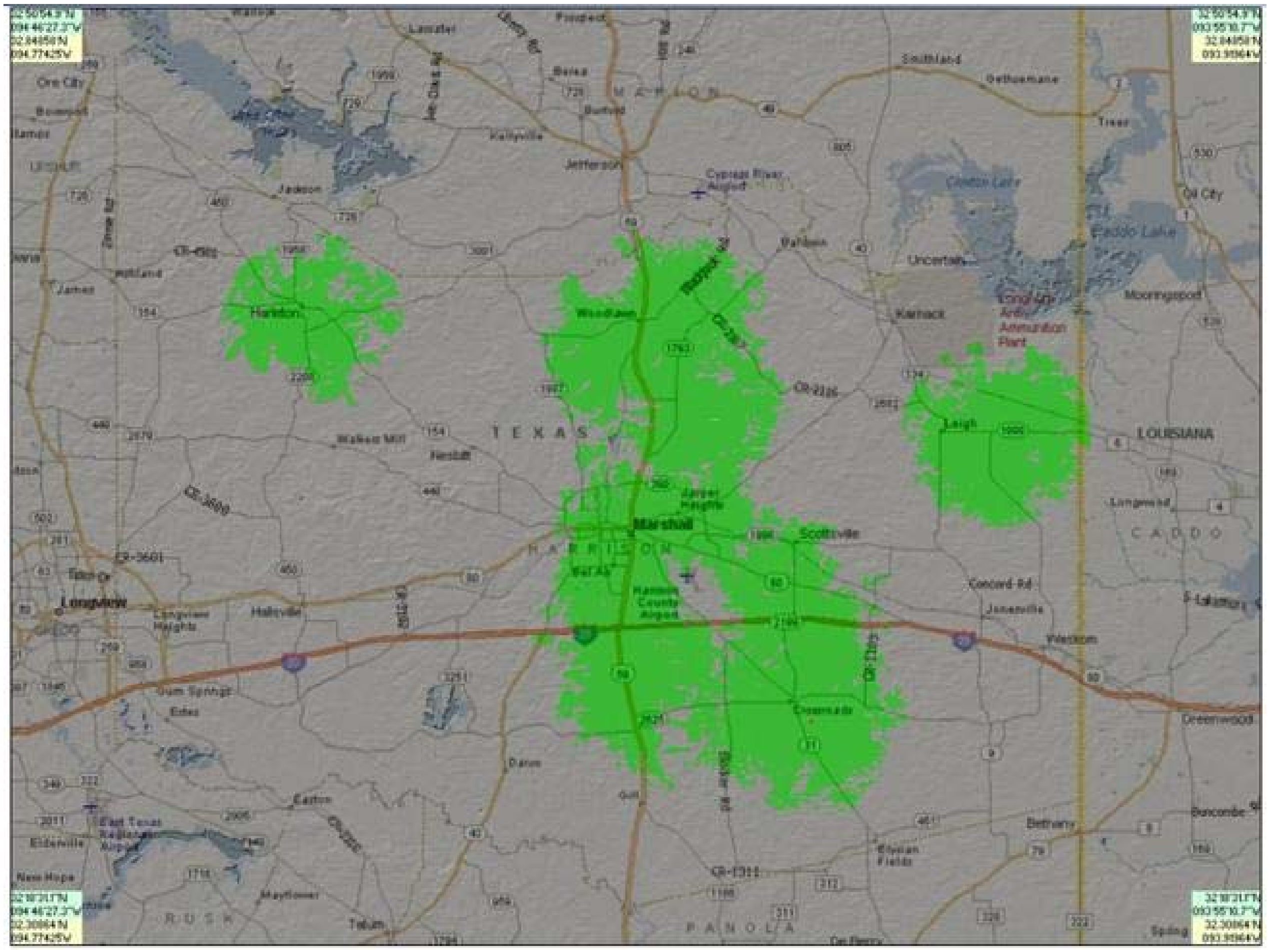
Results and Submission for April 2012

Of the 15 locations visited during the coverage estimation and validation point route, 14 access points were identified and relative information was logged into the GoZoe field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the CN Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to GoZoe Wireless as courtesy copies, and the provider was advised the estimated coverage information would be submitted to Connected Texas and to the NTIA unless the provider notified CN, within 48 hours, of discrepancies of the estimated coverage. The provider did not respond to CN and, as of this date, CN believes the information to be an accurate estimation of the service area of GoZoe Wireless.

Exhibit H: Field Validation Notes

Location	Latitude	Longitude	Frequency Availability		Structure	Approximate Antenna Height	Notes
			900MHz	2.4GHz			
AbbieLane	32.443889	-94.361017	X		Guyed Rohn	120 ft.	No visual on AP; estimated height and location (based on Google Earth overlay). RF presence; private property. Screen print of GE aerial imagery.
Hwy59-1	32.476792	-94.359497	X		Guyed Rohn	120 ft.	NAPA truck center; hub distribution point; multiple backhaul links.
Hwy59-2	32.481733	-94.358119	N/A	N/A	N/A	N/A	**No tower structure; only guy anchor posts; site decom.**
Hwy59-3	32.513619	-94.356717					
Hwy59-3 Revised Coords	32.513889	-94.353611	X		Guyed Rohn	120 ft.	**Sector antenna approximately 270 degrees azimuth**; 180 degree panel. 5.3GHz backhaul (SSID capture).
Washington	32.518367	-94.366317		X	Rohn	70 ft.	2.4GHz detected; backhaul antennas mounted on top.
Lafayette	32.546483	-94.365128	X	X	Rohn-Rooftop Mnt.	110 ft.	GoZoe hub and office location.
Commerce	32.553639	-94.296431	X		Rohn Guyed	100 ft.	Industrial park area; identified Tsunami access equipment operating at channels 2, 7, and 11.
Shadowood	32.613081	-94.306108	X		Guyed Rohn	120 ft.	Sector antenna arrays; 360 degree coverage.
Memory	32.652858	-94.350017	X			120 ft.	No visual on AP; estimated height and location (based on Google Earth overlay). RF presence; private property.
BlackJackW	32.675925	-94.318119	X			120 ft.	No visual on AP; estimated height and location (based on Google Earth overlay). RF presence; private property.
FM450/2208	32.666883	-94.568447	X		Water Tank	150 ft.	No access to site; private road.
FM1999	32.603986	-94.101294	X		Free Standing Comm	160 ft.	"old" AT&T comm site; SBA Site: TX 14398; FCC# 104897; operating 2.4GHz and 5.7GHz backhaul (SSID captures).
FM2199	32.499297	-94.236131	X		Guyed Rohn	110 ft.	Omni at 900MHz; 2.4GHz and 5.7GHz backhaul (SSID captures).
FM2625	32.449783	-94.275753	X		Guyed Rohn	100 ft.	**Sector at approximately 180 degrees azimuth**; 180 degree panel
FM31	32.437633	-94.226956	X			120 ft.	No visual on AP; estimated height and location (based on Google Earth overlay). RF presence; private property.

Exhibit I: GoZoe Wireless Composite Coverage



Zulu Internet, Inc.

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 State Broadband Initiative (SBI) program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Zulu Internet, Inc., a wireless Internet service provider (WISP), located in Paris, Texas, with a service area within Fannin and Lamar counties. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 14 instances of communication via telephone and e-mail sessions since May 26, 2011, through February 2, 2012. The owner of the company was non-responsive to all telephone and e-mail outreach activity. Additionally, a CN staff member attempted to arrange an office meeting with the owner of Zulu Internet, Inc. to discuss the project firsthand and assist with gathering data for the access points. There were no return replies to the requested meeting.

The Issue

Zulu Internet, Inc., by its lack of responsiveness since May 26, 2011, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.zuluinternet.com/index.html) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number ("FRN") on the FCC **CO**mmission **RE**gistration **S**ystem ("CORES") system yielded the following FRNs of 0021125265 and 0021129457 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded license WQOR870, under FRN 0021125265 **(Exhibit D)**, Radio Service: NN-3650-3700MHZ with 0 active locations.

Exhibit A: Service Plans

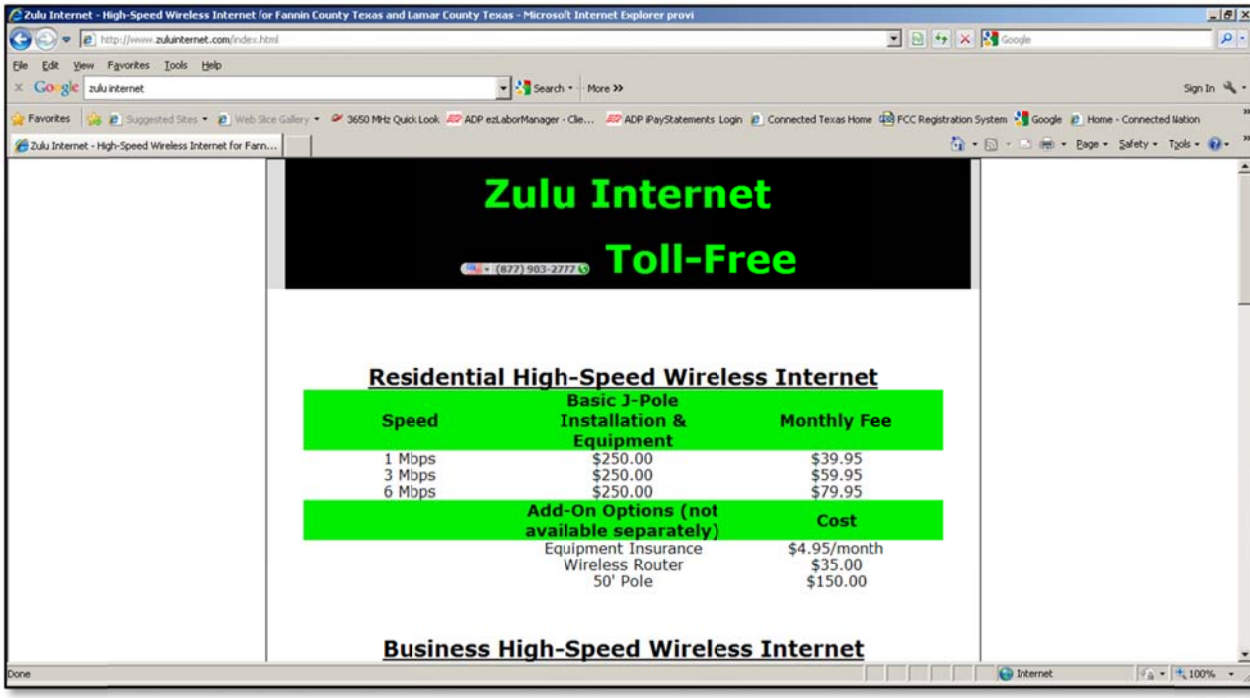


Exhibit B: Service Area

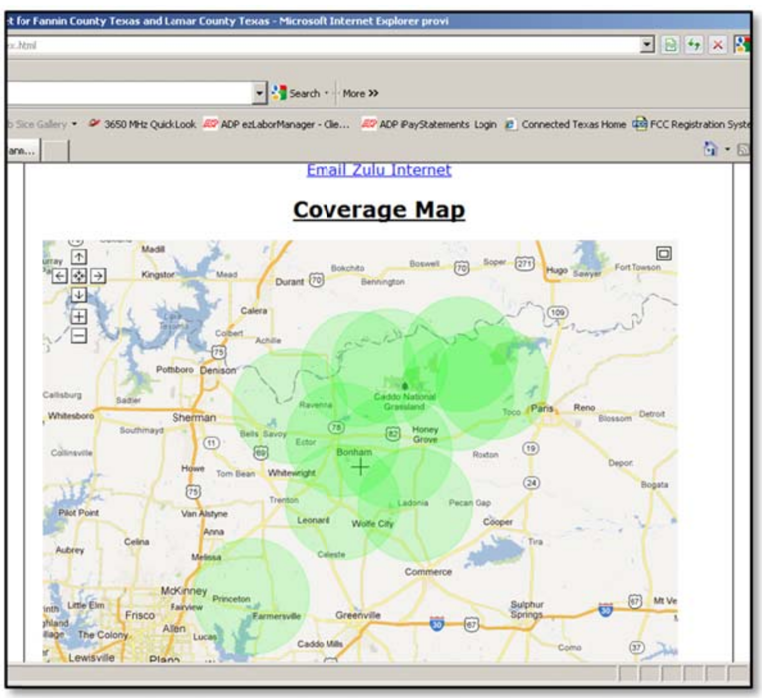
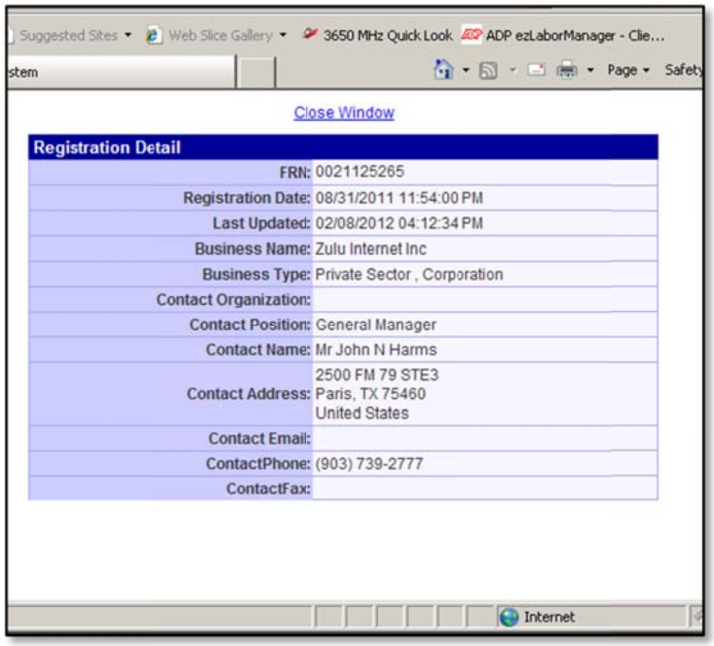
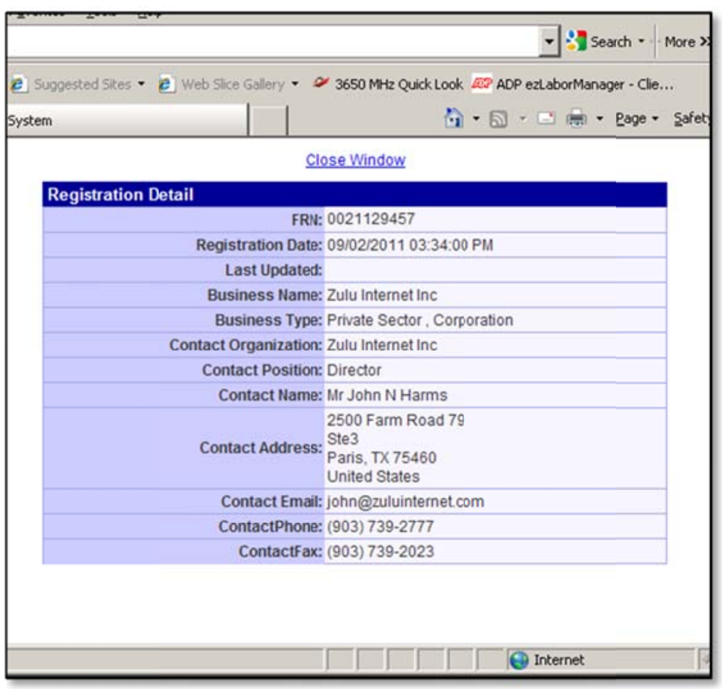


Exhibit C: Federal Registration Numbers

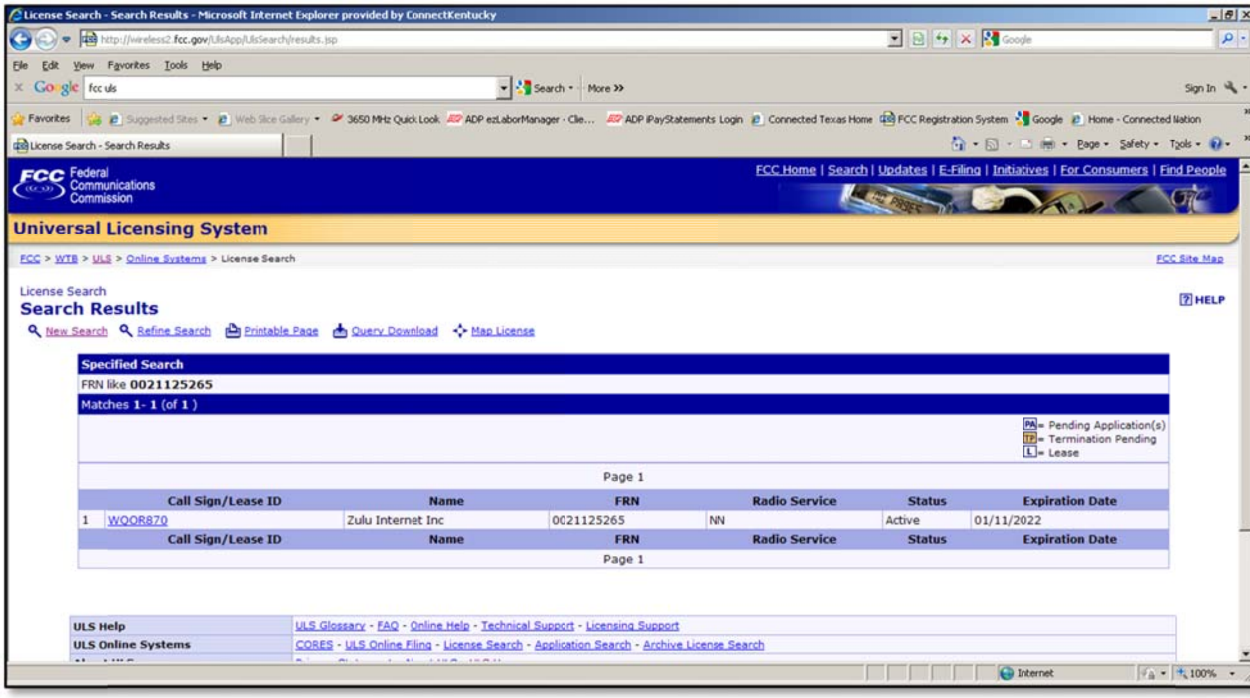


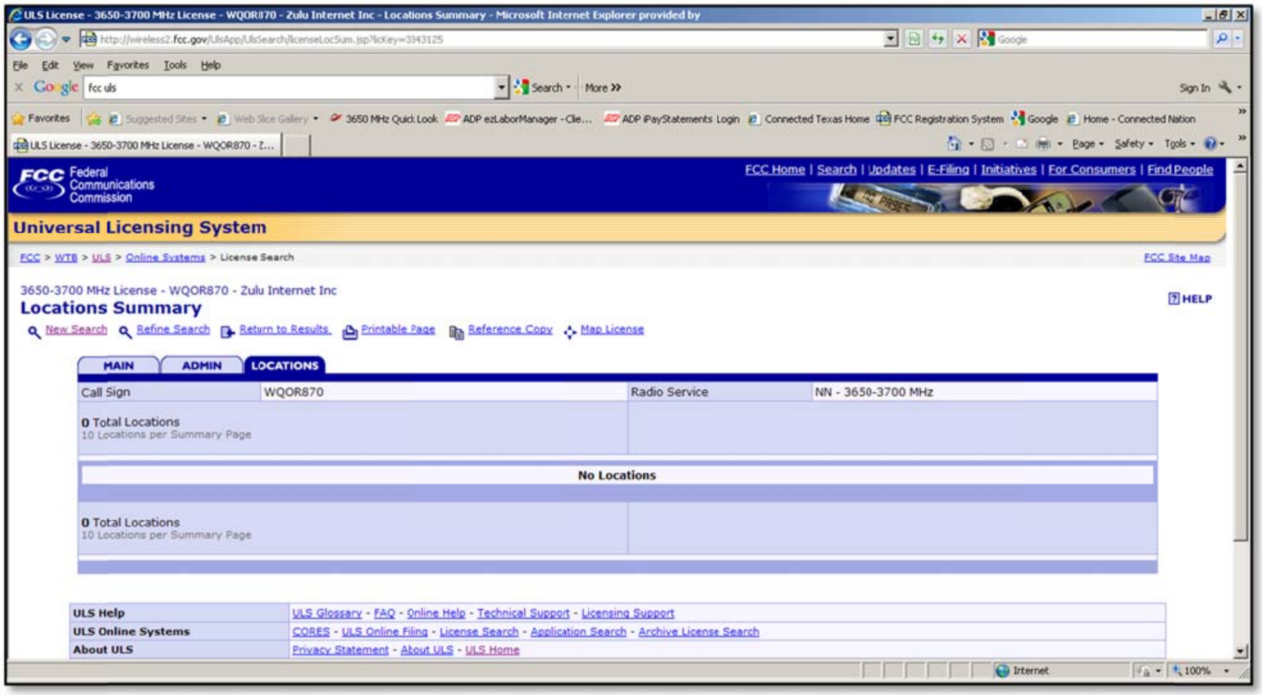
Registration Detail	
FRN:	0021125265
Registration Date:	08/31/2011 11:54:00 PM
Last Updated:	02/08/2012 04:12:34 PM
Business Name:	Zulu Internet Inc
Business Type:	Private Sector , Corporation
Contact Organization:	
Contact Position:	General Manager
Contact Name:	Mr John N Harms
Contact Address:	2500 FM 79 STE3 Paris, TX 75460 United States
Contact Email:	
ContactPhone:	(903) 739-2777
ContactFax:	



Registration Detail	
FRN:	0021129457
Registration Date:	09/02/2011 03:34:00 PM
Last Updated:	
Business Name:	Zulu Internet Inc
Business Type:	Private Sector , Corporation
Contact Organization:	Zulu Internet Inc
Contact Position:	Director
Contact Name:	Mr John N Harms
Contact Address:	2500 Farm Road 79 Ste3 Paris, TX 75460 United States
Contact Email:	john@zuluinternet.com
ContactPhone:	(903) 739-2777
ContactFax:	(903) 739-2023

Exhibit D: WQOR870 License Reference





Preliminary Identification of Provider's Coverage Area

CN extracted the Zulu Internet, Inc. service area map directly from the provider's website. Information from that website was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .1 mile (528 ft.) to establish a minimum search criteria of a given wireless access point. The provider's service area depiction is represented by polygons as shown in **Exhibit B**. Using the Google Earth overlay each location was examined via an aerial zoom and street level observation to identify possible wireless access point structures at the center points of the polygons. This process provided a means of establishing coordinates for 17 validation points to identify structures with operational equipment. All 17 locations were entered into the Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

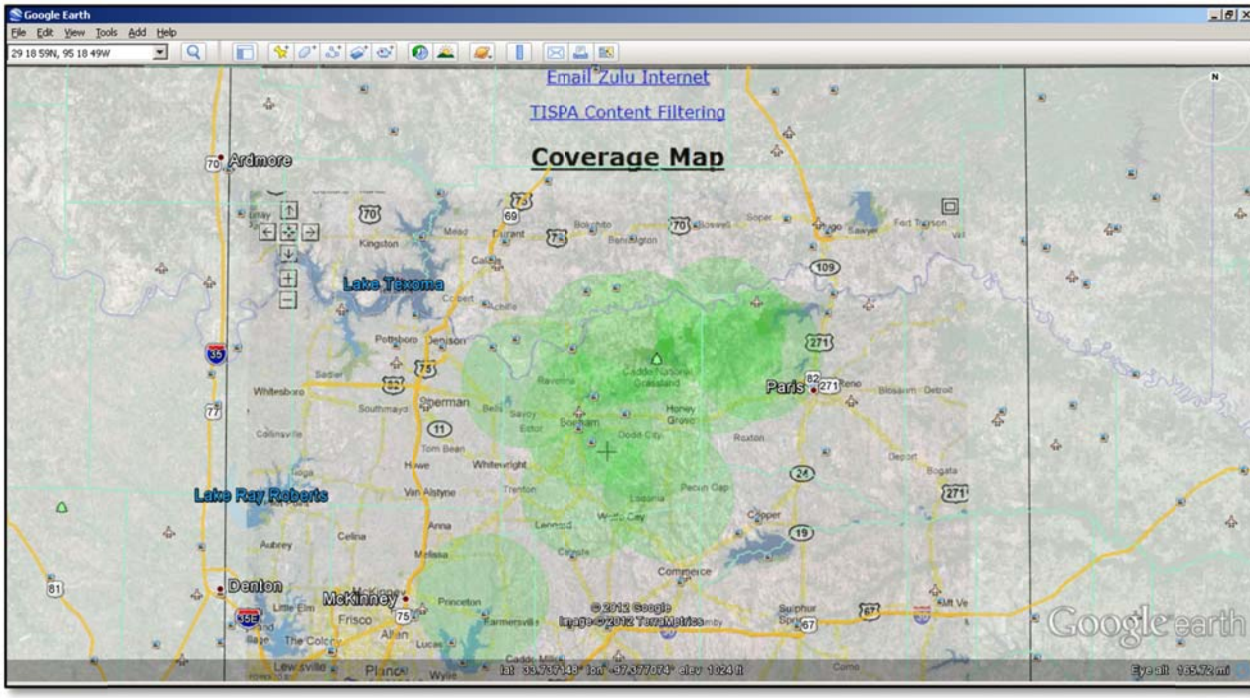
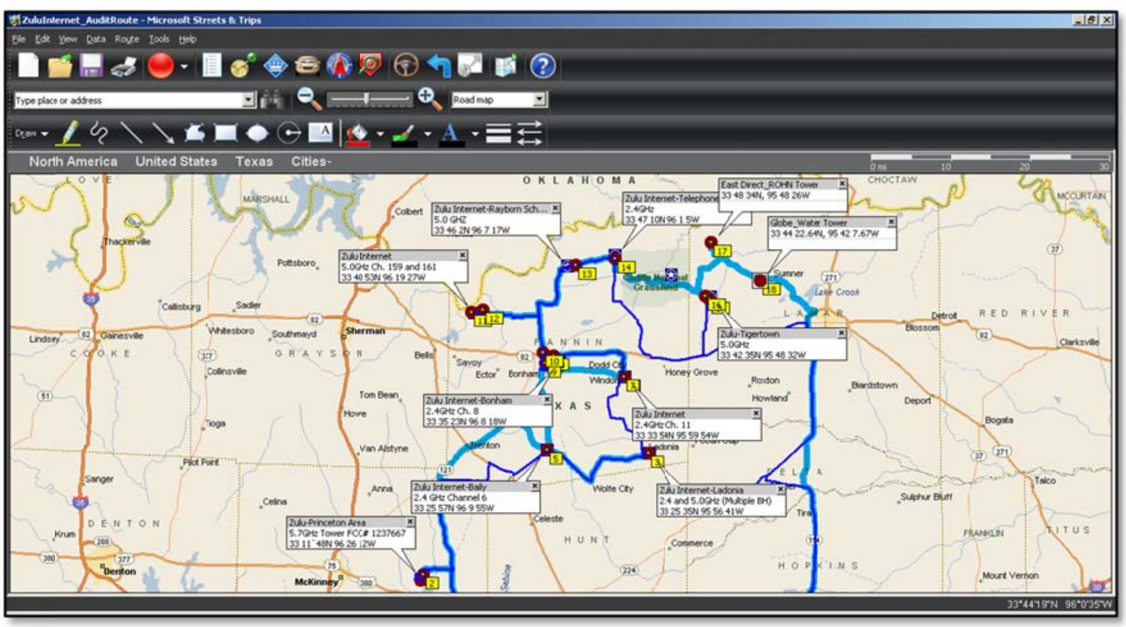


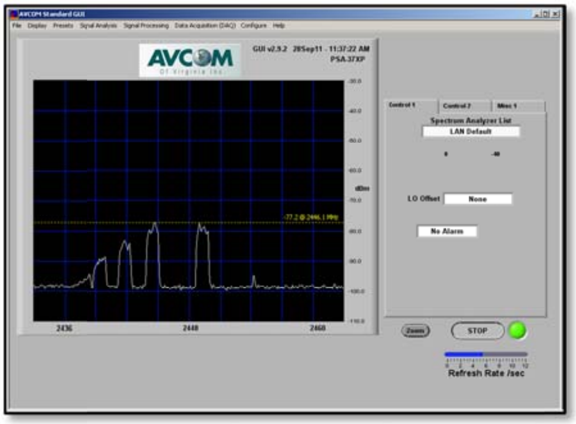
Exhibit F: Validation Points for AP Structures

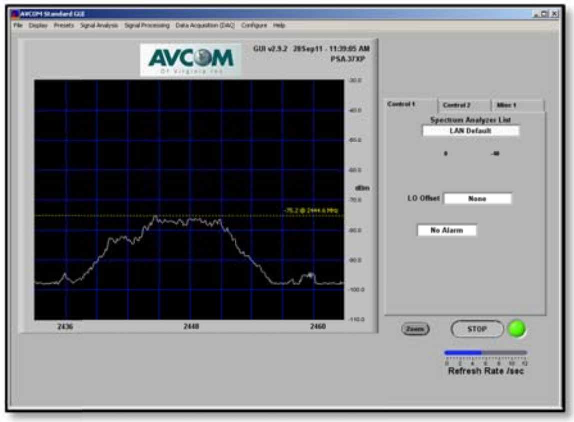


Testing Techniques

CN staff developed a data collection and site validation route based on information derived from the Google Earth image overlay of Zulu Internet's publicly available coverage on its website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omni or sectored), and photographs were taken of the access points.

Exhibit G: Field Data for Zulu Internet, Inc.'s Access Point/ Backhaul Hub Location





Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
	Ladonia Rohn Tower	33 25 35.96N	95 56 41.38W		X			Guyed Rohn	160ft.	Actual AP location identified. Serving AP with multiple BH.
ZuluInternet	Ladonia	33 25 35.96N	95 56 48.35W							GE-identified water tower structure.
										RF snapshot and site photos on file.

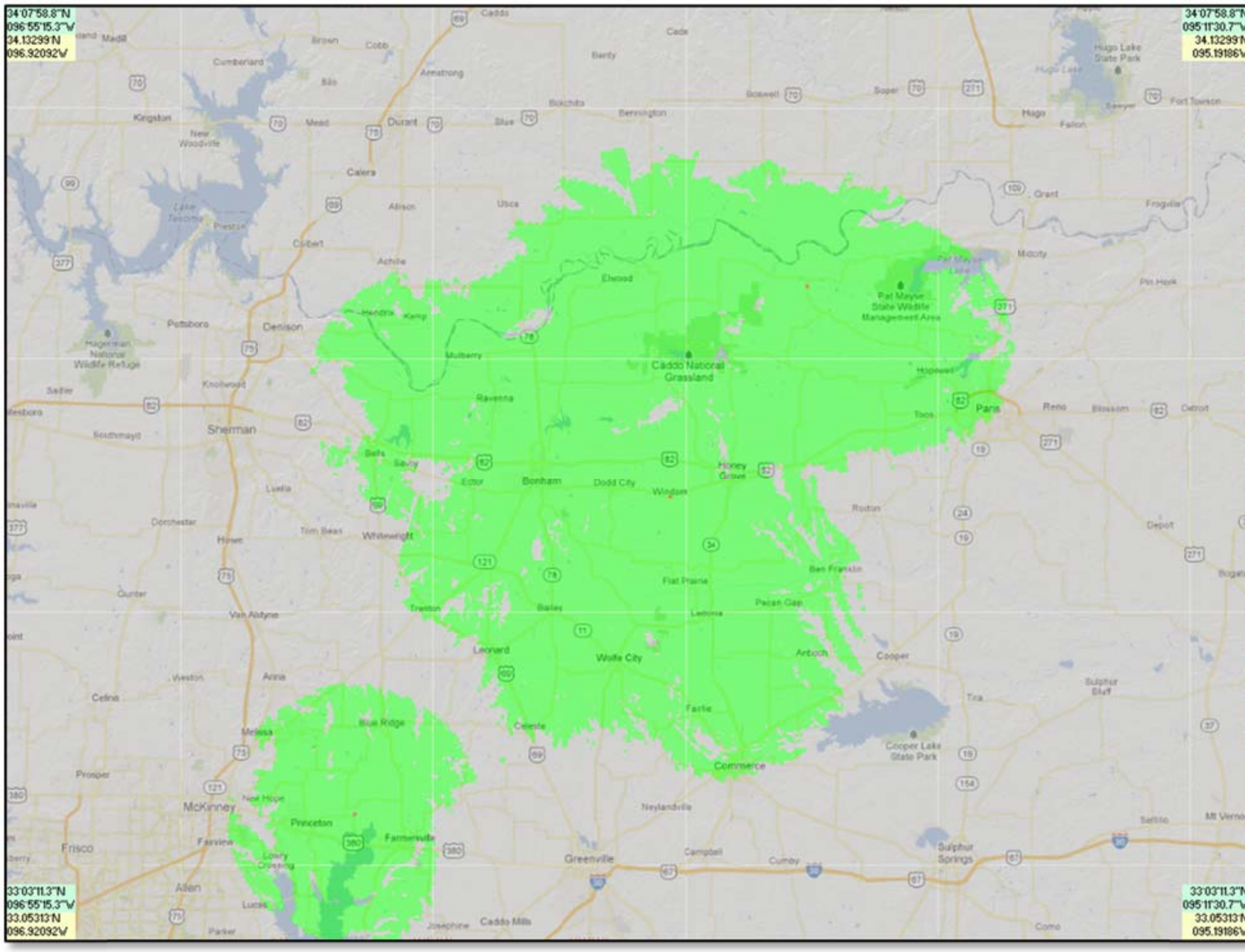
Results and Submission for April 2012

Of the 17 locations visited during the coverage estimation and validation point route, 11 access points were identified and relative information was logged into the Zulu Internet, Inc. field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the CN Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to Zulu Internet, Inc. as courtesy copies and the provider was advised that the estimated coverage information would be submitted to Connected Texas and to the NTIA unless the provider notified CN, within 48 hours, of discrepancies of the estimated coverage. The provider did not respond to CN and, as of this date, CN believes the information to be an accurate estimation of the service area of Zulu Internet, Inc.

Exhibit H: Field Validation Notes

Location	Latitude	Longitude			Structure	Approximate Antenna Height	Notes
			2.4GHz	5.0GHz			
Ladonia Rohn Tower	33 25 35.96N	95 56 41.38W	X		Guyed Rohn	160ft.	Actual AP location identified. Serving AP with multiple BH.
Ladonia	33 25 35.96N	95 56 48.35W					GE-identified water tower structure.
							RF snapshot and site photos on file.
Bailey Rohn Tower	33 25 57.45N	96 9 54.15	X		Guyed Rohn	120ft.	Actual AP location identified.
Bailey_Center Point	33 25 56.11N	96 9 56.94W					RF snapshot and site photos on file.
Bailey_Rohn Tower	33 25 57.66N	96 9 54.24W					GE-identified ROHN tower structure.
Telephone Rohn Tower	33 47 10N	96 1 5W	X		Guyed Rohn	160ft.	Actual AP location identified.
Telephone_Rohn Tower	33 46 46.82N	96 1 6.74W					GE-identified ROHN tower structure.
							RF snapshot and site photos on file.
Ivanhoe Comm Tower	33 46 2.05N	96 7 12.63W		5.7GHz	Comm Tower	110ft.	Actual AP location identified; tower FCC Reg# 1272885
FM273/CR2245_Rayburn Schools	33 46 4.21N	96 6 13.42W					GE-identified 2 tower structures in the area.
							RF snapshot and site photos on file.
Ravenna Rohn Tower	33 40 54.18N	96 19 26.58W		5.7GHz	Guyed Rohn	160ft.	Actual AP location identified.
FM 1753_Texas Industries_Center Point	33 40 57.02N	96 19 58.78W					GE-no identifiable structures.
FM 1753_Roving Point	33 41 15.97N	96 18 28.02W					RF snapshot and site photos on file.
Bonham Rohn Tower	33 35 23N	96 8 18W	X		Guyed Rohn	160ft.	AP location estimated; no close proximity access; private property.
							RF snapshot and site photos on file.
Bonham_Water Tower	33 36 33.67N	96 10 30.84W					GE-identified water tower.
Bonham_Center Point	33 36 11.66N	96 9 8.85W					GE-near a Golf Club.
Bonham_Roving Point	33 35 23.28N	96 10 8.18W					
Princeton Comm Tower	33 11 47.8N	96 26 14.3W		5.7GHz	Comm Tower	180ft.	Actual AP location identified; tower FCC Reg# 1237667
Princeton_Center Point	33 11 37.88N	96 26 22.95W					GE-no identifiable structures.
Princeton_Roving Point	33 12 18.16N	96 26 3.84W					RF snapshot and site photos on file.
Windom Water Tower	33 33 54.61N	95 59 54.27W	X		Water Tower	150ft.	Actual AP location identified.
							RF snapshot and site photos on file.
Windom_Water Tower	33 33 54.61N	95 59 54.22W					GE-identified water tower structure.
Windom_Silo	33 33 54.59N	95 59 56.64W					GE-identified Silo structure.
FM38_CR35300 Rohn Tower	33 42 32.38N	95 48 35.91W		5.7GHz	Rohn Tower	160ft.	Actual AP location identified.
							RF snapshot and site photos on file.
FM 38_CR35300_Center Point	33 42 22.03N	95 48 40.73W					GE-no identifiable structures.
FM 38_Silo	33 42 43.50N	95 49 15.80W					GE-identified Silo structure.
Globe_Water Tower	33 44 22.64N	95 42 7.67W		5.7GHz	Water Tower	150ft.	Identified AP structure during provider area validations and broadband inquiries.
							RF snapshot and site photos on file.
East Direct_ROHN Tower	33 48 34N	95 48 26W		5.2GHz	ROHN-Guide	160ft.	Identified AP structure during provider area validations and broadband inquiries.
							RF snapshot and site photos on file.

Exhibit I: Zulu Internet, Inc. Composite Coverage



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 2.92 percent of Texas households do not have terrestrial fixed broadband service available, and approximately 0.18 percent[1] of Texas households have neither mobile nor fixed broadband service available.[2]

Within rural areas of the state, results derived from provider-validated data indicate that approximately 6.23 percent of rural Texas households do not have terrestrial fixed broadband service available, and approximately 0.55 percent[3] of rural Texas 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.

[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 state.

[3] See footnote 1.

[4] See footnote 2.

6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. 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 Connected Texas website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information 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 Connected Texas project has received a total of 39 inquiries (513 grant inception to date). As more inquiries are submitted to Connected Texas, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

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 Connected Texas project launched BroadbandStat on June 16, 2010, and has received a total of 16,003 visits to date, of which 1,055 occurred this reporting period.

SPEED TEST METHODOLOGY

The 796 speed tests that are represented in the Connected Texas Speed Test Report during this reporting period (6,960 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connected Texas speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

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

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 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	01 Communications of Texas	http://www.o1.com	CLEC in California and a nonfacilities-based nationwide reseller
2	1Source Tech	http://www.1sourcetc.com	Does not offer broadband services; not a broadband provider
3	21Globe, Inc.	http://www.21globe.com/	Does not offer broadband services; not a broadband provider
4	2473365 Wireless	n/a	No information could be located on company
5	360networks	http://www.360networks.com/	Acquired by another company
6	36db	n/a	Acquired by ERF Wireless
7	4D Networks Corp.	http://www.4dn.com	Provider does not serve consumers in Texas; Oklahoma provider
8	802DSL.com	n/a	No information could be located on company; not a broadband provider
9	A 007 Access	http://www.a007.com/	Nonfacilities-based reseller of Quest DSL and mobile wireless
10	AAA Internet Service	http://aaainter.net/dsl	Dial-up service and is also a nonfacilities-based DSL reseller

11	Aaccess Network Communications, Inc.	http://www.aaccess.net	Not a broadband provider
12	ABI Network Solutions, Inc.	http://abinetworksolutions.com	General reseller; requests for information were never returned
13	AboveNet Communications, Inc.	http://www.abovenet.com	Company is a Business provider only; does not offer residential service
14	Acceris Communications Corporation	http://www.accerispartners.com	Company does not provide Internet service; not a broadband provider
15	Access Integrated Networks, Inc.	http://www.birch.com/About/accesscommredirect.aspx	Company no longer exists; changed name to Birch Communications in 2006
16	Access One, Inc.	http://www.accessoneinc.com/access_one_direct.php	Company is a Business provider only; does not offer residential service
17	Access Point, Inc.	http://www.accesspointinc.com/products.htm	General reseller; nonfacilities-based
18	Access123.net	http://access123.net/	Website is a search engine for all types of products.; company is not a broadband provider
19	Access2Go, Inc.	http://www.acc2go.com/	General reseller; nonfacilities-based
20	Accutel of Texas, LP	http://www.accutel.net/	No viable information could be located on company; URL inactive; not a broadband provider
21	ACERX.NET	http://acerx.net/	General reseller; nonfacilities-based
22	ACN Communications Services, Inc.	https://www.myacn.com/phone/dslbundle.html	General reseller; nonfacilities-based
23	Adirondack Area Network	http://www.aanet.org/	Provider does not serve consumers in Texas; New York State provider
24	Advance Telephone Services	http://www.advanced-telephone.com/	Company does not provide Internet service; not a broadband provider

25	Advanced Communicating Techniques	n/a	No viable information could be located on company; URL inactive; not a broadband provider
26	Advanced Integrated Technologies, Inc.	http://www.a-i-t.com/	Company does not provide Internet service; not a broadband provider
27	Advanced Wireless Solutions	http://www.awsolutions.net	Company is B2B provider of networking solutions; not a broadband provider
28	AEConnect	n/a	No information could be located on company; not a broadband provider
29	AEI Wireless	http://www.aeiwireless.net	Based on website; speed offerings are not compliant to FCC broadband definition
30	Aerie Network Services, Inc.	http://www.aerienetworks.com/	No viable information could be located on company; URL is web search engine; not a broadband provider
31	Aero Communications, LLC	n/a	Company categorized under Telecommunications consultant, no website located and is not a broadband provider
32	Aeroconnect	http://www.aeroconnect.net	Company is B2B provider of networking solutions; not a broadband provider
33	Affinity Network, Inc.	http://www.affinitynetworkinc.com/	Company is B2B provider of long distance and calling card services; not a broadband provider
34	Affordable USAWide.Net, Inc.	http://www.usawide.net	General reseller; non-facilities based; offers DSL and dial-up
35	Air2LAN	n/a	Company was purchased by U.S. Wireless Online in February 2005; no longer in business

36	AirChips Communcation, LLC	http://www.airchips.com	Company performs network consulting services and does not have broadband operations; not a broadband provider
37	AIRDIS Telecom	http://www.airdis.com/	Company sells telecommunications equipment to business and does not have broadband operations; not a broadband provider
38	Airespring, Inc.	http://www.airespring.com	General reseller; nonfacilities-based
39	Airewaves Broadband, LLC	www.airewaves.com	Airewaves is a Internet media download center; not a broadband provider
40	Airimba Wireless, Inc.	http://airimba.com/	Provider supplies bulk level agreements to housing communities; B2B
41	Airmail247.com	http://airmail247.com/	No viable information could be located on company; URL is not located; not a broadband provider
42	Airo Networks, LLC	http://www.aironetworks.com	No viable information could be located on company; URL is not located; not a broadband provider
43	Airocom	http://www.airocom.net	Acquired by NetWest Online
44	Akeva	n/a	Reseller of Verizon Mobile Phones in mall kiosk; not a broadband provider
45	Alec, Inc.	http://www.singlepipecom.com	Nonfacilities reseller of DSL services however does not serve the state of Texas
46	Allo Telecommunications, Inc.	http://tc.allophone.com/	Nonfacilities reseller of business circuits
47	Allumera	http://www.amirarif.com/	Not a broadband provider

48	Almega Cable	http://almega.com	Currently only supplies Internet connectivity to one anchor institution in Texas; no residential services
49	AltiComm, Inc.	n/a	Based on internet research and PUCT report the organization is nonfacilities-based or resells internet services
50	Amarillo Cell Telco	http://www.cell1amarillo.com/	Acquired by Alltel
51	American Dial Tone (Ganoco, Inc.)	n/a	Company offers dial-up services only
52	American Fiber Network, Inc.	https://www.afnltd.com	Company performs network consulting services and does not have broadband operations; not a broadband provider
53	Americans Conex, LLC	n/a	No viable information could be located on company; URL is not located; not a broadband provider
54	America's Tele-Network Corp	n/a	Company is no longer in business
55	AmeriMex Communications Corp.	http://www.amerimex.biz/	Company sells international calling plans and does not provide broadband services; not a broadband provider
56	AMERIPHONE NETWORK, LLC	n/a	No viable information could be located on company; URL is not located; not a broadband provider
57	Amigos - Tu Compania De Telefono	n/a	No viable information could be located on company; URL is not located; not a broadband provider
58	Amtel	n/a	No viable information could be located on company; URL is not located; not a broadband provider
59	An Elite State Telephone Company	n/a	No viable information could be located on company; URL is not located; not a broadband provider

60	Annox, Inc.	n/a	Company is no longer in Business and is listed as Inactive in the State of Texas
61	Antioch Wireless Broadband	n/a	No viable information could be located on company; URL is not located; not a broadband provider
62	AP Telecommunications	http://www.academicplanet.com	Company offers dial-up services only; not a broadband provider
63	Apache Networks	http://www.apachenetworks.net	Company offers VOIP services only; not a broadband provider
64	Apogee Telecom, Inc.	http://www.apogeenet.net	Company does not provide direct residential service; design and build networks for institutions of higher learning; not a broadband provider
65	Arrowheadnet.com	http://www.arrowheadnet.com/	Company offers web hosting services only; not a broadband provider
66	Artisan Communications	http://www.artisan.tv	Company offers telephony services to business only; not a broadband provider
67	ATC Outdoor DAS, LLC	n/a	Company offers radio services for business only; not a broadband provider
68	A-Tech Telecom, Inc.	n/a	No viable information could be located on company; URL is not located; not a broadband provider
69	Ateck Internet Providers	www.atxip.net/	Information located on company shows no longer in business
70	AURIC Marketing LLC	n/a	Company offers Pots and Private T-1 services; not a broadband provider
71	Austin Bestline Company	http://www.bestline.net/	Reseller who provides Internet access to business only; B2B provider

72	Austin Teleco Usa, Inc.	n/a	No viable information could be located on company; URL is not located; not a broadband provider
73	AzleTexas.Net	n/a	Information located on company shows not a broadband provider
74	Backbone Communications, Inc.	http://www.backbonecommunications.com/	Not a broadband provider; assist with development of technology platforms for classroom environment
75	bargainisp.net	http://www.bargainisp.net/	Not a broadband provider; web search engine
76	Basicphone, Inc.	n/a	Information located on company shows no longer in business
77	BCN TELECOM, Inc.	http://www.bcntele.com/	General reseller; nonfacilities-based; business accounts only
78	Bear Creek Copperfield ISP	n/a	Information located on company shows no longer in business
79	Bear Technologies Corporation	http://www.beartech.com	Company offers services to business subscribers only
80	Bellerud Communications, LLC	http://www.bellerudcommunications.com/	Company is not a Broadband provider; offers Telephone services to only
81	Bellsouth BSE, Inc.	n/a	Assets were subsumed by Clearwire Corporation; no active URL
82	BelWave Communications	http://www.belwave.com	Company offers services to business subscribers only
83	Best Line Communications	http://www.bestline.net/	Company offers services to business subscribers only
84	BetterWorld Telecom, LLC	http://betterworldtelecom.com	Company offers services to business subscribers only
85	BioVLAN	http://www.biovlan.com	Company offers turnkey solutions and is not a broadband provider
86	Birch Communications	http://www.birch.com/About/birchlinkfamily.aspx	Company is a reseller of business services only

87	Biztel, L.P.	n/a	No viable information could be located on company; URL is not located; not a broadband provider
88	Blonder Tongue Telephone, LLC	http://www.blondertongue.com/	Company offers equipment solutions and is not a broadband provider
89	Blue Corner Communications, LLC	n/a	No viable information could be located on company; URL is not located; not a broadband provider
90	Blue Moon Solutions, Inc.	http://www.bmsol.com	No viable information could be located on company; URL is not located; not a broadband provider
91	Blue Sky Telecommunications, LLC	http://www.blueskycommunications.net/contact-us	Company is not a Broadband provider; offers telephone services only
92	Blue Wireless & Data, Inc.	http://www.bluewirelessdata.com/	No viable information could be located on company; URL is not located; not a broadband provider
93	Bluebonnet Internet	http://www.bluebonnet.net	Company is not a Broadband provider; offers telephone services only
94	Bold Communications networks, LLC	http://www.boldwireless.net/	No viable information could be located on company; URL is not located; not a broadband provider
95	Border Wireless	n/a	No viable information could be located on company; URL is not located; not a broadband provider
96	Bravo Net	http://www.bravo.net	No viable information could be located on company; URL is not located; not a broadband provider
97	Brazoria Dot Net	n/a	No viable information could be located on company; URL is not located; not a broadband provider
98	Broadband National	http://www.broadbandnational.com	General reseller; nonfacilities-based
99	Broadlink Telecom, LLC	http://www.broadlinktelecom.com/	Company is a reseller of business services only

100	Broadview Networks Holdings, Inc.	http://www.broadview.com	General reseller; non-facilities based; national provider
101	Broadvox-CLEC, LLC	n/a	Not a broadband provider; direct conversation determined entity does not have a network for broadband services
102	Broadweave Networks Of Texas, LLC	n/a	According to Texas PUCT CLEC report; phone services only
103	Budget Prepay, Inc.	http://www.budgetphone.com	According to Texas PUCT CLEC report they offer phone services only
104	BullsEye Telecom, Inc.	http://www.bullseyetelecom.com/Products.aspx	General reseller; nonfacilities-based national provider
105	Business Telecom, Inc.	n/a	Now owned by Deltacom Inc. according to Texas PUCT CLEC report
106	BYOTV Media Corporation	n/a	Not a broadband provider; specializes in broadcast video services
107	Cable And Wireless Americas Operations, Inc.	www.cw.com	Not a broadband provider; Internet hosting service company
108	CAC MediaNet, Inc.	n/a	Not a broadband provider
109	Call One	http://www.callone.com	Not a broadband provider; business solutions services
110	CallFree	n/a	Not a broadband provider; POTS and long-distance services only
111	Camalott Communications	http://www.camalott.com	Acquired by Texas Communications
112	Camino-Net Internet Services	http://www.camino-net.com	Not a broadband provider; offers dial-up only
113	Candice Clark Consulting	http://www.candiceclarke.com/	Not a broadband provider; consulting firm

114	Capital Telecommunications, Inc.	http://www.captel.com/	Not a broadband provider; hardware provider for the deaf's telecommunication devices
115	Casey & Gentz	http://www.phonelaw.com/	Not a broadband provider
116	CAT Communications International, Inc.	http://www.ccitelcom.com/	Not a state provider per representative of the company
117	Cavalier Telephone LLC	http://www.cavtel.com/	Company merged with PAETEC
118	CCG Consulting, LLC	http://www.c-c-g.com/	Not a broadband provider; telecommunications consulting services
119	CCIS.net	http://www.ccis.net	Inactive; no longer in business
120	Cdi Broadband	http://www.cdibroadband.com	Acquired by TierOne Converged Networks
121	Celito Communications, Inc.	http://www.celito.net/	This company does not offer service in Texas
122	Cellular One of Amarillo	n/a	Acquired by Alltel
123	Centel Communications	n/a	No URL; no FRN; non-responsive to outreach activity
124	CenTex Web Access	n/a	This company is not a broadband provider
125	Central Telecommunications	n/a	This company is not a broadband provider
126	Centramedia Inc.	http://www.centramedia.com	Acquired by ERF Wireless
127	Century Alpha	n/a	This company is not a broadband provider
128	Chaparral Broadband	n/a	Not a broadband provider in Texas
129	Chip Shot.Net	http://www.chipshot.net	Provider only provides dial-up service
130	Christoval Communications	n/a	Not a broadband provider per a representative of the company

131	CIR Wireless Net	n/a	Unable to locate any current information on this company; no active website
132	City of Brownsville	n/a	Grant Awardee; not a broadband provider
133	City of El Paso	n/a	Grant Awardee; not a broadband provider
134	CityNet Texas, LLC	n/a	This company is not a broadband provider
135	Cleartouch.Com	n/a	Unable to locate any current information on this company; no active website
136	Cleburne.com	n/a	Unable to locate any current information on this company; no active website
137	Cletel Telephone Service, LLC	n/a	This company is no longer in business
138	CloseCall America, Inc.	http://www.closecall.com/	General reseller; nonfacilities-based
139	Cobalt Broadband	http://www.cobaltbroadband.com	Acquired by JAB Wireless
140	Cognisurf	http://www.aboutus.org/CogNiSurf.com	Not a broadband provider
141	CommCentral, Inc.	n/a	General reseller; nonfacilities-based; no active URL
142	Communication Lines, Inc.	n/a	Not a broadband provider; Texas PUCT CLEC report identifies POTS service only
143	Communications Pearl, LLC	n/a	Reseller; nonfacilities-based
144	Computer Network Technology Corporation	http://www.brocade.com	Not a broadband provider; sells communication equipment to operators
145	ComTech 21, LLC	http://www.comtech21.com	Representative stated their organization does not provide service in Texas

146	Comtel Services	http://www.comtelservices.com/	Not a broadband provider; provides wiring solutions
147	Connect Insured Telephone Company	n/a	Inactive; no longer in business; Internet research rendered no valid information.
148	ConnectSouth	n/a	Not a broadband provider; managed services only
149	Constant Communications, Inc.	www.constant.com	Inactive; n longer in business; invalid contact information
150	Contel of Texas, Inc.	n/a	Acquired by GTE in 1992
151	Convergent Communications Services, Inc.	http://converg.com/	This company is not a broadband provider
152	Corban Networks	http://www.corbannetworks.com	Inactive; no longer in business; invalid contact information
153	Cordia Communications Corporation	https://www.cordia.us/	Not a broadband provider; Texas PUCT CLEC report identifies POTS and long-distance services only
154	Cost Plus	n/a	Not a broadband provider; Texas PUCT CLEC report identifies POTS and long-distance services only
155	Cox Communications	n/a	Acquired by SuddenLink (Texas)
156	CP Telco, LLC	n/a	Not a broadband provider; no evidence of operations
157	Crescent Broadband	n/a	Inactive; no longer in business; no active or valid information identified
158	CrossConnect	n/a	Inactive; non-state provider
159	Crosswind	http:/www.crosswind.net	Acquired by ERF Wireless
160	CS Wireless Systems, Inc.	n/a	Acquired by Clearwire Corporation
161	Cuda Communications	n/a	Inactive; non-state provider

162	Current Communications of Texas, LP	n/a	Not a broadband provider
163	Curtis Blakely	n/a	Not a broadband provider; certified public accountant
164	CVC CLEC, LLC	n/a	Inactive-Non state provider per representative of the company
165	Cyberbay	http://www.cyberbay.com	General reseller; nonfacilities-based
166	CyberStation, Inc.	http://www.cst.net	Not a broadband provider
167	Cybertel, LLC	www.westernbroadband.com	Inactive; no longer in business
168	Cypress Communications Operating Company, LLC	n/a	Not a broadband provider; local and long distance services only
169	DashLink	n/a	Inactive; no longer in business
170	DATACentric Broadband	n/a	Inactive; no longer in business
171	Del Rio LIVE!	n/a	Inactive; no longer in business
172	DelRio.com	n/a	Inactive; no longer in business
173	DeltaCom, Inc.	http://www.deltacom.com	Inactive; non-state provider
174	Deltaforce	http://www.deltaforce.net	Not a broadband provider; dial-up services only
175	deluxehost.com	http://deluxe-host.com	Not a broadband provider; web design and hosting
176	DFW Broadband	http://www.dfwbroadband.net	Not a broadband provider; business to business service provider
177	DGUI	http://www.dgui.com/	Inactive; no longer in business
178	Dial National	http://www.dialnational.com/	Inactive; no longer in business
179	Dialer.net	http://www.dialer.net/internet_access/United_States.html	Not a broadband provider; international dial-up services
180	Diamond Telco-Your Home	n/a	Not a broadband provider; POTS services only

	Telephone Store		
181	Digital Communities	n/a	Not a broadband provider; coalition organization for WIMAX development
182	Digitalpath Texas	http://www.1txbb.net	Acquired by First Texas Broadband
183	Direct Telephone Company, Inc.	n/a	Not a broadband provider; POTS services only
184	DO Communications	n/a	Inactive; no longer in business
185	Dot11 Networks	n/a	Acquired by JAB Wireless
186	DR Telecom, Inc.	n/a	This company is not a broadband provider
187	DSL @ Interlync	www.interlync.com	General reseller; indications of facilities-based; multi-state provider
188	DTS-NET.COM	http://www.dts-net.com/	General reseller; nonfacilities-based; multi-state provider
189	East Texas Rural Net	n/a	Inactive; no longer in business
190	East Texas WISP	http://www.etwisp.net	Inactive; no longer in business
191	Easton Telecom Services, LLC	n/a	Not a broadband provider; POTS and long-distance services only
192	Easy Cellular, Inc.	n/a	This company is not a broadband provider
193	Eccentrix Technologies, LLC	http://www.eccwireless.com/	Acquired by another company
194	EdnaOnline	n/a	This company is not a broadband provider
195	e-GWS	n/a	This company is not a broadband provider
196	Element Networks, LLC	http://txairmail.net/residential.html	Acquired by another company
197	ELP Networks, Inc.	http://www.elpn.com	Provider sold wireless network assets; general reseller; nonfacilities-based of DSL and nationwide dial-up access

198	Entelegent Solutions, Inc.	n/a	Not a broadband provider; business telephone services only
199	Entex Telephone Cooperative	n/a	Inactive; no longer in business
200	Ernest Communications, Inc.	http://www.ernetstelecom.com	Not a state provider per a representative of the company
201	Esodus Communications, Inc.	n/a	No active URL and no direct contact information available; No longer in business
202	Essential.com, Inc.	n/a	Texas PUCT CLEC reseller; no services identified; not a broadband provider
203	ETI - Connecting Your World	http://wwweticomm.net	General reseller; nonfacilities-based; multi-state provider
204	Everybody's Phone Company	http://www.everybodysphonecompany.com/	Provides pre-paid phone services; not a broadband provider
205	EveryCall Communications	http://www.everycall.com/	Local and long-distance phone plans to residential and business; not a broadband provider
206	Excel Telecommunications, Inc.	www.excel.com	Local and long distance phone plans to residential and business; not a broadband provider
207	Exigo Office	www.exigo.com	Not a broadband service provider; consulting firm
208	Express Telephone Services, Inc.	n/a	Not a broadband service provider; POTS and long-distance resell only
209	EZ Connect, Ltd.	n/a	Texas PUCT CLEC reseller; local and long distance; not a broadband provider
210	EZ Phone, Inc.	n/a	No longer in business; telephone number disconnected; e-mail exchange error received
211	EZ Talk Telecommunications	n/a	Texas PUCT CLEC report indicates bankruptcy; all contact information invalid; no longer in business

212	Facilities Communications International	n/a	No longer in business; telephone number disconnected; e-mail exchange error received
213	Familytel of Texas, LLC	n/a	Not a broadband provider; a company representative indicated the organization is a reseller of telephone services only
214	Fast Dependable Access	http://www.fda.net/	No longer in business; invalid URL
215	Fastline ISP	http://www.fastlineisp.com	No longer in business; telephone number disconnected; no active URL
216	FiberTower Corporation	fibertower.com	No information can be found
217	Fiesta Telephone Company, Ltd.	n/a	Texas PUCT CLEC reseller; local and long distance; not a broadband provider
218	First World Communications	n/a	No longer in business; all contact information is inactive
219	Flow Communications	n/a	Not a broadband provider; no Texas PUC filing
220	Fort Bend Telephone Company	n/a	Not a broadband provider; no Texas PUC filing
221	France Telecom Corporate Solutions, Inc.	n/a	Not a broadband provider; received a response from a company representative indicating the organization does not provide broadband services
222	Freedom Communications USA, LLC	n/a	Received an initial response to outreach activity
223	Frontera Telecommunications, Inc.	www.fronteratelecom.com	Not a broadband provider per a representative of the company
224	Frontier Broadband	http://www.frontierbroadband.com	Acquired by ERF Wireless

225	Gerdes Web Services	n/a	Inactive; no longer in business; contact information invalid
226	Global Connection Inc. of America	http://connectwithglobal.com	Not a broadband provider; provides local, long-distance, and dial-up Internet only
227	Global Metro Networks Texas, LLC	n/a	No longer in business per Texas PUCT CLEC report-relinquished operations
228	Globaltech 2000, Inc.	n/a	No longer in business; all contact information is inactive
229	GO-COMM, Inc.	n/a	Acquired by Airband Communications
230	Gordon Communications, Inc.	http://www.gordonone.com	Representative of the company indicated last mile connectivity is made available
231	Grande River Technology Group	n/a	Not a broadband provider; Internet research identifies company as communication lines and tower construction company
232	Granite Telecommunications, LLC	n/a	Not a broadband provider; representative indicated company is a regulatory consulting firm
233	Great America Networks, Inc.	http://www.ganconference.com/	General reseller; nonfacilities-based
234	Great West Services, LTD	n/a	No longer in business per Texas PUCT CLEC report-relinquished operations
235	Group Long Distance, Inc.	n/a	Not a broadband provider; long-distance service provider only
236	GST Telecomm Texas, Inc.	n/a	Acquired by Time Warner
237	H.S.I. Communications, LLC	n/a	No longer in business; contact information invalid
238	Habla Comunicaciones, Inc.	n/a	Internet research identified company filed Chapter 7 bankruptcy; no longer in business

239	Hamilton Telecommunications	http://www.hamilton.net	Spoke to a representative of the company; no resell activity in Texas
240	HBF Group, Inc.	n/a	Not a broadband provider; acquired by West Corporation; a VoIP service provider
241	Hello Depot	http://www.hellodepot.com	General reseller; nonfacilities-based
242	Home Wireless Company	n/a	No longer in business; no relative data found during Internet research
243	Homefone Services, LLC	n/a	Not a broadband provider; phone services provider only
244	Horizon Broadband	http://horizonbroadband.net	Non-state broadband provider
245	Horizon WiFi Texas	http://horizonwifi.com	Not a broadband provider; confirmed with a representative of the company
246	Hubwest	http://www.hubwest.com	Not a broadband provider; dial-up and web hosting services only
247	Hubwest Protected Networks LLC	http://www.hubwest.com	Not a broadband provider; dial-up and web hosting services only
248	Huntleigh Telecommunications Group	http://www.htg.net	General reseller; nonfacilities-based
249	HyperHog.Net	http://www.bci1.com	Speeds below FCC definition of broadband
250	Hyperoam	n/a	No longer in business; no active URL or viable data supporting operational status as active
251	i9 Networks	n/a	No longer in business; no active URL or viable data supporting operational status as active
252	ICG ChoiceCom, LP	n/a	Reviewed Texas PUCT CLEC; recent transfer of ownership-June 2011; new contact identified

253	I-Element, Inc.	n/a	Not a broadband provider; statement received from a representative of the company
254	I-Link Communications, Inc.	n/a	Not a broadband provider; provider of webinar support and equipment
255	Imbris, Inc.	http://www.imbris.com	Inactive; non-state provider
256	IMGISP.NET	http://www.imgisp.net/	Not a broadband provider; search engine and buyers guide to ISP
257	In Touch Communications	n/a	No longer in business; per Texas PUCT CLEC report
258	Incredible Networks	http://www.incredible.gr	Not a broadband provider; provides WEB hosting services
259	Inercom Communications Inc.	www.inercom.com	Inactive; no longer in business; contact information invalid; URL for sale
260	Inetworks Group, Inc.	http://www.inetworksgroup.com	Received a refusal to participate from a representative of the company during the October 2011 outreach session; website identifies business type solutions; cannot interpret if the company is facilities-based
261	Infotelecom, LLC	http://infotelecom.us	Not a broadband provider per statement received form a representative of the company
262	Innercity Fibernet, LLC	http://www.innercityfiber.net	Not a broadband provider per statement received form a representative of the company
263	Integra Telecom	http://www.integratelecom.com	Not a broadband provider per a statement from a company representative; non-facilities based long-distance service provider
264	Integrated Communications Consultants, Inc.	http://www.cromaine.com	Based on website research, company is a telecommunications consulting firm

265	Integrated Digital Solutions	http://www.integratedds.com	Not a broadband provider; website development service provider
266	Integrity Online Brazos Valley	http://www.iolbv.com	Not a broadband provider; dial-up service offering only stated on website
267	Interactiveinfo.com Inc.	http://www.rocketbroadband.com	Inactive; non-state provider
268	Interlink Wireless	n/a	Acquired by Internet America Wireless
269	Internap Network Services Corporation	http://www.internap.com	Not a broadband provider; business to business solutions provider
270	Internet Texas	http://www.itexas.net	Acquired by ERF Wireless
271	Internet Texoma, Inc.	http://www.texoma.net	Not a broadband provider; website advertises speeds below FCC standard
272	Ionex Telecommunications, Inc.	n/a	Acquired by Birch Communications
273	IPNS	http://www.ipns.com	Inactive; non-state provider
274	iRadical	n/a	Not a broadband provider; Internet research rendered no organization information
275	ISPartner.net	n/a	Not a broadband provider; Internet research rendered no organization information
276	Jenco Speed Web	http://www.jencospeed.net	Inactive; non-state provider
277	John Staurulakis Incorporated	http://www.jsitel.com	Not a broadband provider; consultant services only
278	Jones Broadcasting	http://www.jonesbroadcasting.com	Not a broadband provider; consulting services only
279	Kentucky Data Link, Inc.	http://www.kdlinc.com	Acquired by Windstream; Connected Nation national team outreach

280	Kentucky Universal Telecom, Inc.	n/a	Not a broadband provider; Texas PUCT CLEC report identifies residential POTS only
281	Koyote Internet	n/a	Acquired by eNet
282	L&D Wireless	n/a	Inactive; no longer in business; per previous owner business operations was terminated.
283	Lake Country Internet	n/a	Inactive; no longer in business
284	Lake Kiowa	n/a	Not a broadband provider; Internet research rendered no organization information
285	LARIAT.NET	http://www.lariat.net/	Inactive; non-state provider
286	LavonWeb.net	n/a	Acquired by TierOne Converged Networks
287	LayerOne, Inc.	n/a	Not a broadband provider; acquired by Switch and Data-infrastructure and access management services
288	LCSisp.com	http://www.lcsisp.com/index.cfm	Not a broadband provider; dial-up service only
289	LEC Unwired, LLC	n/a	No longer in business; Internet research identified operations transitions to other companies
290	Legacy Long Distance International, Inc.	http://www.golegacy.com	Long distance, pay telephone, pager, and customer services only provider; not a broadband provider
291	Lightning Connect	http://www.lightningconnect.net	No longer in business; invalid contact information and extensive Internet research declares no operations
292	LightSpeed Wireless	n/a	Acquired by Blue Wireless and Data
293	Lightyear Network Solutions, LLC	lightyear.net	General reseller; nonfacilities-based per a representative of the company; multi-state provider

294	Linden Wireless	n/a	Inactive; no Longer in business; no active URL or valid contact information
295	LinkAmerica.Net	http://www.linkamerica.net/	No longer in business; telecommunications refurbishing was primary business
296	Lipan Telephone Company, Inc.	www.lipan.net	Not a broadband provider; offers service below FCC standard
297	Local Telecom Systems, Inc.	n/a	Not a broadband provider; local calling card services only
298	Lone Star Communications	http://lonestarcom.com	General reseller; nonfacilities-based
299	M.L.M. Telecommunications, Inc.	n/a	Inactive; no longer in business
300	MainBoard	http://www.mainboard.cc/internet.htm	General reseller; nonfacilities-based
301	Maine Cable and Wireless	http://www.mainecableandwireless.com	Not a broadband provider; system integrator and solutions provider
302	Managed Services, Inc.	n/a	Not a broadband provider based on limited information available on the Internet
303	Marcin Company	n/a	Not a broadband provider
304	Master Call Communications, Inc.	http://www.choosemcc.com	General reseller; nonfacilities-based; resells long distance and phone cards; not a broadband provider
305	McGraw Communications	http://www.mcgrawcom.net	General reseller; nonfacilities-based; received a reply from a company representative indicating non-facility based reseller
306	Mesh.Net	http://www.mesh.net	Acquired by VRFuturenet
307	METTEL (Metropolitan Telecommunications)	http://www.mettel.net	General reseller; nonfacilities-based; received a reply from a company representative indicating nonfacilities-based reseller

308	Mexus Communications	http://www.mexus.net	Continued outreach to reconfirm a representatives statement of being a business to business provider only
309	MidTech	n/a	Not a broadband provider; no relevant information obtained from Internet research to classify as an ISP
310	Millenicom Inc.	http://www.millenicom.com/internet_access.html	Multi-state provider; Connected Nation national team has encountered repeated non-responses to outreach effort
311	Millennium One Communications, Inc.	n/a	No longer in business; telephone disconnect message and e-mail returns via Microsoft Exchange
312	Miracletel Telephone Service, LLC	www.miracletel.com	Inactive; no longer in business; invalid contact information
313	Mitel NetSolutions	http://www.mitel.com	General reseller; nonfacilities-based
314	Mobilelitie, LLC	http://www.mobilitie.com	Not a broadband provider; manages and leases tower infrastructures
315	Momentum Internet & Computer Services	http://www.moment.net	Acquired by ERF Wireless
316	Momentum Online	n/a	Acquired by ERF Wireless
317	Momentum Telecom, Inc.	https://www.momentumtelecom.com/	General reseller; nonfacilities-based; wholesaler and dial up service provider
318	Moviestar Telecom, Inc.	n/a	CLEC Report indicates long distance and local telephone service; no URL listing
319	Mundo Telecom	http://www.mundotelecom.biz	Inactive; no longer in business; Texas PUCT CLEC report identifies organization as being relinquished

320	MXD	n/a	No services defined within CLEC report; telephone number disconnected; no response to e-mails
321	N. Texas Wireless	n/a	Inactive; no longer in business; invalid contact information
322	Nanomega.Com	www.nanomega.com	Inactive; no longer in business; invalid contact information
323	National Clear Tone, LP	n/a	Inactive; no longer in business; invalid contact information
324	National Discount Telecom, LLC	n/a	Inactive; no longer in business; invalid contact information
325	Nations Broadband, Inc.	http://nationsbroadband.com/	General reseller; nonfacilities-based; no URL listing or business information identified on the Internet
326	Navigator Telecommunications, LLC	http://www.navtel.com	Representative of the company stated the organization does not provide broadband residential services; not a broadband provider
327	Nei Datacom	http://neidatacom.com	Not a broadband provider; designs and constructs telecommunication infrastructure
328	Net Star Telecommunications	http://www.netstarwireless.com	Not a broadband provider; per a representative of the company only provides business to business solutions
329	Net Talk.Com, Inc.	http://www.nettalk.com	General reseller; nonfacilities-based; VoIP and Wifi services offered
330	NetAccess, Inc.	http://www.nas.net/	Not a broadband provider; business portal provider
331	NetSpeed Online	www.netspeed-online.net	Inactive; no longer in business; URL inactive; no valid contact information identified

332	Netstreamlive	http://www.netsreamlive.com	Not a broadband provider; provides webcasting events via satellite for special events
333	NetVoice	n/a	Not a broadband provider; a representative stated service offering is VoIP
334	Neutral Tandem-Texas, LLC	http://www.neutraltandem.com/	Not a broadband provider
335	New Access Communications LLC	n/a	Not a broadband provider; provides POTS only
336	New Edge Networks, Inc.	http://www.newedgenetworks.com/	General reseller; nonfacilities-based; backhaul services
337	New Horizons Communications Corporation	http://www.nhcgrp.com/	Not a broadband provider; VoIP and cellular voice
338	NewGenWireless	http://www.newgenwireless.com	Not a broadband provider; provides cellular phone packages
339	Newphone	http://www.newphone.com	Not a broadband provider; phone services only per Texas PUCT CLEC report
340	Nextg Networks of Illinois, Inc.	http://www.nextgnetworks.net	Not a broadband provider; provider serves as an integrator; nonfacilities-based operations
341	Nexus Communications, Inc.	http://www.tsihomephone.com/	Not a broadband provider; telephone services provider only
342	No	n/a	Not a state provider per Connected Nation national outreach team
343	NoDial.net	n/a	Acquired by Internet America Wireless
344	North Dallas Wireless	n/a	Not a broadband provider; cellular telephone services only
345	North East Texas Wireless Initiative	n/a	Not a broadband provider; Internet research leads to a BLOG website

346	North Texas UnWired	n/a	Inactive; no longer in business; Internet research concludes no business operations and no active URL
347	North Texas Web Services	http://www.ntws.net	Acquired by eNet
348	Northeast Texas Broadband, LLC	n/a	Acquired by eNet
349	Northeast Texas Online	http://www.neato.net	Acquired by eNet
350	Northwest ISP	http://www.northwestisp.com	Inactive; no longer in business
351	NSN Wireless, L.P.	http://www.nsn-wireless.net	Not a broadband provider; business to business solutions provider
352	Ntegrity Telecontent Services, Inc.	n/a	Not a broadband provider; content provider for MDU via other providers transport
353	Ntera, Inc.	n/a	Inactive; no longer in business; invalid contact information an no active URL
354	Nucentrix Broadband Networks	n/a	Acquired by Clearwire Corporation
355	Oklahoma ECG, L.L.C.	n/a	Not a broadband provider; POTS and long distance services only
356	Omni Internet	www.omniglobal.net	Not a broadband provider; dial-up services for residential and up to T1 rate for business only
357	One Connect	www.oneconnect.ca	Not a broadband provider; business to business solutions provider
358	One Ring Network	http://www.cvc.net/	Not a broadband provider; business to business solutions provider
359	One Star Long Distance, Inc.	http://www.onestarld.com/	Not a broadband provider; local and long-distance services only

360	One-Call Telcom, Inc.	http://www.onecalltelecom.com/	General reseller; nonfacilities-based
361	Open Range Internet	www.openrangecomm.com	Inactive; non-state provider
362	OSN CLEC	n/a	General reseller; no URL listing
363	Overarch Broadband	http://www.overarch.com	Inactive; non-state provider
364	Pacific Internet Exchange	http://www.pie.us/	General reseller; nonfacilities-based
365	Pac-West Telecomm Inc.	http://www.pacwest.com/	Not a broadband provider; wholesale telephone services
366	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company
367	Paknet Limited	n/a	Inactive; non-state provider
368	Pampa Cyber Net	http://www.pan-tex.net/	Not a broadband provider; database management services
369	Panaband	www.panaband.com	Inactive; no longer in business; invalid contact information an no active URL
370	Panoptos, LLC	n/a	Inactive; no longer in business; telephone number indicates disconnected service and no URL listing
371	Peerless Network of Texas, LLC	http:/www.peerlessnetwork.com	Non-state broadband provider
372	Pelican Bay Internet	n/a	No information
373	PELZER COMMUNICATIONS CORPORATION	www.pelzercom.com	Inactive; no longer in business; assets are being sold per company representative
374	Permian Basin Online	http://www.netwest.com	Acquired by NetWest Online
375	PhoneCo, L.P.	http://www.phoneco1.com	Not a broadband provider
376	Phone-Link, Inc.	n/a	No longer in business; disconnected telephone service and no active URL located

377	Pics.Net	http://www.pics.net	Subsidiary of WesTex Connect (corporate staff)
378	Piney Woods Wireless	www.pineywoodswireless.com/	Inactive; no longer in business; a representative stated operations were terminated about 5 years ago
379	Planet Online	http://www.planetonline.net/	Not a broadband provider; web-hosting services
380	Posner Telecommunications Inc.	n/a	Not a broadband provider; a paging service company
381	PRAIRIENET	http://www.prairienet.us/	Acquired by JAB Wireless
382	PremoWeb	http://www.premoweb.com/about_us/contact_us.html	Not a broadband provider; national dial-up service
383	PRIDE Network, Inc.	n/a	Subsidiary of NTS Communications
384	PrismNet	www.prismnet.com/	Not a broadband provider; statement of not providing broadband service received from a representative of the company
385	Progressive Concepts, Inc.	http;//www.progressive-concepts.com	Not a broadband provider; equipment supplier for broadcast applications
386	Pro-Sky	http://www.prosky.net/products/residental_wireless/index.html#	Inactive; no Longer in business; invalid contact information; no active URL
387	Provis Broadband	n/a	General reseller; nonfacilities-based; representative of the company indicated wireless assets were sold; selling other provider services only
388	Purelyonline	www.purelyonline.com	Inactive; no longer in business; Internet research identified status of organization
389	QPQ Marketing, Inc.	n/a	Not a broadband provider; Texas PUCT CLEC report identifies residential POTS only

390	Quality Telephone, Inc.	http://www.qtelephone.com	Not a broadband provider; received a response from a company representative indicating the organization does not provide broadband services
391	QuanTumNet ISP	http://www.qins.net	Inactive; no longer in business; invalid contact information and no active URL
392	Quick-Tel Communications, Inc.	http://www.quick-tel.com/	Not a broadband provider; a provider of business telecommunications equipment
393	Qwest Communications Company, LLC	http://www.qwest.com/	Acquired by CenturyLink; Qwest had no operations in the state
394	Qzip.Net	http://www.qzip.net	Not a broadband provider; business solutions services
395	R2R Connectivity	www.r2rconnect,net	Not a broadband provider; provides service below FCC standard
396	Randy White Telecommunications, Inc.	http://www.rwttelecommunications.com	General reseller; nonfacilities-based
397	Reach Direct, Inc.	n/a	Not a broadband provider
398	Reconnect Plus, LLC	n/a	Inactive; no longer in business; invalid contact information an no active URL.
399	Region 18 Education Service Center	n/a	Grant awardee
400	Regional Wireless Networks	n/a	Not a broadband provider; Internet research found no relevant information
401	Reliant Communications, Inc.	http://www.reliant-communications.com/	General reseller; nonfacilities-based

402	Renaissance Networks	http://www.renaissancenetworks.com/	Small business technology consulting and investment company serving Albuquerque, New Mexico
403	RHO Wireless	http://www.rhowireless.com/Default.aspx	This company offers wireless and hardware/software small business solutions in the Dallas/Fort Worth area
404	RioWave.net	http://www.svideo.com/wi.html	Company operates as Svideo offering hardware and wireless at speeds of 128Kbs up and 512Kbs down
405	Rosebud Telephone	n/a	General reseller; nonfacilities-based; no URL listing
406	Rx Technology	http://www.rx-tech.com	Web host and reseller for south Texas businesses and government entities
407	Sage Telecom, Inc.	http://www.sagetelecom.net/	Not a broadband provider; dial-up services only
408	Sanswire.Net	http://www.sanswire.com	This is a satellite surveillance company
409	SATEXAS Communications Network, Inc.	http://www.satexas.com	This company services businesses and is an IT consultant, not a qualified broadband provider
410	SC TXLINK, LLC.	n/a	Confirmed with company that they do not provide broadband internet services of any kind
411	Seneca Communications, LLC	http://senecacommunications.com	This company offers business internet solutions only
412	Servisense.com, Inc.	n/a	Inactive; no longer in business; telephone number-disconnected status; no active URL

413	Signatel Telephone Corp	n/a	Company indicated they are a facilities-based and reseller for residence and commercial and work through PUC to provide required information only
414	Simply Cellular & Telephone Reconnections, LLC	n/a	Inactive; no longer in business; logged telephone number assigned to another business firm; no active URL
415	Simply Dialup A Metrogeek Company	http://www.simplydialup.com/	Company offers only dial-up services
416	SkyvueUSA	http://www.skyvueusa.com	Acquired by ERF Wireless
417	Sling Broadband	http://www.slingbroadband.com/	Service provider in Broward and Dade County, Florida
418	Smartcom Telephone, LLC	http://www.smartcomtelephone.com/	Commercial broadband provider, does not service a residential market with broadband
419	Smartresort Co, LLC	www.discoverbeyond.com; http://www.smartresort.com;	General reseller; multi-state provider
420	Soft Switch Communications Inc.	http://softswitchcom.com/	This company is a business telecommunications service provider and is not a broadband service provider
421	Solarity Communications LLC	n/a	Inactive; no longer in business; continuous busy signal with logged telephone number; no active URL; e-mail, Microsoft delivery rejection
422	South Texas Internet	http://www.stic.net/	This company is a business telecommunications service provider and is not a broadband service provider
423	Southwestern Bell Telephone, L.P.	n/a	Acquired by AT&T, Inc.

424	Southwestern Network Communications, Inc.	n/a	No longer operating; this company was a facilities-based reseller
425	Spectrotel, Inc.	http://spectrotel.com	Website identifies DSL service; no evidence of facilities-based operations
426	Speed Cell Communications	n/a	This company is no longer in business
427	Speed Express Networks	http://speedexpress.net	This company is no longer in business
428	Spindlemedia	http://www.spindle.net	This company offers no broadband services
429	Sprint Broadband Direct	http://www.broadbandreports.com/shownews/Sprint-Broadband-Direct-Goes-Offline-July-31-94556	This company is no longer in business
430	Starlight Phone, Inc.	n/a	This company offers local phone service only
431	Stealthwave, LLC	http://www.stealthwave.net	This company's identified speeds do not meet FCC broadband specifications
432	Stellar Communication, Inc.	http://stellarcommunications.info	This company is no longer in business
433	Stratos Global Services, Inc.	n/a	This company offers business internet solutions only
434	Summit Communications	http://suminet.net	Not a state provider for broadband services
435	Sunray	n/a	This company is not a viable broadband provider, no service offerings found
436	Sunset Cablevision	n/a	This company is no longer in business

437	Superior Phone Company, Inc.	n/a	This company was acquired and now operate under D&B Payphone as payphone servicer
438	Sure-Tel, Inc.	n/a	This company is no longer in business
439	Surferz.Net	http://www.surferz.net/	This company offers dial-up service
440	SurfsideTX.Net	http://www.surfsidetx.net	This company's identified speeds do not meet FCC broadband specifications
441	SurfTX	n/a	This company is no longer in business
442	Symtelco, LLC	http://symtelco.com	This company, formerly a consulting firm, is no longer in business
443	T1 Shopper	http://www.t1shopper.com/	This company provides backhaul and is not a broadband provider
444	T3 Wireless	http://www.t3wireless.com/	This company does not provide residential service, only B2B
445	Tel West Network Services Corporation	http://www.telwestservices.com	This company does not provide residential service, only B2B
446	Telcentris Communications, LLC	http://www.telcentris.com	Business solutions provider only
447	Telcove	n/a	This company offers business internet solutions only
448	Telefamilia Communications, Inc.	http://www.atsi.net/	This company was acquired by ATSI Communications
449	Telefonos De Tejas, Inc.	n/a	This company offers telephone service only
450	Telenational Communications Inc.	http://www.telenational.net	Not a broadband provider per a company representative
451	Tele-One Communications, Inc.	http://www.tele-onecom.com/	This company offers dial-up service

452	TeleShare Wireless	http://www.teleshare.net/	Acquired by Internet America Wireless
453	Teligent Services, Inc.	http://www.teligent.com	Not a broadband service provider; voice service only
454	Telscape Communications, Inc.	http://www.telscape.com/	Not a broadband provider; consulting firm only per a representative of the company
455	Telson Communications, Inc.	n/a	This company is no longer in business
456	Terra Com Inc.	n/a	This company is an environmental consulting firm in Marianna, Florida
457	Texas Air Net	n/a	This company operates as housing directory assistance
458	Texas American	n/a	This company is no longer in business
459	TEXAS I.S.P.	http://www.texasisp.com/	General reseller; nonfacilities-based
460	Texas Networking, Inc.	n/a	Texas PUCT report identifies no services available in Texas
461	Texas One Internet	http://tex1.net	Dial-up service provider; no broadband capabilities
462	Texas State Library and Archive Commission	n/a	Grant awardee; non-mappable
463	Texas Unwired Networks	n/a	Acquired by Internet America Wireless
464	Texas Web Networks	n/a	This company is no longer in business
465	THE PHONE PROS	http://www.phonepro.com/	This company is no longer in business
466	Tiagris Corporation	http://www.tiagris.net/	This company is no longer in business
467	Tieless Communications	http://tieless.net/	This company is no longer in business
468	TIM RON ENTERPRISES, LLC.	n/a	Not a broadband provider; local and long distance service only

469	TMC Communications	http://www.tmccom.com/	Not a broadband provider; VoIP services
470	TNCI, Inc.	http://www.tncii.com/	No residential services available; B2B provider
471	TopGun Telecom	n/a	Acquired by Internet America Wireless
472	TopMost Connects, Inc.	n/a	No longer in business; representative of the company stated the organization has been out of business for 5
473	Total Access Networks, Inc.	http://www.totalaccess.net/	Not a wisp; website looks like a reseller
474	Total Telephone Service Company	http://www.totaltelephone.com/	This company offers voice services only
475	Trinsic Communications, Inc.	http://www.trinsic.com/main.asp	Not a broadband provider based on LinkedIn information; telephone number disconnected; no responses to e-mails
476	TSISP.NET	www.tsisp.net	This company is no longer in business
477	TSTAR Internet	http://www.tstar.net/wireless_service.htm	Acquired by ERF Wireless
478	TXK Communications, Inc.	n/a	Inactive; no longer in business; invalid contact information
479	TXOL Internet	http://www.txol.net/	Below FCC standards for broadband serviceability
480	UCN, Inc.	http://www.incontact.com/	Not a broadband provider; long-distance and calling card services
481	Unidial Communications	www.lightyear.net	This company was acquired by Lightyear
482	UNIVERSAL TELEPHONE EXCHANGE, Inc.	n/a	This company is no longer in business

483	University Corporation for Advanced Internet Development	n/a	This is a community anchor institution network
484	UNUM Telecommunications, Inc.	http://www.utinet.net/	This company is no longer in business
485	UrNet	http://www.urnet.net/	Acquired by Digital Passage
486	US Cable Corporation	http://www.uscablegroup.com/	Acquired by another company
487	US LEC COMMUNICATIONS Inc.	http://www.paetec.com/	This company is a reseller of frame relay services and does not qualify as a broadband provider
488	US Wireless Online	n/a	This company was purchased by iElement and is no longer in business
489	USA Airnet, Inc.	www.usaairnet.com	This company is no longer in business
490	USA Online, Inc.	http://www.usaonline.net/	This company was acquired by Whitehorse
491	USA QUICK PHONE, Inc.	n/a	This company is no longer a general reseller of broadband
492	USTelecom	http://www.ustelecom.org/Video_Blogs/Broadband-Now.html	There was a company called BroadbandNow Texas Inc. that provided broadband to MDU's, but went bankrupt in 2003 and no longer active; Broadband NOW is the motto or mantra for USTelecom
493	V3 Global, Inc.	n/a	This company is no longer a general reseller of broadband
494	Valley Telecom Group, Inc.	http://www2.vtc.net/	This company is a reseller of phone services only
495	Vantage Systems	n/a	This is a software company
496	VCI COMPANY	n/a	This company is a Comcast affiliate
497	VCOM SOLUTIONS	http://www.vcomsolutions.com/	Not a broadband provider

498	Vectren Communications Services, Inc.	http://www.vectren.com/	This company is a national gas company and not a qualified broadband provider
499	Vertex Communications, Inc.	n/a	This company offers dial-up service
500	Viteris, Inc.	n/a	Acquired by Internet America Wireless
501	Viyu Communications	n/a	This company is no longer in business
502	Voice Runner, Inc.	http://www.voicerunner.com/	This company is not a broadband provider
503	VoicePaq Prepaid, LLC	n/a	Sent NDA and data request
504	VOLO COMMUNICATIONS OF TEXAS, Inc.	http://www.volocommunications.com/	No longer in business
505	VPM Global Internet Services, Inc.	n/a	General reseller; multi-state provider; no confirmation received regarding facilities
506	VSS Wireless	n/a	This company is no longer in business
507	Warp Speed Internet	n/a	Acquired by ERF Wireless
508	Wave2Wave Communications Inc.	http://www.wave2wave.com	This company does not have a footprint in TX and only operates in NY. CT, NJ, IL , and PA
509	Waymark Communications	http://www.waymark.net/	Website research indicates a business to business service provider
510	WCS Communications	n/a	General Reseller; non-facilities based; satellite services
511	WDSL Net	n/a	This company is no longer in business
512	Web Fire Communications	http://www.wf.net	General reseller per website research
513	Webatron Internet Solutions	http://www.webatron.net	This company is no longer in business

514	Webcheetah	n/a	This company is a web design firm
515	WEST TELCOM, Inc.	n/a	This company operated in California and is no longer in business
516	West Texas Internet Services	n/a	This company is no longer in business
517	West Texas Online	n/a	This company is no longer in business
518	WhiteHorse Communications	http://www.net	This company offers dial-up service only
519	Winstar Communications, LLC	http://gvcwinstar.net/	This company is no longer in business
520	Wireless Frontier	n/a	This company is no longer in business
521	Wireless Roanoke, Inc.	http://www.wirelessroanoke.com/	This company is no longer in business
522	Wireless TelCorp	http://www.wirelesstelcorp.com	This company, formerly serving businesses, is no longer in business
523	Wirestar, Inc.	http://www.wirestar.net/	This company is not a broadband provider
524	WireWeb	http://www.wireweb.net	Acquired by Internet America Wireless
525	wisbin	http://www.wisbin.com/	This company is no longer in business
526	Wi-Speed	n/a	This company is no longer in business
527	World Link Communications	n/a	This company offers dial-up service only
528	WTX Communications	n/a	This company is no longer in business
529	www.AmericanAngel.us	http://www.americanangel.us/	This company is no longer in business
530	Xanadoo, LLC	http://www.xanadoo.com	This company refuses to participate and acquired Pegasus Communications

531	Xramp Wireless	n/a	This company was acquired by Wireless Frontier
532	Xspedius Management Co. Switched Services, L.L.C	n/a	This company and web-hosting was acquired by Time-Warner
533	YEYZOO.NET	http://www.yeyzoo.net/	This company is no longer in business
534	YFT.Net	http://www.yft.net	Acquired by AMA Technologies, Inc.
535	YLISP (Your Local ISP)	http://www.itsyournet.com	General reseller; multi-state provider
536	YourT1Wifi.com	http://yourt1wifi.com/	This company does not service the Texas market and is an Idaho WISP
537	ZOOM Internet Services, LLC	n/a	This company does not service the Texas market and is a Michigan WISP

Broadband Provider Log

Complete	260
Non-Responsive/Refused	40
In Progress	1
Count of Datasets by Status	**301**
Total Unique Providers Represented	**195**

Provider Name	Platform	Status	NDA Execution Date	Notes
AT&T Communications of Texas, Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[FEB-28-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
AT&T Communications of Texas, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[FEB-28-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Bee Creek Communications	Fixed Wireless	Data Added to Statewide Inventory	5/21/2010	[JAN-30-12 Sarah Finne] Correction: Bee Creek Communications was previously non-responsive, but they provided data this round.
Big Bend Telephone Company, Inc.	DSL	Data Added to Statewide Inventory	3/10/2010	[FEB-08-12 Amanda Bentley] Correction: Areas where FTTH overlapped with DSL coverage were removed from DSL footprint.
Big Bend Telephone Company, Inc.	Fiber	Data Added to Statewide Inventory	3/10/2010	[FEB-08-12 Amanda Bentley] Change: Network expansion.
Big Bend Telephone Company, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/10/2010	[DEC-13-11 Sarah Finne] Change: New platform addition (fixed wireless).
Border to Border Communications, Inc.	Fiber	Data Added to Statewide Inventory	2/20/2012	[FEB-28-12 Sarah Finne] Change: Provider submitted data for new platform (FTTH).
Border to Border Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory	2/20/2012	[FEB-28-12 Sarah Finne] Change: Provider submitted data for a new platform (Fixed Wireless).
Broadcomm.US	Fixed Wireless	Data Added to Statewide Inventory	3/9/2011	[JAN-27-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer speed tier 5 download speeds.
Buffalo Cable TV	Cable	Data Added to Statewide Inventory		[FEB-01-12 Amanda Bentley] Correction: Buffalo Cable TV was previously non-responsive, but they provided data this round.
Cable ONE Inc.	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-07-12 Amanda Bentley] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Cameron Telephone Company, LLC	DSL	Data Added to Statewide Inventory	3/18/2010	[FEB-22-12 Amanda Bentley] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Cap Rock Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	3/4/2010	[FEB-01-12 Amanda Bentley] Change: Network expansion (new DSLAMs added).
Celltex Networks, LLC	Fixed Wireless	Data Added to Statewide Inventory		[JAN-12-12 Amanda Bentley] Change: New fixed wireless tower in operation.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[FEB-16-12 Amanda Bentley] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Cequel Communications	Cable	Data Added to Statewide Inventory	12/15/2009	[MAR-06-12 Sarah Finne] Correction: Provider corrected speed data in DOCSIS 3.0 areas; submitted speeds by county/city.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[JAN-26-12 Amanda Bentley] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/3/2010	[JAN-23-12 Amanda Bentley] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission. Provider also supplied additional information on coverage for substantial service sites in October 2011, however requested that CN not submit or publish this coverage since they do not market to these areas.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[FEB-13-12 Amanda Bentley] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Community Telephone Company, Inc.	DSL	Data Added to Statewide Inventory	3/10/2010	[FEB-09-12 Amanda Bentley] Change: Provider upgraded infrastructure and can now offer speed tier 5 download speeds and speed tier 3 upload speeds.
Consolidated Communications	DSL	Data Added to Statewide Inventory	11/30/2009	[JAN-23-12 Amanda Bentley] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.

Consolidated Communications	Fiber	Data Added to Statewide Inventory	11/30/2009	[JAN-23-12 Amanda Bentley] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Cumby Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/5/2010	[FEB-09-12 Amanda Bentley] Change: Network expansion.
Eastex Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	6/20/2011	[FEB-14-12 Amanda Bentley] Change: Network expansion (new DSLAMs added).
ENMR Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	4/22/2010	[JAN-19-12 Amanda Bentley] Change: Coverage removed from Farwell exchange (converted to FTTH).
ENMR Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	4/22/2010	[JAN-19-12 Amanda Bentley] Change: Network expansion into Farwell exchange.
Five Area Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	3/8/2010	[FEB-06-12 Amanda Bentley] Change: Removed Sudan exchange (upgraded technology from DSL to FTTH).
Five Area Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/8/2010	[FEB-06-12 Amanda Bentley] Correction: Fiber lines have been changed to polygons; entirely new dataset provided for April 2012 submission.
Gtek Communications	Fixed Wireless	Data Added to Statewide Inventory	5/24/2010	[FEB-29-12 Amanda Bentley] Change: New fixed wireless towers in operation.
GVEC.net	Fixed Wireless	Data Added to Statewide Inventory	2/25/2010	[FEB-28-12 Sarah Finne] Change: New fixed wireless towers in operation.
JAB Wireless, Inc.	Fixed Wireless	Data Added to Statewide Inventory	6/14/2010	[FEB-07-12 Sarah Finne] Change: JAB Wireless, Inc. acquired Eccentrix Technologies' assets and are now operating their old fixed wireless towers.
La Ward Telephone Exchange, Inc.	DSL	Data Added to Statewide Inventory	11/16/2009	[FEB-28-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer speed tier 6 download and speed tier 3 upload speeds.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[FEB-28-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
MetroPCS Wireless, Inc.	Mobile Wireless	Data Added to Statewide Inventory	2/10/2012	[FEB-29-12 Sarah Finne] Change: New mobile wireless provider identified.
Millennium Telcom, LLC	Fixed Wireless	Data Added to Statewide Inventory	8/26/2010	[FEB-06-12 Amanda Bentley] Change: New fixed wireless tower in operation.
Neu Ventures, Inc.	Cable	Data Added to Statewide Inventory	6/17/2010	[FEB-15-12 Amanda Bentley] Change: Provider upgraded infrastructure and can now offer speed tier 6 download speeds in all locations except Reeves County.
Neu Ventures, Inc.	Fixed Wireless	Data Added to Statewide Inventory	6/17/2010	[FEB-29-12 Amanda Bentley] Change: New fixed wireless towers in operation.
North Texas Cellular, Inc.	DSL	Data Added to Statewide Inventory	3/22/2010	[JAN-30-12 Amanda Bentley] Change: Network expansion (new DSLAM added).
Northland Communications	Cable	Data Added to Statewide Inventory	8/19/2010	[FEB-28-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer speed tier 7 download speeds to select market areas.
Panhandle Telephone Cooperative, Inc.	Cable	Data Added to Statewide Inventory	12/7/2009	[JAN-24-12 Amanda Bentley] Change: Network expansion (into Texhoma).
Panhandle Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	12/7/2009	[JAN-27-12 Amanda Bentley] Change: Network expansion (additional DSLAMs in Texhoma and Perryton).
Panhandle Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	12/7/2009	[JAN-24-12 Amanda Bentley] Change: Provider upgraded infrastructure and now offers FTTH in select areas.
Panhandle Telephone Cooperative, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/7/2009	[FEB-06-12 Amanda Bentley] Change: New platform addition (mobile wireless).
Pathwayz Communications, Inc.	DSL	Data Added to Statewide Inventory	12/9/2011	[JAN-18-12 Amanda Bentley] Correction: Pathwayz Communications, Inc. was previously non-responsive, but they provided data this round.
Pathwayz Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory	12/9/2011	[JAN-18-12 Amanda Bentley] Correction: Pathwayz Communications, Inc. was previously non-responsive, but they provided data this round.
Poka Lambro Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	2/15/2010	[JAN-25-12 Sarah Finne] Change: Network expansion.
RB3, LLC	Cable	Data Added to Statewide Inventory	10/23/2009	[JAN-17-12 Sarah Finne] Correction: Provider requested removal of 2 market locations.
RB3, LLC	Fixed Wireless	Data Added to Statewide Inventory	10/23/2009	[JAN-17-12 Sarah Finne] Change: New fixed wireless tower in operation and provider decommissioned a few tower sites.
Rock Solid Internet & Telephone	Fixed Wireless	Data Added to Statewide Inventory	2/14/2011	[FEB-28-12 Sarah Finne] Change: New fixed wireless towers in operation.
RodZoo Wireless	Fixed Wireless	Data Added to Statewide Inventory		[FEB-24-12 Sarah Finne] Change: Provider submitted additional fixed wireless tower data.
Santa Rosa Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	3/9/2010	[JAN-30-12 Amanda Bentley] Change: Removed Kirkland and Goodlett exchanges (upgraded technology from DSL to FTTH).
Santa Rosa Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/9/2010	[JAN-30-12 Amanda Bentley] Change: Added Kirkland and Goodlett exchanges (upgraded technology from DSL to FTTH).
Skynet Country, LLC	Fixed Wireless	Data Added to Statewide Inventory		[JAN-30-12 Sarah Finne] Change: New fixed wireless provider identified.
South Plains Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/15/2010	[FEB-21-12 Amanda Bentley] Change: Network expansion.
Southwest Texas Telephone Company	Fiber	Data Added to Statewide Inventory	3/3/2010	[FEB-28-12 Sarah Finne] Change: Provider submitted data for new platform (FTTH).

Southwest Texas Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	3/3/2010	[FEB-28-12 Sarah Finne] Change: New fixed wireless tower in operation.
Speed of Light Broadband, Inc.	Fixed Wireless	Data Added to Statewide Inventory	11/3/2009	[JAN-17-12 Sarah Finne] Change: New fixed wireless tower in operation.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JAN-25-12 Amanda Bentley] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-28-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Texas Wireless Internet	Fixed Wireless	Data Added to Statewide Inventory	5/14/2010	[JAN-17-12 Sarah Finne] Change: New fixed wireless tower in operation.
Time Warner Cable LLC	Cable	Data Added to Statewide Inventory	12/21/2009	[FEB-28-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
TISD, Inc.	Fixed Wireless	Data Added to Statewide Inventory	4/19/2010	[JAN-27-12 Amanda Bentley] Change and Correction: Speeds increased and tower data errors led to recreation of fixed wireless propagations.
Verizon Southwest, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[FEB-28-12 Sarah Finne] Change and/or Correction: Possible corrections to previous dataset; entirely new dataset provided for April 2012 submission. Dataset shows decrease in coverage, particularly in eastern Texas.
Verizon Southwest, Inc.	DSL	Data Added to Statewide Inventory	12/14/2009	[FEB-15-12 Amanda Bentley] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
Verizon Southwest, Inc.	Fiber	Data Added to Statewide Inventory	12/14/2009	[MAR-01-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2012 submission.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[FEB-28-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer speed tier 5 download speeds. Also, ViaSat has acquired WildBlue and coverage will be represented as ViaSat, Inc. starting with the April 2012 submission.
Web Fire Communications	DSL	Data Added to Statewide Inventory		[FEB-29-12 Sarah Finne] Correction: Web Fire Communications was previously non-responsive, but they provided data this round.
Wireless Internet Corp	Fixed Wireless	Data Added to Statewide Inventory	11/11/2011	[JAN-17-12 Sarah Finne] Correction: Twin Wireless, Inc. was previously non-responsive, but they provided data this round.
XIT Telecommunications & Technology, Ltd.	Fiber	Data Added to Statewide Inventory	3/2/2010	[JAN-20-12 Sarah Finne] Change: Network expansion.
Zeecon Wireless Internet, LLC	Fixed Wireless	Data Added to Statewide Inventory		[JAN-17-12 Sarah Finne] Correction: Zeecon Wireless Internet, LLC was previously non-responsive, but they provided data this round.
AT&T Communications of Texas, Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/16/2009	
Cap Rock Telephone Cooperative, Inc.	Backhaul	Backhaul Provider Only Processing Complete	3/4/2010	
Charter Communications, Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/15/2009	
Conterra Ultra Broadband, LLC	Backhaul	Backhaul Provider Only Processing Complete		
MegaPath Inc.	Backhaul	Backhaul Provider Only Processing Complete	2/15/2010	
Panhandle Telephone Cooperative, Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/7/2009	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
Valley Telephone Cooperative, Inc.	Backhaul	Backhaul Provider Only Processing Complete	11/24/2009	
Zayo Bandwidth, LLC	Backhaul	Backhaul Provider Only Processing Complete		
CKS Wireless, Inc.	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
East Texas Broadband	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Broadwaves	Fixed Wireless	Updated-Estimated Coverage Submitted for Non-Participating Provider		[NOV-29-11 Sarah Finne] Correction: Updated estimated coverage submitted (propagation) for non-participating provider, updated per new website information.
AMA TechTel	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[FEB-06-12 Amanda Bentley] Correction: Estimated coverage created and submitted for non-responsive provider.
GoZoe Wireless, LLP	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[FEB-01-12 Amanda Bentley] Correction: Estimated coverage created and submitted for non-responsive provider.
Zulu Internet, Inc.	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[FEB-01-12 Amanda Bentley] Correction: Estimated coverage created and submitted for non-responsive provider.
East Texas DSL	Fixed Wireless	Approval for Update Not Received – Data Still Submitted	5/25/2010	[FEB-28-12 Sarah Finne] Change: New fixed wireless tower in operation.
AirBand Communications, Inc.	Backhaul	No Update to Provide	3/29/2010	
Aledo Broadband	Fixed Wireless	No Update to Provide	3/26/2010	
Aledo Broadband	Backhaul	No Update to Provide	3/26/2010	
Alenco Communications, Inc.	DSL	No Update to Provide	11/17/2009	
Alenco Communications, Inc.	Fiber	No Update to Provide	11/17/2009	
Alenco Communications, Inc.	Fixed Wireless	No Update to Provide	11/17/2009	
Alenco Communications, Inc.	Backhaul	No Update to Provide	11/17/2009	
Allegiance Communications	Cable	No Update to Provide	2/4/2010	
Alpheus Communications, L.P.	Backhaul	No Update to Provide		
Argon Technologies	Fixed Wireless	No Update to Provide		
AwesomeNet, Inc.	Fixed Wireless	No Update to Provide		
Basin 2 Way Radio, Inc.	Fixed Wireless	No Update to Provide	4/14/2010	
Big Bend Telephone Company, Inc.	Backhaul	No Update to Provide	3/10/2010	

Big Bend Telephone Company, Inc.	Satellite	No Update to Provide	3/10/2010	
Border to Border Communications, Inc.	DSL	No Update to Provide	2/20/2012	
Brazoria Telephone Company	Cable	No Update to Provide	6/17/2010	
Brazoria Telephone Company	DSL	No Update to Provide	6/17/2010	
Broadband Data Services of Texas, LLC	Fixed Wireless	No Update to Provide	4/29/2010	
Cameron Telephone Company, LLC	Backhaul	No Update to Provide	3/18/2010	
Cap Rock Telephone Cooperative, Inc.	Fiber	No Update to Provide	3/4/2010	
Cap Rock Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/4/2010	
Central Texas Cable Partners, Inc.	Cable	No Update to Provide	2/22/2010	
Central Texas Telephone Cooperative, Inc.	DSL	No Update to Provide	3/2/2010	
Central Texas Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/2/2010	
Central Texas Telephone Investments, LP	Fixed Wireless	No Update to Provide	4/22/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Coleman County Telephone Cooperative, Inc.	DSL	No Update to Provide	3/10/2010	
Coleman County Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/10/2010	
Colorado Valley Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/9/2010	
Colorado Valley Telephone Cooperative, Inc.	DSL	No Update to Provide	3/9/2010	
Community Telephone Company, Inc.	Backhaul	No Update to Provide	3/10/2010	
Connextions Telcom	DSL	No Update to Provide	3/2/2011	
Connextions Telcom	Fiber	No Update to Provide	3/2/2011	
CTX Unwired	Fixed Wireless	No Update to Provide	2/14/2011	
Cumby Telephone Cooperative, Inc.	DSL	No Update to Provide	3/5/2010	
DigiComm Enterprises, LLC	Fixed Wireless	No Update to Provide	6/15/2010	
Digitex.com	Backhaul	No Update to Provide	5/25/2010	
Digitex.com	Fixed Wireless	No Update to Provide	5/25/2010	
DISH Network Corporation	Satellite	No Update to Provide	1/27/2010	
Dot 10 Wireless, LLC	Fixed Wireless	No Update to Provide		
East Texas WiFi	Fixed Wireless	No Update to Provide		
ELC Internet Services, Inc.	Fixed Wireless	No Update to Provide	3/4/2011	
Electra Telephone Company	DSL	No Update to Provide	11/24/2009	
ENMR Telephone Cooperative, Inc.	Backhaul	No Update to Provide	4/22/2010	
ERF Wireless	Fixed Wireless	No Update to Provide		
ETAN Industries	Cable	No Update to Provide		
ETEX Communications, LP	DSL	No Update to Provide	2/25/2010	
ETEX Communications, LP	Fiber	No Update to Provide	2/25/2010	
ETEX Communications, LP	Backhaul	No Update to Provide	2/25/2010	
ETS Cablevision Co., Inc.	Cable	No Update to Provide	10/30/2009	
ETS Cablevision Co., Inc.	Fiber	No Update to Provide	10/30/2009	
Farm to Market Broadband LP	Fixed Wireless	No Update to Provide	4/16/2010	
Ganado Telephone Company, Inc.	DSL	No Update to Provide	11/16/2009	
GEUS	Cable	No Update to Provide		
Gilmer Cable Television Company, Inc.	Cable	No Update to Provide	6/18/2010	
Grande Communications Networks LLC	Cable	No Update to Provide	3/31/2010	
Grayson CableRocket, LLC	Cable	No Update to Provide	6/15/2010	
Gtek Communications	Backhaul	No Update to Provide	5/24/2010	
Guadalupe Valley Communications Systems	Cable	No Update to Provide	11/23/2009	
Guadalupe Valley Communications Systems	DSL	No Update to Provide	11/23/2009	
Guadalupe Valley Communications Systems	Fiber	No Update to Provide	11/23/2009	
GVEC.net	Backhaul	No Update to Provide	2/25/2010	
Helmsco, Inc.	Fixed Wireless	No Update to Provide	2/15/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
IGN-LPG Enterprises LLC	Fixed Wireless	No Update to Provide	2/17/2011	
Industry Telephone Company	DSL	No Update to Provide	11/6/2009	
James Cable LLC	Cable	No Update to Provide	1/11/2010	
James Cable LLC	Fixed Wireless	No Update to Provide	1/11/2010	
Lake Livingston Telephone Company, Inc.	DSL	No Update to Provide	11/20/2009	
Livingston Telephone Company, Inc.	DSL	No Update to Provide	2/25/2010	
Livingston Telephone Company, Inc.	Backhaul	No Update to Provide	2/25/2010	
McDonald Group	Cable	No Update to Provide	3/5/2010	
Mid-Plains Rural Tel. Co-op. Inc.	DSL	No Update to Provide	3/5/2010	
Mid-Plains Rural Tel. Co-op. Inc.	Backhaul	No Update to Provide	3/5/2010	
Mid-Plains Rural Tel. Co-op. Inc.	Fiber	No Update to Provide	3/5/2010	
Millennium Telcom, LLC	Cable	No Update to Provide	8/26/2010	
Millennium Telcom, LLC	DSL	No Update to Provide	8/26/2010	
Millennium Telcom, LLC	Fiber	No Update to Provide	8/26/2010	
NetWest Online, Inc.	Fixed Wireless	No Update to Provide	2/23/2010	
Neu Ventures, Inc.	Backhaul	No Update to Provide	6/17/2010	
Nortex Communications	Cable	No Update to Provide	2/12/2010	
Nortex Communications	DSL	No Update to Provide	2/12/2010	
Nortex Communications	Fiber	No Update to Provide	2/12/2010	
Nortex Communications	Fixed Wireless	No Update to Provide	2/12/2010	
Nortex Communications	Backhaul	No Update to Provide	2/12/2010	
North Texas Telephone Company	DSL	No Update to Provide	11/30/2009	
Panhandle Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	12/7/2009	
Peoples Communication, Inc.	DSL	No Update to Provide	3/4/2010	
Peoples Communication, Inc.	Backhaul	No Update to Provide	3/4/2010	
Poka Lambro Telephone Cooperative, Inc.	DSL	No Update to Provide	2/15/2010	
Poka Lambro Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	2/15/2010	
Poka Lambro Telephone Cooperative, Inc.	Backhaul	No Update to Provide	2/15/2010	
Promptwireless, LLP	Fixed Wireless	No Update to Provide	4/27/2010	
Ridgewood Cable	Fixed Wireless	No Update to Provide		
Rioplex Wireless LTD	Fixed Wireless	No Update to Provide	3/3/2010	
Santa Rosa Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/9/2010	
Santa Rosa Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/9/2010	
SmartBurst, LLC	Fixed Wireless	No Update to Provide	8/4/2010	
South Plains Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/15/2010	
South Plains Telephone Cooperative, Inc.	DSL	No Update to Provide	3/15/2010	
Southwest Arkansas Telephone Cooperative, Inc.	DSL	No Update to Provide	1/19/2010	
Southwest Arkansas Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/19/2010	

Sprint Nextel Corporation	Backhaul	No Update to Provide	1/14/2010	
Stelera Wireless, LLC	Mobile Wireless	No Update to Provide		
Tatum Telephone Company	DSL	No Update to Provide	11/24/2009	
Taylor Telephone Cooperative, Inc.	DSL	No Update to Provide	3/11/2010	
Taylor Telephone Cooperative, Inc.	Fiber	No Update to Provide	3/11/2010	
Taylor Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/11/2010	
Texas CellNet	Fixed Wireless	No Update to Provide	2/17/2011	
Texhoma Wireless, L.L.C.	Fixed Wireless	No Update to Provide	3/8/2011	
TGN Cable	Cable	No Update to Provide	5/20/2010	
Time Warner Cable LLC	Backhaul	No Update to Provide	12/21/2009	
Totelcom Communications, LLC	DSL	No Update to Provide	11/30/2009	
Totelcom Communications, LLC	Fixed Wireless	No Update to Provide	11/30/2009	
tw telecom of texas, llc	Backhaul	No Update to Provide	3/10/2010	
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
Valley Telephone Cooperative, Inc.	DSL	No Update to Provide	11/24/2009	
Valley Telephone Cooperative, Inc.	Fiber	No Update to Provide	11/24/2009	
Valley Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	11/24/2009	
Verizon Southwest, Inc.	Backhaul	No Update to Provide	12/14/2009	
Wes-Tex Telecommunications, Ltd.	Backhaul	No Update to Provide	3/1/2010	
Wes-Tex Telecommunications, Ltd.	Cable	No Update to Provide	3/1/2010	
Wes-Tex Telecommunications, Ltd.	DSL	No Update to Provide	3/1/2010	
Wes-Tex Telecommunications, Ltd.	Fixed Wireless	No Update to Provide	3/1/2010	
Windjammer Communications LLC	Cable	No Update to Provide	11/16/2009	
Windstream Communications	Backhaul	No Update to Provide	1/19/2010	
Windstream Communications	DSL	No Update to Provide	1/19/2010	
XIT Telecommunications & Technology, Ltd.	DSL	No Update to Provide	3/2/2010	
Zito Midwest, LLC	Cable	No Update to Provide	2/17/2011	
Baja Broadband Holding Company	Cable	No Update Provided - Use Last Submission Data		[MAR-07-12 Sarah Finne] Change: Baja Broadband acquired U.S. Cable and the former U.S. Cable data is being submitted under the Baja Broadband name.
Basin Broadband, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/23/2010	
Blossom Telephone Company, Inc.	DSL	No Update Provided - Use Last Submission Data	3/26/2010	
Cequel Communications	Backhaul	No Update Provided - Use Last Submission Data	12/15/2009	
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
Dell Telephone Cooperative, Inc.	Backhaul	No Update Provided - Use Last Submission Data	4/6/2010	
Dell Telephone Cooperative, Inc.	DSL	No Update Provided - Use Last Submission Data	4/6/2010	
Dell Telephone Cooperative, Inc.	Fiber	No Update Provided - Use Last Submission Data	4/6/2010	
Dell Telephone Cooperative, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	4/6/2010	
ECTISP, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Enet Internet Services, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		
Gower Computer Support, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	2/14/2011	
Greasy Bend Ventures, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	8/16/2010	
Hi Speed Wireless	Fixed Wireless	No Update Provided - Use Last Submission Data	2/22/2011	
Hill Country Telephone Cooperative, Inc.	Backhaul	No Update Provided - Use Last Submission Data	3/9/2011	
Hill Country Telephone Cooperative, Inc.	DSL	No Update Provided - Use Last Submission Data	3/9/2011	
Hill Country Telephone Cooperative, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/9/2011	
KeyOn Communications, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	10/15/2009	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Maverick Internet	Backhaul	No Update Provided - Use Last Submission Data	6/4/2010	
Maverick Internet	Fixed Wireless	No Update Provided - Use Last Submission Data	6/4/2010	
Nextlink Wireless, Inc.	Backhaul	No Update Provided - Use Last Submission Data	2/12/2010	
North Texas Broadband, LLC	Cable	No Update Provided - Use Last Submission Data	3/1/2010	
NTS Communications	DSL	No Update Provided - Use Last Submission Data		
NTS Communications	Fiber	No Update Provided - Use Last Submission Data		
Our-Town Internet Service	Fixed Wireless	No Update Provided - Use Last Submission Data	3/31/2010	
Pulsestream Internet Services, LLC	Backhaul	No Update Provided - Use Last Submission Data	6/2/2011	
Riviera Telephone Company, Inc.	Backhaul	No Update Provided - Use Last Submission Data	3/11/2010	
Riviera Telephone Company, Inc.	DSL	No Update Provided - Use Last Submission Data	3/11/2010	
Smithville System	Fixed Wireless	No Update Provided - Use Last Submission Data	6/17/2010	
Southwest Texas Telephone Company	Backhaul	No Update Provided - Use Last Submission Data	3/3/2010	
Southwest Texas Telephone Company	DSL	No Update Provided - Use Last Submission Data	3/3/2010	
Texas Broadband, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	5/12/2010	
Tier One Converged Networks, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/24/2010	
Versalink Enterprises, LLC	Cable	No Update Provided - Use Last Submission Data	5/11/2010	
WEHCo Video, Inc.	Cable	No Update Provided - Use Last Submission Data		
West Texas Rural Telephone Cooperative, Inc.	Backhaul	No Update Provided - Use Last Submission Data	3/31/2010	
West Texas Rural Telephone Cooperative, Inc.	Cable	No Update Provided - Use Last Submission Data	3/31/2010	
West Texas Rural Telephone Cooperative, Inc.	DSL	No Update Provided - Use Last Submission Data	3/31/2010	
West Texas Rural Telephone Cooperative, Inc.	Fiber	No Update Provided - Use Last Submission Data	3/31/2010	
Wharton County Electric Cooperative, Inc.	Backhaul	No Update Provided - Use Last Submission Data	4/15/2010	
Wharton County Electric Cooperative, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	4/15/2010	
XO Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	2/12/2010	
Windstream Communications	DSL	Other	1/19/2010	[FEB-01-12 Wes Kerr] Company representative notified us that they do not have the ability at this time to provide data for the acquired company.
281 Communications, Inc.	Fixed Wireless	Refused to Participate		[JAN-05-12 Daryl Coffey] Provider representative instructed us to never contact him again regarding this project.
Anvil Communications	Fixed Wireless	Refused to Participate		[JAN-05-12 Daryl Coffey] Company representative refused again saying the process is "too intrusive."
Buford Media Group	Cable	Refused to Participate		[JAN-06-12 Daryl Coffey] Received email from company representative saying the company would not participate.

Centrovision	Cable	Refused to Participate		[JAN-09-12 Daryl Coffey] A company representative stated that a coverage map is being constructed, but will not be ready until the summer.
Gecko Inter.net	Fixed Wireless	Refused to Participate		[JAN-19-12 Dwayne Goodman] Received an e-mail from a company representative refusing to participate and requested no additional contact.
Internet America Wireless Internet Access	Fixed Wireless	Refused to Participate		[JAN-04-12 Dwayne Goodman] Internet America office meeting adjourned with a non-participatory status received from an executive of the company. Internet America staff's review of the NTIA National Broadband map determined the map reveals coverage detail that could be very instrumental to a competitor.
Presidio Community Wireless Network	Fixed Wireless	Refused to Participate		[NOV-29-11 Dwayne Goodman] A company representative provided an e-mail notification of electing not to participate.
Terral Telephone Company	Fixed Wireless	Refused to Participate		[NOV-2-11 Dwayne Goodman] Received an e-mail reply from a company representative electing not to participate.
Western Broadband	Fixed Wireless	Refused to Participate		[JAN-26-12 Daryl Coffey] Company representative sent an e-mail stating that the company "will not be able to provide our proprietary info to you."
Americatel Corporation	Backhaul	Non-Responsive to Multiple Attempts		In addition to attempting to contact the provider during the last mapping submission period, 2 additional contact attempts were made this period.
Burcham Solutions, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		5 contact attempts were made between January 30 and February 10, 2012.
Centrovision	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 6 additional contact attempts were made this period.
CIT - Campbell Information Technology	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.
Cybercom Corporation	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 6 additional contact attempts were made this period.
Digital Passage	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.
East Texas Cable Co.	Cable	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 6 additional contact attempts were made this period.
Fiberlight LLC	Backhaul	Non-Responsive to Multiple Attempts	4/20/2010	In addition to numerous contact attempts made during past mapping submission periods, 2 additional contact attempts were made this period.
Hill Country Networks	Fixed Wireless	Non-Responsive to Multiple Attempts		7 contact attempts were made between December 13, 2011, and February 10, 2012.
Hometown Computing	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 7 additional contact attempts were made this period.
I20 Access	Fixed Wireless	Non-Responsive to Multiple Attempts		5 contact attempts were made between November 14, 2011, and February 10, 2012.
Liquid Stone Wireless	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.
LSCWeb.Com	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.
Medicine Park Telephone Company	Backhaul	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 additional contact attempts were made this period.

The State of Utah Broadband Project
State Broadband Data and Development
(SBDD) Grant Program
March 30, 2012

Data and Mapping Methodology

Map Disclaimer

Broadband service availability and characteristics are depicted as derived from data assembled by the Utah Broadband Project. Data sources include biannual broadband service provider submissions and publicly available sources. Data has been modified, where necessary, to meet broadband mapping standards set by the National Telecommunications and Information Administration (NTIA).

Broadband service availability is displayed per NTIA specifications which include technology and speed categories and the generalization of non-wireless service availability information to either U.S. Census blocks (where smaller than 2 sq. miles) or road segments.

Speeds shown are the 'maximum advertised' for the geographic features depicted, and must exceed 0.768 Mbps download and 0.2 Mbps upload (NTIA minimum definition of broadband) to be included. Actual speeds may vary within and along census blocks and roads due to the granularity and currency of the data, technological limitations, and service plan limitations. Users of this data and associated map visualizations are encouraged to inquire directly to providers for current service availability and speed.

All information presented on the Utah's interactive broadband map is for general reference purposes only and may contain errors and omissions. The State of Utah makes no warranty with respect to information available, express or implied, including but not limited to the fitness for use for a particular purpose.

The Utah Broadband Project welcomes your comments (broadband@utah.gov).

Map Data Description

All broadband mapping data either is sourced directly from a broadband provider, or from working directly with a provider. Utah has 100% participation from the 45 providers identified to date.

Wireless broadband internet data is mapped using coverage area footprints derived from analyzing antennae location, signal strength and terrain. Wireline broadband internet data is mapped using 2010 census blocks for blocks less than two square miles in area, and road segments in cases of larger census blocks.

Once a provider’s broadband coverage is initially mapped, data updates take several forms including GIS files, written descriptions, provider created maps, and verbal and written discussions.

Community Anchor Institution locations are mapped using supporting resources from Utah's State Geographic Information Database (SGID). Broadband Internet subscription information comes from a variety of sources including the Utah Education Network, the State of Utah Department of Technology Services, and the Utah Telehealth Network.

Confidential data not shown on the map is also collected by the Project, and submitted to the NTIA. This information includes middle and last mile broadband infrastructure points.

Validation

The Project's data submission is compliant with the December 2011 SBDD Data Transfer Model and the State Broadband Data and Development NOFA. All broadband data that does not agree with the allowable values and ranges in the Data Transfer Model is studied and adjusted to agree with the data model or noted as exceptions as appropriate.

Another important part of data validation is the project's data intake and processing flow. In summary, our data flow consists of:

- Initial evaluation of data submission and initial documentation.
    - Recordation what was submitted by provider.
    - Verification that the data update is usable.
- Make data submission updates and put the data in the NTIA data model.
- Detailed evaluation and documentation.
    - Document details of the data and the data processing steps.
    - Review the provider's changes from previous submissions for consistency between what is in the data and what discussions have been made with providers.
- Create data feedback for provider to review.

Aerial photography, address location services, census block geometry, and road segment geometry used for broadband service mapping and for quality control of the broadband data are from public domain resources in the SGID.

Verification

All Broadband data received by the project is reviewed for overall verification. Besides our initial verification, other sample verification methods are listed below.

- The project maintains archives and documentation of a given provider's data over time, and changes are noted and verified as to their plausibility. All data related interaction with a provider since the project began in June 2010 is also documented. This provider submission history is periodically referred to in order to guide correspondence needs and special handling of the submission data.
- For each provider's geographical extent, examination of areas that are not served or are underserved is completed and discussed with the provider for accuracy.
- Every time the project receives updates from a broadband provider, data feedback is sent to the provider for them to verify that the data or updates have been prepared accurately. The biggest source of feedback for providers is being able to interact one on one with their

specific data on the Utah Broadband Interactive Map. Providers can do this on their own or with the project during a scheduled conference.

- Local telecom territories are used to verify reported DSL coverage areas.
- Wireless Drive Test: In July 2011, the Utah Broadband Project contracted with Isotrope LLC, a Massachusetts-based company, to perform a drive test to assess wireless broadband services and capabilities throughout the state. The drive test data, collected by traversing over 6000 miles of the state , provides a snapshot in time of mobile broadband speeds, signal strength and technologies. After being collected, the drive test data was used to assess broadband provider data and was used in verification discussions with wireless providers. It was also provided to all wireless providers for their own use.
- Prior to July 2011, commercial wireless data such as the American Roamer data was used to verify reported wireless coverage areas.
- In order to map the wireless data more accurately, whenever possible the project mapping team has worked with providers to acquire wireless coverage areas based on signal propagation modeling. If a provider does not have the capacity to submit a propagated coverage area, the project encourages providers to provide tower locations and antenna locations and specifications to the project mapping team that are then used for a viewshed to create a propagated coverage area.

Additional Utah Broadband Maps and Data Resources

The Utah Broadband Project maintains additional maps beyond the online interactive map. These are available on request and include maps of broadband coverage availability, best available speed, and highest order technology in Utah. The project is also willing to work on other specific mapping requests.

About the State Level Broadband Map

The Utah Broadband Interactive Map was developed and is hosted by the Utah Automated Geographic Reference Center (AGRC) utilizing data complied by the Project from broadband providers and public sources, including Utah's State Geographic Information Database (SGID) which is utilized extensively for locating addresses, locating geographic places, and displaying background maps.
Map Goals

- The map attempts to provide consumers, community leaders, and broadband providers with a comprehensive map-based view of non-confidential data complied by the Utah Broadband Project.
- The map is also meant to be used by policy makers or policy maker supporters, such as the Utah Broadband Advisory Council.
- The map serves as a basis of discussion with Broadband Providers to verify accuracy of data.
- The data on the map is used in our twice yearly submission to the NTIA.

Please report any problems with the above web page, the Utah Broadband Interactive Map, or relating to broadband availability in Utah to broadband@utah.gov.

Commonwealth of Virginia

Virginia Center for Innovative Technology

Virginia Information Technologies Agency
Virginia Geographic Information Network

Virginia Tech
Center for Geospatial Information Technology

NTIA STATE BROADBAND DATA DEVELOPMENT

ROUND 5 - Spring 2012 SUBMISSION

Summary of Virginia Submission

The Virginia Center for Innovative Technology (CIT) was designated by the Governor of Virginia as the primary point of contact for all Commonwealth of Virginia participation in the National Broadband Mapping Project. The CIT worked in conjunction with the Virginia Information Technologies Agency's (VITA) Virginia Geographic Information Network (VGIN) to review, process, normalize and submit the information outlined in the National Telecommunications and Information Administration's (NTIA) Notice of Funding Availability (NOFA) establishing a Virginia iteration of the National Broadband Map.

The spring 2012 submission is the fifth submission of data to the NTIA and the update includes data from 47 broadband service providers with unique federal identifications delivered in various formats ranging from GIS shape files to text files detailing broadband availability. Of the 47 broadband providers included, 28 submitted updated service information. To provide a complete snapshot of broadband availability in Virginia, the spring 2011 submission data was carried forward for several remaining broadband providers while some carry over providers were reworked for the 2010 census block request.

A summary of the spring 2012submission data includes:

Census Block polygons provided with coverage information	359947
Address points provided with availability information	63497
Street Segments provided with availability information	54707
Wireless polygons with coverage	19
Middle Mile points with availability information	557
Community Anchor Institution points with availability information	3591

All broadband providers participating provided advertised speed information for wireless polygons, census block, road centerline segment, or addresses.

There is a total of 174 broadband providers that have been identified through various source within the Commonwealth of Virginia as of April 1, 2012. There are 65 providers who are participating in the national program and 108 who have not responded to a call for data. Virginia has an on-going effort to contact the providers who have not responded to offer any assistance needed for them to participate.

Virginia Broadband Data Verification and Validation

Verification Techniques

In the fall of 2010, the Virginia broadband mapping team subcontracted with Apex-CoVantage to provide the following one-time broadband data verification techniques using standardized questionnaires for the Commonwealth of Virginia:

- Telephone interviews
- Field (door to door) interviews
- Direct mailings
- Drive Testing
- GPS data collection at field interview sites

A total of 2,421 surveys were conducted, with 616 in-person and 1,805 by telephone.

Validation Methods

Using the NTIA definitions for served/under-served/unserved combined with Census demographics and Virginia broadband availability data, the Virginia Tech mapping team produced an estimated Broadband "serve-ability" Census Block map for Virginia. From this the Apex team then identified a geographically stratified (rural/urban) statistically significant sample size for which to apply the above data verification techniques.

Results

The effort resulted in the following findings:
- Surveys confirming Wireline Provider access: 97.3%
- Surveys confirming Wireless Provider Access: 99.7%
- Surveys confirming Internet Service Provider: 91.1%

In addition, the survey questionnaires confirmed valuable location information (lat/long & address) along with details about internet service provider and demographic information.

Percentages as of April 1, 2012.

Base Map Data

VGIN maintains a series of statewide feature classes or partnerships with commercial entities which allow the granularity of data necessary to support the National Broadband Mapping Project. The following Virginia and Federal data sets were used in SBDD data processing.

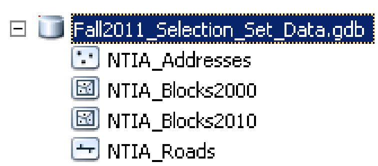
Address Points - VGIN maintains a statewide address point feature class that is updated quarterly using locality address submissions. This statewide address point database is used to generate a Point Address Geocoding Service which is fed into the Virginia statewide composite geocoding web service.

Road Centerlines (RCL) – VGIN maintains a statewide road centerline feature class that is updated quarterly using locality centerline submissions. This road centerline database contains address range information when it is provided by the locality. The RCL database is used to generate a geocoding service which is an interpolated point along a centerline and this is fed into the Virginia statewide composite geocoding web service.

TIGER 2010 Census Blocks – 2010 Census geometry that is available to the broadband mapping project for location and presentation of broadband data.

Getting Started: Selection Set Feature Classes

Before any provider information was processed, a geodatabase of selection set feature classes was created and individual feature classes were created for use in the 2011 fall data submission. In order to support the processing of broadband data based on select by location, feature classes were set up into a selection feature database which allowed subsets of provider information to be joined spatially or by attributes and schema to be used seamlessly from the processing environment to the transfer data model. Each feature class of interest was an import of the most recent iteration the NTIA SBDD data model schema (June 2011). Features from Virginia base map data was ETL'd using appropriate field mapping. The following are layers used in the Selection Set geodatabase:



NTIA Roads Feature Class - Virginia RCL data has address ranges in the form of four fields; from left, to left, from right, & to right. Two fields were added in the VA State RCL output for address high and low and calculated based on several selection queries. A blank schema feature class of the roads was added and the field V_LEID (VA RCL unique ID) was added to the feature class. This customized statewide data set from the Virginia RCL Quarter 2 of 2011 was then loaded to a selection set feature class which cloned the schema of the NTIA SBDD model feature class called BB_Service_RoadSegment. Unique IDs from the VA centerline were loaded to the selection set road centerline feature class. All Broadband related fields (DBA, FRN, TransTech, etc.) assumed default values of the NITA data model and were <Null> or blank.

NTIA Addresses Feature Class - Statewide data from the Virginia AP Q2 of 2011 was loaded to a selection set feature class which cloned the schema of the NTIA SBDD model feature class called BB_Service_Address. A spatial join was performed to this data set to the 2010 census blocks in order to apply block information to the point and the 2010 bock information available on the fly. The FULLFIPSID field inside the address points was then overwritten with the new spatially joined data based on the GEOID value from 2010. Latitude and Longitude values were also calculated in the selection set feature class. All Broadband related fields assumed default values of the NTIA data model and were <Null> or blank. These values were calculated individually for providers who submitted data relevant to address points.

NTIA Blocks2000 Feature Class - 2000 Tiger blocks were loaded into the NTIA model directly using the schema of the NTIA SBDD data model for the feature class named BB_Service_CensusBlock. FIPS values were matched up in the ETL and several other related block fields were loaded as well. Broadband related fields assumed default values of the NTIA data model. Values were calculated individually based on joins. This data was used solely to create a quick reference to confirm suspicions of whether a provider submitted data in 2000 census block geography or 2010.

NTIA Blocks2010 Feature Class - 2010 Tiger blocks were loaded into the NTIA model directly using the schema of the NTIA SBDD data model for the feature class name BB_Service_CensusBlock. GEOID values in the 2010 data were mapped to the FIPS values in the NTIA schema and other related block data was matched with its appropriate field name. Broadband related fields assumed default values of the NTIA data model. A separate field called SQ_MI_VA_LAMBERT was added to the selection set feature class and was created in the NAD_1983_Virginia_Lambert (Meters) projection and calculated to the WGS_84 data set. This was used in Square Mile QC.

Broadband Provider Processing Environment

To support the processing of broadband provider information separately, a broadband provider specific staging geodatabase was created. Each broadband provider participating in the spring 2012had its own geodatabase and data was processed completely independent of all other broadband providers, allowing providers to move through the process at different rates. This also allowed the correction of any data problems specific to broadband providers without affecting the entire submission database.

A naming convention for each selection set feature class was used and called “NTIA_” and the feature class type. “NTIA_Roads” were loaded to the transfer data model feature class BB_Service_RoadSegment, “NTIA_Census_Blocks” were loaded to the transfer data model BB_Service_CensusBlock feature class, “NTIA_Addresses” were loaded to the transfer data model BB_Service_Address feature class, and depending on provider category “NTIA_Wireless” was loaded to the transfer data model BB_Service_Wireless. Once the broadband provider data was processed to a point in its native feature class in the staging geodatabase which fully conformed to the NTIA specifications, it was included in the Virginia submission for quality control and subsequent delivery.

Virginia Provider Data Submission Categorization

Between submissions from the spring 2011 and fall 2011, Virginia designed a nomenclature to use in referring to a provider based on the category of data which they provide to the CIT and VGIN. While it is apparent that the receipt of GIS data is the most desirable format when processing data sets, some providers may not be able to send this type of information based on the resources they have at hand. Provider data category generally dictates provider processing methodology.

Between submissions it was noted that some providers may actually change the type of data they submit to CIT and VGIN. Some providers may have the capability of storing or already storing their information in the most desirable format although not submitting data in this format.

Tracking what is sent and placing a category for the type of data received can be a good factor in analyzing deltas for feedback looping and can ultimately build provider communication and allow new standardization of data submitted. Virginia would like for providers to be consistent in the data they send to the CIT and VGIN and provider data category becomes a quick reference for this consistency.

The naming convention is only for providers who submit census blocks, addresses, address ranges, or wireless information. In the next submission, middle mile, pricing, and additional data sets may be used in the update to wireline provider type. The following are categories which refer to the data received by a provider for base data:

Wireline Providers:

Category 1
- Provider sent GIS census blocks (census)
- Provider sent GIS road centerlines (census)

Category 2
- Provider sent census block IDs in tabular form for blocks less than 2 square miles
- Provider sent address ranges in tabular form with TLID (Tiger GIS line ID)

Category 3
- Provider sent census block IDs in tabular form for blocks less than 2 square miles

- Provider sent customer address numbers in tabular form

Category 4
- Provider sent census block IDs in tabular form for blocks less than 2 square miles
- Provider sent address ranges in tabular form with no TLID

Category 5
- Provider sent census block IDs in tabular form
- Provider did not submit address level data

Category 6
- Provider did not send census block IDs
- Provider sent customer address numbers in tabular form OR provider sent address ranges

Wireless Providers:

Category 7
- Provider sent GIS shapefiles of coverage areas

Category 8
- Provider sent customer address numbers in tabular form which represented coverage (propagation model developed)

Generalized Broadband provider Data Processing

Broadband provider processing was accomplished in using selection set feature classes and the appropriate geometry supplied. Data was reported in many different categories and each of these reporting formats was handled differently. While there were other NTIA SBDD data sets that were provided differently from providers (pricing, speed by region), they were considered separate use cases than base layer data since the output of these secondary data sets was not primarily geospatial. The following are GIS data layers reported in the SBDD data model.

Wireless Service Area Polygon Reporting – Service Area Polygons were reported by Wireless Broadband providers and required little processing to be included in the NTIA SBDD data model. Typical inclusion processes included attribute validation and use of the ESRI Simple Data Loader or Copy and Paste.

Census Block Reporting – Broadband providers reporting broadband availability on a census block basis submitted it in list form a majority of the time. These lists came in the form of spreadsheets and text files. These lists were normalized into spreadsheets and then imported into a provider staging geodatabase table. An attribute join using the full census block ID was completed to the Selection Set census block feature class. Census blocks less than 2 square miles were exported to a separate feature class to use in processing address and/or road centerline data also sent by the provider.

Address Reporting – The majority of providers reporting broadband availability on a service address basis submitted in a list format and four providers sent geospatial data for the first time. All lists were converted to spreadsheets and were geocoded using VGINs three tiered geocoding process. Addresses were first geocoded against the statewide address point database. Any service addresses that were tied with the match threshold or unmatched on the first pass were rerun using the statewide road centerline geocoding web service. At this point, a majority of the addresses were located and unmatched and tied addresses were then exported as a separate feature class.

Road Segment Address Reporting – Broadband providers reporting broadband availability using road address ranges submitted the data in a non-spatial list in a majority of cases, although several providers did send in TIGER lines or VA RCL data. These lists were normalized into a series of spreadsheets when processing the individual provider. The data was either used in joining to census features by Tiger Line ID (TLID) and then selecting by location from the selection set RCL data or used raw in geospatial format and selected.

Community Anchor Institutions –
Virginia's CAI data has additional attribution beyond the NTIA data model due to the source of the VA data set. VGIN and Virginia Tech both house CAI data although the record counts for tables are not identical. The master VGIN geospatial feature class is used in submission to the SBDD project while changes from Virginia Tech are generally conflated.

Virginia Tech held speed tests in 2009 and this information was applied to the NTIA SBDD transfer data models of the past. With the inclusion of attribute values for subscriber upload and subscriber download speeds with the most recent NTIA model for the Spring 2012 submission, Virginia Tech provided VGIN with an export of its most recent database to include speed testing held in 2011 in the SBDD Transfer Data model CAI feature class. Included were a subset of features based on CAI category and were not the entire CAI feature class so features in the VT data were then applied to the VGIN submission feature class.

In order to apply changes from the Virginia Tech update to the VGIN NTIA submission data, the VGIN CAI point feature class as well as the VT point feature class update were imported into a staging file Geodatabase. The VT update was buffered 5 feet and output to a buffer feature class which included the same attribution as the point feature class. The point was spatially joined to the buffer feature class and values were calculated within the point data to include updates to speeds and transmission technologies where captured by VT. Of the total features, approximately 100 features did not fall within the buffers and were not spatially joined. These values were either features which the VT feature class contained and the VGIN feature class did not, or the geometry locations were different for the same feature. These remaining buffered features were exported to a separate feature class to use in manually adding changes to the VGIN point data. For each feature not available in the VGIN CAI features, the data was copied from the Virginia Tech data and placed in the VGIN CAI feature class. For each feature that were in both databases but spatial location was different, the ESRI ArcGIS Attribute Transfer functionality was used to conflate speed values.

In order to represent the data with 2010 census geography as requested by the NTIA for the Fall 2011 SBDD submission, data was then spatially joined to the 2010 census block data and output in the working Geodatabase feature class. The resulting feature class was calculated for the full FIPS ID and this was loaded to the transfer data model in the NTIA SBDD format.

Dialogues are planned to occur between the spring 2012 and fall 2012 data releases which will allow a more efficient maintenance technique between the two participating entities.

Middle Mile – The majority of providers do not send middle mile data. When it is received it is converted into a geodatabase table in the broadband provider's staging geodatabase. An add XY function was performed in ArcMap and XY events were exported as a new feature class. Inside the provider's staging geodatabase, the NTIA SBDD data model feature class named BB_ConnectionPoint_MiddleMile was imported and renamed NTIA_middle_mile. Data was either loaded to this feature class and all appropriate fields were calculated based on the XY event in order to load data spatially or if only a handful of points were provided the data was manually edited in an edit session.

Pricing - If nominal weighted subscriber speed was available from a broadband provider, the data was placed into an excel spreadsheet for the spring 2012submission which followed the format of requested text output information from NTIA. It was then output to a requested tab delimited text file for the release. All providers who had previously sent in pricing data but had not submitted an update for the spring 2012release were carried over into the spring 2012pricing spreadsheet.

Speed based on CMA/MSA/RSA - If speed was available by cellular market area or MSA/RSA and provided to CIT and VGIN, this information was placed into a newly created SDE feature class which tracked the most current speed from a provider. If the provider was a new or updated submission, the feature class was updated with the most recent speed data. All archive speed data was located and custom areas of interest were added as polygons in this feature class.

Processing QC, Batch Calculation, & Loading

While some provider data imported directly, where information for 2010 census geography was needed (Census Blocks, Middle Mile, Address Points) the feature of interest was imported and processed differently depending on the type of geography stored. Not all providers submitted census blocks to the NTIA but those who did were validated with a field in the selection set census block layer which contained square mileage calculated on the VA Custom Lambert projection.

For data reported as service addresses, several fields were required that could be calculated in batch. The FULLFIPSID was calculated to the address points by spatially joining points to the census blocks. Latitude and Longitude were calculated in ArcCatalog using the calculate geometry function.

Only a few broadband providers who participated in the fall 2012 NTIA submittal provided Middle mile data. Resultantly, the processing and aggregation of a middle mile data set was done outside of standard broadband provider data processing.

Address Points, Road Centerlines, Census blocks, and Wireless Service polygons were processed as broadband provider data was received although middle mile information was a post processing step. To create middle mile event data, the broadband providers that provided the information to CIT and VGIN generally included latitude and longitude of the facility and these values were used in ArcGIS with the add XY function. After points were brought into ArcGIS, data was exported into a separate feature class and values were calculated based on information the broadband provider provided.

Specific Broadband Provider Processing Methodology

The following Broadband Providers submitted CIT data for the spring 2011 NTIA submission. It is assumed that the participating Broadband providers provided entire coverage as opposed to update only data sets unless otherwise noted. Included are the methods used in updating the Virginia Broadband map data:

Broadband Provider	FCC Registration Number
AT&T Wireless	0004979233
Charter Communications, Inc.	0017179383
Cogent Communications Group	0019066034
Comcast	0004441663
Covad Communications Company	0003753753
Cox Communications	0001524461
Cricket Communications, Inc.	0002963528
Highland Telephone Cooperative	0004318846

Mid-Atlantic Broadband Cooperative	0019765304
Northern Neck Wireless Internet Services, LLC	0017338054
NTELOS Inc.	0005849518
NTELOS (Richmond 20 MHz LLC)	0001656180
NTELOS (Virginia PCS Alliance, L.C.)	0002051720
NTELOS (West Virginia PCS Alliance, L.C.)	0002049328
NTELOS Telephone Inc.	0002073138
NTELOS Network Inc.	0003742442
Roanoke and Botetourt Telephone Company	0003775244
R&B Network Inc.	0003775301
RCN	0003735016
Shentel Cable Company	0018024075
Shentel Service Company	0013393988
Sidera Networks	0006254403
Sprint Nextel Corporation	0003774593
Starband Communications Inc.	0005087457
T-Mobile	0006945950
TDS Telecom (Amelia Telephone Corporation)	0002073526
TDS Telecom (New Castle Telephone Company)	0003767399
TDS Telecom (Virginia Telephone Company)	0002058261
Time Warner Cable	0013430244
Verizon Wireline	0002073203
Verizon Wireless	0003290673
WildBlue Communications Inc	0007843766

AT&T Mobility, LLC

AT&T wireless provided geospatial data in the form of a coverage area shape file. Middle mile data was included but the values reported were the same as reported in the spring 2011 submission and were carried over to the Spring 2012 NTIA data model.

Inside the shapefile provided by AT&T were over 1800 polygon records with identical attribution. The data appeared to be gridded for internal use. The shape file was copied for editing in the staging database and the polygons were merged into a single coverage polygon. The shape file was then loaded into the VGIN NTIA transfer data model. Upon reviewing the documentation from AT&T, their coverage area did have two spectrums so the shape file was loaded a second time into the VGIN NTIA transfer data model. The two records were then populated with attributes matching the supplied documentation.

Provider Name:	AT&T Mobility, LLC
DBA Name:	AT&T Mobility, LLC
FRN:	0004979233
Transmission Technology	80
VA Data Category:	7
Wireless Polygons:	2
2010 Census Blocks <2 Square miles:	0

Address Point features:	0
Road Centerline features:	0
Middle Mile features:	1
Community Anchor Institutions reported:	0

Charter

Charter provided Geospatial data in the form of road centerlines and 2010 census blocks (< 2 square mile) for two different transmission types, as well as middle mile data. All were in a shape file format. No new subscriber-weighted nominal speed data was sent therefore that data was carried over from the Fall 2011 submittal.

The middle mile attributes were complete to NTIA standards when submitted by Charter and were loaded directly into the VGIN NTIA transfer data model.

The census block shp file contained only a portion of the attributes needed to meet the NTIA standards. A select by location was performed using the census block feature class in the VA Selection Set and all identical polygons matching the census blocks from Charter were exported to a shape file. All attributes were populated in the exported shape file and then loaded into the VGIN NTIA transfer data model.

In order to provide the Road Centerline data in Virginia's geometry (VBMP RCL Quarter 1, 2012) and eliminate the bulk of ancillary roads from TIGER lines, the road lines provided by Charter were used in a select by location analysis. A select by location was performed using the road centerline feature class in the VA Selection Set to select road lines that were within 2 meters of the lines submitted by Charter. The selected data was then exported to a shape file and the NTIA attributes were populated before loading into the VGIN NTIA transfer data model.

Provider Name:	Charter Communications, Inc.
DBA Name:	Charter Communications, Inc.
FRN:	0017179383
Transmission Technology	40
VA Data Category:	1
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	5345
Address Point features:	0
Road Centerline features:	314
Middle Mile features:	3
Community Anchor Institutions reported:	0

Provider Name:	Charter Communications, Inc.
DBA Name:	Charter Communications, Inc.
FRN:	0017179383
Transmission Technology	41

VA Data Category:	1
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	320
Address Point features:	0
Road Centerline features:	2
Middle Mile features:	0
Community Anchor Institutions reported:	0

Cogent Communications Group, Inc.

Cogent is a backbone provider and submitted an email with instructions for downloading address data from their web site. The email also included the transmission technology type and advertised down and upload speeds for the addresses. The data was downloaded in a spreadsheet format from the Cogent web site and imported into the provider staging database. Geocoding resulted in a 95% match. The GIS table was scrubbed to add and populate fields to conform to the NTIA data model and loaded to the VGIN NTIA transfer data model.

Provider Name:	Cogent Communications Group, Inc.
DBA Name:	Cogent
FRN:	0019066034
Transmission Technology	50
VA Data Category:	?
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	53
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Comcast

Comcast provided census block and address range spreadsheets. Speed data was provided by region in a spreadsheet and the values inside were added to the Speed SDE feature class as regional polygons. A staging file geodatabase was created for this provider and the census block spreadsheet information was imported as a table.

None of the census blocks reported were over two square miles. The spreadsheet was imported to the staging database and joined to the census block feature class in the VGIN VA Selection Set. The joined data was then exported to a new feature class. The features in this new layer were selected by location to the SDE speed feature class in order to apply maximum down and upload speeds which were reported in the speed spreadsheet.

Address level data was not sufficient for the Spring 2012 submission so Fall of 2011 address point data was utilized. The points were selected by location based on the updated block information and all points which fell outside of the blocks were used. The same methodology was used in reporting geocoded centerline data.

Provider Name:	Comcast Cable Communications, LLC
DBA Name:	Comcast
FRN:	0004441663
Transmission Technology	40, 41
VA Data Category:	3
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	54103
Address Point features:	11628
Road Centerline features:	325
Middle Mile features:	0
Community Anchor Institutions reported:	0

Covad Communications Company

Covad provided Census Blocks, Address ranges, Middle Mile, subscriber pricing, and speed by region as text files. This data was normalized to spreadsheets. CIT confirmed with the provider that the census geography used was in 2010. A staging geodatabase was created and the spreadsheets were imported as feature class tables. The pricing information was added directly from the imported spreadsheet to the provider aggregate pricing spreadsheet while the Middle mile and speed data were checked and no updates were necessary to make in the Middle mile point and Speed polygon feature classes so values were carried over from the spring 2011 submission.

Covad provided different transmission technology speeds within the same geometric features so the output product need was stacked geometry. In order to geographically represent the data this way, for Census Block and Address Segment data, transmission type was selected and a separate geodatabase table was exported for each. There were 3 tables for Census Blocks created; 10, 20, & 30. There were 3 tables for address ranges created; 10, 20, & 30. Each of these were joined to the appropriate feature class individually, exported as a separate feature class, and then loaded to a single feature class per geometry.

The census block text file contained varying transmission technologies. There were more records than Microsoft excel 2003 could handle so the import procedure to normalize the data was directly into an Access database. To graphically represent the COVAD data, the imported Access table was added as a table in ArcMap and individual table selections were output for Transmission Technology type. There were three output tables created and each table was individually joined to the selection set census block layer to verify record number counts. The joins all were successful, signifying that the data was indeed in 2010 geography so they were exported to a separate feature class per table. Typical Download and Upload speeds were on the feature through the join but Advertised was located in the speed information which was applied to the SDE Speed polygon layer so layers were selected individually to conflate the advertised speeds based on select by location. The three populated feature classes were loaded into a single feature class to represent block geography and this was loaded to the NITA transfer data model.

Address Ranges did have TLID values inside of them so for each Address Table created, they were joined to the 2010 TIGER lines and then exported individually to a TIGER Feature class. Each Tiger feature class was used in select by location to be within 5 meters of the selection set Virginia Road Centerline data. Three selection set feature classes were then output and attributes were populated individually. The three line features were merged into a single feature of stacked geometries and this was loaded to the NTIA Transfer data model.

Provider Name:	DIECA Communications, Inc.
DBA Name:	Covad Communications Company
FRN:	0003753753
Transmission Technology	10, 20 , 30
VA Data Category:	2
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	128672
Address Point features:	0
Road Centerline features:	1243
Middle Mile features:	6
Community Anchor Institutions reported:	0

Cricket

Cricket provided Geospatial data in the form of a coverage area shape file and the coverage foot print had changed from the last submittal. Middle mile data was not included. The shape file had all of the attributes needed so a staging database was not needed. The shape file was copied and pasted into the VGIN NTIA Transfer data model BB_Service_Wireless feature class and attributes were populated as listed in the source data.

Provider Name:	Leap Wireless International, Inc.
DBA Name:	Cricket Communications, Inc.
FRN:	0002963528
Transmission Technology	80
VA Data Category:	7
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Highland Telephone Cooperative

Highland Telephone provided a document stating they had no changes to their service area but their maximum advertized download speeds have increase. They also listed middle mile x, y values with appropriate attributes for the first time. A provider staging data base was created for importing the middle mile data and populating the attributes. The middle mile feature class was then loaded to the VGIN NTIA transfer data model.

Provider Name:	Highland Telephone Cooperative
DBA Name:	Highland Telephone Cooperative
FRN:	0004318846
Transmission Technology	10
VA Data Category:	7
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	306
Middle Mile features:	3
Community Anchor Institutions reported:	0

MBC

MBC is a middle mile/backbone fiber company and does not provide service to end users. They currently have construction in progress for infrastructure build-outs through two grants. MBC submits shape files of nodes and lines under construction along with their middle mile data but it is not processed into the NTIA data model at this point.

The middle mile shape file was copied for editing. Fields were added and populated as needed and were then imported into the NTIA transfer data model. No staging database was needed.

Provider Name:	Mid-Atlantic Broadband Cooperative
DBA Name:	MBC
FRN:	0019765304
Transmission Technology	50
VA Data Category:	7
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	22
Community Anchor Institutions reported:	0

Northern Neck Wi-Fi

Northern Neck Wireless provided its submission for the spring 2012release in the form of address level data even though they are a wireline provider. Based on NTIA feedback and the transmission technology type of the provider, Virginia Tech developed a radio tower propagation model for the spring 2011 SBDD data release to be used in reporting instead of address level point or road centerline data. For detailed processing information, please review the spring 2011 SBDD reporting documentation. The address level data for the spring 2012release was geocoded and points were used in verification of accuracy of the polygon data based on the centroid of the point.

Many addresses that were geocoded fell outside of the model generated for the previous release. All address and RCL point matches through the history of submission of Northern Neck Wi-Fi were merged together in a single point layer. Points were selected if their centroid fell within the propagation model polygon, and then results were switched to find all features outside of the polygon. Many customer addresses points were found outside of the tower extents (polygons). Buffers of 500 meters were created around the points since the original VA broadband map from 2008 was generated for statewide visualization of 500 meter buffers. The polygon buffers were all merged together in a single polygon and loaded to the SBDD wireless polygon feature class in the transfer data model. The carryover polygon information from spring 2011 was loaded into the transfer data model as well.

Provider Name:	Northern Neck Wireless Internet Services, LLC
DBA Name:	Northern Neck Wireless Internet Services, LLC
FRN:	0017338054
Transmission Technology	70
VA Data Category:	8
Wireless Polygons:	2
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

NTELOS Wireline

The NTELOS data was received late and the data format of their files was substantially changed from previous submittals. They sent in excel files of census blocks less than two square mile and census blocks over two square miles. No address or road data was received for areas outside of census blocks less than two square miles. The attributes did not contain FRNs or provider/DBA names so it was not possible to break out the data into the various companies. Due to the late submission by the provider it was decided to carry over their data from fall 2012.

Provider Name:	NTELOS Inc.
DBA Name:	NTELOS Telephone Inc.
FRN:	0002073138
Transmission Technology	10, 50
VA Data Category:	3
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	3260
Address Point features:	6462

Road Centerline features:	1263
Middle Mile features:	2
Community Anchor Institutions reported:	0

Provider Name:	NTELOS Inc.
DBA Name:	NTELOS Network Inc.
FRN:	0003742442
Transmission Technology	10, 50
VA Data Category:	3
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	1946
Address Point features:	1768
Road Centerline features:	295
Middle Mile features:	50
Community Anchor Institutions reported:	0

Provider Name:	NTELOS Inc.
DBA Name:	Roanoke and Botetourt Telephone Company
FRN:	0003775244
Transmission Technology	10, 50
VA Data Category:	3
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	1297
Address Point features:	3508
Road Centerline features:	121
Middle Mile features:	1
Community Anchor Institutions reported:	0

Provider Name:	NTELOS Inc.
DBA Name:	R&B Network Inc.
FRN:	0003775301
Transmission Technology	10
VA Data Category:	3
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	1019
Address Point features:	469
Road Centerline features:	171
Middle Mile features:	13
Community Anchor Institutions reported:	0

RCN Telecom Services LLC

RCN provided a spreadsheet of address availability and middle mile points for the spring 2012submission. A provider staging geodatabase was created and both files were imported as tables for normalization. The Address availability import table was geocoded and matched records were kept, while unmatched and tied results were exported to a separate table in the geodatabase. The matched feature class was then loaded into the VGIN NTIA Transfer data model.

The middle mile data provided this round was reviewed and had not changed from the Fall 2011 submittal so the fall 2011 data was loaded into the VGIN Carry Over data model.

Provider Name:	Starpower Communications LLC
DBA Name:	RCN Telecom Services LLC
FRN:	0003735016
Transmission Technology	40, 41
VA Data Category:	6
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	0
Address Point features:	2270
Road Centerline features:	0
Middle Mile features:	2
Community Anchor Institutions reported:	0

Shentel

Shentel provided separate spreadsheets for Shentel Cable Company and Shentel Service Company. Within each spreadsheet was a tab for road segments outside of census blocks less than two square miles, and a tab for census blocks less than 2 square miles. Spreadsheets for speed by county were also sent for both companies. Middle mile and pricing was not submitted at this point in time. The speed information provided was used in updating the SDE speed layer. Two new staging geodatabases were created for both Shentel FRNs and tables were imported into the geodatabase of interest from the original excel tab.

Census block information was reported in 2010 geography so the imported block data was joined to the Selection Set census block table in ArcMap with a 100% match. The new feature class join was then exported to a new feature class and values were calculated based on joined features. The feature class of census blocks were verified as less than two square miles and loaded to the VGIN NTIA transfer data model.

The road segment data submitted by Shentel was in Virginia's road centerline geometry (VBMP RCL Quarter 1, 2012). The table was imported into the road staging database and joined to the Selection Set road table. Matched values were output to a new feature class and attributes were reviewed for completeness. This iteration of the roads was loaded into the VGIN NTIA transfer data model.

Provider Name:	Shentel Cable Company
DBA Name:	Shentel
FRN:	0018024075
Transmission Technology	40
VA Data Category:	2
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	10336
Address Point features:	0
Road Centerline features:	3004

Middle Mile features:	0
Community Anchor Institutions reported:	0

Provider Name:	Shentel Service Company
DBA Name:	Shentel
FRN:	0013393988
Transmission Technology	10
VA Data Category:	2
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	2381
Address Point features:	0
Road Centerline features:	669
Middle Mile features:	0
Community Anchor Institutions reported:	0

Sidera Networks LLC

Sidera provided a spreadsheet for middle mile data with addresses and an address availability text file. Sidera Networks is a backbone provider

The middle mile excel file was imported into the provider staging database and geocoded with a 100% match rate. The GIS file was scrubbed to add and populate fields as required by the NTIA data model. The feature class was then loaded into the Transfer Data Model.

The address availability text file was imported into a spreadsheet format and then imported into the Sidera staging database. The data was then geocoded with a 100% match rate. The new address feature class was compared to the Selection Set census block table and it was determined that all the address points fell inside a census block less than two square miles. The census blocks containing the address points were selected and exported to a separate feature class. The data was scrubbed to populate fields as required by the NTIA data model from the source data. The feature class of blocks less than two square miles was loaded to the NTIA transfer data model.

Provider Name:	Sidera Networks LLC f/n/a RCN New York Communications LLC
DBA Name:	Sidera Networks
FRN:	0006254403
Transmission Technology	50
VA Data Category:	0
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	2
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	8
Community Anchor Institutions reported:	0

Sprint

Sprint provided Geospatial data in the form of a coverage area shape file and middle mile data was included in a text file.

The GIS shape file was loaded into the provider staging geodatabase and compared to the fall 2011 submission to review for changes. The area footprint was different so the attributes were scrubbed to match the NTIA reporting format. The data was then loaded into the VGIN NTIA transfer data model. Middle mile information had not changed from the last round so it was loaded to the VGIN NTIA transfer data model.

Provider Name:	Sprint Nextel Corporation
DBA Name:	Sprint
FRN:	0003774593
Transmission Technology	80
VA Data Category:	7
Wireless Polygons:	2
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	2
Community Anchor Institutions reported:	0

T-Mobile

T-mobile provided geospatial data in the form of three coverage area shp files. In the supporting documentation, T-mobile explained attribute values for each polygon feature class. Middle mile and subscriber-weighted nominal speed data was included in tabular format.

The shapefiles provided by T-mobile were named UMTS, HSPA21, & HSPA42 and inside each shapefile were several thousand records with every single record in each feature class containing identical attribution. The data appeared to be gridded for internal use. The three shp files were imported into the provider’s staging geodatabase. The polygons were merged into a single coverage polygon in the individual staging feature class and then each was copied and pasted into the VGIN NTIA transfer data model. Attributes were populated to match supporting documentation provided by T-mobile.

The middle mile and subscriber-weighted nominal speed data was unchanged from the last submittal.

Provider Name:	T-Mobile USA, Inc.
DBA Name:	T-Mobile
FRN:	0006945950
Transmission Technology	80
VA Data Category:	7
Wireless Polygons:	3
2010 Census Blocks <2 Square miles:	0

Address Point features:	0
Road Centerline features:	0
Middle Mile features:	1
Community Anchor Institutions reported:	0

TDS Telecom

TDS Telecom provided geospatial data for the first time as well as the csv files of Address Availability, Middle mile, and weighted speed that was the source data for their GIS data. The provider submitted data consisted of three address availability feature classes, one for each FRN, and a middle mile feature class. A provider staging database was created to review each feature class. The New Castle Telephone and Virginia Telephone address point layers were determined as acceptable but Amelia Telephone was not. The source csv file for Amelia was imported into the staging database for geocoding and all matched records were kept. All attributes were reviewed for completeness and the three address feature classes were loaded into the VGIN NTIA transfer data model.

The weighted speed information was placed into the pricing spreadsheet directly. Comparison of the middle mile data to the fall 2011 release, revealed no changes so values were carried over from the fall data set.

Provider Name:	Amelia Telephone Corporation
DBA Name:	TDS Telecom
FRN:	0002073526
Transmission Technology	10, 50
VA Data Category:	6
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	0
Address Point features:	3949
Road Centerline features:	0
Middle Mile features:	1
Community Anchor Institutions reported:	0

Provider Name:	New Castle Telephone Company
DBA Name:	TDS Telecom
FRN:	0003767399
Transmission Technology	10
VA Data Category:	6
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	0
Address Point features:	2416
Road Centerline features:	0
Middle Mile features:	1
Community Anchor Institutions reported:	0

Provider Name:	Virginia Telephone Company
DBA Name:	TDS Telecom
FRN:	0002058261

Transmission Technology	10, 50
VA Data Category:	6
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	0
Address Point features:	2416
Road Centerline features:	0
Middle Mile features:	1
Community Anchor Institutions reported:	0

Time Warner Cable (TWC)

TWC provided Geospatial data in the form of road centerlines and 2010 census blocks < 2 square miles. The provider also included a document stating that no middle mile data had changed; and, subscriber- weighted nominal speed would be sent as soon as it was available.

The TWC data included two transmission types 40 and 41. Working in the provider staging database, census blocks < 2 square miles were joined to the Selection Set Census block data using the FIPS number text fields. The joined block data was output to a new feature class. Fields were calculated in the selection set export to match Time Warner fields and then the feature class was loaded into the NTIA transfer data model.

In order to provide the road centerline data in Virginia's geometry (VBMP RCL Quarter 1, 2012), the road lines provided by Time Warner were used in a select by location analysis. The Virginia Road Centerline Selection set was selected if the lines provided by Time Warner were within 5 meters and then exported to a new feature class. The values for all road segments were the same so values from the selection road centerline set were manually calculated to match the provided roads. This iteration of the roads was loaded into the NTIA transfer data model.

Provider Name:	Time Warner Cable LLC
DBA Name:	Time Warner Cable
FRN:	0013430244
Transmission Technology	40
VA Data Category:	1
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	124
Address Point features:	0
Road Centerline features:	86
Middle Mile features:	0
Community Anchor Institutions reported:	0

Transmission Technology	41
VA Data Category:	1
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	3237
Address Point features:	0

Road Centerline features:	2245
Middle Mile features:	0
Community Anchor Institutions reported:	0

Verizon Wireless

Verizon Wireless provided two service area coverage shape files and sent the associated broadband attributes in an email. No middle mile **CARRY OVER** or subscriber-weighted nominal speed data was submitted. Each shape file contained a different footprint, one of Verizon's 4G LTE area and the second of their 3G area. The 3G area was listed in the email as having three separate spectrums.

The shape files were imported into a staging database. A merge was performed in each file as each contained multiple polygons with identical attributes resulting in a single polygon for 3G and one for 4G. Fields were created in the 4G shape file to match the NTIA BB_Service_Wireless feature class document. The 4G shape file was then loaded to the VGIN NTIA transfer database; and, the 3G shape file was loaded three separate times to create three records in the feature class. Attributes were populated in the VGIN NTIA transfer database using the email attribute information with each of the 3G records having a different spectrum. The final geometry was three stacked polygons for the 3G coverage area and one polygon for the 4G area.

Provider Name:	Cellco Partnership and its Affiliated Entities
DBA Name:	Verizon Wireless
FRN:	0003290673
Transmission Technology	80
VA Data Category:	7
Wireless Polygons:	4
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Verizon Wireline

Verizon Wireline provided text files for census block availability, address range availability with TLID, and a spreadsheet of Middle Mile information by addresses. The text files were exported to excel files and loaded into the provider staging geodatabase as tables. The middle mile information was geocoded to the state address point locator and output to a feature class, and then loaded into the transfer data model middle mile feature class. Speed data was not reported this round but the SDE speed feature class was updated with Verizon's speed data from the spring 2011 submission.

Census block information was reported in 2010 geography to CIT and a Verizon reported dual transmission technology types. An initial join of the Verizon census block table to the 2010 blocks showed that several thousand records were filtered out by the join. A frequency was performed on the provided census block FIPS id to see if any duplicate records were present signifying potential transmission technology overlap and there were several thousand. Block information was then exported to two Transmission technology type tables; one for DLS and one for FIOS. These tables were individually joined to the 2010 census blocks in order to achieve exact record matches. The joins were exported to new feature classes and values were calculated based on joined features. Blocks were then verified for appropriate square mileage in the geography conversion and exported to two feature classes per transmission technology type based on the SQ_MI_VALAMBERT inside the selection set feature class. Blocks greater than two square miles that were erroneously reported were exported and loaded to the reported error feature class. The remaining blocks less than two square miles was loaded to the NTIA transfer data model.

The address import data did have TLID available as a column Verizon's data. Since census block transmission technology represented multiple areas, the Transmission Technology type for addresses reported was separated into two geodatabase tables for DSL and for FIOS. In order to provide the Road Centerline data in Virginia's geometry (VBMP RCL Quarter 2, 2011), individual transmission technology tables were joined to the 2010 tiger lines since Verizon reported 2010 data. The joins were output to new feature classes and they were used in a select by location analysis. The Virginia Road Centerline Selection set was selected if the lines provided by Verizon TLID joined lines were within 5 meters and then exported to a new feature class. All values inside the Verizon roads were then used in select by location queries to conflate attributes. This iteration of the roads was loaded into the reporting database.

Provider Name:	Verizon Virginia Inc.
DBA Name:	Verizon Virginia Inc.
FRN:	0002073203
Transmission Technology	10, 50
VA Data Category:	2
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	110853
Address Point features:	0
Road Centerline features:	15403
Middle Mile features:	12
Community Anchor Institutions reported:	0

WildBlue Communications, Inc

WildBlue is a satellite provider and sent Geospatial data in the form of a coverage area shape file (the entire state) with attributes for transmission technology, spectrum and advertised speeds. A staging database was not needed and the coverage area polygon was cut and pasted to the BB_Service_Wireless feature class in the VGIN NTIA transfer database. Attributes were populated to match the original shape file.

Provider Name:	WildBlue Communications, Inc
DBA Name:	Wild Blue Communications, Inc
FRN:	0007843766
Transmission Technology	60
VA Data Category:	7
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Many providers did not submit updates for the spring 2012 so their data from the fall 2011 SBDD transfer model was carried over. A new staging geodatabase was created which represented providers who did not send updates and the schema matched the transfer data model. Providers who did not submit an update were selected by FRN from the fall 2011 NTIA SBDD submittal. The following broadband providers are participants in the VA SBDD project but did not indicate having updates and were loaded into the address point, road centerline, and middle mile carryover feature classes directly without the need of a data rework:

Broadband Provider	FCC Registration Number
BVU OptiNet	0006823991
Buggs Island Telephone Cooperative	0002031698
CenturyTel, Inc.	0018626853
Citizens Cablevision Inc.	0009485343
Citizens Telephone Cooperative	0004381422
Cox Communications	0001524461
FairPoint Communications	0002071116
Level 3 Communications	0003723822
MetroCast Communications	0018547471
MGW Networks	0019225366
Midatlantic Broadband Cooperative	0019765304
Nelson Cable	0000900287
New Hope Telephone Cooperative	0002071579
Nextlink Wireless	0014286934
Roadstar Internet, Inc.	0013445358
Scott County Telephone Cooperative	0002069862
Sunset Digital Communications	0000826322
The Wired Road	0020153854
Verizon Wireless	0003290673
Virginia Mountain Micro	0018713800
XO Communications	0006275945

Post Processing Validation and Quality Control

The data included in the NTIA SBDD data model was quality controlled using the topology included in the model as well as the python script provided by NTIA. The topology was validated using ESRI ArcGIS Topology validation tools within ArcCatalog and no errors were reported.

The spring 2012 SBDD data submission was also quality controlled using the latest python script made available by NTIA on March 23, 2012. The script produced both warnings and failures and the data was scrubbed to correct as many as possible. A few items were noted and skipped due to inconsistencies in the NTIA GP check model as described in the March 23, 2012 conference call for all SBDD states with NTIA. The final run of the script resulted in speed tier warnings and failures which have been documented in detail in the READ ME_NTIA_SPRING_2012_SCRIPT_ERROS included in the data submittal.

Data Issues/Considerations

A major issue with Virginia Broadband data observed from the python QC output is address data. Some providers do not send parsed address data which causes a failure in the script. VGIN plans to review providers who only send concatenated address data to determine if the provider can change the source data or if VGIN can find or develop a tool to assist with this.

Virginia has worked to improve communications directly between VGIN and the technical staff of each provider to review their maps, attribution and data formats. We are striving to make more of the data sent in by providers to conform to the most desirable format for greater speed and efficiency in processing. Our effort has started to pay off with several providers who either sent data spatially for the first time or changed their format. We are encouraged and will continue to work on feedback looping with every provider who submits data.

Project History: Vermont's Broadband Mapping Initiative (BMI) is a collaborative broadband data collection and verification effort involving partners from the public, private and academic sectors participating as the Vermont Broadband Mapping Team. The BMI is supported by grant funds provided under the National Telecommunications and Information Administration's (NTIA) State Broadband Data and Development Program (SBDD).

In November 2009 the Vermont Broadband Mapping Team (BMT) initiated the creation and development of a comprehensive and verified geographic inventory of broadband service availability in the State of Vermont. Landline and wireless services (fixed and mobile) were mapped using information from the providers and other sources. The broadband mapping information collected and verified through this effort is supporting the broadband development objectives identified in the RUS Broadband Initiatives Program (BIP) and NTIA's Broadband Technology Opportunities Program (BTOP) in Vermont. Most importantly, the geographic inventory will further refine our understanding of the location of "unserved" and "underserved" areas in the state, thereby supporting targeted future investments in these areas.

The BMT includes the following organizations: Vermont Department of Public Service, the Vermont Telecommunications Authority, the Center for Rural Studies at the University of Vermont, Vermont's Enhanced 9-1-1 Board and the Vermont Center for Geographic Information. The BMT is also supported by private sector contractors.

Summary of Deliverables: The BMT's second broadband data submission (April 1st, 2012) includes broadband information as of December 31, 2011 (VT_SBDD_20120401.ZIP). The data complies with the NTIA NOFA requirements and SBDD data model (FGDB) specifications as of 12/31/2011. A detailed description of each dataset is available in the ./metadata folder included with the deliverable package.

Listed of Providers Contacted: The BMT reached out to the following list of providers for the 12/31/2011 update.

List of all Companies Contacted by BMT for 12/31/2011		
Doing Business As	**FCC FRN**	**Provided Data**
AT&T Mobility	0004979233	Y
Burlington Telecom	0010480093	No Updates
Charter Communications Inc.	0017179383	Y
Cloud Alliance	0018600445	No Updates
Comcast	0003768165	Y
Duncan Cable	0016391716	No Updates
EC Fiber	9999	Y
FairPoint Communications	0003723202	Y

List of all Companies Contacted by BMT for 12/31/2011		
Doing Business As	**FCC FRN**	**Provided Data**
FairPoint Vermont	0017551359	No Updates
Franklin Telephone Company, Inc.	0004356952	Y
GlobalNet	0018331173	No Updates
Great Auk Wireless, LLC	0017383332	No Updates
Green Mountain Access	0004956652	Y
Hughes Network Systems LLC	0018483073	No Updates
Jeffersonville Cable TV	0003755600	No Broadband Service
Kingdom Connection	0017631540	No Updates
Level 3 Communications	0003723822	No Updates
NCIC	9999	No Broadband Service
North Branch Networks	0018206391	No Updates
North Country Communications	0019521087	No Updates
One Communications	0015337702	N
PC One Cable	9999	No Broadband Service
SegTel	0006204630	No Updates
Shoreham Telephone Company	0004380200	Y
Smuggler's Notch Water Company	0007320963	No Updates
Southern Vermont Broadband Cooperative	9999	No Updates
Southern Vermont Cable Company	0003770351	No Updates
Sovernet Communications	0015120850	Y
Sprint Nextel	0003774593	Y
Starband	0005087457	No Updates
Stowe Cablevision	0003755766	No Updates
TDS Telecom	0004948105	Y
TelJet	0017834540	No Updates
T-Mobile	0006945950	No Broadband Service
Topsham Communications	0016569485	No Updates
Topsham Telephone Company	0016569485	No Updates
Trans-Video Cable	0003770401	No Updates
U.S. Cellular	0004372322	No Updates
Verizon Business	0010856284	No Broadband Service
Verizon Wireless	0003290673	Y
Vermont Telephone Company	0003646213	No Updates
Waitsfield Cable	0004956652	No Broadband Service

List of all Companies Contacted by BMT for 12/31/2011		
Doing Business As	**FCC FRN**	**Provided Data**
WaveComm	0003665080	Y
WildBlue Communications	0007843766	No Updates
WirelessVT Solutions	9999	Y

Data Development Methodology: A variety of data source and data collection methods were used to identify the characteristics and geographic extent of broadband service in Vermont. Here is a quick breakdown

- **Cable:** Mapped to street/street-segment level
- **DSL:** Mapped as polygons (usually Exchange areas) or address points (list of addresses submitted by provider).
- **Fiber Optic:** Mapped as address points (list of address submitted by provider)
- **Fixed Wireless (WISP):** Mapped as polygons (propagation maps prepared by independent contractor using data provided by WISPs)
- **Mobile Wireless:** Mapped as polygons (data submitted by provider)
- **Satellite:** Mapped as polygons (data submitted by provider). Providers of satellite-based broadband services claimed that they covered the entire state.

The cable, DSL, fiber optic, and fixed wireless (WISP) layers were “intersected” with Vermont’s E911 address point layer to determine broadband availability at the address-level. This information was then intersected with Vermont’s 2010 Census Block layer to calculate availability at the block level. The April 1st, 2012 deliverable includes Census block-level data for Census Blocks less than or equal to 2 sq miles, and address level data for Census blocks greater than 2 sq miles.

Mobile wireless and satellite-based broadband polygons were submitted by providers to VCGI. They were formatted to match NTIA specification, but otherwise forwarded as-is.

Vermont’s broadband providers submitted data which was used to populate a table listing maximum advertised and typical speeds by Metropolitan Statistical & Rural Service Areas (Cellular Market Areas). This information was used to populate the speed information contained in the submitted broadband, including speed information at the census block level. In numerous cases providers did not submit typical speed information.

The initial list of Community Anchor Institutions (CAIs) was derived from existing data sources including the VT Critical Facilities Database and Public Libraries Survey from the Institute of Museum and Library Services. Community Anchor Institutions include schools, libraries, medical facilities, public safety facilities, universities and colleges, and other community facilities such as town halls/offices. An email and hard-copy mailing was sent to every institution in the list. They were asked to fill out an online survey. Follow-up emails and phone calls were made to increase the response rate.

The data delivered to the NTIA includes all CAIs, but only includes broadband information for a subset. Additional broadband institutions will be added as their information becomes available.

Data Review: No formal confidence interval for provider data submissions has been established. Vermont is waiting for clarification from the NTIA on this. However, each provider submitted dataset is evaluated against a minimum standard or expectation of quality. If the data submission is identified by the VT Dept of Public Service as not credible based upon their experience, it is not included in the inventory. If a provider creates a data submission that cannot be parsed or, resolved, we contact the provider to try and work out a method of submission that can be used. Vermont had 100% participation from all 38 broadband providers for the 12/31/2011 data submission. However, many of these did not have any updates to report.

Feedback Loops: Each broadband provider that supplies broadband service data in some manner to the VT broadband data inventory is given the option to view a final version of their data submission as it will be represented in the NTIA delivery. However, very few providers have asked for a copy of the final version of their data submission for review. Some smaller providers have asked for, and received, a hardcopy map or digital map graphic (PDF) of their coverage area. All of the providers that requested to see what was being submitted to NTIA representing their coverage area received either a copy of the data, a hardcopy map or digital map graphic in accordance with their preference.

Data Verification Methodology: The BMT used two primary data verification methods: 1) a phone survey conducted by the UVM Center for Rural Studies (CRS) to verify the broadband maps, and 2) wireless-drive testing to evaluate mobile wireless propagation maps submitted by providers.

Conclusion: Vermont's Broadband Mapping Team is pleased to deliver a robust broadband availability inventory to the NTIA. We are confident that it meets the specifications outlined in the NTIA SBDD NOFA. The broadband data and maps will help Vermonters refine their understanding of "un-served" and "underserved" areas of the state, thereby supporting targeted future investments in these areas.

Washington Broadband Mapping

Data Submission Methodology Report

April 1, 2012

Sanborn
320 Miller Avenue
Suite 80
Ann Arbor MI 48103

Washington Broadband Mapping

Data Submission Report (April 1, 2012)

Table of Contents

1 Introduction

This report is submitted along with the fifth data submission for the Washington Broadband Mapping Project. This submission includes all data collected so far per the requirements of the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program (Docket No. 0660-ZA29) Notice of Funds Availability (NOFA) and formal and informal clarifications to it. Specifically, it includes broadband data collected from broadband providers and community anchor institutions data compiled from various sources for the State of WA. The State of WA has retained a mapping contractor, The Sanborn Map Company to perform the work related to the Mapping Grant for this project. Data from the previous submission is now publicly accessible via the WA Broadband Program (http://wabroadbandmapping.org/).

This document is a supplement to the four previous reports submitted with previous data submissions on May 1, 2010, October 1, 2010, April 1, 2011, and October 1, 2011 respectively. Therefore, it builds on the documents provided with those submissions. Rather than repeat the contents of the previous report, this document makes incremental updates on various topics where changes have been made in the methodology or reiterates the methodology used. Please refer to the previous documents for further details.

2 Overall Project Status

2.1 DATA COLLECTION

This section details data collection related to NTIA deliverables which include broadband data and community anchor institution data.

2.1.1 Broadband Data

For this submission, Sanborn started data collection efforts on January 26th, 2012 by sending out data update requests and technical data specifications after NTIA announced all final changes on January 17th, 2012. These were sent to a large list of companies which were compiled from multiple lists (FCC 477 list (dated July 29th, 2011), a list provided by the Washington UTC, Wireless Internet Service Providers Association (WISPA)) and from any providers that were identified through other sources such as web research, planning meetings, State outreach, etc. Sanborn also uploaded the final data for each provider in NTIA format from the previous submission to the Sanborn Provider Portal. The providers were encouraged to use the provider portal and update their information on it.

We followed the same contact and follow-up protocols as the previous submissions. In brief, this involved following up with already participating providers after sending them a letter requesting data updates. For newly identified providers, we contacted them three additional times and offered any/all support to make this as easy as possible. We provided a due date for submission but worked with providers who needed more time. If providers did not submit updated data and did not respond to our efforts to contact them, we reused their existing data.

The following are some of the important changes or no changes:

1. In the October 2011 submission, we migrated all data to Census 2010 geography. We continued to use this geography for this submission. All census blocks and road segments continue to be mapped based on 2010 census data set. Any data submitted in 2000 or 2009 format was converted to 2010 for this submission.

2. We requested all providers to provide us their speed information in mbps rather than as a speed tier. We did this in order to better validate the data, analyze served/underserved, and identify the breakdowns in speeds within a given tier. This had some challenges because some providers were confused with our request, others refused to provide the information, and in some cases, there were mismatches between what they provided before in speed tiers vs. what they were providing in mbps for this submission. This continues to be a work in progress. For this submission, 44% of the participating providers in WA have given us their speed in mbps rather than speed tier.

3. We also requested fixed wireless providers to provide us appropriate information to do propagation analysis. While most providers were open to this idea, due to time limitations and resource constraints, we were successful in getting data for only two providers in WA. One of these providers eventually decided to not allow us to use propagation for their submission but agreed to work with us on this in the future to get better results from propagation. We are using Radio Mobile to do propagation analysis.

4. We continued to not collect data from resellers.

5. Due to our NDA restrictions, last mile infrastructure points, if submitted by providers, are still not being submitted to NTIA.

6. We continue to submit data for satellites in this submission based on NTIA clarifications. We have added an additional satellite provider (StarBand Communications, Inc.) in this submission. We continue to work with Wildblue to improve their service area usingViewshed Analysis to identify areas with no line of sight to satellites. They have indicated willingness to work with us on using viewshed analysis for the next submission.

7. We continued to strive for better participation from Public Utility Districts (PUDs) in Washington. As previously noted, PUDs are public entities at the County level that lay broadband infrastructure connecting to the end users (i.e. such as fiber to the homes) but WA regulations do not allow them to sell directly to the customers (see previous submission report for detailed discussion about this). We added a new PUD – Okanogan PUD to this submission. It is to be noted that the speed for PUDs is likely to be higher than advertised speed due to reasons discussed in the previous methodology paper.

8. Due to NDA restrictions, address points are not included in this submission to NTIA for any commercial provider.

9. Some providers did not submit middle mile elevation or backhaul capacity, particularly when they asked us to reuse previous submission data. Wherever possible, we went back to providers to obtain that information, but it is not available for every record.

10. Terrestrial Mobile Wireless and Terrestrial Fixed Wireless (licensed and unlicensed) were treated as wireless coverage and were delivered as a shapefile. In cases where a provider served using the same technology and spectrum but with different speeds, overlapping areas were removed and the higher speed was assigned.

11. If a cable based wireline provider provides both DOCSIS 2.0 and DOCSIS 3.0 service to the same area, the block or road was listed only once with a technology code of 40.

12. Providers were only willing to indicate on a general level if they served business, residential or both, so we did not get any providers that broke down the type of service by block. Only if the provider stated they only serve business to business customers did we fill in the “category of end user” with a code of 2, otherwise this field was left blank. There are five providers in WA who are identified as serving business customers only. These are:

    1) Capacity Provisioning, Inc.
    2) Integra Telecom of WA
    3) Level 3 Communications, LLC
    4) TW Telecom of WA, LLC
    5) XO Communications, LLC

13. The submission 5 provider data model is currently based on the NTIA data model as of 1/17/12.

    We have added six new providers in this submission:

    1) Desert Winds Wireless (fixed wireless)
    2) Rebus Communications, LLC (fixed wireless)
    3) Startouch, Inc (fixed wireless)
    4) Odessa Office Equipment/ACCIMA (fixed wireless)
    5) StarBand Communications, Inc. (satellite)
    6) Public Utility District of Okanogan County (fiber)

    In this submission:

    1) 47% of the providers submitted new or updated data whereas for 53% of the providers we reused data from their previous submissions. This is in contrast to 59% submitting new or updated data during the previous submission.
    2) We have identified 102 potential providers, of which 82 are participating in this map to date and 20 have refused to participate. In addition, 21 providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers and non-providers is provided at the end of the document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers or resellers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.

During this submission period, we had the following changes in providers:

1) Broadstripe was bought by Wave Holdings

2) Pend Oreille Telephone changed its name to RTI-Pend Oreille Telecom
3) CresComm Services Inc. is now called CresComm WiFi LLC.

2.1.2 Community Anchor Institutions Data

The community anchor institutions data continues to be crowd-sourced through the online data gathering application created by the Sanborn Team. This submission saw very little activity by way of updates from CAIs. This has been a slow process and we are getting to a point of diminishing returns with this effort. The numbers of community anchor institutions that have responded so far is provided below:

Category	Name	Total	Total with Broadband Information in Submission 4
1	School - K through 12	2299	1773
2	Library	356	356
3	Medical/healthcare	135	54
4	Public Safety	1706	105
5	University, college, other post-secondary	220	180
6	Other community support - government	343	32
7	Other community support - nongovernmental	344	11

2.2 DATA PROCESSING

We started with the following base data:

Census Blocks:

For this submission, Census 2010 data was utilized. The data was set up as follows:

- Block size (AREA) is calculated combining the 2010 land area (ALAND) and water area (AWATER)
- AREA is converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

Road Segments:

2010 Tiger Line IDs (TLID) were used for data processing for this submission. The data was set up as follows:

- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
  - The 2010 road segment is completely within a block that is NOT less than 2 square miles
- Only minimum and maximum address ranges and a single zip code for each road segment is maintained.

All data received went through the following processing steps:

1. **Triage:** All new data were quickly reviewed to understand what was received, and in what format. We also made sure we had all the required components for NTIA's data model, such as their FRN and advertised speed information. We also screened for any known issues that we might have seen before (such as Excel 2003 spreadsheets that cut off at 32k row).
2. **Ingest:** At this time the data is actually brought into our systems. Each provider is set up with a unique file geodatabase to store their information. Record counts of what was received are logged so that we can validate that we did not drop anything in processing.
3. **Data Processing:** In this step, the data goes through a number of ETL routines to convert the raw proprietary information into a format similar to the NTIA format. The exact routine utilized depends on how the data is received.
   1) When a wireline provider submits a service boundary, we select all the blocks and roads inside that shape.
   2) If a wireline provider submits a customer address list, the points are geocoded, and then the appropriate block or road segment is selected.

3) If a wireline provider submits block and road information using Census data, we just make sure everything is formatted to the appropriate specifications.
4) If the wireline provider submits any type of road or line data that does not directly correlate to the TIGER data set, we convert the lines to TIGER by selecting the road centroid and spatially selecting the closest segment in our data set. If the road is in a block less than 2 square miles, then the block is selected. Some manual cleanup is also applied to make sure we do not accidentally drop any road segments that should have been processed.
5) Wireless provider data is formatted to ensure that there are no overlapping polygons with the technology type and spectrum. In addition the data is cropped to the state boundary.
6) After each round of processing, we make sure that we only keep unique records. A unique record is defined as having a unique combination of FRN, Block/Road ID, and technology type. If there are multiple records with different speeds, but all else is equal, than we select the maximum of the advertised speeds.

4. **QC Review:** All data are then sent to a different analyst to perform a thorough quality control review on the processed data set. Record counts are compared to what was submitted. The QC staff also make sure the ETL scripts and routines populated all of the right fields.
5. **QA Review:** Data are then sent to another team for Quality Assurance Review. In this step the data is not only double checked against what was originally submitted, but it is also brought up inside standardized ArcMap templates that allow us to make sure our results make sense. This often involves comparing the new data set with prior submissions, as well as looking for any possible technology or speed anomalies and verifying against third-party datasets (as discussed in more details in the next section).
6. **Provider Review:** Processed data is all posted to a customized web-mapping tool we commonly refer to as the Provider Portal. All providers were notified once their data was available on the site, and most were given five business days (with the exception of a couple who were provided three business days) to review the data and respond. In this site, providers can log on and visually see their processed data in a map format. It also allows them to overlay their raw data to help them validate that we did indeed process things correctly. The provider portal also has a suite of markup tools that will allow the providers to edit their data, including adding or removing service areas, and making changes to the data attributes.
7. **Comment Processing:** All comments and feedback received from the provider portal is then reviewed and applied to the processed data set. This updated data set goes back through our QA and QC processes, and if time allows, back out to the Provider Portal, for the provider to review and sign off.
8. **Data Append:** After all of the individual data sets are processed and approved, we run an append process which merges all of the individual provider data sets into one geodatabase. This is also the point where our

team will do any final transformations to get our working data model into the latest NTIA publishing format.

9. **Final QA/QC:** A series of quality checks are run on the final appended data sets to ensure it is ready for submission to NTIA. We also run the NTIA receipt tool at this time. Any last issues are corrected, and the data is sent to the state for their review.
10. **Submission to NTIA.**

2.2.1 Submission 5: NTIA Submission Data Model Schema Changes

The data model released on January 17, 2012 was very similar to the June 30, 2011 data model. No substantive changes were noted and changes related to allowable speed and technology of transmission combinations. Most of these combinations have exceptions to them and hence were not being completely disallowed by NTIA.

2.3 DATA VALIDATION

Sanborn has continued to perform the same validation on the data as the previous four submissions (details in previous reports and a summarized version provided below). Some minor updates to the validation process are discussed below.

1) QC of the data at various steps – this includes when data is received (triage), when it is processed through the various processing steps discussed above, etc.
2) Spatial checks against public and commercial datasets
    a. For WA, we continued to use the following datasets for validation:
        i. Exchange Boundaries: for DSL boundaries
        ii. MediaPrints: for Cable and Fiber boundaries
    b. We did not use speedtest.net speed data that we used previously for validation as we had our own speed test data that was more current and pertinent.
3) Speedtest data and other data collection for verification
    a. We continue to use speedtest data collected through our interactive map and community anchor data crowd-sourced for validation purposes.
    b. For this submission, we added an additional dataset to check against – FCC speed test data. We geocoded the data, used the IP to reverse engineer the provider name and used it to check speeds where possible.

   c. We also incorporated any feedback we received through the interactive map – this included feedback such as incorrect speeds, incorrect boundaries, missing provider or areas of no service, etc.

4) Verification by providers – processed data are uploaded on our Provider Portal for providers to review both the outcome of data processing and any issues that we found in the third-party and crowd-sourced validation. Issues pertaining to a particular provider are highlighted and shown in the portal for those providers only. Issues that are global and cannot be assigned to a particular provider are shown to all providers (e.g. there are no providers in this area, or we tried to get service here and heard x from A provider, y from B provider, etc.). Previously, we were highlighting these issues through a letter but in this submission, we have integrated the feedback through the Provided Portal. We make additional calls to providers who have issues. Planning workshops and local validation – we have looked into any issues that the State Planning team has identified and brought to our attention.

2.4 UNIVERSE OF CONTACTED PROVIDERS/NON-PROVIDERS

We have identified 102 potential providers, of which 82 are participating in this map to date and 20 have refused to participate. In addition, 21 providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers and non-providers is provided at the end of the document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers or resellers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.

2.4.1 Non-providers

Advanced Tel, Inc.
Americom Technologies, Inc.
Beaver Creek Telephone Company dba Timberline Tele
Bell South Long Distance, Inc.
Big River Telephone Company, LLC
Bluebird Wireless Broadband Services, LLC
Cbeyond Communications, LLC
CCS, LLC
CIMCO Communications, Inc.
Clear Talk
Convergia, Inc.
Cordia Communications Corp.
CTC Communications Corp.
CTG3/Bandwidth Builders
DigitalBridge Communications Corp.
Eastern Sub-RSA Limited Partnership
Eltopia Communications, LLC

Enhanced Communications Network, Inc.
Enventis Telecom Inc.
Extenet Systems, Inc.
First Communications, LLC
Harbor Communications, LLC
Horizon Telecom, Inc.
IDT America, Corp
Infotelecom Holdings, LLC
Inland Long Distance Company
Lightspeed Networks, Inc.
Matrix Telecom, Inc.
McLeod USA Telecomm (PAETEC)
Navigator Telecommunications, LLC
NextG Networks of California
North County Communications Corporation
North Olympic Penninsula Data Centers
Pac-West Telecomm, Inc.
Public Communications Services, Inc.
PUD - Asotin
PUD - Clark
PUD - Cowlitz
PUD - Ferry
PUD - Jefferson
PUD - Kittitas
PUD - Klickitat
PUD - Mason #1
PUD - Skamania
PUD - Snohomish
PUD - Stevens
PUD - Thurston
PUD - Wahkiakum
PUD - Whatcom
Qwest Communications Company, LLC
Smart Choice Communications, LLC
Stat Network Solutions
Suddenlink Communications
Syniverse Technologies, Inc.
T2 Technologies
Tcast Communications, Inc.
Telecom Pacific
Touchtone Communications, Inc.
TransNational Communications International, Inc.
University Corporation for Advanced Internet
Verizon
Virtual Networking Services, Inc.
Voicecom Telecommunications, LLC
Washington RSA No 8 Limited Partnership
YMAX Communications Corp.
Zayo Bandwidth Northwest, Inc.
Zayo Enterprise Networks

2.4.2 Resellers

Access One, Inc.
Access Point, Inc.
ACN Communication Services, Inc.
Airespring, Inc.
Alliance Group Services, Inc.
Birch Communications
Broadcore, Inc.
Broadview Networks Holdings, Inc
BullsEye Telcom, Inc
Cincinnati Bell Any Distance, Inc.
Computers 5, Inc. d/b/a LocalTel
Digizip.com, Inc.
Ernest Communications, Inc.
Global Crossing
GlobalCom, Inc.
Highland Internet Services
LightEdge Solutions, Inc.
Metropolitan Telecommunications Holding Company
New Edge Network, Inc.
Norlight, Inc.
Reliance Globalcom Services, Inc.
Silver Star Telecom Washington LLC
Telekenex, Inc
Threshold Communications, Inc.
United Telecom, Inc.
Accel Net Inc.

2.4.3 Non-Responders/Difficulty Contacting

ALEC, Inc.
Bellevue, City of
Fiberlink, LLC
Global Telecom and Technology Americas, Inc.
Greenfly Networks, Inc
Guiness Communications Inc.
Iron Goat Networks
Netlogic, Inc.
Orcas Online, Inc.
Peninsula Telecom of Washington, LLC
Primus Telecommunications, Inc
PUD - Benton
Telovations, Inc.
Towerstream, Inc.
Wanned Technologies, Inc.
WCI Cable, Inc.
WDT World Discount Telecommunications Co., Inc.
Westgate Communications LLC
Windjammer Communications, LLC
World Communications, Inc

X2Comm, Inc.

State Broadband Initiative Mapping Methodology

For the State of Wisconsin Revised March 30, 2012

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

The following documentation provides an overview of how the fifth required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Wisconsin.

This submission marks the first separation of distinct methodology deliverables for each state we work with. In terms of broadband data development and data presentation, we strive to maintain a consistent process across the States. This cross-state approach also helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning a sustainable program leadership to the respective states.

As our team enters the third year of the SBI program, more work has shifted to in state partners. Much of this work focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that our in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this third program year we also anticipate in-State partners taking over the state web presence, both in terms of content and hosting.

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

Significant changes include additions covering:

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

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods
3. Provider advertised speed and coverage validation

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

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

We also note that the mapping deliverable is increasingly important to state policy makers as each of the states we work with continues to assess the policy ecosystem that supports the advancement of broadband access and adoption.

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

Purpose of This Manual

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

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

Data Sources

Developing the Provider List

Provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Independent web searches
- Interviews with key state staff members and important community influencers

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

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

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

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

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

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

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

Provider Survey

Since four prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 5. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 5 survey process was designed to accommodate both

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

new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

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

Returning providers: For Round 5 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 5 survey in early January 2012, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of January and February. The initial data submission deadline was set for February 17, but we continued to accept "straggler" submissions into March.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the vast majority of those we were unable to reach were providers who have simply ceased to exist[2].

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 5, given the data vintage of December 31, 2011, we began this process in January and the last submissions were accepted in March, 2012.

While we continue to successfully engage the majority of providers in each round, the amount of manpower required to solicit complete and timely responses should not be underestimated. This process is one of the most costly and complex within the entire SBI program.

Third Party Data Used

Beyond the data obtained from providers, we acquired the following commercial/restricted use data products:

[2] The list of known providers and important submission statistics are contained in the datapackage.xls file.

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- MapInfo ExchangeInfo, Professional. This data was used in the verification of telephone Broadband provider data. Where a public domain exchange boundary wasn't available, the MapInfo boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service. In very rough terms the contained boundaries were used to test the location of some provider data. FCC 477 restricted use data were analyzed to find valid providers within a given area.

We have included third party data sources which touch on each of the three major technologies analyzed within the SBI program. Each of these data sources tie back to a public domain data source, which provides a cross-verification mechanism for the commercial data product.

Although there are a large number of third party licensed data sources available, we remain conservative in our acquisition plans. From our limited analysis we are concerned about the ability to cross-verify additional third party licensed sources against public domain data. Further, we are unsure of how we may be able to integrate another data provider's view of valid Broadband providers within the definitions used by the NOFA (e.g. Are they using an FRN/DBA identity view or a marketing view? Can the provider supply in a 7-10 day window? Are they facilities based or not?). This leads us back to a statement we made in a 'lessons learned' Webinar (April 2010) about exploring a consortia to lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

Beyond these commercial data sources, we used a number of public domain sources. These included:

Geographic Data Files
US Census TIGER data[4]
Sources that helped isolate providers, identity management or provider service areas
NECA Tariff 4
State produced exchange boundaries
Carrier produced wirecenter boundaries (sometimes proprietary to provider)
FCC Coals reports (321/325)
FCC FRN API lookup tool
FCC/FAA Antenna Registration System
FCC FRN Lookup Tool (plain text search)
USAC High Cost FCC Filing Appendices

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[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.
[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

Sources that helped isolate anchor institutions
USAC Grant lookup tool
USAC High-Cost FCC Filing Appendices
HRSA data warehouse
NCES data lookup
State managed lists of schools (K-12), post-secondary institutions and libraries
List of museums, conventions, and visitors bureaus from www.onlineatlas.us
In state relationships to key stake holders.

Finally, challenges exist when dealing with the inevitable conflicts between provider-submitted data and third party sources (public or commercial). There is no guarantee third party sources are more accurate or timely than the providers' own reports. Indeed, some third party sources are based upon different standards than those specified in the NOFA, perhaps making them less reliable than information collected directly from providers. At the very minimum, provider data has a lineage and temporal status that we can identify. A concern we have with increasing use of third party data is that we have no way to verify its quality or development methodology. Particularly in rural areas we are concerned about what third party data may reflect based upon what we assume to be a small sample of information.

In other words, we may hit a wall in which we can't determine how the commercial source derived its coverage conclusion. To us this means that third party data sources are beneficial, but represent a supplementary view, not an authoritative one, of the NOFA defined Broadband market.

In short, we have chosen to use provider data as the baseline. We will challenge provider reports when third party data shows major anomalies, when submitted data conflict with prior submissions or when a consistent volume of consumer feedback points to a potential error.

Confidentiality and the Use of Licensed Materials

As a mapping vendor, we are reliant upon the cooperation of Broadband service providers. In large part, what underlies this cooperation is trust that we will not violate the proprietary and confidential nature of the data provided to us.

We are thankful for the confidentiality clarification that NTIA shared with us (included as Appendix three). We use this as a guiding document to help us communicate with providers about what information NTIA considers to be confidential. Our suggestion is that NTIA publish this, or something comparable, to ensure a consistent interpretation of the NOFA and how it guides NDAs.

As some providers are non-responsive to requests for information, or lack resources necessary to put data into NTIA compliant formats, we have fallen back to the use of commercial data sources in several places.

For incumbent telephone providers we have used commercial wirecenter boundary products to filter Census Blocks and segments that are clearly out of their exchange areas. For cable providers we will use an estimate based upon Census Designated Places within MediaPrints named areas.

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the state programs overall and engage more citizens in the work at hand. In addition to the various opportunities the public has to provide input via the online service coverage maps and the related 'Broadband story' process, our crowd sourcing efforts are grounded in a time tested telephone survey approach focused on the consumer market. In addition, we continue to advance our process to include certain initiatives centered in two social media outlets – Facebook and Twitter. These initiatives are discussed below.

Consumer Surveys

Working under contract for the state of Alabama in 2009, our initial consumer survey was performed before the NTIA SBI grant was in place. Subsequent consumer surveys funded by the SBI grant were hosted in 2010 for the states of Idaho, Wisconsin and Wyoming and then again in 2011 for Alabama (as noted below). These surveys will be repeated after two years to establish and evaluate trends. Survey results from the most recent effort in Alabama are currently under evaluation. These primarily telephone based surveys include two distinct and carefully scripted tracks: one for Internet users and one for non-users. The telephone survey approach allows us to reach the non-Internet user group as well as the current Internet user. A secondary online approach is also used to augment input from current Internet users. In the most recent Alabama survey we added a third tier to our approach as we equipped local field survey teams with an iPad-based survey tool and targeted their time to reaching the younger market. For non-users, the surveys help determine why they don't have or don't use Broadband. For current Broadband users, the survey helps determine the nature of their Broadband access and how they use that connectivity in their daily lives. In addition to our state-specific surveys a nation-wide survey was also hosted to provide a broader view of consumer views for comparison purposes. State-specific surveys are, where possible, framed to match the state's regional Broadband planning structure (e.g., the updated consumer survey in Alabama was designed to produce results relevant to the state's twelve Broadband planning regions).

The resulting data is helpful on a number of fronts in the SBI's mission to advance the access and adoption to Broadband. Survey data provides an important, albeit broad, gauge for assessing coverage information obtained by providers. For example, areas with widely available coverage (according to provider information), but lower consumer subscription levels (according to survey results), or perhaps where survey results suggest Broadband is not available, can be examined in more detail. Survey results are also very important to the broadband planning (and capacity building) components of the SBI program in that they help inform and formulate Broadband advancement priorities. Survey results also help inform Broadband policy discussions on both the local and state levels. Finally, survey results provide important information to the service provider community regarding market demand and specific Internet use in specific communities (i.e., regions).

Our ongoing consumer survey process adheres to a consistent process. For example, consistent with prior practice the 2011 Alabama survey was launched in June 2011 with a test number of survey calls to confirm (and adjust as needed) the structure of the survey and the underlying survey process. Our surveys typically run for three to four months. All telephone surveys are completely random beginning with the acquisition of a list of state-specific, randomly selected landline telephone numbers. Mobile phones are not typically included in the surveys. Upon evaluation of the survey statistics, auxiliary surveys are executed to ensure appropriate representation is achieved on both demographic and geographic fronts. For example and as noted above, the recent Alabama survey was augmented with a field effort to ensure the younger demographic (i.e., age 18 – 25) was adequately represented. This secondary step is required because of the continued migration (by younger markets) to non-landline based communications. This younger market is also surveyed by reaching out through social media outlets (primarily Facebook and Twitter) to encourage their participation in an online survey process.

Survey statistics from the Alabama update survey are currently being developed and evaluated. Survey statistics from our initial surveys in Idaho, Wisconsin and Wyoming were summarized in our last filing. Survey volumes are designed to achieve statistical validity.

As noted above, our telephone survey process is augmented by providing online access to the survey. Participation in the online survey is promoted on all of our state-specific public web sites and selected social media.

As a final relevant point with respect to the consumer survey process the length of the survey is noteworthy. By survey standards, these tend to be long surveys. The surveys typically average just over fifteen minutes. While this clearly contributes to the number of survey call attempts that were required to reach the level of statistical validity, it is not insurmountable.

Social Media

The phenomenon of social media is widely documented and yet still emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Different states have different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. As noted above, we are able to promote additional input on the consumer surveys through a social media outreach program aimed at our younger market segments.

In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners. As we move into program year 3, distinct tasks are migrating to the responsibility of our State partners.

Within each State, transition planning and responsibility for specific activities is on a slightly different timeline. Much of this is driven by resource availability and partner identification within the State. For example we began transitioning the responsibility for Community Anchor Institution data to the State of Alabama in Round 3, starting with the use of interns to validate Community Anchor Institution data. In Round 4 the state's responsibility expanded to include collection of all CAI data, and in Round 5 the effort culminated with Alabama assuming responsibility for the CAI submission. LinkAMERICA supported this process with detailed transition documents and technical support.

Alabama plans to continue the transition process though the end of year 3 assuming more responsibility for the interactive State maps and website. In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs for this round. Other States are looking more towards the end of program year 3 and the in-State hire of a Broadband Coordinator as the initiation point to support their transition efforts. Broadband Coordinators were brought on board in both Idaho and Wyoming over the past six months. An open position is posted for Wisconsin and that position is expected to fill soon. Alabama has had a broadband coordinator in place for over a year.

Trends in Submitted Data

Overall we note several important trends in this data submission. The list below represents general trends and not a scientific survey.

We note the following trends:

The coverage of advertised speeds is increasingly important. More and more providers are specifically concerned about where the submitted NTIA footprint shows available of 4 x 1 Mbps or 6 x 1 Mbps service.

xDSL speeds are increasing. More and more xDSL is likely ADSL 2+, VDSL, shortened loops, pair bonded or some combination of these. As we talk to providers who trigger speed/technology tripwires, we receive more and more feedback about the presence of these new technologies to enable speeds comparable with DOCSIS systems.

DOCSIS 3 is becoming the norm. Most cable systems are becoming DOCSIS 3.0. Overtime we are seeing the DOCSIS 2.0 areas diminish. In some DOCSIS 3 areas there tend to be pockets of non DOCSIS 3 in predominant DOCSIS 3.0 markets.

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio

manufacturers specific to very high speed wireless services. Although the service can be deployed within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category.

Data Production Process

To support our objective of transitioning the data development process to our State partners, we continue to model and document our data production process. We find this to be a very beneficial step for two purposes.

First, it helps us understand why (and if) a task is being done, and if it is being done efficiently. Much of this program started so quickly that it was difficult to plan logical integration and hand off points among the various workgroups. Further, we are currently in the process of consolidating much of the process data (check-ins, check-outs, metadata) and we can use this process model to efficiently plan cohesive information architecture.

Second, our process documentation and modeling helps explain why resources are being consumed in a particular way. This helps our State partners plan for in-sourcing specific tasks as their time and budgetary constraints allow. It also helps our LinkAMERICA team better plan and cross-train members to deal with the work surge that occurs 30-45 days prior to submission.

Finally, documenting and modeling our process helps us to take advantage of increasing specialization and proficiency with certain types of data and management responsibilities. In submission 3, we had identified data "czars" responsible for check-in and check-out of data. That data czar helped to bridge the gap among receipt functions, provider feedback, production and DBA. In round 5 the data czar was also tasked with alerting on speed/technology tripwires. This individual was responsible for taking the initial review of each submission and determining if an NTIA speed/technology warning would be triggered.

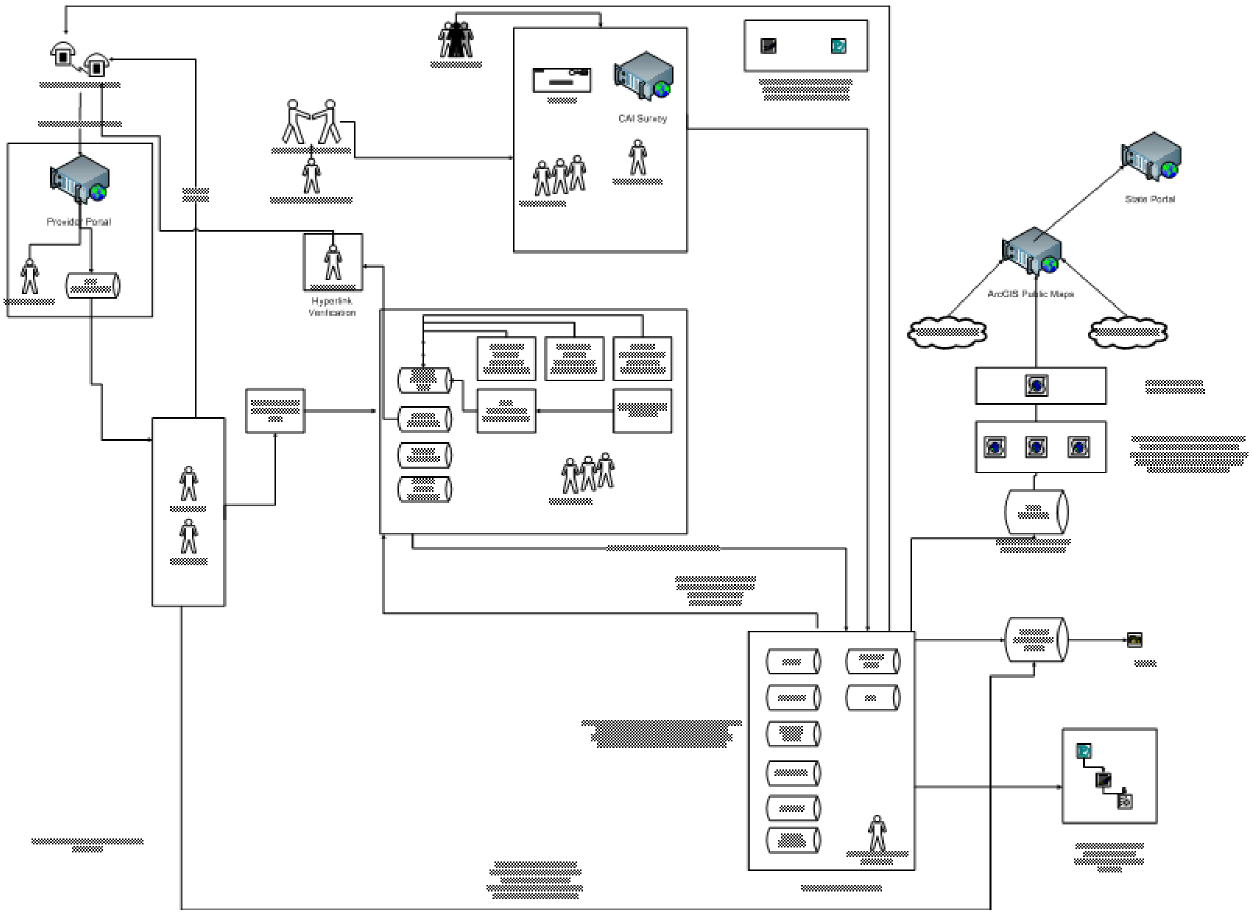

Figure 1—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

Prior to initiating the Round 5 survey, LinkAMERICA transitioned in house provider tracking systems to a Cloud based application, TrackVia.

The movement away from desktop solutions was based upon several factors. First the architecture these systems were designed under no longer met the program realities. For example, deliverables like Datapackage.xls were not contemplated when the original provider tracking system was developed. Second the ability to share data across multiple geographic areas and organizations was becoming increasingly important as the program evolves and responsibility moves to in-State partners. Third, portions of this data need to securely transition back to State resources that may or may not be able to support a specific IT infrastructure. These factors combined to make the Cloud applications a valuable alternative.

As with any IT transition, the process has not been without challenges. Nonetheless the investment in time and resources has proven to be effective and worthwhile. We anticipate further movement away from desktop oriented architecture to a more open, Cloud type solution.

Data Production Methods

As raw data were received from the provider community, attention turned to normalizing the disparate submission formats[5]. The team considered each submission with respect to the following criteria. These criteria are important because they perform the basis for our verification and quality assurance process. In other words, we have to appropriately scale our data verification efforts to match the scale or ambiguity of the following:

- Locational certainty
- Speed certainty
- Temporal certainty
- Provider and network ownership certainty

The team's goal was NOT to quantify a particular degree of precision with respect to any of these criteria. Rather, we are working to attribute the above "certainty attributes" to each submission, and will continue to implement quality assurance and verification mechanisms that are resource-appropriate for each.

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

1. Coverage in Census Blocks (2010) of 2.00 or less square miles
2. Covered Street Segments (2010) in Census Blocks greater than 2 square miles[7]
3. Address Level Coverage (point data)
4. Wireless Service Areas (SHP file format)

With each submission, the team went through a series of steps to normalize and categorize the data. Since data arrived in many different formats, and at many levels of granularity, the following normalization procedures were used:

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Geo-referencing the data; QA the geo-referenced data
- Geoprocessing the geo-referenced response

[5] In line with NTIA Best Practices we continue to request and receive a large number of data input formats. This ranges from tabular Block lists to hand drawn maps.

[6] Speed, Anchor institutions and Middle Mile facilities are discussed in later sections.

[7] To help clarify issues relating to Census block area and vintages in use, our team published a technical paper to the Grantee workspace. Because we were unsure if this standard should be implemented uniformly, this document was never distributed to the provider community.

- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

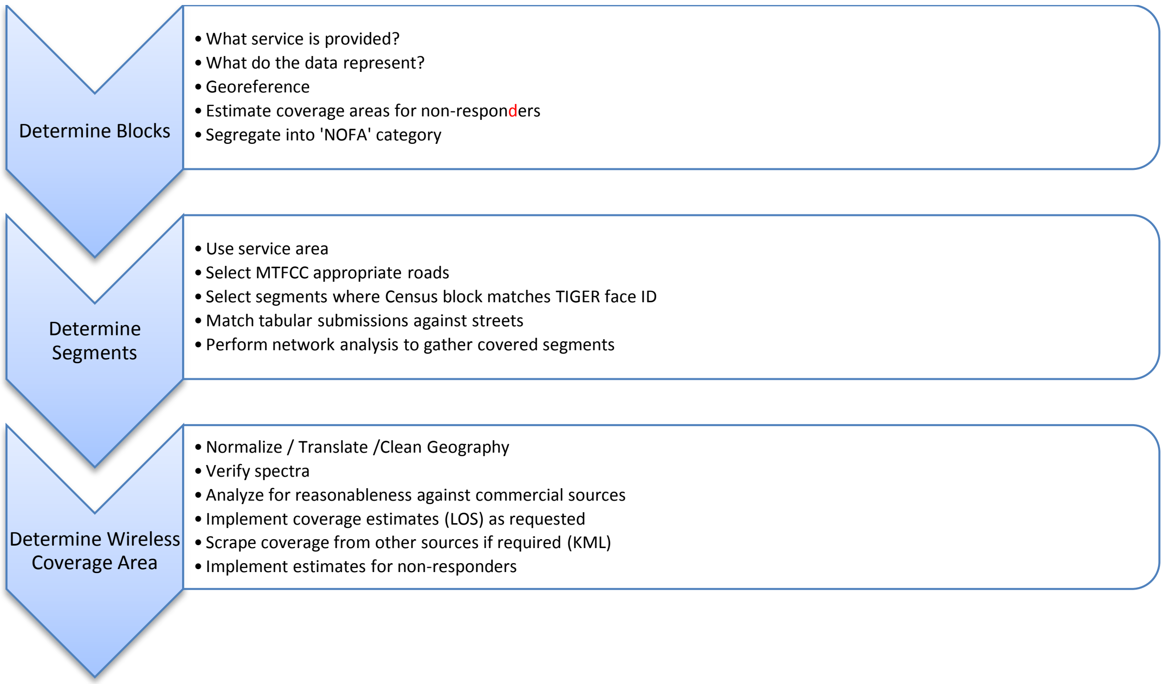

Figure 2-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 5.

Speed Examination

Given recent concerns about the depiction of speed and what that mapped speed represents, LinkAMERICA invests considerable time requesting detailed information on speed which appeared to be beyond normal speeds for a given Technology of Transmission given the NTIA supplied frequency tables.

Based upon these conversations we learned

A) For incumbent telephone providers; the speeds beyond the normal xDSL range represent significantly shortened copper loops, as well as upgrading DSLAMs and modems to support ADSL2+ or VDSL.

B) For cable providers the intermixing of DOCSIS 3.0 and non 3.0 systems in a market area is typical and sometimes reflects a circumstance where segments of plant cannot be upgraded to DOCSIS 3.0. This variance can be at a level below the Census block. In these cases the maximum advertised speeds remain to represent the market area but the plant variance is typical.

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[8] When our team logs a submission into the staging database we record at least two attributes. One records the method used to derive the coverage, the other records the method by which speed was attributed to that object. Other attributes carried to NTIA carry source meta values as well.

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers.

E) There exists a minority of providers who submit a theoretical speed that is unmatched by their web advertising. In these cases we request clarification from the provider on the inconsistency. Our experience has been that providers will modify the speed to be consistent with their web coverage.

F) The maximum advertised speed offered is not always clear. Sometimes the speed is described in advertisements in terms of a combination of video and data. Other times it is data not video. Some providers allow a customer to select how much bandwidth they want to allocate to their data stream versus video stream. In other words the bandwidth available to a household is constant but how it gets allocated among the data versus video becomes a customer or service directed choice. This makes getting Maximum Advertised Downstream speed very difficult because it is not just a product of the broadband network which we are mapping but also the customer's selected service package.

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11) directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[10]. In some cases this involved using simple

[9] We have requested from NTIA information on how provider matching is done within their QA process; beyond the relatively short whitepaper posted with the national map <http://www.broadbandmap.gov/blog/wp-content/uploads/2011/02/DataComparison_Methodology2.pdf>, we have not received any more detailed information on how providers are cross verified between submitted and third party sources at the national level. Our understanding is licensing concerns are holding the release of this information.

[10] We continue to process older submission data looking for information and methods by which we can estimate coverage information. This will be an ongoing process.

polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

In the weeks leading to submission 5 we received a request from NTIA to clarify the presence of unusual shaped wireless polygons. Our interpretation of this was a request for information relating to the source of these data which do not appear as propagated coverage. Although the 'unusual shapes request' represents a very small portion of the submitted data, it begs an important question about the expectations with respect to wireless coverage patterns. We look forward to working with NTIA to address these issues in a fair way across States and providers. We would not want to create a coverage dichotomy where advertised coverage was disallowed from the NTIA submission because of an expectation about how advertised coverage should appear. One concern we have when we develop a coverage estimate which differs from a providers advertised coverage pattern, which should we submit?

Finally, we have used the new provider type classification of 'other' to bring specific aspects of certain provider's data into our submission. There still seems to be confusion on how to handle provider types where a provider offers multiple paths to provision Broadband for typically business customers. Rather than waiting for certainty on the answer, we bring the provider in and list them as provider Type "other". Our sense is provider Type "other" will continue to expand in subsequent submissions.

Clearly one challenge is the data, but an equally significant challenge is appropriate messaging around this "other" provider type category. We do not want to leave consumers with the impression that they can get a high capacity fiber or microwave link despite the fact that the hospital next to them or in a nearby Census block can get this service.

After the Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[11]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

The next section discusses how data were georeferenced and geoprocessed given a particular submission format. We have yet to find a particular method that works across all submissions. Rather we tend to tailor our geoprocessing to meet the specifics of the service provider and data submitted.

In most cases, in Round 5 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[12]

[11] https://sbdd-granteeworkspace.pbworks.com/w/file/42309493/provider%20ClassificationFINAL.docx

[12] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to "belong" is highlighted. In this case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

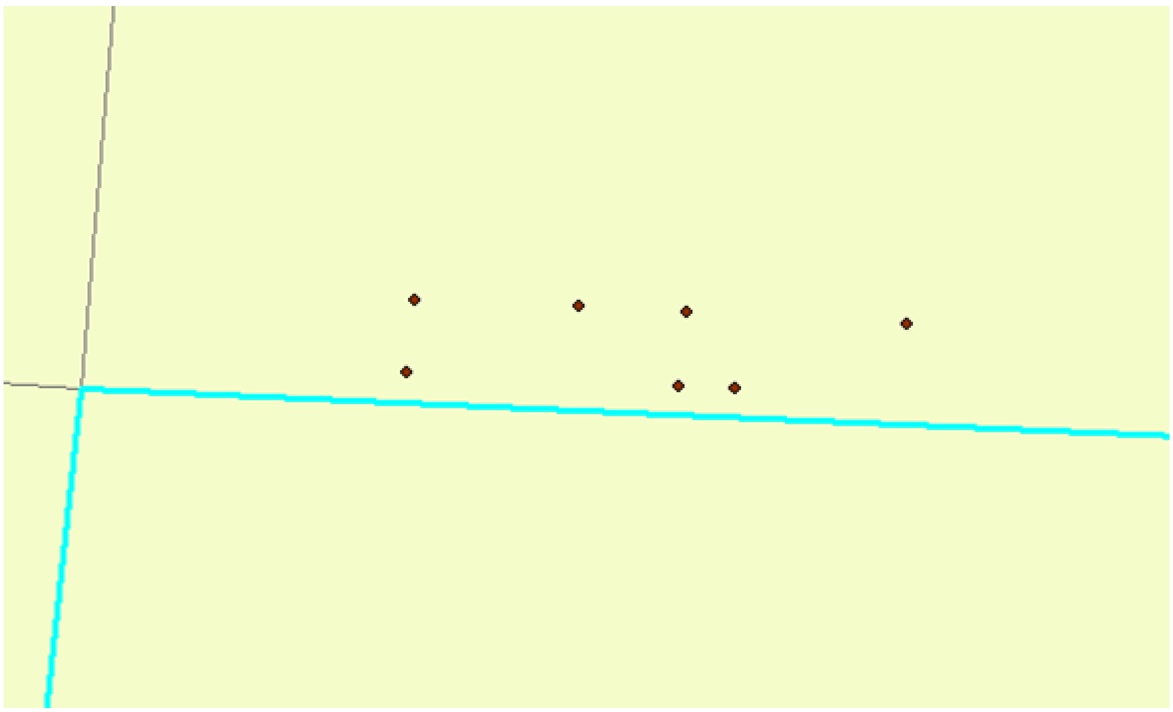


Figure 3-Internal inconsistency in submitted data

In other circumstances, we found that inconsistent geocoding standards may produce misleading results. The next image shows point level data, and the Blocks are colored based upon the counts of points intersecting Blocks. The challenge this presents is that if geocoding was performed on a different dataset than the block boundaries (the road traces are not coincident with block boundaries) and/or geocoding was done without an offset, it becomes problematic to assign coverage to a Census block based upon only the point locations.

cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

Figure 4-Block Coverage

For this reason, where we were provided address point data and asked to generate covered Census blocks, we elected to use a 200-foot buffer to select Census Blocks that intersect our points.

We also see a number of providers submit customer data and facility data. Their intent is to allow us to have two primary sources from which to derive the most accurate coverage. In these cases we tend to look for clusters of customers in areas where we see no facility based coverage.

With respect to deriving Block level speed from sub-Block data, we have instituted a business rule where the predominant speed in a Block is the speed we attribute to the Block.

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

In other circumstances, providers submitted point level plant data. From what we could gather, these points tended to be customer-dedicated terminals. Typically, these providers were high speed Broadband producers—which may somewhat strain the definition of Broadband as other providers supplying comparable services specifically disclaimed the ability to provide high-capacity Broadband services in the required 7-10 day interval. In these plant point data submissions, we had similar concerns to the point level customer data, but two factors tended to make us use a more conservative intersection buffer. First, we tended to have far fewer points to work from, so our concern was grabbing too many covered Blocks as the Blocks tended to be much smaller in these urban areas.

Second, these plant points tended to be dedicated to distinct customers, but it was difficult to know which element of the customer's campus to attach coverage to.

In the case of the image below, given a small shift to the left, it would be easily possible to gather 1 to 3 Census Blocks from this point. Although orthoimagery is helpful in a circumstance such as this, it is still indeterminate.

Thus, in the circumstance of plant level point data, we used a 100-foot intersection buffer.

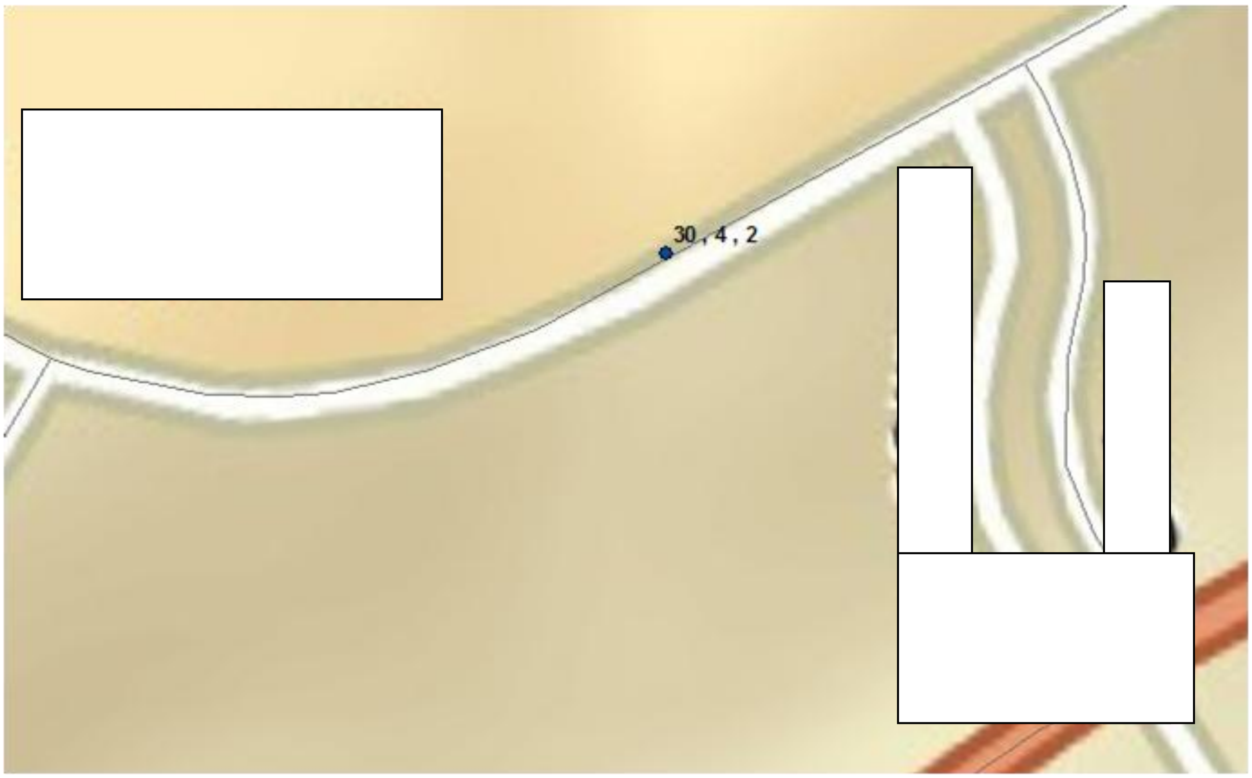


Figure 5-Plant Point level data

Coverage Derivation Using Linear Facilities Data

A number of providers submitted facilities data. We handled this data in different ways depending upon what we believed the facility data represented.

Most telecommunications networks are divided into two components. Feeder supplies higher capacity nodes (e.g. DSLAMs, Fiber Nodes). Distribution usually supplies customer premises (NIDs, Pedestals, Taps, ONTs). Where we could discern what facilities we were provided, we used different methods.

The next image demonstrates a geo-referenced CAD image as given to us by a service provider. Note the light and dark green shading. We would infer that the lighter segments represent distribution and the dark green represents the feeder network.

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a

situation comparable to customer point level submission in that we have most of the network footprint captured.

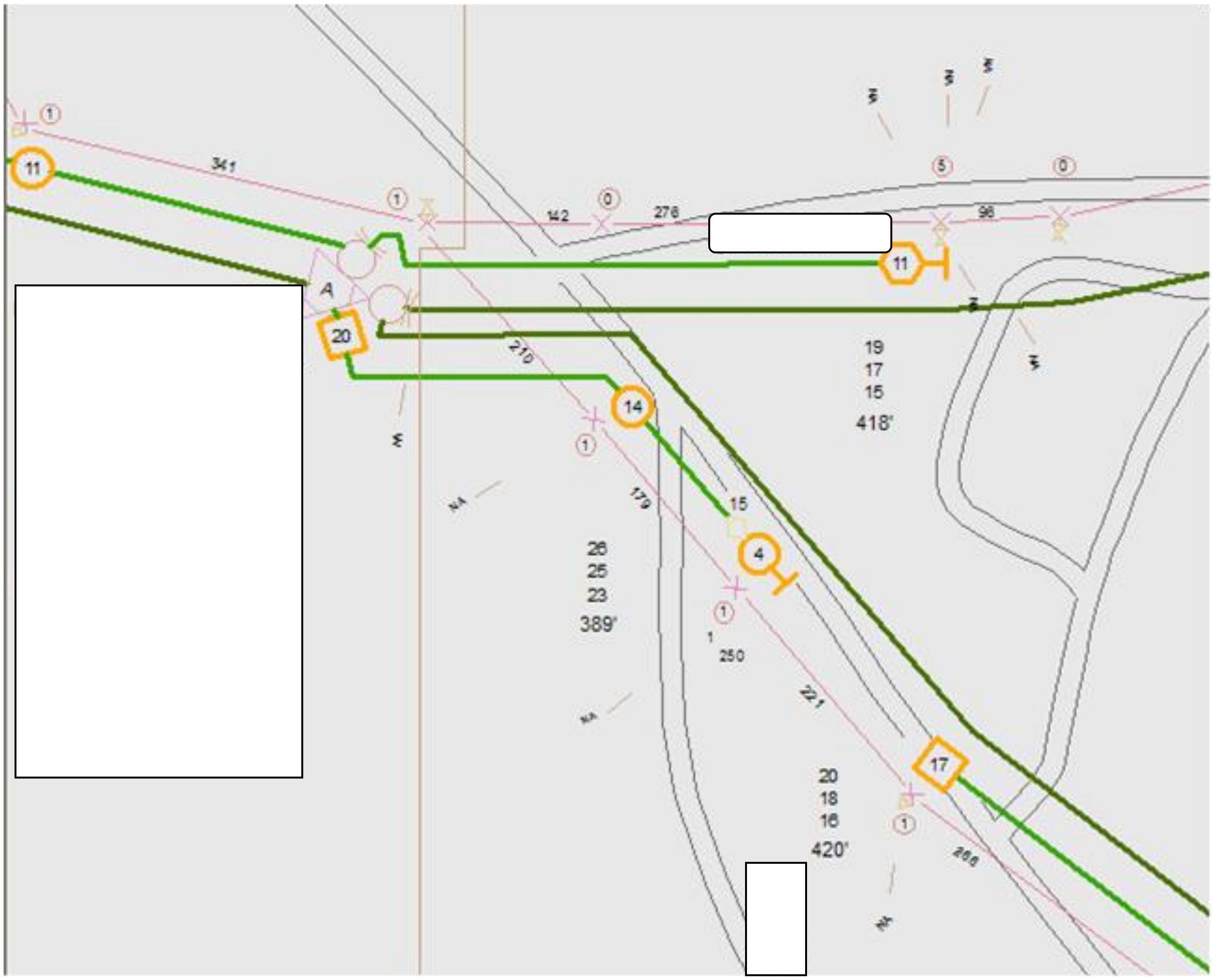


Figure 6-Georeferenced CAD information supplied by Broadband provider

In other circumstances, we were provided engineering information that we inferred to be feeder only. This inference was typically based upon the presence of fiber optic equipment only. In these cases, we used a more generous 2,000 meter Census block intersection. The 2,000 meter criteria was based upon an informal survey of population in proximity to the geo-referenced strand data, but it could be varied based upon a more complete survey.

Coverage Derivation Using Covered Street Segment Data

In some cases we were provided with covered street segment data. Covered segments tended to come from two sources.

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our

team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

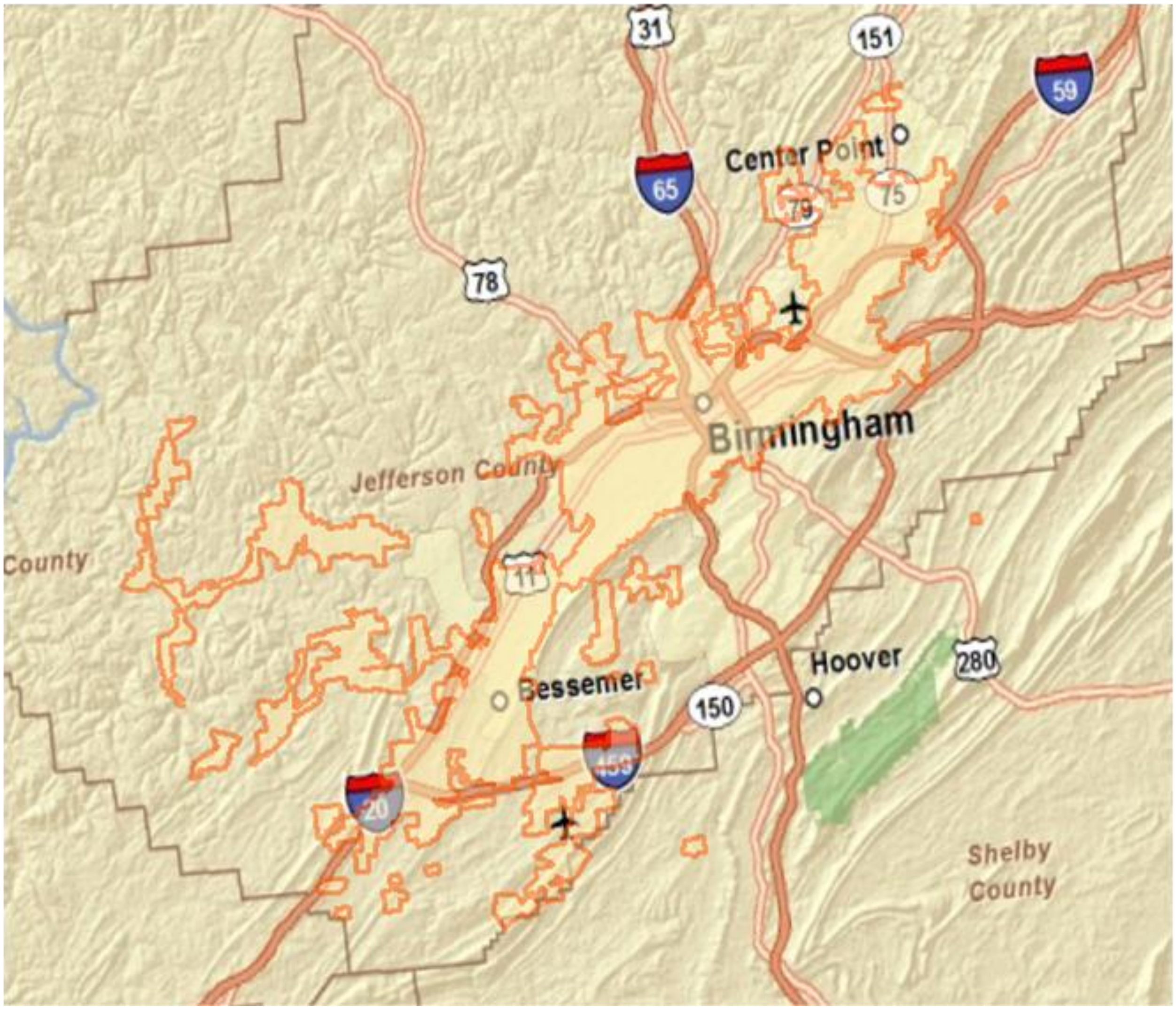


Figure 7-Coverage derived from street segments

In a second circumstance, street segment data was developed during coverage estimation. Handling the estimated data is discussed below.

Coverage Derivation Using Serving Area Point Submission Data

In other cases we worked with providers to derive service areas based upon point plant data. In these cases we were given a serving node and an appropriate road length service boundary. There is an important distinction from the plant data discussed above. In this specific case, the data submitted was a node that served many locations--such as a Central Office or DSLAM. This is contrasted with the earlier example in which the point represents a node serving only a few customers.

When trying to derive coverage from Central Office or DSLAM nodes, the team used ESRI Network Analyst to derive covered road segments honoring these road engineering parameters.

The figure below shows street level coverage derived from Central Office and remote DSLAM point data.

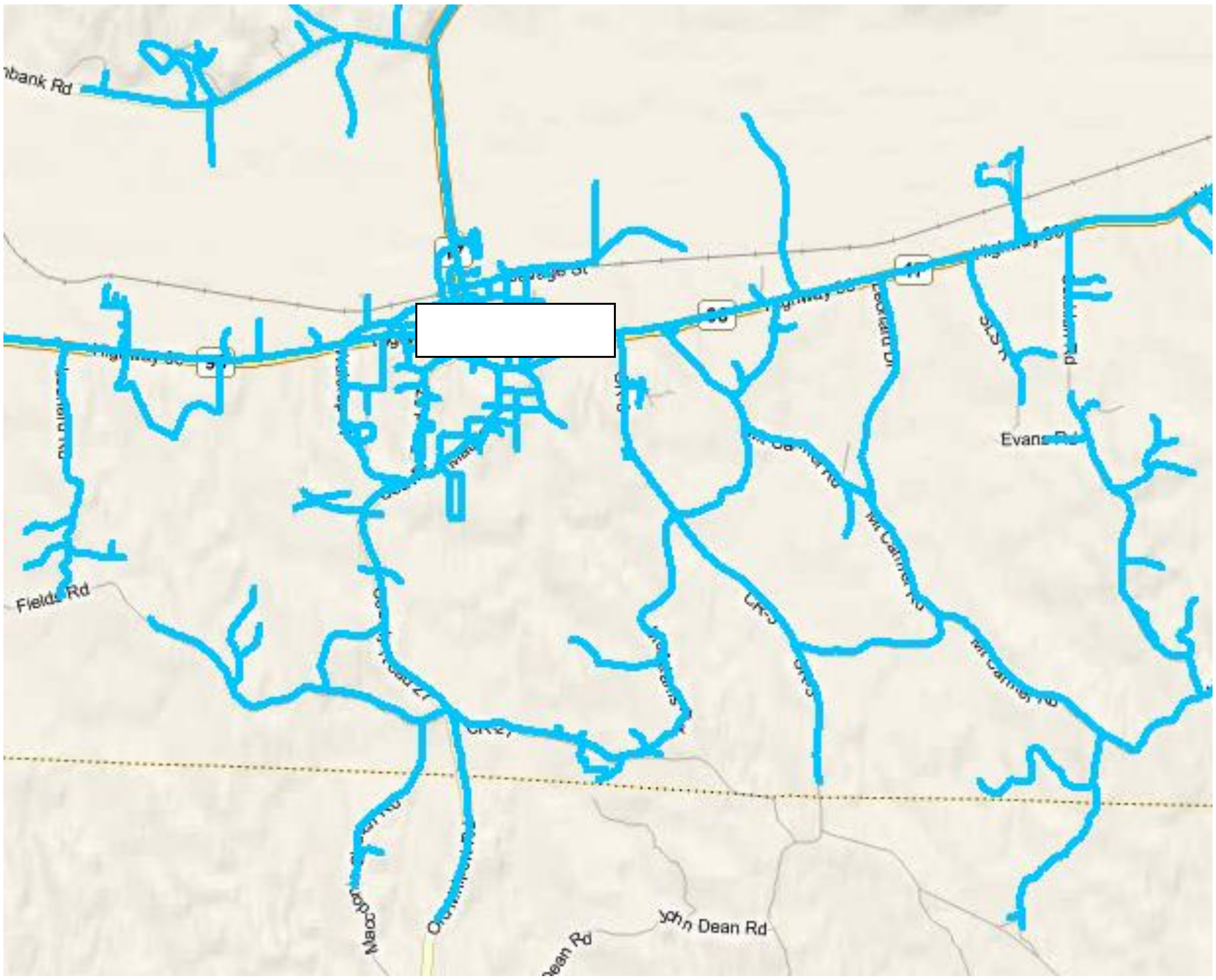


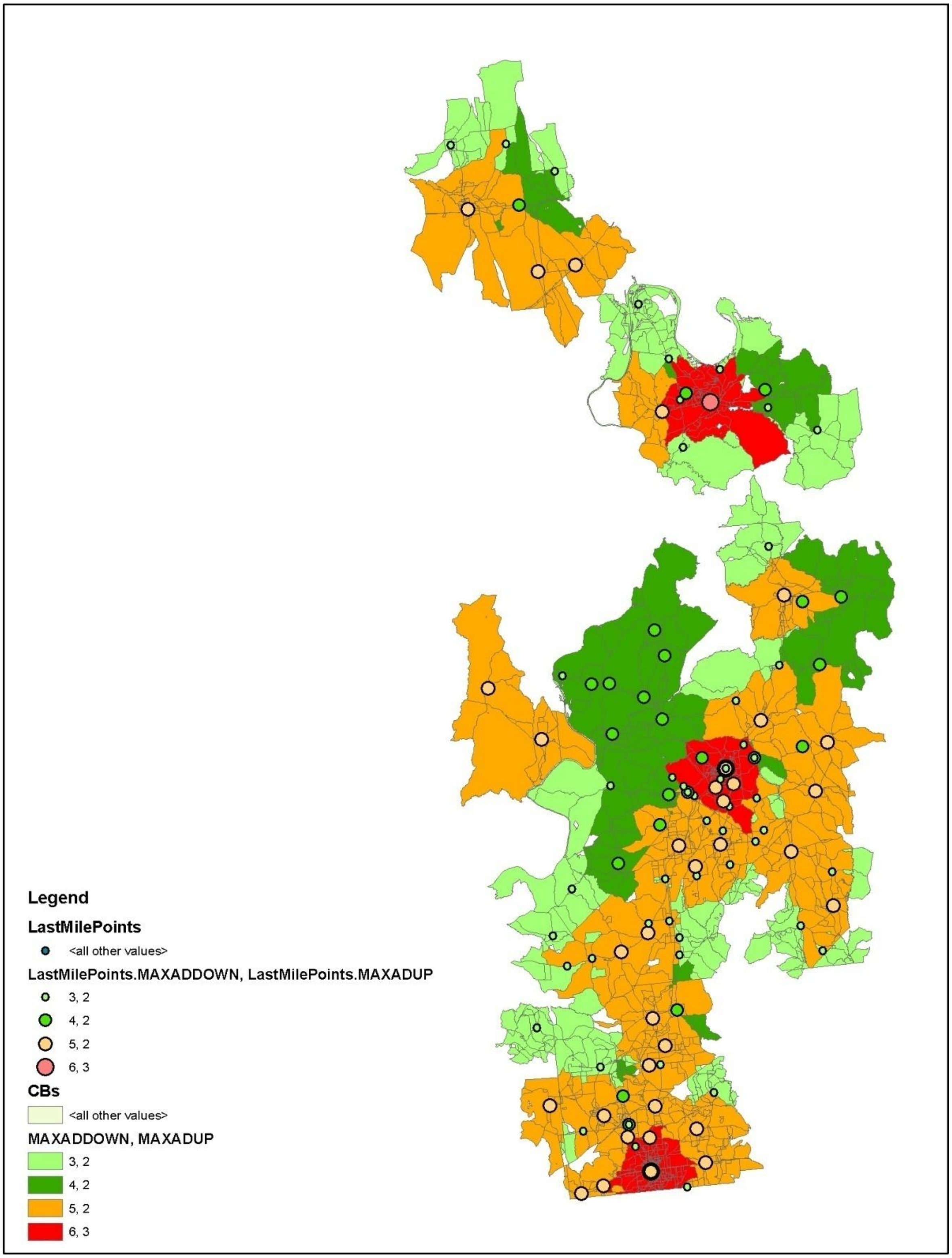
Figure 8-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[13]

The segment level coverage is easily extendable to derivations of Census block level speed. The figure below shows the attributions of block level speed based upon the Maximum Advertised Speed available from a DSLAM. Although the methodology isn't perfect, it does provide insight into the value of granular infrastructure data.

[13]Only TIGER features of MTFCC type S1100 and S1200 were excluded from use.

Over time we have seen an increase in the number of providers submitting this type of data for our use. Our sense is some providers find plant level data easier to generate and are satisfied with the results of derived coverage.


Legend
LastMilePoints
<all other values>
LastMilePoints.MAXADDOWN, LastMilePoints.MAXADUP
3, 2
4, 2
5, 2
6, 3
CBs
<all other values>
MAXADDOWN, MAXADUP
3, 2
4, 2
5, 2
6, 3

Coverage Derivation Using Polygon/Polyline Serving Areas

Broadband service providers sometimes submitted coverage in terms of served areas. This was either in direct geospatial formats, CAD files, or paper maps. The image below reflects a carrier's service area. Within that service area, there are variations in technology of transmission and served speeds. When polygons with speed data and technology of transmission were available, we used a spatial intersection to gather covered Census Blocks. In many cases, using covered Census Blocks resulted in a loss of the speed variation (sometimes the speed variation was at a level smaller than a Block and did not get picked up within a spatial query).

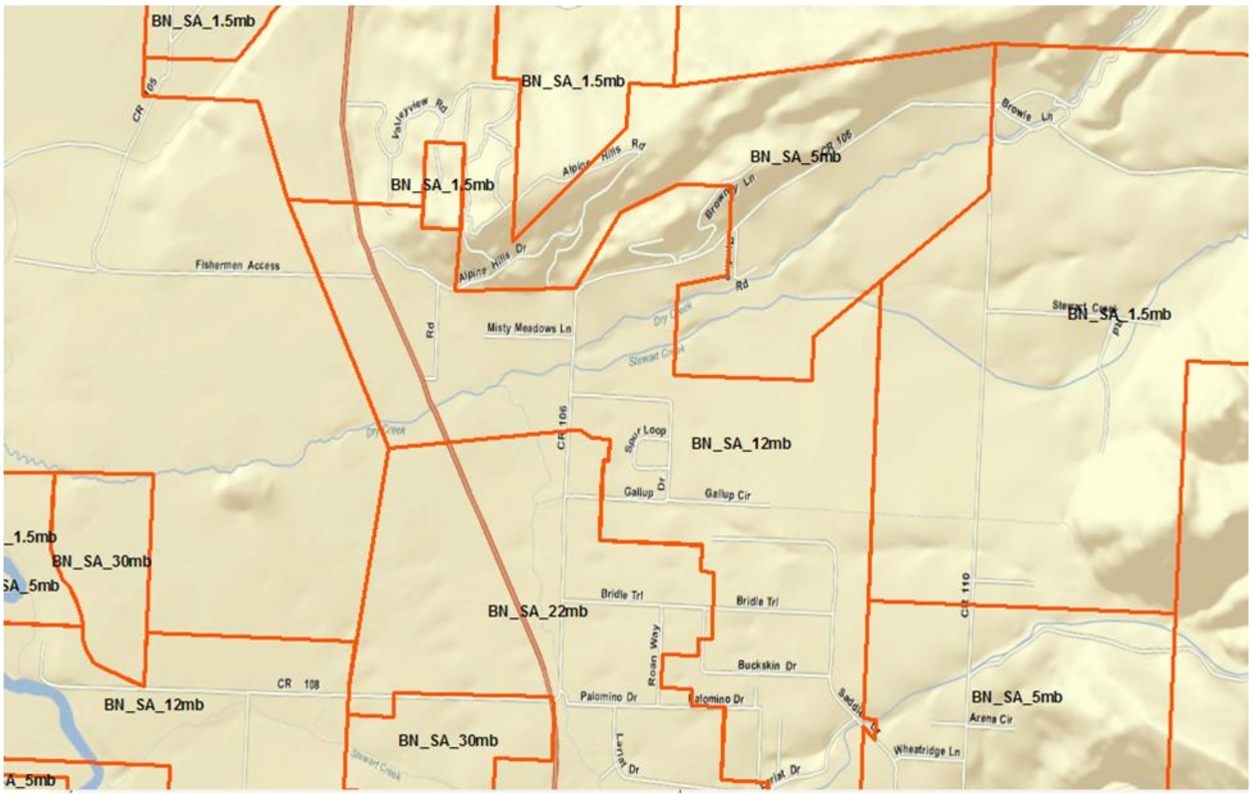


Figure 9-Coverage derived through serving area polygons

Although we cannot directly solve the loss of speed granularity due to Block shapes, we honor a business rule wherein we always select Blocks from the highest speed areas first, and then allow the lower speeds to select from the remaining Blocks. This is an arbitrary rule, but our feeling was that it should be a consistent selection, rather than an unordered selection.

Street Segment Derivation, Large Blocks

For those calculated Blocks greater than 2.00 square miles (large Blocks), we provided coverage in terms of covered street segments and corresponding geography.

With respect to segments we had four sources of data:

Covered large Blocks
Tabular street segments and address ranges for large Blocks

Geographic segments either with street attributes or without
Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format. Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded segment coverage pattern, like

the image shown below.[14]

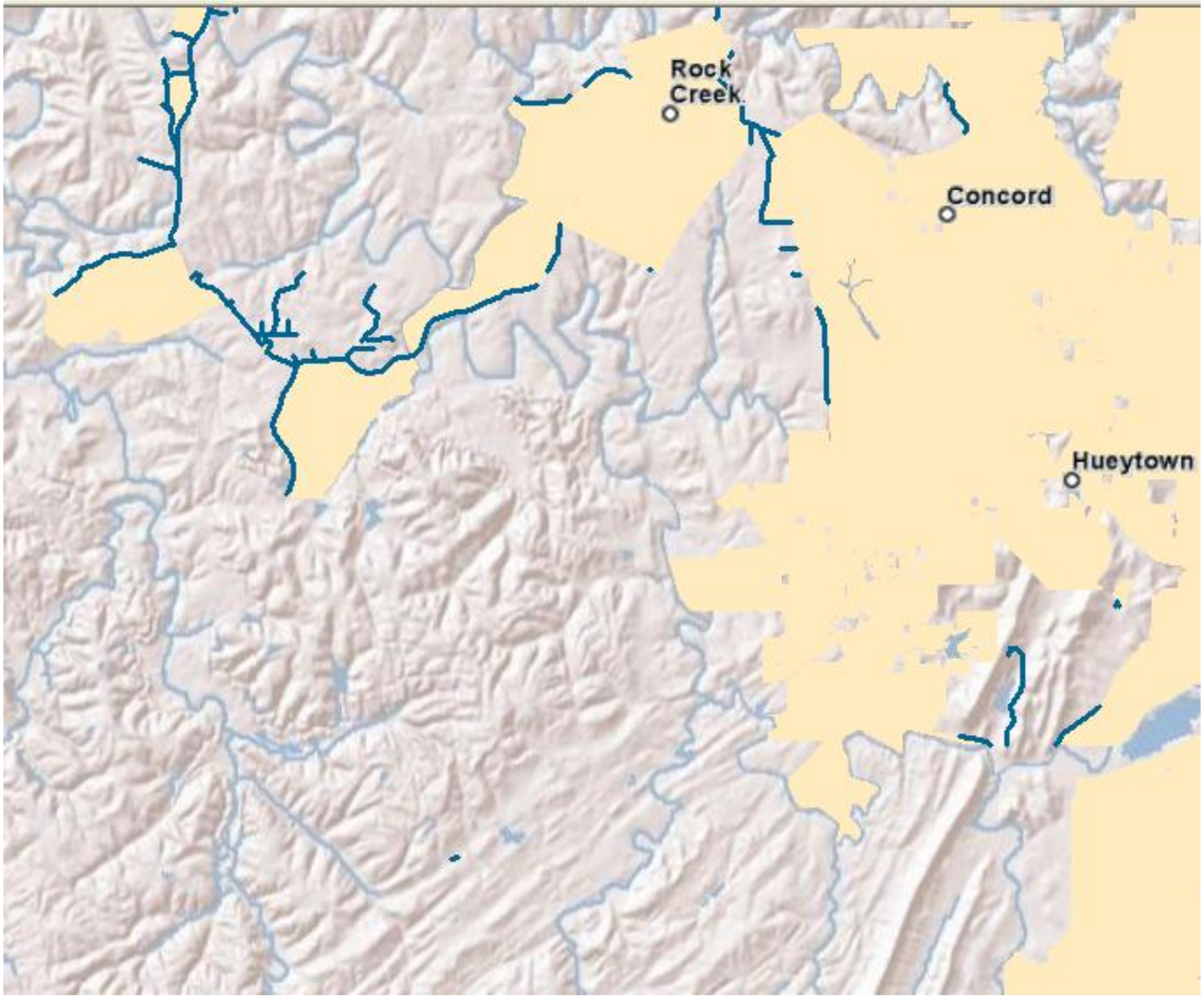


Figure 10-Blue road segments adjacent to peach covered small Blocks

A number of providers submitted geographic objects. In this case, our manual process was directed toward a conflation of data sources. The goal was to take provider submitted segments and put these segments in terms of our TIGER 2010 basemap. Although there is a trade-off in the accuracy using non-provider submitted segments, we felt it was more important to have a road set that would edgematch our Block features and remain consistent with the Block size standards we used for other providers. This is important for the appearance of the online maps, as well as potential verification work where we are attempting to judge a feature based upon its attachment to a covered small Census block. The figure below shows street segment input data.

[14] We continue to hear providers expressing concern that our request for either a geographic object or TIGER Line ID is beyond the scope of the NOFA clarification. Therefore, they cannot supply additional information to us.

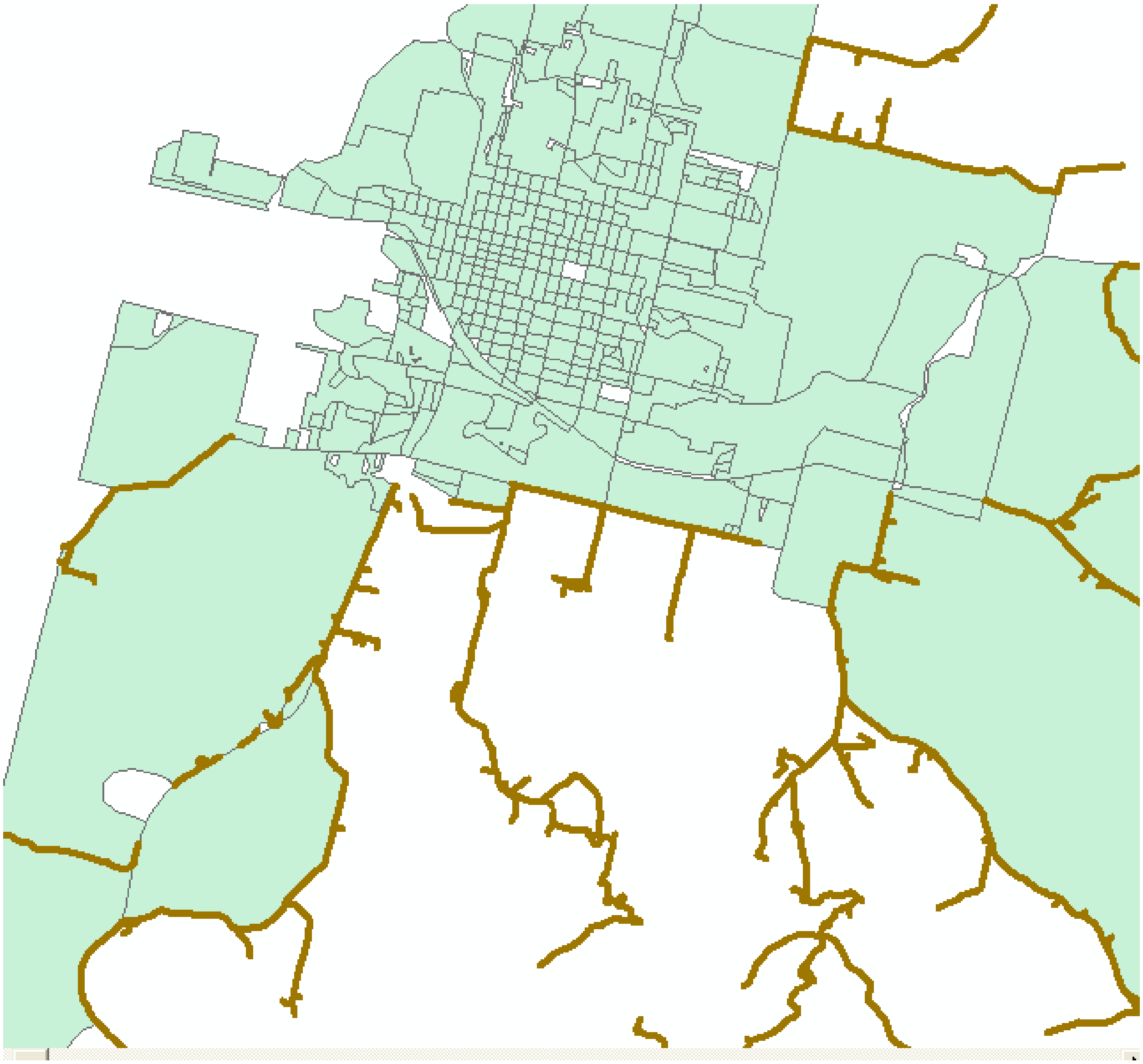


Figure 11-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

The figure following demonstrates the same area after the conflation process. Blue segments are the conflated TIGER roads which will be passed to NTIA.

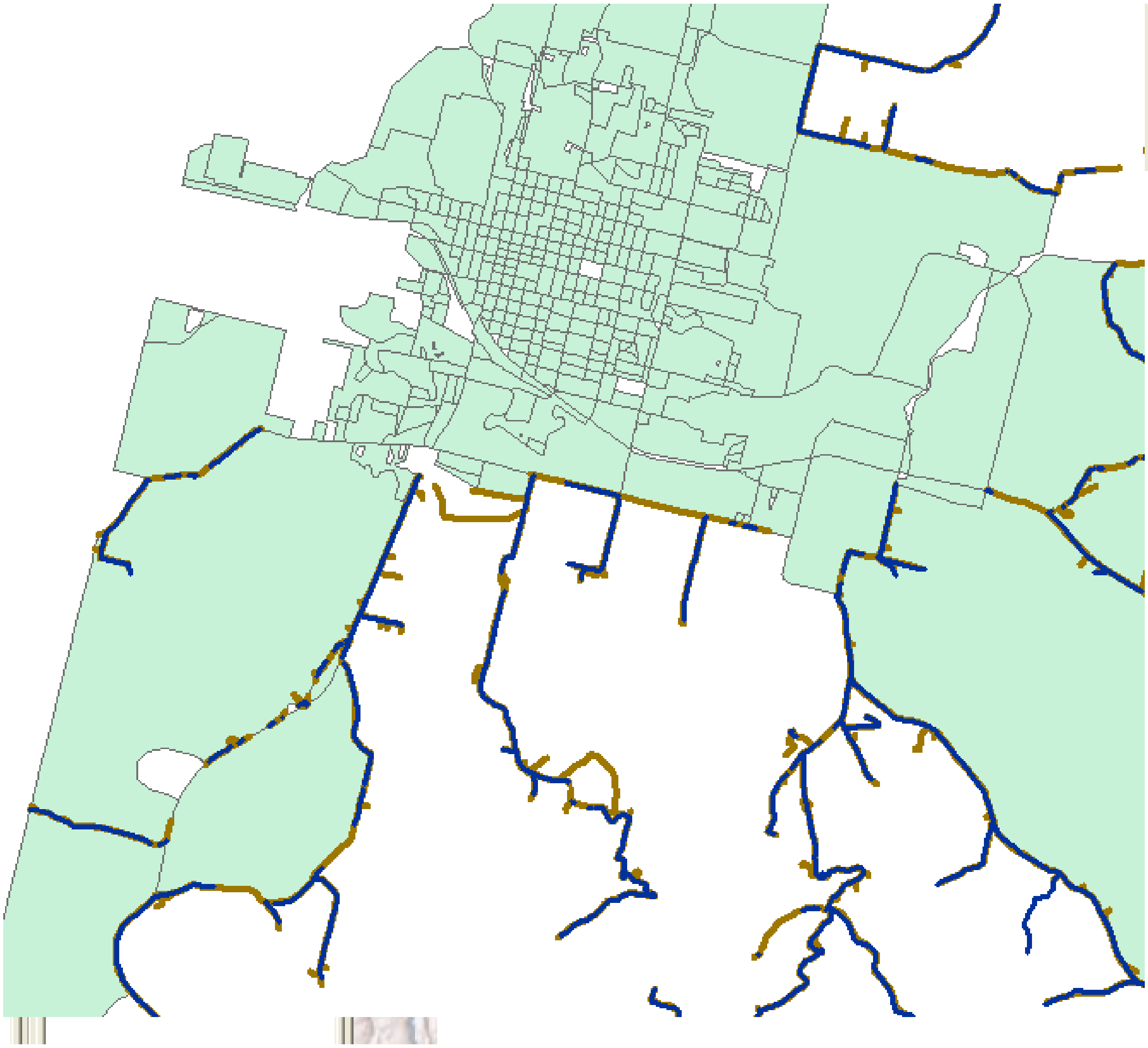


Figure 12-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

The final segment process was used when we were supplied with a Broadband covered area polygon. In this case, we found the segments within covered areas and eliminated those segments inside of Blocks less than or equal to 2.00 square miles.

Because there was more control over the format of the inputs (we knew we had a boundary and were working with TIGER segments), this was an automated process that followed this general format:

Select large covered Blocks by provider ID (from updated Large Block table)
Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider

Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
Join TIGER roads feature class to temporary table on TLID
Select covered segments (Python script)
Select service area polygons for provider
Clip selected facing segments with selected service area
Export clipped segments to staging feature class, keyed by providerID
In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[15]

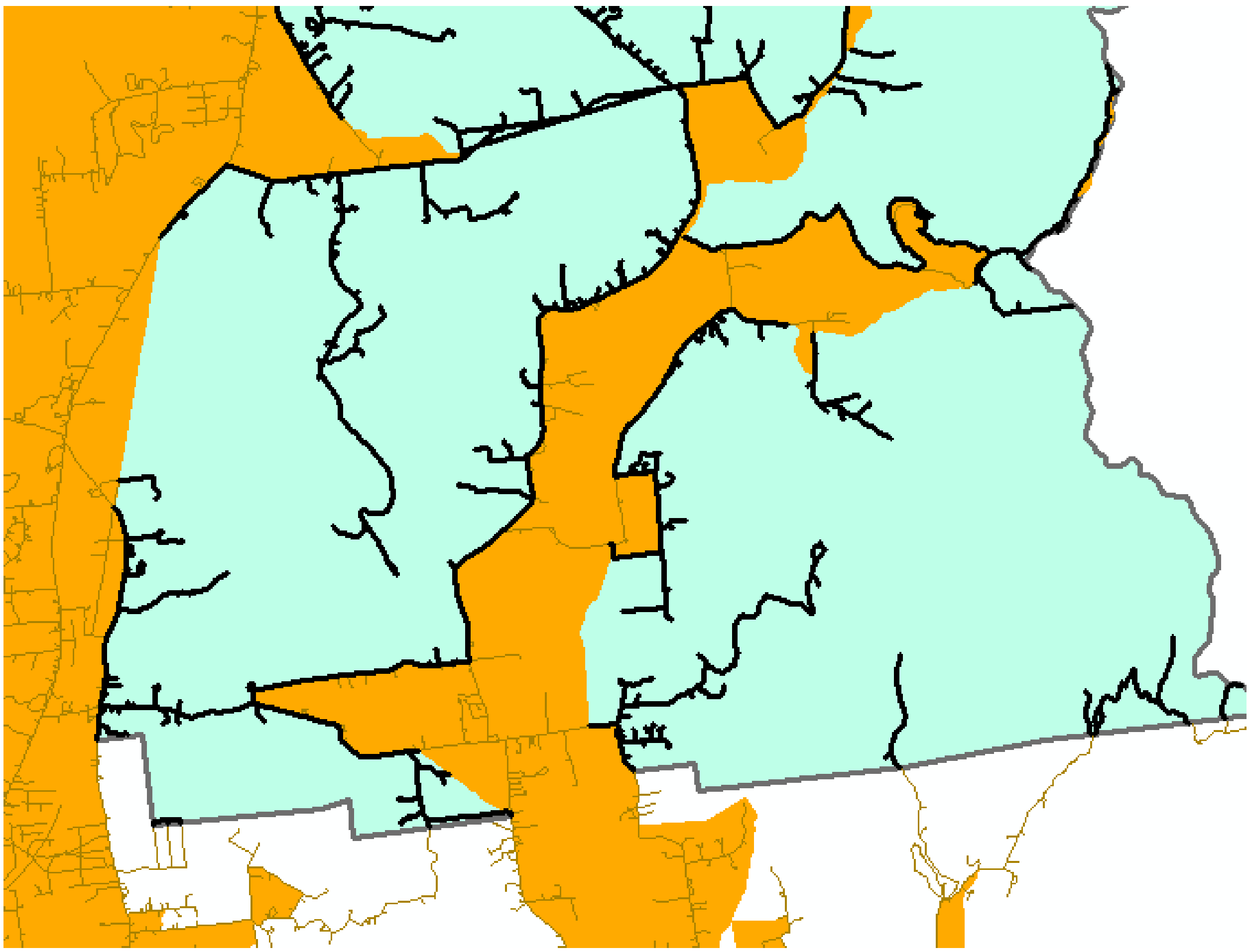


Figure 13-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[16]

[15] An outcome not discussed here is how to handle address ranges on segments. As NTIA is asking for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are null able data elements.

LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid submission format.

In Round 5 fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored.

Other fixed providers were able to supply us with hand drawn maps or polygons/polylines drawn in Google Earth format. In these cases we did our best to georeference and verify the coverage areas with the WISP.

When we received coverage information in KML format, like the image below, we accepted the data as it was presented to us as the submitted coverage patterns were used in the provider advertising.

[16] Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.

As the image above shows, in some cases we were provided hand-drawn coverage, as well as infrastructure. Instead of estimating their coverage using a line of sight or RF study, we elected to stick with the provider's supplied information. Our decision was guided by two primary factors:

If the provider is advertising using this coverage they must have specific confidence in its accuracy.
If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information.

The downside, of course, is the polygon shown on the map may not represent our notion of how wireless coverage should appear.

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary strength (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location.. Fourth, it was very difficult getting providers to identify spectra used for Broadband data services[17]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area.

Service Address Point Process

A handful of providers have requested that customer level, service address point data be submitted to NTIA. In these circumstances we have done minimal processing to preserve the provider's intent with this deliverable and not bias downstream NTIA use.

Our verification included checks against commercial or Public Utility/Public Service Commission exchange boundary maps. Points not contained within three miles of a boundary are not submitted to NTIA.   The percentage of excluded data varies cross providers, but it tends to be under 1% of the total submission.

We retain from the provider the provided latitude and longitude, as well as Census block. For some coverage data, if a provider is unable to supply a longitude, latitude or Census block, we fill in these attributes. In those circumstances where we do not have a Census block, but we do have a longitude

[17] One provider responded by email, "This mapping program is to provide the coverage area for Broadband provided by a company. Not to keep a detailed account of every aspect of a companies (sic) network."

and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[18] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[19].

We typically resorted to three possible estimation paths.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[20] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[21]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be

[18] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue is address quality but also difficulties in geocoding in very rural areas.

[19] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.

[20] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.

[21] Central Office location was derived from MapInfo ExchangeInfo Professional. Wirecenter boundaries also came from this commercial product.

provided, we used a view shed analysis and estimated line of sight coverage at 10mi per tower[22]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

Speed

Speed attributes are reported both at the block (typical) and higher levels (maximum advertised and subscriber weighted). We note that in many cases, providers did not supply typical or subscriber-weighted speeds. In some cases, it appears--although we cannot verify--that their maximum advertised speeds were used to populate typical speed columns.

We do have limited testing data on reported speeds, but we have been careful to not use our typical reported values with carrier-provided information. If we do not have a speed value from a provider, we report an empty value.

Several service providers claim they do not have data on typical speeds available, but estimate a 20% overhead factor between the advertised speed and what may be experienced by an end user.

We continue to request advertised speed at the block level. Nevertheless we appear to be getting speeds that do not vary over a large geographic area – leading us to believe that providers may still be submitting the maximum speed advertised in local media for the entire market. For the most part, we have been unsuccessful in messaging that advertised speed should not correspond to a market area, but instead, the maximum speed, which can be provided to a household—what some may describe as a 'qualified speed.'[23]

As a general rule, in circumstances where a provider supplies a range of speed attributes, we assign NTIA categories based upon the midpoint of the range. We follow this rule unless we can determine other grantees are handling the same submitted information differently.

To support NTIA program office requests, we have also modified the structure of the Service Overview table. Even if Maximum Advertised Speed is supplied at the market or county level, we push that speed down to the contained Blocks. The only records that remain in this table, will be those wireline records with either a non NULL nominal weighted speed or ARPU value.

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but

[22] In some cases we had an approximate radius of coverage but no height. In this case we used a 50' height estimate and then clipped the coverage to the provided coverage range. We also clipped wireless coverage to honor state boundaries but did not look for providers serving coverage with out of study state facilities.

[23] As an example of a response to our request for Block level advertised speeds, we received the following comment from one anonymous provider, "This is and of itself does not require anything new of us – just states the NTIA supports efforts focused on getting that information on the CB level." It would be helpful to have broader messaging so that providers understand this new direction.

extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted "something," there was a significant variance in what that "something" represented.

The purpose of this section is to record some of the comments and questions we have received about Middle Mile. We hope this provides better context for our data submission.

Within the NOFA, Middle Mile was defined as (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points.")[24]

Given the existence of the "or" in this definition, providers submitted a variety of information. Based upon the NOFA example, several fixed wireless providers interpreted Middle Mile in terms of the connection points from their towers to their own serving backhaul location. The topology was commonly Microwave from their distribution towers to their NOC. The NOC and towers were listed as the Middle Mile points. This seems to be consistent with the first definition clause (a).

Telephone, Mobile Wireless, and Cable providers tended to remain either silent on the question, or would provide a single location in which Internet peering occurred (clause b). A number of participants explained that the NOFA was quite ambiguous with data traffic moving back and forth over both TDM and IP networks--it was unclear where the distinction should be drawn. As a general rule it seemed like many providers listed a single location where Internet Peering occurred.

A number of providers refused to answer the question on grounds of confidentiality[25]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of "other," we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for public / private networks.[26] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is "data" (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

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[24] From http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf at 54, visited March 28, 2010

[25] As received in email 9/30/10, "Due to security concerns and the risk of public disclosure of highly sensitive data, whether inadvertent or otherwise, ***REDACT***response to the Middle Mile and backbone interconnection request is limited to publicly available information available on {remainder not included}"

[26] As discussed in our readme.txt file, a number of middle mile points were lost in validation due to their location in adjacent state. This will cause a decrease in some providers relative to prior submission.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL). In Round 5, the check submission script no longer accepts negative elevation values. For a number of providers who submitted negative elevation data (facilities buried underground) we changed the value to zero, per Program Office direction.

To the extent possible in our timeframe, we verified the location of a sample of Middle Mile points. Where we could see infrastructure that appeared to be consistent in location with other provider infrastructure, we felt that the location was accurate. In some cases, the point provided seems sensible (is on a road, near other equipment), but using imagery, we couldn't find a place where this type of connection could occur. This wouldn't be unforeseen, in that Middle Mile connectivity likely takes place in a protected environment much smaller than a standard Central Office installation.

Mobile Wireless Coverage

We have received mobile wireless coverage from most mobile Broadband providers in each state. At this point we have cleaned the geometry of the data and attributed it with spectra, NTIA speed categories and FRN as required.

Where possible, provider derived coverage has been reviewed against the commercial licensed product for consistency. To a limited extent we also use licensing locations and tower infrastructure to spot-check supplied coverage. This mode of verification remains complex, given the lack of facility-based information with mobile wireless.

Finally with respect to mobile Broadband services, we note several trends.

First LinkAMERICA used the NTIA supplied frequency tables to report speeds consistent with other grantees. In circumstances where a provider supplied a range of experienced speeds, we used the portion of the range consistent with the most frequently reported Grantee value.

Second where a provider reports multiple frequency bands in use but doesn't distinguish these bands by submitted SHP file, we submit identical geometries but attribute one geometry to each submitted spectrum value.

Third we are seeing a trend toward increasing Broadband speed. As of this writing, there is not consistency across providers in how they attribute the advertised 4G speed values. In other words, for some providers 4G means advertised speed categories increase. For other providers, the speed value did not change.

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an

fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats and expands in more depth on the confidence analysis within the data.

Verification Methods Summary

Our overall verification standard is focused on the level at which we supply processed data to NTIA. This means that the vast majority of our verification process and resources will be focused on verifying provider identity, coverage, reported speed and appropriate metadata for Census block's less than or equal to 2 square miles.

We believe three broad verification themes are important to consider

a) The first step of broadband service verification is a consistently applied market definition—we call this provider identity verification.

b) There is probably not a single dispositive method of verification. Rather, a number of verification approaches are needed to appropriately classify confidence in data submitted to NTIA.

c) Verification approaches tend to meld together. As an example a web survey is complimented by a phone survey but expert review and external data may be necessary to reach a final informed judgment.

The table below demonstrates the various methods used across each feature class submitted to NTIA.

	Data Types			
Verification Method	**Census Block, Road segment or, address specific service availability**	**Mobile wireless service availability**	**Middle mile infrastructure locations**	**Community anchor institutions**
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review	METHOD USED			METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling	METHOD USED			METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED

Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

The following table defines each of these methods and provides a summary of why this method is used, and the value we gain from it.

	Definition	**Methodology**	**Purpose**	**Benefit**
Provider Verification	Provider verification is the process of assembling a broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	Provider verification involves combining multiple data sources, interviewing providers and classifying the broadband provider type.	Without a consistent understanding of the provider 'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	The main benefit of this verification process is understanding who is providing broadband services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission consistent with the technical specifications of the service offered.	Most of this validation is performed using our spatial databases and running queries that compare submissions. We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations which are unusual relative to other data received across all states.	The purpose of this type of validation is to understand how things change over time and why. It also helps informs us for circumstances where we have data points which appear to be outside of the norm. If these outliers are detected, they can be pursued directly with the provider.	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a change.
External data	An external data	External validation can	We don't believe	External validation provides an

consistency checks	consistency check is a measure of the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	be performed by verifying supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to tower locations.	a single, exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	external measure of data quality assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider to ensure that translation into NTIA formats is fair and appropriately accurate.	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	One of the more critical steps in broadband mapping is translating carrier supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) is a an important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with providers.
Public review	Public review is the process of collecting structured feedback	Currently we use an online map 'layer' which provides consumers the	As with other crowd-source approaches the	The benefit is to provide feedback and also display real time the comments of the

	from the general public in a manner which can be analyzed and used to improve/validate the submitted data.	ability to feedback about the coverage and provide in depth information about their concerns. The maps are also discussed within the context of planning teams within each state. We receive feedback from these meetings.	intent is to allow the general public to feedback and improve the displayed and submitted data.	general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution broadband market.	We have used three methods to verify anchor institution data. The first is a targeted series of telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	As Anchor Institutions represent a different class of coverage information as well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross check on data from a second source—can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to understand ambiguous information	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of submission formats and innovative ways to supply broadband, it is always helpful to have multiple sets of eyes available to reduce errors from misunderstanding.	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven process making all the decisions.

		in submissions.		
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information.
Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based surveys	Web based surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be	In the case where a web survey is a compliment to phone or in person a survey, instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website	The purpose in all cases is to gather additional information via the Web.	The benefits of web survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.

	used to verify provider information.	via a specific web application. We currently use both approaches depending on our goal.		
Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording observations. To date most of our field survey work has been in engaging CAIs into the process. We have performed limited wireless testing and infrastructure verification.	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment presence or the strength of a wireless broadband signal.	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

Verification Standard

Verification is a broad term, but in our definition it boils down to determining if Broadband coverage is in the right place. For a given provider, the question is whether the coverage is assigned to appropriate Census Blocks, road segments or area features. Coverage verification can be further broken out into two distinct classes:

- Technology verification, which is determining if the provider is listed with a technology consistent with their marketing information.
- Speed verification, which is determining if the speed supplied for that block, road segment, point area file or market area is consistent with the technology and the marketing information received.

The final verification dimension is consumer feedback and crowd-source verification. This is a dynamic set of steps we are beginning to implement. One side of this is responding to consumer concerns. The second is using the crowd sourced data to validate provider claims and, if appropriate, update the map and the underlying data.

At this stage, our working hypothesis (confirmed by our experience) is that there will not be a single measure to indicate broadband coverage availability in a Census block or along a segment. From prior work, and examining our current provider submissions, we believe that there is too much variation below the submitted record to make a single binary yes/no indication. Rather, there will be a series of measures that combine to provide qualitative confidence (a classification scheme) in our indication of Broadband availability at the block, segment, or wireless polygon level. We believe such a qualitative classification scheme is both relevant to and supportive of NTIA interests, as well as the interests of our end-user community – that is, the states and citizens we serve through this program.

The intent of this section is to illustrate why our team is moving toward a particular verification methodology. Our team is learning as we go along, and will adjust and improve this thinking. But given our experience to date, this is our path. As stated above:

- First, coverage verification is at the level of data submitted to NTIA.
- Second, coverage verification is enhanced when there is a secondary measure of availability (such as infrastructure presence or serving area boundaries)
- Third, given the limited resources of this effort, the most important coverage verification process to implement is the erroneous dispersion of coverage. These are the “islands” of coverage isolated by significant distance from other covered areas. . In other words, Broadband Internet likely doesn’t exist far away from other areas with Broadband Internet access.
- Next we present several examples which illustrate the complexity of coverage verification.

The first example is taken from a gentleman who requested a map change in Alabama. His home is near the yellow dot. The darker grey Blocks are covered Census Blocks. The black lines are covered road segments. He cannot receive DSL from his incumbent provider, although his neighbors can. The incumbent carrier does have at least one structure in that block from which Broadband services can be provided; unfortunately his home is not served.

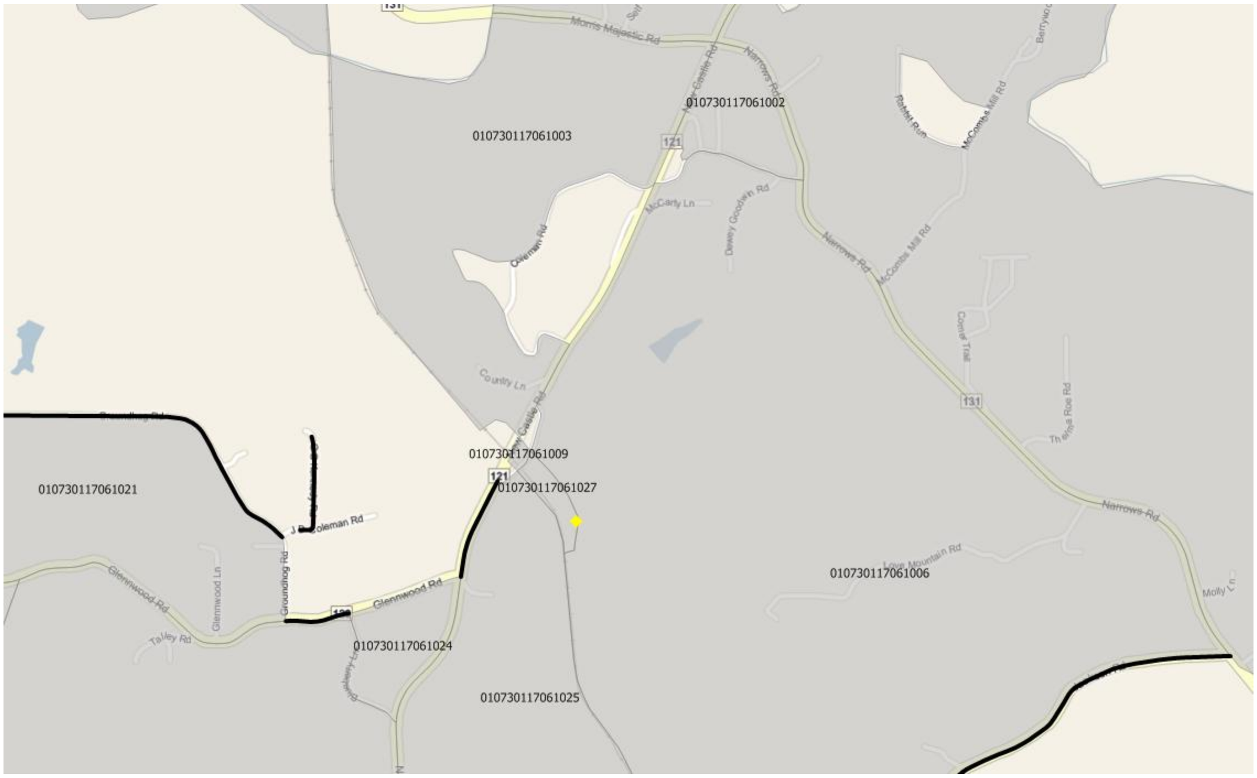


Figure 14--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

Beyond this type of one-off structure-level qualification, sometimes, as shown below, we have even larger gaps in provided coverage. The image here shows an "outlier" block that could be an error, or it could indicate missing Blocks along a major road that should have been filled in. In this figure, the outlier block is highlighted in turquoise.

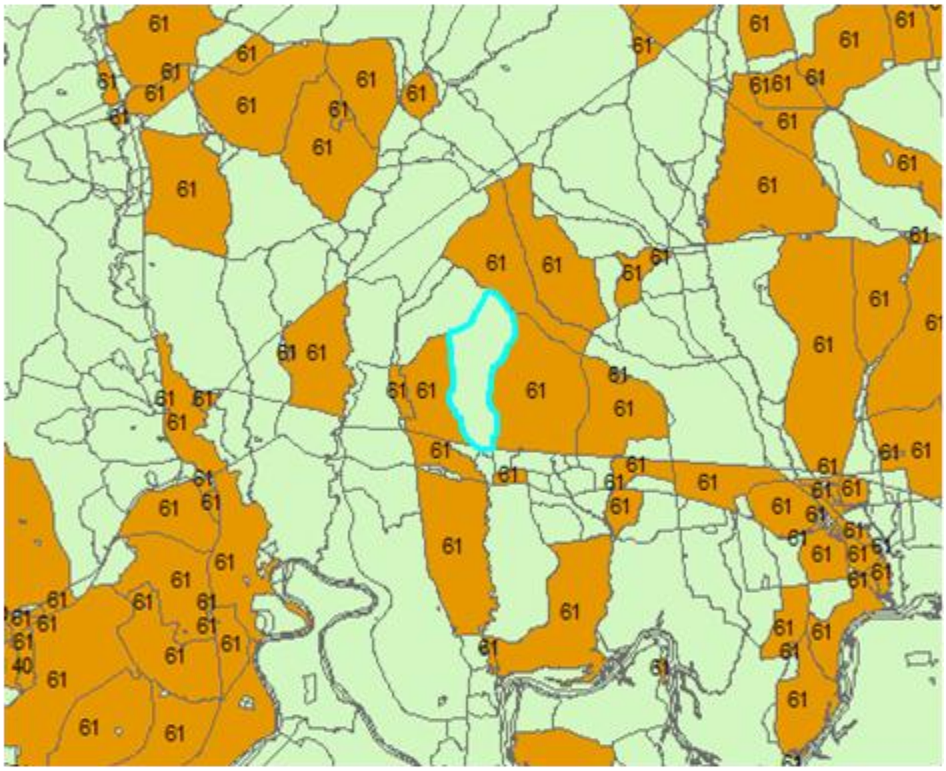


Figure 15--Dispersion in Submitted Data

In this particular case, we are faced with a different verification question. Based upon the properties of the neighbors, we believe this block should likely be covered (coverage interpolation,) but supplied data from the incumbent says otherwise. Although we don't have information to know how much of the data submitted to us is generated, our sense is that geocoded customers or plant are used. In this case the block dispersion could be the result of a side of the street assignment rather than an availability assignment. In other words the data may speak to where is plant rather than where could service be provided in 7 to 10 days.

The next example shows where an interpolation process could require some adjustment. The figure below shows a town level. There are some smaller Blocks that are likely covered by interpolation logic, but we also do not want to extend coverage beyond a franchise boundary as in the areas shown in a box on the bottom of the map.

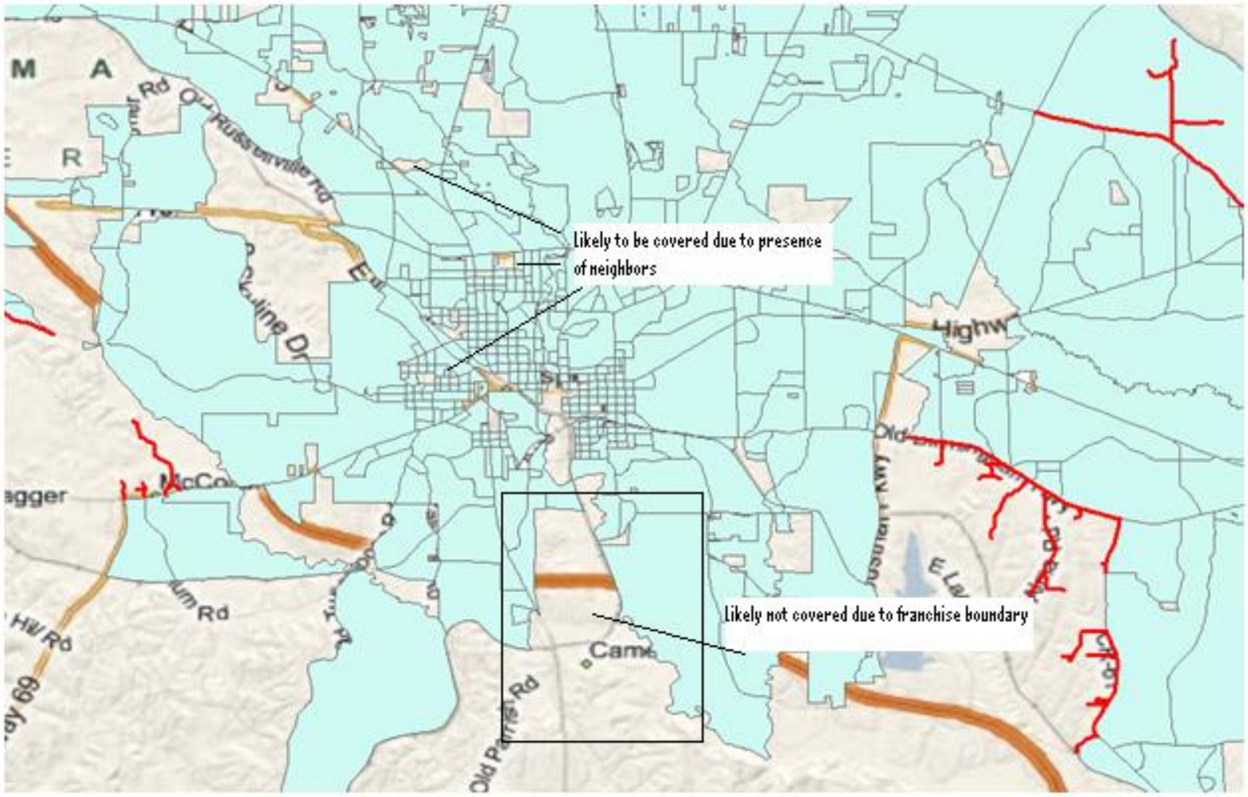


Figure 16-Where do you stop interpolating?

From what we can gather from some providers, the submitted data—data with consistently high degrees of dispersion or coverage holes—tends to come from geocoded billing records. In this paradigm, this means where there are no customers; service is not identified on a map. The interpolation verification question then takes on two dimensions.

First, if a provider has no customers in an area, how can we know if they would be able to provide service in a 7-10 day interval?

Second, if we use the properties of neighboring Blocks to interpolate coverage, when should we stop (e.g., at a franchise boundary, at a certain distance, etc.)?

Third, if we are comparing to a data source that examines coverage at a higher level (such as 477 Tract) do we use the Tract information to assign information block level coverage or do we use the tract coverage to filter out dispersions in coverage.

We continue to work with providers to get additional information to help us better understand and contend with this type of circumstance. However, we have not been entirely successful at getting franchise boundaries that would address much of the issue.

The final map shows this dispersion problem, but to an even larger degree. This solitary large block is likely the result of a bad geocode, but we don't know, given the data that has been submitted by the provider and the "single customer in a block standard" set by the NOFA clarification.

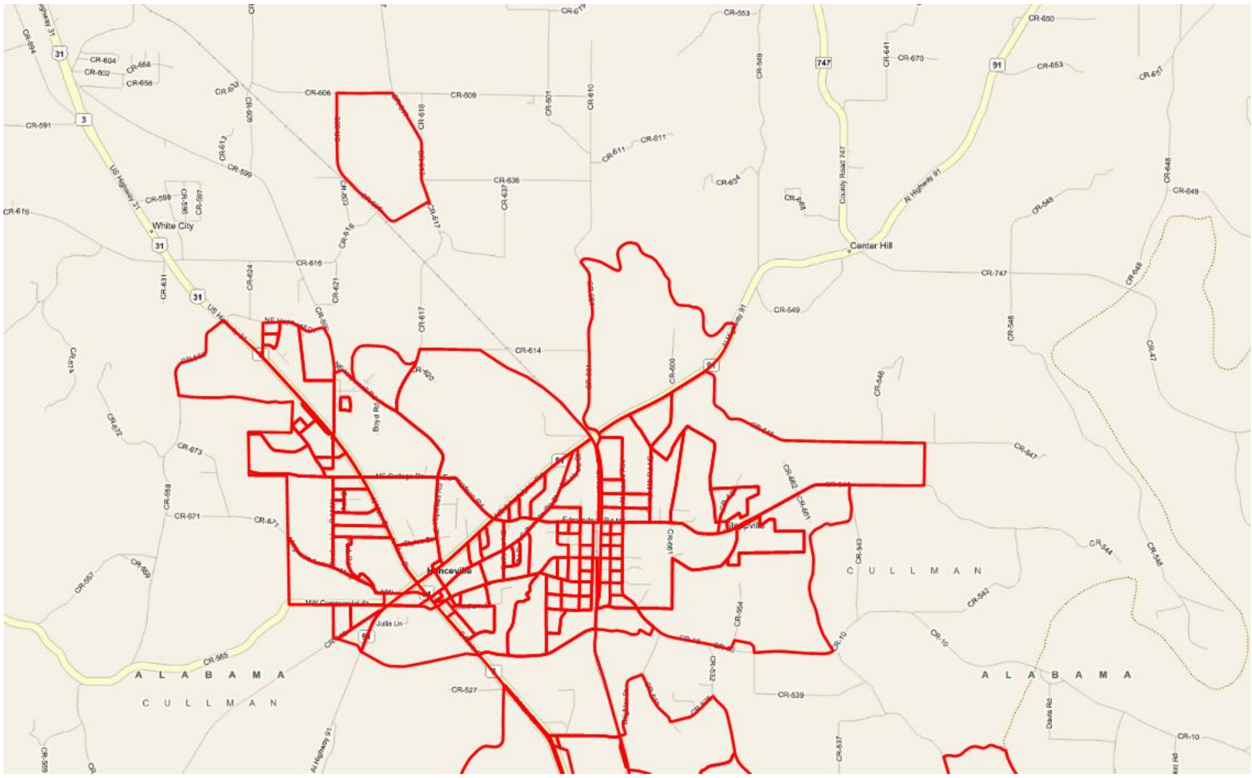


Figure 17-Dispersion in covered Blocks

Due to the fact that this situation is quite obvious in display, this type of problem is one that we are more aggressively trying to resolve. Where a single block has no neighbor offering comparable coverage and is a specified distance beyond an exchange boundary, our approach has been to filter these Blocks out. As of now, this filter is limited to incumbent DSL providers because we have a good source of exchange boundaries.

The exchange boundary dispersion verification method breaks down when examining smaller providers who are more likely to CLEC into neighboring territory. In the figure below, the black line represents the exchange boundary, while the continuity in the DSLAMs likely points to coverage extending along a road into another provider's territory.

Figure 18--DSL Coverage outside of exchange boundary

In sum, the variability in our source data continues to suggest that our dynamic verification process is relevant, appropriate and evolving in a manner consistent with the overall program. And, as noted above, we believe the more meaningful outcome of our verification processes will likely be a series of qualitative indicators or expressed confidence levels. Our concern, as with the development of any sort of classification process, is how rigid we should make this classification given the variation in our input data and the varied perceptions of service providers, map viewers and down-stream data consumers.

Verification Work Process

To support our dynamic multi-factor verification process, we have implemented the following steps.

Between submissions our provider relations team works to analyze our current broadband provider ecosystem and capture any changes such as acquisitions, mergers or cessation of operations. They also remain in touch with providers who have indicated when follow-up is necessary. The team confirms that the providers who submit data are NOFA compliant. Given these steps they begin a survey and awareness campaign to get data submitted for the program.

When data is received, an analyst reviews the submission and any immediate questions or concerns are sent back to the provider as quickly as possible. We have found this gatekeeping step very helpful in making sure we understand the intent of the submission.

For all providers who submitted data to us in the prior round, the provider received both a tabular data summary and mapped output[27]. Prior to releasing the "check maps" to providers, we had a team of analysts visually inspect each provider's coverage area. After this in-house review, we solicited a second level of feedback from providers and received a number of requested changes and corrections used in the development of the current dataset.

For those providers who submit only block or segment level coverage (i.e., in those cases where we have no infrastructure to test with) we test for coverage containment within known service boundaries. The intent of this validation step is to remove Blocks that are obviously erroneous.

We have also begun to perform a mechanical test against wireline providers. This is an examination to ensure that each feature submitted has some neighbor within 1 mile. We are testing this process to try to understand what the neighbor distance should be. This has proven to be a difficult process.

We also verify the submitted speeds against the typical speed ranges in the NTIA frequency tables. If we note a value outside of typical range, we ask the provider for clarification. These responses are recorded.

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a

[27] For the verification of round 3 data, we submitted both PDF and KMZ (Google Earth) format check maps. Some providers prefer to work with the Google format as it supports easier modification. Others continue to submit marked up PDFs.

series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

As our submissions have moved online, we have also begun to benefit from crowd source feedback. In some cases this has helped us identify and fix errors in our underlying data. In other cases, as we have shared with NTIA, we have encountered some perceptual issues rooted in how the data are developed and modeled to comply with the NOFA. Depiction of uniform coverage in small Census Blocks continues to be a challenge. Despite our best efforts to explain the full block coverage requirement, we continue to receive complaints that the coverage shown on the map is not accurate for a particular location within that block.

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

At this point, our external deliverables take three forms: State Broadband Maps, data transfer to NTIA used for the National Broadband Map, and text format data requested by outside parties.

Online Map Experiences

With our State maps online, we continue to harvest viewer feedback and comments. Because an online map allows someone to zoom in far below the scale of the data, a large number of comments reflect sub-Census block concerns. While important to the citizens reporting these issues and to our Broadband planning teams, this level of data is outside the scope of our core validation process, which as noted above, is focused on the level of data submitted to NTIA.

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Online Display of Consumer Feedback

We have completed development of a consumer feedback layer for our online maps.

The intent of the new layer is to show viewers the feedback of other map viewers. This layer went live after the Round 4 data was posted.

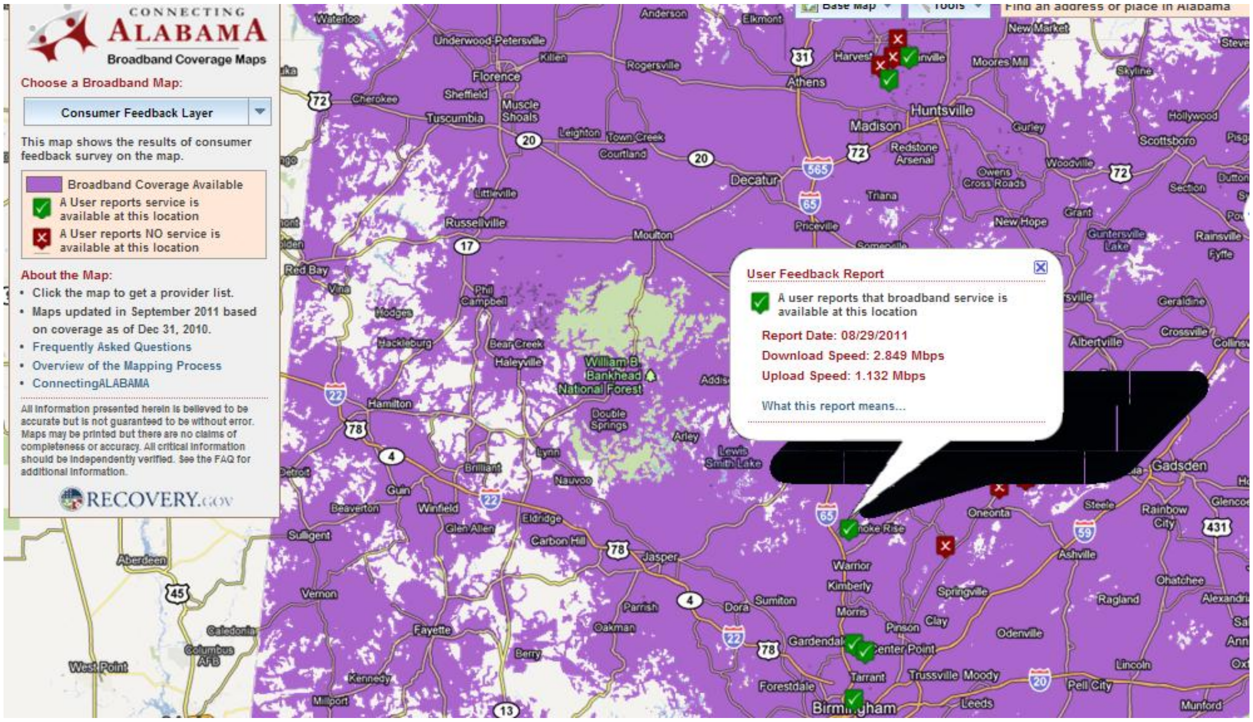
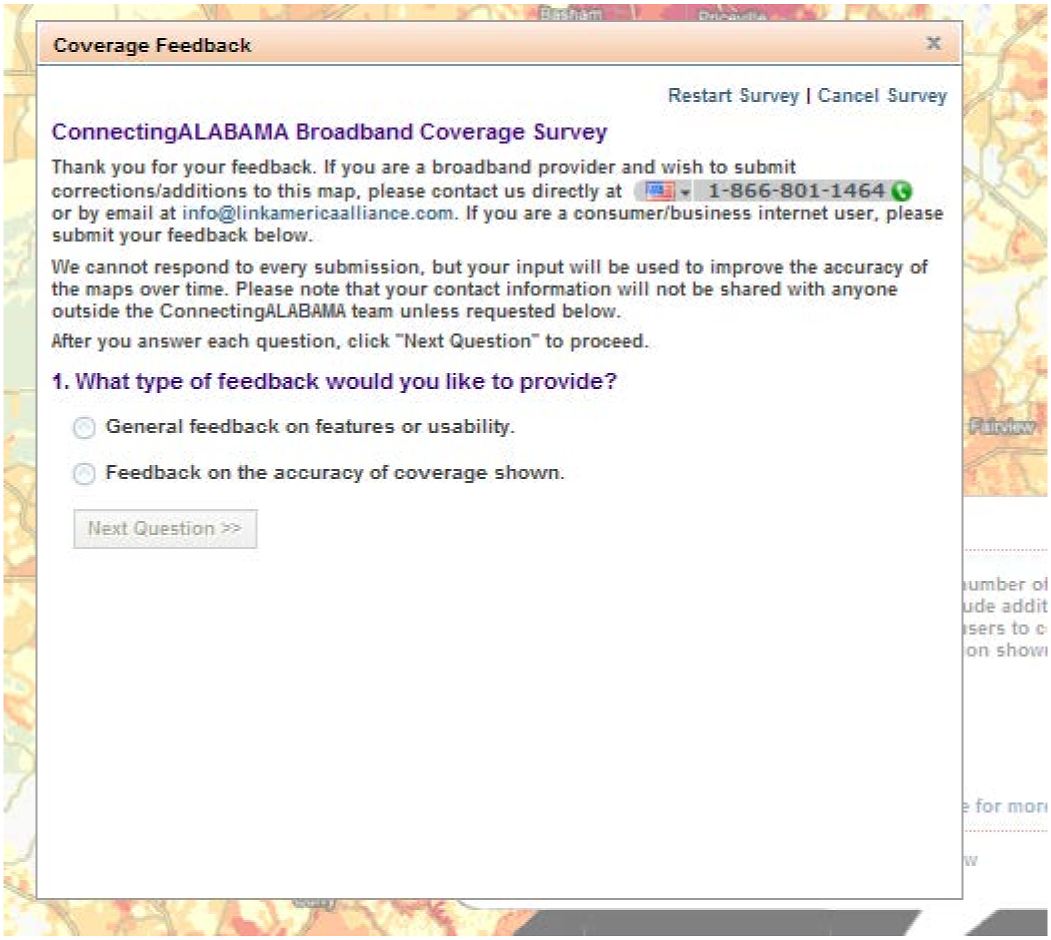


Figure 19--Consumer Feedback Layer

To gather feedback, we use a survey wizard which asks the end users to categorize their concerns. The survey went through several iterations of design and usability testing. Our experience has been unless we get a way to constrain the user feedback into manageable categories, it becomes very difficult to act upon.



As mentioned by other Grantees we struggle with how to use all of the feedback we receive. The qualified data points seem to fall below a volume in which we can infer significant modifications to the map data. Nevertheless, we believe it is important to gather structure and display the feedback to support project transparency.

Perception of Unfair Treatment Across Technologies

Several Broadband service providers have expressed strong concerns regarding how wireline services are displayed, as contrasted to how wireless coverage is displayed. This is an artifact of the SBI data model. As an example, consider the figure below.

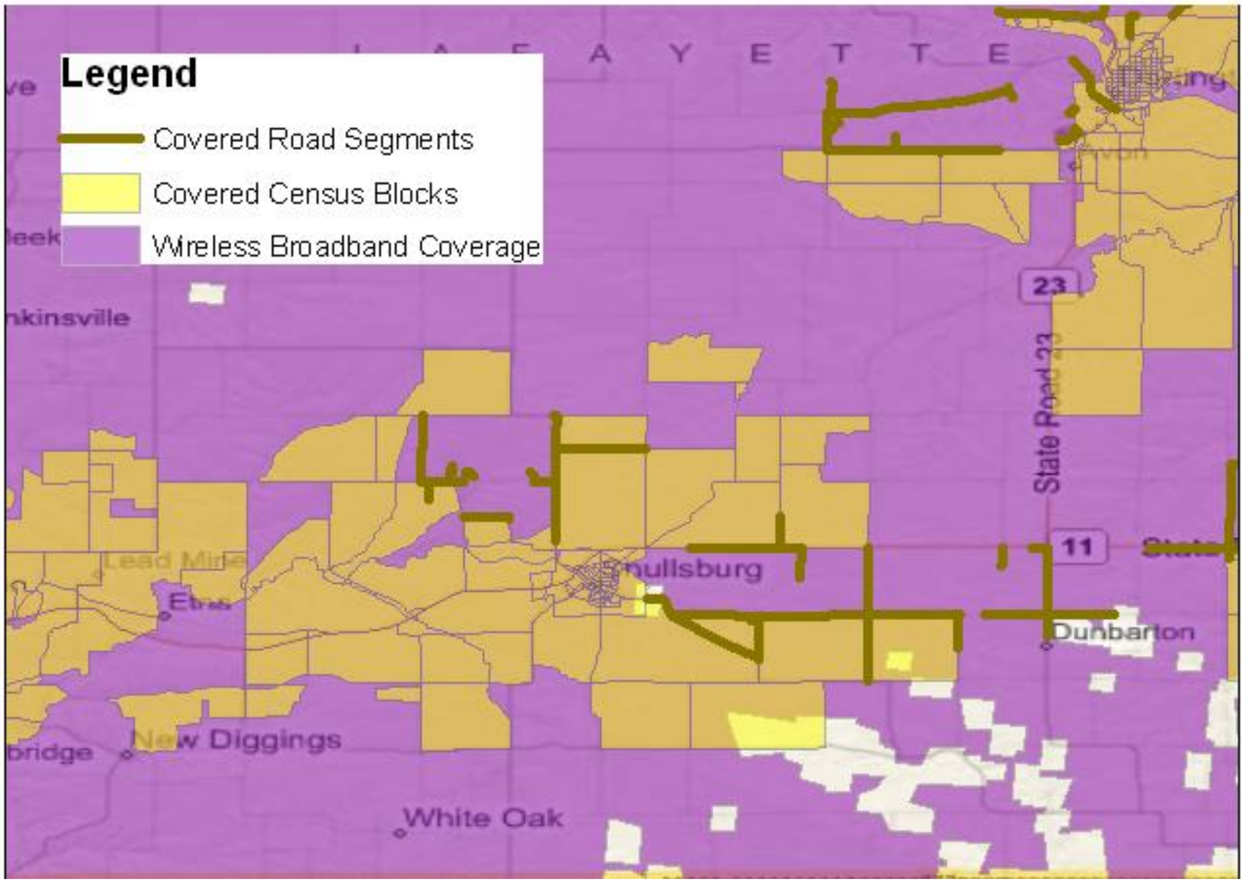


Figure 20--Multi Network Coverage portrayal

In this image, covered Census Blocks are light gold. Covered road segments are a darker gold and wireless coverage is purple. The concern seems to come down to how a wireline provider's coverage is shown in the large Census Blocks (greater than 2.0 sq mi). Some wireline providers have expressed dissatisfaction because their coverage is only tied to road geography, which leads to a visual "hole" in their coverage map. At the same time, they feel that it is unfair that the wireless provider's coverage is shown to be uniform in the same area. Put another way, if our maps show wireline in terms of Blocks and segments, why don't our maps show wireless the same way?

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many

dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

When a viewer of an online map clicks on the map (or zooms to an address), they are provided with a pop-up of service provider coverage in the area. The critical question is this: what is the area to which that pop-up window responds to? In the past, we reported back to the specific Census block, or buffered road segment intersected by the user click. As far as the map was concerned, once we move off of that road, or out of that segment, we have a new area to examine.

Our sense, given feedback received, is that our provider view should be a bit more tilted toward finding providers in a general area, rather than finding providers at a single-click location. If the goal of the map is to get someone to call a provider for service, our bias should be to include all of the potential providers in the general area, rather than giving potential customers a method to self-disqualify. That is, we want to cast a wider coverage net, rather than one too narrow. The problem with this approach is that it will create a number of false positive Broadband reports. As of this date we cannot determine if the claims of inaccurate coverage in online maps are due to the looser provider view standard or not. We keep this looser standard in place to minimize the likelihood of self-disqualifications.

Appendix One-Wisconsin

Community Anchor Institutions

In earlier submissions, the Community Anchor Institution (CAI) process was referred to in terms of a learning curve. This continues to be an appropriate metaphor. The mapping team continues to focus on data that will support and help inform policy makers and the SBI planning process.

In the first submission, the team gathered information on what data was available and what resources will be required to engage these categories of important institutions. In subsequent submissions we have focused our efforts on obtaining connectivity information for CAIs through direct outreach to the specific institutions as well as through central sources within the state or institution associations. The October 2011 submission began a transitional phase, as we stabilized the dataset in preparation for work outside the core LinkAMERICA team.[28]

In the current submission we had the following objectives:

Update the physical addresses of the CAIs, with the goal of eliminating P.O. Boxes from the dataset
Raise awareness of the broadband mapping program to organizations associated with the CAI categories with special emphasis to relevant local and, state government agencies.
Continued outreach to unresponsive CAIs to invite them to become engaged with the SBI program by participating in the online survey.

4) Verify the available connectivity information based upon new survey information

CAI Philosophy

Our work with CAIs is guided by three principles.

First, CAIs are important stakeholders within the planning process. Our goal is to engage participants in regional planning that have strong ties into the CAI categories identified by NTIA. This has a direct benefit of engaging an established stakeholder community. It also allows broadband planning to tie into existing organizational and planning networks. In each of our states, key relationships with education, public safety, libraries, and economic development sectors are being identified and developed.

Second, we believe that CAIs will likely be one of the primary beneficiaries of targeted broadband funding. Our belief stems from the sense that many of the benefits of Broadband will extend from these community 'anchor points'. In other words, it isn't solely the existence of Broadband at a library that provides a benefit. It is people using applications that work only on a Broadband network to upgrade their skills (e.g., online training) and gain access to online content (e.g., job postings, goods and

[28] LinkAMERICA began transitioning the CAI data collection effort in the state of Alabama to ConnectingALABAMA in Round 3. For Round 4 ConnectingALABAMA assumed full responsibility for the CAI data collection effort in Alabama. In Round 5 Connecting ALABAMA assumed full responsibility for the CAI collection and NTIA submission, including the methodology.

services), etc. The targeted use of a specific application--that can only take place with Broadband networks-- is what produces the priority benefit. Put another way, there seems to be a realization that things are less about pure connectivity (for the sake of connectivity) than about connectivity in terms of an application (for the sake of the benefit obtained through the application).

Third, we continue to use a rational and targeted approach to derive information. This means we will utilize our planning teams for as much ground work as possible. This also means that a goal of our CAI process is not an exhaustive Census of anything that could be a CAI; rather, it is the discovery, inventory and integration of Broadband planning activities into those CAIs that stand to produce the greatest synergies with the SBI planning process.

The above implies two significant points. First, the team's goal is to document community anchor institution connectivity within a broader context of regional and statewide planning objectives. Second, if a particular category of CAI has an independent Broadband planning effort underway, we will encourage that organization to take the lead, and we will provide relevant expertise and support as warranted. For example, in one of our states, the public safety community is already engaged in a mobile Broadband survey effort. We have aligned our CAI data collection process with that effort and are sharing information and expertise (e.g., hosting a survey) to support their mission. In another state we are attempting to glean connectivity information from a municipal government survey. There may be some downside to this collaborative approach in that we may have to work with data spanning different times or we may not have all of the location-specific information we need, but this does prevent the same user from receiving multiple inquiries.

Anchor Institution Survey

During the third submission period we designed and developed a simple on-line survey system called CAVS (Community Anchor Verification Survey). The intent of the survey was to both verify received connectivity information and garner additional connectivity information from CAIs. The link for the survey is housed on the Home Page of the State SBI website , thus providing the added opportunity for responding institutions to learn more about broadband activities in their state. The survey remains open between collection periods so that the Regional Planning Teams can update information as they engage with the community, and to allow responding institutions access to update their data as necessary.

Although we have found that reaching out to central contacts, for specific institution groups, is the most fruitful way of collecting connectivity data we find value in inviting individual anchor institutions to participate through means of a survey. In round 5 we reached out to CAIs using an adaptive approach that consisted of: 1) Emailing individual institutions inviting them to participate in the on-line survey 2) Follow-up phone calls to the CAIs to obtain/confirm contact information and encourage participation in the survey. From our perspective, although this method is very time consuming and work intensive, it allows the opportunity to personally explain the objectives of the program and answer questions. It also provides an opportunity for the individual institutions to become engaged in the broadband planning process.

Anchor Institution Trends

At this point we have focused our CAI attention on schools and libraries, with respect to connectivity. We benefit from strong relationships throughout the education sector (K-12 and Post-Secondary). We have also found excellent resources with State librarians.

To supplement the education and library information we have formed organizational relationships with the major hospital associations and other key health organizations within each state. Our goal with these relationships is to cull information from their planning process and partner with them on outreach. As in the prior submissions, we rely on public domain sources of information for the public safety-category. Collecting connectivity data for this group continues to be one of our most significant challenges. Our hope is that in subsequent submissions, we will reduce the size of this category and connectivity information specific to root nodes of the public safety network--such as County Emergency Operation Centers.[29] At this point we have had minimal success gaining this information.

Because we have a wide ranging population of CAIs in our data set we have a variety of Broadband services that don't always fit NOFA parameters. Services like PRI or T1 are classified into "other copper," We also had difficulty obtaining both the upstream and downstream channel capacities. In most instances, when it was logical to do so, we made the speeds symmetrical, but this is an assumption on our part. If a site records bandwidth across several services (eg. video and data), we record the total bandwidth to give a picture of available site bandwidth. We are also working to standardize our response to NTIA in circumstances where an entity shares a Broadband connection among a campus which is fiber fed. In this case we use the total campus bandwidth and use the primary campus Internet connection.

As a final verification step, we attempt to screen the CAI data for duplicate values. Because many CAI are closely clustered together we perform the de-duplication based upon the ANCHORNAME within the ZIP5.

[29] Within the public safety category, it is also very difficult to derive precise locations as many CAI are addressed to PO boxes . This is further complicated due to the many Volunteer Fire Departments used in Rural Communities which often do not have a physical location.

Appendix Two

Data Collection Challenges

This section summarizes some of the challenges we have experienced with data collection and processing. The team believes it is important to categorize these challenges as they help inform the geoprocessing and verification methods used. It is also our hope that some of the more global issues can be discussed and decided within the Grantee community.

We begin with several global issues and then continue toward more granular challenges.

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

As has been discussed in webinars and also within the context of NTIA data assessments, much reported speed information continues to be reported at the market level (MSA/RSA) and then uniformly pushed down to the Census blocks. This has a tendency to create a problem with NTIA speed tripwires since the technology is reported by block but the maximum advertised speed is reported at a regional level.

This challenge gets further amplified at a block level when comparing to a third party data provider. It can create a mismatch between third party data generated at an area larger than block level versus block level generated speed and vice versa. To minimize the potential confusion, it might be helpful to be able to provide a flag at the submitted record level which indicates the geographic basis by which the Maximum Advertised Speed is reported.

Census Block and Road Standards are not clear

There seem to be several methods by which providers are calculating the Census block area. So the distinction at 2.00 square miles can be uniform, it would be ideal to articulate an operational area calculation definition.

Providers Not Wishing for Block Level Aggregation of Their Data

For providers who submit address point data, we do minimal additional processing. Our main test is to ensure that points are contained within 1 mile of exchange boundaries; the only other processing was normalization into NTIA formats.

Broadband providers not Meeting the NOFA "provider" Definition

Comments on PBWorks appear to reflect a concern among a number of grantees about what a Broadband provider is--and how that definition impacts mapping.

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[30]. Further, the need for clarification around a facilities-based provider,

[30] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location,

versus the reseller, has injected even more ambiguity. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

Given mergers and acquisitions in the CLEC space we are noticing a drop off in participation in this program by several national CLECs. We hope this is an artifact of the mergers and resource constraints rather than a long term trend.

Again, we do not want to exclude a service provider, but we believe there needs to be further clarification around the "7-10 day rule," the definition of a "reseller," and better interpretation of facility-based providers, versus equipping UNEs, SpA or leased lines.

We have used the provider Type of "Other" to classify a number of providers who offer Broadband services, but we do not offer them in a manner consistent with Technical Appendix A definitions.

To What Extent Should We Begin "Classifying" the Data and Maps?

The question immediately preceding gets to the intent of a Broadband provider. This question gets to the intent of the Data and Maps.

Earlier in this document we discussed the question of what type of bias we should introduce to our online map messaging. In an online environment, do we want to more likely create an overstatement of coverage for a provider than an understatement? In other words, is the larger problem allowing a consumer to self-disqualify, versus calling a number of neighboring providers? There is a related issue to this. Clearly in our maps there is a lot of scatter in data that we believe should be more continuous. These are the islands of coverage from an incumbent provider[31]. There are a number of processes that could be put in place to deal with this type of scatter, but without more information from the service provider-- essentially the last mile facilities-- it will be difficult to perform this clean up in an informed manner. On the one hand, we can aesthetically clean the maps up and reduce the scatter, but we have little sub-block engineering information upon which to make this decision. Right now our preference is to put out a somewhat aesthetically messier deliverable and work with providers to get better information to clarify their submission. If that isn't forthcoming, we are limited in what can be done given the lack of facility level information. In summary this yields two questions

In our online maps should we error on overstating coverage to prevent consumer self-disqualification? In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?

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versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

[31] For a provider who sells opportunistically (not within a franchise area) it becomes even more problematic to classify their coverage because the points are more related to the type of consumer purchasing the service than a bounded offering. In a matter of speaking, the Provider Type is more determined by the technology and/or location than a type of business. The core intent of the NOFA and our grant application was centered around the 7-10 day providers but we believe maintaining information on provider Type "Other" and "Reseller" is important to assist in validation and market segment analysis as resources are available.

As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results.

Community Anchor Institution Surveys

Over time the base of participation in CAI surveys has broadened. Our teams are interacting with more organizations interested in broadband planning. This is a benefit because it helps integrate the importance of Broadband mapping, planning and capacity building within their organizational framework. But it also begins to create challenges in data collection. There are two noticeable trends in this area.

First, CAIs are organizationally diverse. For a school, you expect to have a centralized entity that can answer and support questions about Broadband services. For a rural, volunteer fire department answering questions about broadband may go to the Chief. The way that he/she answers about Broadband is probably specific to her experience and context. The implication is two-fold. First saying that some percentage of CAIs in a state has access to broadband can be misleading because the formality of a school or government building is much different than the formality of a volunteer fire department. Second, that volunteer fire department may get broadband via a 3G mobile hotspot when they need it…but the presence of *this* type of broadband is a very different thing than the presence of a responder who has mobile LTE broadband.

Second, technical knowledge of the survey respondent differs within each organization. This complicates our data collection. It is not uncommon for someone to say yes we have Broadband, I just don't know how we get it or how fast this is. So in response we report they are broadband served but unknown speed or technology. This doesn't mean they haven't been surveyed, it just means the response was unknown. As there are now a large number of people collecting this data, it would be helpful to have some consistent national business rules from which we can answer questions about the meaning of any particular data element. As an example, when should "no" be used versus when should "unknown "be used. In other words, what is the standard for the difference between never made contact with the CAI versus a respondent didn't know/couldn't answer. We have guidelines internally but are unsure if this is consistent across states.

Finally, as we survey groups we find a wider sampling of broadband technologies used. Fixed wireless and mobile wireless definitely exist in the CAI universe. NTIA may want to reconsider the automatic warning that comes from the check submission script from a non-wireline technology.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute

accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to December 31, 2011. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

The NOFA is clear on submitting a list of Blocks in which a provider delivers Broadband service. This is a different objective than perfectly reflecting service territories. If a firm's accuracy standard is a reflection of their service area, then the data created under the NOFA will not meet their perception of accuracy. This leads to two other issues: First, using Census Blocks rather than serving area may overstate or understate a particular provider's Broadband serving area. This was a significant concern of ***REDACT*** who specifically required us to submit only address-level qualification data. The second issue this brings up is how or if, there should be some standard on how much of a Census Block needs to be covered to call it covered.

Confidentiality

Several providers have noted concerns with CPNI-related issues and have stated this as a reason for non-participation. We have also heard expressions of comparable concern regarding identifiable responses to Anchor Institution information.

Unclear on Definitions

As discussed earlier, several providers claimed confusion on several key terms involved in Middle Mile. We note a consistent stream of questions around the interpretation of Maximum Advertised Speed. Some providers understand this to be the most common speed package bought within the mass market, while others view this as a speed that can be purchased for an additional cost above a mass market offering (e.g. a Turbo option for an additional fee per month). Others interpret this as the fastest speed that is available for that particular location--in terms of xDSL, a structure qualified speed, for example.

Perception of Data Use

There seems to be some hesitancy releasing speed information because no one is sure of how the information will be used, or what the speed is intended to reflect. A number of providers have verbally indicated that typical speed will be about (on average) 80% of purchased speed due to overhead. But there are many other factors (such as a user's home network) that influence speeds measures. Providers are concerned about introducing statistics without a clear understanding of how those statistics are derived and will then be used. Also, as advertised speed is pushed down to a block level, we sense more trepidation to report speed values. This quickly begins to touch on parity across network types (why is wireline down at the block when wireless is half the state, etc.). Finally we note a

significant increase in speed values reported to us. This may be due to network upgrades or competitive concerns to match the theoretical network speed.

Location Uncertainty In Source Data

Within this document we have noted concerns about the impact of source data accuracy. Our geoprocessing methodology provided what we believe is a relatively conservative tolerance to account for the scale issue in the source data, but we are unsure of how this may impact downstream users. Clearly, it also impacts the verification process because we can't attempt to verify received data beyond a scale at which it was developed.

Covered Segment Process

Deriving Broadband covered segments in Census Blocks greater than 2 square miles has proved to be a challenge. Moving from a NOFA specified tabular deliverable to a requested geographic deliverable also increases the complexity of the effort.

Record Level Metadata

It would be helpful to have one or two additional fields in each feature class transmitted to NTIA. One User Defined field could be helpful as an expression of record level confidence. The second field could be used as a Key between the transfer geodatabase and our systems. Ideally, both fields could be large text fields (50 char) so the Grantee can use them to express a variety of attributes.

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

1. There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
2. In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
3. We believe some providers are trimming their coverage to honor license area boundaries.
4. Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
5. In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
6. As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
7. We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed over 10 Mbps.
8. We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.

9. We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the lower of the speed tiers.
10. Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.
11. In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.
12. In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to different than what would be returned in geocoding.
13. We made a modification to the NTIA supplied verification script. For the CAI layer we allow the TRANSTECH to be-9999, as per the default value in the fGDB.
14. We made a modification to the NTIA supplied verification script. In the script. The ' theST' variable is not correct for Wyoming.
15. We are aware of several warnings from the output of the validation script. The majority of the warnings are related to speed. In the cases where xDSL speeds are faster than 10 Mbps, we note in our data processing notes discussions with provider. This warning impacts address points, census blocks and road segments. In the case of cable broadband (Techtrans 40, 41) we have warnings associated with speed tier 8. In these cases we have verified the speed availability. Nonetheless, speed category 8 creates a warning for both DOCSIS 3 and non-DOCSIS 3 systems. We have one fail related to address points with multiple speed. Per the webinar on 3/26/12, the address fail is allowable.

Appendix Three

This appendix contains the confidentiality clarification supplied in a series of emails between CostQuest and NTIA.

Feature Class	*Metadata*	*NOFA Confidential?*	*Online Map*	*Public Disclosure*	*Exemption*
Last Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Middle Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Service Address	Constraints on accessing and using the data	No	No	Yes	
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
CAI	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of				

	the data by users.				
Census Block	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Service Overview	Constraints on accessing and using the data	No	Yes	Yes	The only provider who may not show up on this table is a provider who has provided only confidential data (last mile, Middle Mile, address point with provider name)
	Access constraints: None				
	Use constraints:				

	There are no restrictions on distribution of the data by users.				
Road Segment	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None.				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Wireless	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users				

Appendix Four-Wisconsin

This appendix details our analysis of the potential and actual broadband provider market. We include both our internal tracking description document and then our categorization for each provider. As this extract was made prior to final submission, there may be differences between provider categorization and the attributes on the day of submission to NTIA.

Provider Categorization

Provider Type and Status Definitions

The Provider Type is based upon categories provided by NTIA, while the Provider Status is based upon categories developed internally for tracking purposes. It should be noted that the Provider Status discussed here relates to the provider's overall status within the program. **Provider Type Codes and Definitions:**

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant. Satellite providers are currently included in this category due to uncertainty over satellite reporting requirements.
4	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

Once the proper Provider Type has been assigned to an entity, an overall Provider Status must be established. The Provider Status codes are specific to the Provider Types, and are not interchangeable. The following table lists the status codes associated with each Provider Type.

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.
	S	Satellite	Satellite providers .
	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
N/A	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
X			No status codes associated with this Provider Type

Provider Disposition

Provider State	Provider ID	Provider Name	DBA	Provider Type	Provider Status
WI	192	24-7 TELCOM, INC.	24-7 TELCOM	P	P
WI	193	360 NETWORKS (USA) INC	360 NETWORKS (USA) INC	O	NC
WI	194	ACCESS MEDIA 3, INC.		X	NP
WI	195	ACCESS ONE INC		X	NP
WI	541	AIR-SPEED.NET		P	NR
WI	198	AIRDIS LLC		X	NP
WI	199	AIRESPRING, INC.	AIRESPRING, INC.	R	R
WI	540	AIRRUNNER NETWORKS LLC		P	NR
WI	436	ALLTELL COMMUNICATIONS		P	V
WI	110003	AMERICAN TOWER CORPORATION	ATC OUTDOOR DAS LLC	X	NP
WI	202	AMERY TELCOM INC	NORTHWEST COMMUNICATIONS	P	P
WI	203	AMHERST TELEPHONE COMPANY	AMHERST TELEPHONE COMPANY	P	P
WI	207	AT&T CORP, INC.	AT&T CORP, INC.	P	P
WI	206	AT&T INC.	AT&T SERVICES, INC.	P	V
WI	476	AT&T INC.	NEW CINGULAR WIRELESS SERVICES, INC.	P	V
WI	633	AT&T INC.	AT&T MOBILITY LLC	P	P
WI	542	ATHENET (PKA ATHENA GROUP)	NORTHERN TELEPHONE AND DATA	P	V
WI	110004	ATLANTIS HOLDING	WISCONSIN RSA #7 LIMITED PARTNERSHIP	O	U
WI	209	BADGER TELECOM, LLC	TDS TELECOM	P	P
WI	212	BALDWIN TELECOM, INC.	BALDWIN TELECOM INC.	P	P
WI	634	BALDWIN TELECOM, INC.	BALDWIN BROADBAND, LLC	P	V
WI	110005	BAY COMMUNICATIONS INC.	BAYCOM INC	R	R
WI	215	BAYLAND COMMUNICATIONS, INC.	BAYLAND COMMUNICATIONS, INC.	P	V
WI	697	BAYLAND TELEPHONE, INC.	BAYLAND TELEPHONE, INC.	P	V
WI	110000	BAYNET INC		X	NP
WI	218	BERGEN TELEPHONE COMPANY	BERGEN TELEPHONE COMPANY	P	P
WI	745	BERTRAM WIRELESS	BERTRAM WIRELESS	P	P
WI	110001	BETTER WORLD TELECOM LLC		X	NP
WI	220	BLACK EARTH TELEPHONE COMPANY, LLC	TDS TELECOM	P	P
WI	221	BLOOMER TELEPHONE COMPANY	BLOOMER TELEPHONE CO	P	P
WI	222	BONDUEL TELEPHONE COMPANY, LLC	TDS TELECOM	P	P
WI	110006	BORDERLAND COMMUNICATIONS LLC	BORDERLAND COMMUNICATIONS LLC	P	V
WI	110007	BROADCORE, INC.	BROADCORE, INC.	R	R
WI	110008	BROADSTAR, LLC		O	NC

WI	110009	BROADVIEW NETWORKS HOLDINGS, INC.	BROADVIEW NETWORKS HOLDINGS, INC.	P	NR
WI	225	BROADWING COMMUNICATIONS, LLC	BROADWING COMMUNICATIONS, LLC	P	V
WI	227	BROWN TELEPHONE	BROWN TELEPHONE	P	V
WI	228	BRUCE TELEPHONE COMPANY, INC.	BRUCE TELEPHONE COMPANY	P	P
WI	110010	BULLSEYE TELECOM, INC.	BULLSEYE TELECOM, INC.	R	R
WI	230	BURLINGTON, BRIGHTON & WHEATLAND TELEPHONE COMPANY, LLC	TDS TELECOM	P	P
WI	110082	CACHE VALLEY WIRELESS		N/A	NP
WI	110011	CANNON TELEPHONE COMPANY		P	NR
WI	232	CENTRAL STATE TELEPHONE COMPANY, LLC	TDS TELECOM	P	P
WI	234	CENTURYTEL, INC.	CENTURYTEL ACQUISITION LLC	P	V
WI	662	CENTURYTEL, INC.	CENTURYLINK	P	P
WI	526	CHARTER COMMUNICATIONS	CHARTER COMMUNICATIONS	P	P
WI	239	CHEQTEL	NORVADO	P	P
WI	240	CHEQUAMEGON COMMUNICATIONS COOPERATIVE, INC.	NORVADO	P	P
WI	545	CHIBARDUN TELEPHONE COOPERATIVE	MOSAIC TELECOM	P	P
WI	242	CHOICETEL LLC	CHOICETEL LLC	P	P
WI	110012	CIMCO COMMUNICATIONS, INC.	CIMCO COMMUNICATIONS, INC.	P	NR
WI	110085	CINCINNATI BELL	CINCINNATI BELL ANY DISTANCE INC.	N/A	NP
WI	245	CITIZENS COMMUNICATIONS COMPANY	FRONTIER COMMUNICATIONS CORPORATION	P	V
WI	279	CITIZENS COMMUNICATIONS COMPANY	FRONTIER COMMUNICATIONS- ST CROIX, INC	P	P
WI	280	CITIZENS COMMUNICATIONS COMPANY	FRONTIER COMMUNICATIONS OF VIROQUA	P	P
WI	635	CITIZENS COMMUNICATIONS COMPANY	FRONTIER COMMUNICATIONS OF MONDOVI	P	P
WI	244	CITIZENS FIBERNET INC		O	NC
WI	246	CITIZENS TELEPHONE COOPERATIVE, INC. (WI)	CITIZENS TELEPHONE COOPERATIVE, INC.	P	P
WI	426	CITY OF WAUPACA	WAUPACAONLINE.NET	P	P
WI	345	CLEAR LAKE TELEPHONE COMPANY	NEXTGEN COMMUNICATIONS LLC	P	P
WI	248	CLEAR LAKE TELEPHONE COMPANY LLC	CLEAR LAKE TELEPHONE COMPANY, INC.	P	P

WI	751	CLEARWIRE CORPORATION	CLEARWIRE CORPORATION	P	P
WI	252	COCHRANE COOPERATIVE TELEPHONE COMPANY	COCHRANE COOPERATIVE TELEPHONE COMPANY	P	P
WI	110013	COGENT COMMUNICATIONS GROUP	COGENT COMMUNICATIONS GROUP	O	NC
WI	254	COMCAST OF MINNESOTA WIS. INC.	COMCAST	P	V
WI	682	COMCAST OF WISCONSIN, INC.	COMCAST	P	P
WI	720	COMMUNITY ANTENNA SYSTEM, INC		P	E
WI	110015	COMPUTER DYNAMICS OF NW ILLINOIS, LLC	COMPUTER DYNAMICS OF NW ILLINOIS, LLC	P	NR
WI	258	COON VALLEY FARMERS TELEPHONE COMPANY, INC.	COON VALLEY FARMERS TELEPHONE COMPANY	P	P
WI	110002	COON VALLEY TELECOMMUNICATIONS INC	COON VALLEY TELECOMMUNICATIONS INC	N/A	NP
WI	764	COUNTRY WIRELESS	COUNTRY WIRELESS	P	P
WI	450	CRICKET COMMUNICATIONS, INC.	DENALI SPECTRUM LICENSE SUB, LLC	P	V
WI	263	CTC TELECOM	MOSAIC TELECOM	P	P
WI	264	CUBA CITY TELEPHONE EXCHANGE	CUBA CITY TELEPHONE EXCHANGE CO	P	V
WI	547	CUTTING EDGE SYSTEMS		O	U
WI	110017	CYBER BROADCASTING LLC		O	U
WI	110018	CYBERLYNK NETWORK	CYBERLYNK NETWORK	O	U
WI	110019	CYS INC.	RICHLAND CENTER CABLE TV	O	U
WI	110020	DAIRYLAND CABLE SYSTEMS		N/A	NP
WI	550	DB WIRELESS		O	U
WI	110053	DCS NETLINK	SKYWALK WIRELESS	R	R
WI	499	DEUTSCHE TELEKOM AG	T-MOBILE USA, INC.	P	P
WI	267	DICKEYVILLE TELEPHONE, LLC	TDS TELECOM	P	P
WI	268	DIECA COMMUNICATIONS, INC.	COVAD COMMUNICATIONS COMPANY	O	P
WI	683	DIMAN SYSTEMS	INTERNET KMORAINE	P	P
WI	270	DISCOVERNET	WIRELESS WISCONSIN	P	NR
WI	110021	DLS COMPUTER SERVICES, INC.	DLS COMPUTER SERVICES	R	R
WI	553	DOOR PENINSULA INTERNET, INC. (ONLINE DOOR COUNTY)	DOOR PENINSULA INTERNET, INC.	P	NR
WI	271	DSLNET COMMUNICATIONS, LLC	DSLNET COMMUNICATIONS, LLC	O	P
WI	554	E-VERGENT.COM, LLC	E-VERGENT.COM LLC	P	P
WI	272	EASTCOAST TELECOM OF WISCONSIN, LLC	TDS TELECOM	P	P
WI	110090	ETHOPLEX	ETHOPLEX	O	U

WI	555	EXCEL.NET, INC.	EXCEL.NET, INC.	P	P	
WI	276	FARMERS INDEPENDENT TELEPHONE COMPANY	GRANTSBURG TELCOM	X		0
WI	727	FARMERS INDEPENDENT TELEPHONE COMPANY	GRANTSBURG TELCOM	P	P	
WI	408	FARMERS TELEPHONE COMPANY, LLC	TDS TELECOM	P	P	
WI	748	FAST AIR INTERNET	FASTAIR INTERNET	P	P	
WI	750	FASTBYTES WIRELESS		P	P	
WI	557	FIBERNET COMMUNICATIONS COMPANY		P	D	
WI	454	FIREFLY	FIREFLY	O	U	
WI	281	FRONTIER COMMUNICATIONS OF WISCONSIN	FRONTIER COMMUNICATIONS OF WISCONSIN	P	P	
WI	420	FRONTIER COMMUNICATIONS OF WISCONSIN	FRONTIER COMMUNICATIONS	P	P	
WI	373	FRONTIER CORPORATION	FRONTIER RHINELANDER TELEPHONE COMPANY	P	P	
WI	110024	GENESIS WIRELESS		N/A	NP	
WI	558	GENEVA ON-LINE, INC.	GENEVA ON-LINE, INC.	P	D	
WI	110025	GENISYSNOTWIRESINTERNET	BLAST COMMUNICATIONS	O	U	
WI	285	GLOBAL CROSSING NORTH AMERICA, INC.	GLOBAL CROSSING TELECOMMUNICATIONS, INC.	R	R	
WI	287	GRANITE TELECOMMUNICATIONS LLC	GRANITE BROADBAND, INC	P	NR	
WI	110026	GRANT WIRELESS		O	U	
WI	288	GRANTLAND TELECOM, LLC	TDS TELECOM	P	P	
WI	110079	GREENFLY NETWORKS, INC.		N/A	NP	
WI	289	HECTOR COMMUNICATIONS CORPORATION	HAGER TELECOM, INC.	P	P	
WI	296	HECTOR COMMUNICATIONS CORPORATION	INDIANHEAD TELEPHONE COMPANY	P	P	
WI	273	HICKORY TECH CORPORATION	ENVENTIS TELECOM INC.	N/A	NP	
WI	110027	HIERCOMM NETWORKS	HIERCOMM NETWORKS	P	NR	
WI	742	HILBERT COMMUNICATIONS	BUG TUSSEL WIRELESS	P	P	
WI	291	HILLSBORO TELEPHONE COMPANY, INC.	HILLSBORO TELEPHONE CO INC	P	P	
WI	110028	HNS LICENSE SUB, LLC	HUGHES COMMUNICATIONS, INC.	O	S	
WI	110029	HOWARD CABLE		N/A	NP	
WI	110030	HUGHES COMMUNICATIONS, INC.	HUGHESNET	O	S	
WI	110083	IDAHO CITY CABLE TV		O	U	
WI	295	ILLINOIS TELEPHONE CORPORATION		N/A	NP	
WI	110031	INTERLINK COMPUTERS TECNOLOGY INC.	UP LOGON	P	NR	
WI	672	INTERNATIONAL BROADBAND ELECTRIC COMMUNICATIONS,	IBEC	N/A	NP	

		INC.			
WI	758	KARBAN TV SYSTEMS, INC. (KTVS)	THREE LAKES CABLE TV	P	P
WI	302	KAUKAUNA UTILITIES		P	NR
WI	504	KENOSHA CELLULAR TELEPHONE LP (U.S. CELLULAR CORPORATION)	U.S. CELLULAR CORPORATION	P	P
WI	465	LA CROSSE CELLULAR TELEPHONE CO INC	U.S. CELLULAR CORPORATION	P	V
WI	466	LAGRANT CONNECTIONS, LLC.	LAGRANT CONNECTIONS, LLC.	P	P
WI	306	LAKEFIELD TELECOM, INC.	LAKEFIELD TELEPHONE COMPANY	P	P
WI	561	LAKEFIELD TELECOM, INC.	LAKEFIELD COMMUNICATIONS, INC.	P	D
WI	308	LAKELAND COMMUNICATIONS, INC.	LAKELAND TELECOM, INC.	P	P
WI	313	LAKELAND COMMUNICATIONS, INC.	LUCK TELEPHONE COMPANY	P	P
WI	331	LAKELAND COMMUNICATIONS, INC.	MILLTOWN MUTUAL TELEPHONE CO	P	P
WI	309	LAMBEAU TELECOM COMPANY, LLC		R	R
WI	304	LAVALLE TELEPHONE COOPERATIVE, INC.	LAVALLE TELEPHONE COOPERATIVE INC	P	P
WI	190	LEAP WIRELESS INTERNATIONAL	CRICKET COMMUNICATIONS	P	P
WI	562	LEMONWEIR VALLEY TELEPHONE COMPANY	LEMONWEIR VALLEY TELEPHONE COMPANY	P	P
WI	312	LEVEL 3 COMMUNICATIONS, LLC	LEVEL 3 COMMUNICATIONS, LLC	P	P
WI	110033	LIGHTEDGE SOLUTIONS, INC.	LIGHTEDGE SOLUTIONS, INC.	N/A	NP
WI	563	LITEWIRE INTERNET SERVICES, INC.	LITEWIRE INTERNET SERVICES, INC.	P	P
WI	217	LYNCH INTERACTIVE CORPORATION	BELMONT TELEPHONE COMPANY	P	V
WI	467	MADISON CELLULAR TELEPHONE COMPANY	U.S. CELLULAR CORPORATION	P	V
WI	318	MARQUETTE-ADAMS TELEPHONE COOPERATIVE, INC.	MARQUETTE-ADAMS TELEPHONE COOPERATIVE, INC.	P	P
WI	322	MATRIX TELECOM INC	TRINSIC COMMUNICATIONS BRAND.	O	U
WI	529	MAVAWA TELECOMMUNICATIONS, INC.	MANAWA TELEPHONE CO INC	P	P
WI	323	MCI COMMUNICATION SERVICES, INC.	MCI COMMUNICATION SERVICES, INC.	O	P
WI	531	MEDIACOM COMMUNICATIONS CORP.	MEDIACOM WISCONSIN	P	P
WI	110091	MEDIAG3, INC.	MEDIAG3, INC.	O	U
WI	649	MEGAPATH, INC.	MEGAPATH	O	P
WI	565	MERCURY NETWORK	MERCURY NETWORK	P	P

		CORPORATION	CORPORATION		
WI	532	MERRIMAC COMMUNICATIONS, LTD.	MERR.COM	P	P
WI	327	METROPOLITAN TELECOMMUNICATIONS HOLDING COMPANY	METROPOLITAN TELECOMMUNICATIONS HOLDING COMPANY	R	R
WI	533	MH TELECOM, LLC	MHTC	P	P
WI	265	MID WEST DATA SYSTEMS	CYBERZONE	P	NR
WI	328	MID-PLAINS TELEPHONE, LLC	TDS TELECOM	P	P
WI	110014	MIDCONTINENT COMMUNICATIONS	MIDCONTINENT COMMUNICATIONS	P	P
WI	329	MIDWAY TELEPHONE COMPANY, LLC	TDS TELECOM	P	P
WI	330	MIDWEST FIBER NETWORKS LLC	TDS TELECOM	O	NC
WI	472	MILWAUKEE SMSA LTD PARTNERSHIP		N/A	NP
WI	110034	MITEL NET SOLUTIONS INC	INTER-TEL NETSOLUTIONS	O	NC
WI	333	MOMENTUM TELECOM INC		O	U
WI	334	MOSINEE TELEPHONE COMPANY, LLC	TDS TELECOM	P	P
WI	335	MOUNT HOREB TELEPHONE CO	MHTC	P	P
WI	336	MT. VERNON TELEPHONE COMPANY, LLC	TDS TELECOM	P	P
WI	337	NATIONAL COMMUNICATIONS LLC		O	U
WI	338	NAVIGATOR TELECOMMUNICATIONS LLC		N/A	NP
WI	339	NELSON TELEPHONE COOPERATIVE	NELSON TELEPHONE COOPERATIVE	P	P
WI	669	NELSON TELEPHONE COOPERATIVE - CABLE	CHIPPEWA VALLEY CABLE INC.	P	P
WI	110035	NET CABLE		N/A	NP
WI	567	NETWURX		P	P
WI	110036	NEW CENTURY COMMUNICATIONS		O	U
WI	675	NEW EDGE NETWORK, INC.	NEW EDGE HOLDING COMPANY	O	NC
WI	343	NEW LONDON ELECTRIC & WATER UTILITY		R	R
WI	568	NEWWIS (AKA - DOOR COUNTY COMPUTER)	NEWWIS	O	NC
WI	110037	NEXTERA HOLDING, LLC	NEXTERA WIRELESS	P	NR
WI	346	NEXVO LLC		P	NR
WI	752	NIAGARA COMMUNITY TV COOP.	NIAGARA COMMUNITY TV CO-OP.	P	NR
WI	347	NIAGARA TELEPHONE COMPANY	NIAGARA TELEPHONE COMPANY	P	P
WI	782	NIAGARA WIRELESS, LLC.	CIRRINITY	P	P
WI	110038	NOBELTEL LLC		R	R
WI	110039	NORSTAR TELECOMMUNICATIONS, LLC		R	R

WI	340	NORTHEAST COMMUNICATIONS OF WISCONSIN, INC.	NET LEC, LLC	P	V	
WI	534	NORTHEAST TELEPHONE COMPANY LLC	NSIGHT TELSERVICES	P	P	
WI	353	NORTHERN TELEPHONE & DATA CORP		R	R	
WI	569	NORTHERN TELEPHONE AND DATA CORP.	NORTHERN TELEPHONE & DATA	P	P	
WI	354	NORTHSTAR TELECOM INC		R	R	
WI	352	NORTHWEST COMMUNITY COMMUNICATIONS, INC.	NORTHWEST COMMUNICATIONS	P	P	
WI	110086	NW SPECTRUM CO.	NEXT WAVE WIRELESS	N/A	NP	
WI	110040	OCONTO FALLS CABLE TV		N/A	NP	
WI	731	ONE COMMUNICATIONS CORPORATION	ONE COMMUNICATIONS CORP.	O	NC	
WI	481	ONSTAR CORPORATION		R	R	
WI	357	ONVOY INC		R	R	
WI	110041	OPEN RANGE	OPEN RANGE	X		0
WI	416	P&V CAPITAL HOLDINGS, LLC (US SIGNAL)	US SIGNAL COMPANY, LLC	O	P	
WI	715	PACKERLAND BROADBAND	CCI SYSTEMS, INC.	P	P	
WI	325	PAETEC CORPORATION	MCLEODUSA TELECOMMUNICATIONS SERVICES, INC.	O	NC	
WI	359	PARTNERS TELECOM INC		O	U	
WI	360	PEERLESS NETWORK OF WISCONSIN, LLC		R	R	
WI	361	PHOENIX INTERSTATE DATA SYSTEMS INC		R	R	
WI	110042	PHOENIX PC SERVICE	PHOENIX PC SERVICE	N/A	NP	
WI	110043	PHONE1 INC		R	R	
WI	362	PIONEER COMMUNICATIONS INC		O	U	
WI	364	PLYMOUTH UTILITIES		N/A	NP	
WI	484	PNG TELECOMMUNICATIONS INC		O	U	
WI	365	POWERCOM CORPORATION		N/A	NP	
WI	366	PRAYZTEL COMMUNICATIONS LLC		N/A	NP	
WI	367	PRICE COUNTY TELEPHONE COMPANY	PRICE COUNTY TELEPHONE COMPANY	P	P	
WI	574	PRICE COUNTY TELEPHONE COMPANY	PRICE COUNTY INFORMATION SYSTEMS, INC.	P	P	
WI	110044	Q-COMM CORPORATION	WINDSTREAM (PKA-NORLIGHT INC .PKA-CINERGY COMMUNICATIONS COMPANY)	O	NC	
WI	368	QWEST COMMUNICATIONS COMPANY, LLC	CENTURYLINK	N/A	NP	
WI	488	RANGE CORPORATION	RANGE TELECOMMUNICATIONS	R	R	

WI	719	RAPID COMMUNICATION LLC		P	E
WI	369	REEDSBURG UTILITY COMMISSION	REEDSBURG UTILITY COMMISSION	P	P
WI	110081	RICHLAND CENTER ELECTRIC UTILITY		X	NP
WI	375	RICHLAND-GRANT TELEPHONE COOPERATIVE, INC.	RICHLAND-GRANT TELEPHONE COOPERATIVE, INC.	P	P
WI	110045	RIDGE RUNNER INTERNET SERVICES	RIDGE RUNNER INTERNET SERVICES	N/A	NP
WI	110046	RIDLEY TELEPHONE COMPANY LLC		R	R
WI	377	RIVERSIDE TELECOM, LLC	TDS TELECOM	P	P
WI	490	ROADPOST USA INC		R	R
WI	511	RURAL CELLULAR CORPORATION	WIRELESS ALLIANCE LLC	O	U
WI	110047	S & K TV SYSTEMS		P	NR
WI	378	SAGE SPECTRUM, LLC	SAGE TELECOM INC	N/A	NP
WI	110084	SCA CABLE INC.	SOLARUS	P	V
WI	381	SCANDINAVIA TELEPHONE COMPANY, LLC	TDS TELECOM	P	P
WI	575	SELK ELECTRONICS		R	R
WI	491	SHARED TECHNOLOGIES CELLULAR INC		R	R
WI	382	SHARON TELEPHONE COMPANY	SHARON TELEPHONE COMPANY	P	P
WI	110049	SHARON TELEPHONE COMPANY (IL & WI)	SHARON TELEPHONE COMPANY - CLEC	P	V
WI	110050	SILV COMMUNICATION INC		R	R
WI	110051	SIMICOMM LLC		R	R
WI	110052	SIREN TELEPHONE COMPANY	SIREN COMMUNICATIONS	P	V
WI	385	SIREN TELEPHONE COMPANY, INC.	SIREN TELEPHONE COMPANY, INC.	P	P
WI	386	SOMERSET TELEPHONE CO.	NORTHWEST COMMUNICATIONS	P	P
WI	747	SONICNET	SONICNET	P	P
WI	387	SOUTHEAST TELEPHONE CO. OF WISCONSIN, LLC	TDS TELECOM	P	P
WI	494	SOUTHERN & CENTRAL WIRELESS LLC		R	R
WI	110054	SPECTROTEL INC		N/A	NP
WI	231	SPRING VALLEY TELEPHONE COMPANY, INC.	CELECT COMMUNICATIONS, LLC	P	V
WI	390	SPRING VALLEY TELEPHONE COMPANY, INC.	SPRING VALLEY TELEPHONE	P	P
WI	650	SPRINT NEXTEL CORPORATION	SPRINT	P	P
WI	110055	STARBAND COMMUNICATIONS INC.	STARBAND COMMUNICATIONS INC.	O	S
WI	110056	STEALTHNET	STEALTHNET	X	NP
WI	394	STOCKBRIDGE & SHERWOOD TELEPHONE COMPANY, LLC	TDS TELECOM	P	P

WI	395	STOUGHTON MUNICIPAL UTILITIES		O	NC
WI	396	STUDIO TECH LLC		N/A	NP
WI	398	SUN PRAIRIE WATER & LIGHT COMMISSION		O	NC
WI	580	T-NETIX TELECOMMUNICATIONS SERVICES INC		R	R
WI	399	T6 WIRELESS, INC.	T6 BROADBAND	P	NR
WI	310	TALK AMERICA	LDMI TELECOMMUNICATIONS INC	N/A	NP
WI	400	TCG MILWAUKEE INC		R	R
WI	403	TECH-COM, INC.	GENUINE TELECOM	P	P
WI	497	TELECORP COMMUNICATIONS LLC		R	R
WI	110057	TELEFONICA DATA CORP SA		N/A	NP
WI	402	TELEPHONE AND DATA SYSTEMS, INC.	TDS TELECOMMUNICATIONS CORPORATION	P	V
WI	110058	TELEPHONE ASSOCIATES	TELEPHONE ASSOCIATES	P	NR
WI	110087	TELEPHONE ASSOCIATES INC	TELEPHONE ASSOCIATES INC	R	R
WI	405	TELEPHONE USA OF WISCONSIN LLC		R	R
WI	110088	TELOVATIONS, INC.	TELOVATIONS, INC.	R	R
WI	407	TENNEY TELEPHONE COMPANY, LLC	TDS TELECOM	P	P
WI	110022	THE ISERVCO	EAGLENET, INC.	N/A	NP
WI	393	THE STATE LONG DISTANCE TELEPHONE CO	TDS	P	P
WI	579	THEGLOBALNET		N/A	NP
WI	654	TIME WARNER CABLE LLC	TIME WARNER CABLE	P	P
WI	110059	TON SERVICES INC		R	R
WI	110060	TOUCHTONE COMMUNICATIONS INC		R	R
WI	410	TRI-COUNTY COMMUNICATIONS COOPERATIVE, INC.	TRI-COUNTY TELEPHONE COOPERATIVE, INC.	P	P
WI	655	TRI-COUNTY COMMUNICATIONS COOPERATIVE, INC.	WESTERN WISCONSIN COMMUNICATIONS, LLC	P	P
WI	581	TRI-COUNTY ELECTRONICS & INTERNET SERVICE		P	NR
WI	110061	TRI-M COMMUNICATIONS INC		R	R
WI	411	TSR COMMUNICATIONS INC		O	NC
WI	412	TW TELECOM OF WISCONSIN L.P.	TW TELECOM INC.	P	P
WI	413	TWO RIVERS WATER & LIGHT UTILITY		R	R
WI	110062	U.S. TELECOM LONG DISTANCE INC		R	R

WI	110064	UNI-TEL COMMUNICATIONS GROUP INC		R	R
WI	110063	UNION INFORMATION SYSTEMS, LLC		R	R
WI	415	UNION TELEPHONE COMPANY	UNION TELEPHONE COMPANY	P	P
WI	110065	UPPER PENINSULA COMMUNICATIONS		N/A	NP
WI	505	USA MOBILITY WIRELESS INC		O	U
WI	418	UTELCO, LLC	TDS TELECOM	P	P
WI	419	VCI COMPANY		R	R
WI	110066	VERIZON BUSINESS GLOBAL LLC	VERIZON BUSINESS	O	NC
WI	507	VERIZON COMMUNICATIONS INC.	CELLCO PARTNERSHIP - WIRELESS	P	P
WI	110067	VERIZON WIRELESS PKA RURAL CELLULAR CORPORATION	MINNESOTA SOUTHERN WIRELESS CO	P	V
WI	110068	VERIZONCLEARWAVE		N/A	NP
WI	582	VERNON COMMUNICATIONS LLC	VERNON COMMUNICATIONS LLC	P	P
WI	422	VERNON TELEPHONE COOPERATIVE, INC.	VERNON TELEPHONE COOPERATIVE	P	P
WI	423	VERTEN BROADBAND CORPORATION		O	U
WI	110069	VILLAGE OF BOAZ		N/A	NP
WI	425	WAUNAKEE TELEPHONE COMPANY, LLC	TDS TELECOM	P	P
WI	583	WAUPACAONLINE.NET		X	NP
WI	427	WAUPUN PUBLIC UTILITIES		R	R
WI	728	WAUSAU CELLULAR TELEPHONE COMPANY LP	CELLCOM	P	P
WI	537	WEST WISCONSIN TELCOM COOPERATIVE, INC.	WEST WISCONSIN TELCOM COOPERATIVE INC	P	P
WI	584	WI CONNECT	COMPUTER CONNECTIONS	P	P
WI	428	WI INDEPENDENT TELE SYSTEMS INC		R	R
WI	667	WILDBLUE COMMUNICATIONS, INC.	WILDBLUE COMMUNICATIONS, INC.	P	P
WI	110071	WILTEL COMMUNICATIONS, LLC.	LEVEL 3	P	V
WI	110072	WINDSTREAM COMMUNICATIONS INC		N/A	NP
WI	539	WISCONSIN BELL, INC	AT&T WISCONSIN	P	P
WI	515	WISCONSIN RSA #3 LTD PARTNERSHIP	WISCONSIN RSA #3 LTD PARTNERSHIP	P	V
WI	110073	WISCONSIN RSA #5 CORP		P	NR
WI	110023	WISCONSIN RSA 7	ELEMENT MOBILE	P	P
WI	732	WITTENBERG CABLE TV	WITTENBERG CABLE TV COMPANY	P	P
WI	430	WITTENBERG TELEPHONE COMPANY	WITTENBERG TELEPHONE COMPANY	P	P

WI	744	WITTENBERG TELEPHONE COMPANY	WITTENBERG TELEPHONE COMPANY	P	P
WI	110074	WONDERWAVE INTERNET		O	U
WI	431	WOOD COUNTY TELEPHONE COMPANY	WOOD COUNTY TELEPHONE COMPANY	P	P
WI	110075	WOODMAN TV CABLE SYSTEM		N/A	NP
WI	110077	WORLD DISCOUNT TELECOMMUNICATIONS COMPANY		R	R
WI	110089	WOW!INTERNET AND CABLE	WOW!INTERNET AND CABLE	N/A	NP
WI	432	XO COMM INC.	XO COMM INC.	R	R
WI	433	YGNITION NETWORKS, LNC		X	NP
WI	110078	ZAYO GROUP, LLC	ZAYO ENTERPRISE NETWORKS, LLC	O	NC
WI	519	ZTAR MOBILE		O	U

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West Virginia Geological and Economic Survey

State Broadband Mapping Methodology

For the State of West Virginia, April 2012

Contents

Overview

This document gives a summary of the data collection, normalization and verification processes used by the State of West Virginia (State) for the April 2012 data submission to the National Telecommunication and Information Agency (NTIA) in accordance with the State Broadband Data Development (SBDD) program. While most of the processes used in this data submission remained the same as ones for the previous submissions, there were additional adjustments made to continue to refine the process to receive 2010 census geography from the providers in more efficient ways. The State of West Virginia interactive broadband map continues to provide the broadband coverage information to the public and is able to receive comments and feedback from consumers and citizens of the state.

Purpose

This documentation was developed to illustrate the processes used during the data collection, normalization and verification processes. The information within this document will provide a background to the development of the provider list and data request, and specific issues encountered by West Virginia regarding data collection, normalization and validation.

Data Sources

Provider List

The provider list for this fifth round of data collection started during the first round of data collection. For this round, the list was regenerated to include any new providers within the state. The list was created by contacting the West Virginia Cable Telecommunications Association, the West Virginia Public Services Commission (PSC) and the West Virginia Broadband Deployment Council. The state receives an updated provider list from the PSC every six months. This information was compiled and compared against the list from the Federal Communications Commission (FCC). Providers were then contacted using information provided by the FCC's public information search Web tool. Providers who were contacted during the first round of data were contacted again through the same name and address. If a provider contacted during the first round had given more detailed contact information for a specific individual, those individuals were contacted instead of the contact provided by the FCC.

The provider list is updated every six months to reflect any mergers or acquisitions that have occurred. There are some legal issues when a merger occurs, but the data integration does not occur until up to a year later. In those circumstances, the data is kept separate until a full merger occurs.

Data Gathering

Provider Data Request

This component of the project was heavily reliant on working with service providers to obtain data. Each identified provider was mailed a standard data request outlining the elements identified in the Notice of Funds Availability (NOFA) Technical Appendix that were requested from providers. This request included information regarding the availability of broadband services, technology used to provide them, the location of certain broadband infrastructure and the speed of the service. Data was requested to be submitted in the form of census block lists and service area boundaries, including address level and street segment data. If a provider was unable to fulfill such requirements, the West Virginia Geological and Economic Survey (WVGES) worked with those providers to gather the necessary data in an alternative approach. For this round of data collection, an updated guide for broadband data submission was developed for the providers. Along with this guide, a letter outlining the continued overall goals of the broadband mapping program and the objectives of the new updated guide were sent to each provider. The guide was developed to continue to standardize the data received from providers, including modifications and updates that have been made to the requirements by the NTIA since the original Technical Appendix.

Examples of the letter and guide are provided in Appendix A and Appendix B in this document. All of the providers that submitted census block information for this submission provided census 2010 geometry or census block numbers. However, no providers submitted TLIDs for roads as described within the new guide. Without TLIDs, roads need to be hand selected or geocoded, which can lead to some additional processes and inaccuracies because of the limitations described in the Geocoding Issues section.

After the initial data request was mailed, follow up phone calls and emails were made to remind providers of due dates and to collect any missing or unclear data. As of this submission, the response rate from providers continues to be over 90 percent. After data was received, the data was normalized per NTIA standards and placed into the provided geodatabase. WVGES continued to operate under the same assumption as used in the first round of data gathering. WVGES let the data "speak for itself" and did not make any grand assumptions or estimates in the interest of maintaining clean and accurate data.

Providers submitted only maximum advertised speed data. Providers have not been very willing to submit typical speed data as the typical speeds are generally lower than the advertised speeds. Advertised speed data was given by all providers and then pushed to typical speeds as per NTIA's advice in the Round 3 data review conference call.

In addition to the data request, each provider was required to sign a Nondisclosure Agreement (NDA) between themselves and WVGES. The NDA outlined how provider data would be handled and what portions of that data would be considered confidential, which would be shared with the NTIA and which were to be made publically available.

Coverage Information

Data was derived and normalized into four formats in accordance with the data model:

- Census blocks (2010) of two or less square miles
- Street segments (2010) of census blocks greater than two square miles
- Address level (geocoded point data)
- Wireless area (shapefile)

The normalization procedures were as follows:

- Determine service being provided – what technologies are being used to provide the service
- Understand data/determine how to process – determine which feature class in the geodatabase data belongs
- Georeferencing/geocoding necessary data – georeferencing data for wireless area coverage and other service area maps, as well as geocoding address level data
- Segregating data into NOFA compliant formats – completely filling in geodatabase fields, as well as making sure topology is correct
- Quality assurance/quality control (QA/QC) – verification and validation of data

Typically there were two main types of data supplied for normalization – service area maps and flat Excel tables.

Service areas were georeferenced, digitized and then intersected with the master blocks and roads files. These blocks and road segments were then loaded into the geodatabase and the additional company specific data was appended to those records.

Flat Excel tables were exported to a database and then joined with the FIPS ID for the block files and the TLID for the roads files. The joined fields were exported and then imported into the database. NTIA has not required this information and in cases where a TLID was not given by the provider there was much greater difficulty and inaccuracy as roads had to be geocoded and hand selected.

Geocoding Issues

The West Virginia Statewide Addressing and Mapping Board (SAMB) information is not yet completed across all of the counties in West Virginia, leaving areas within the State without complete or verified address information. This led to low geocoding match rates of provider supplied information, especially in rural areas, throughout the data normalization workflows. For some of these areas, additional broadband coverage processes were used to derive coverage estimates described in the next section.

Other Issues

Another issue of incomplete broadband coverage was due to the acquisition of Verizon by Frontier. When Frontier submitted digital subscriber line access multiplexer (DSLAM) locations for the April 1, 2011 deadline it did not include the entire Verizon infrastructure. Frontier has since re-submitted its DSLAM locations for the October 1, 2011 deadline, which now should include those missing Verizon DSLAMs and the coverage map has been extended into certain areas that were not previously included.

For the April 1, 2012 data submission, in order to avoid generating errors when running the current NTIA QC Script, "9999" was used as the default elevation value in the Middle Mile table, instead of "-9999."

Additional Data Processing Techniques

Because of geocoding inconsistencies in certain areas of the State, some provider address information could not be mapped and other data processing techniques had to be implemented to create broadband coverage estimates. In cases where DSLAM points were able to be provided, broadband coverage was mapped by loading the DSLAM points into Environmental System Research Institute's (ESRI's) Network Analyst. For this processing, the West Virginia State SAMB street centerlines were used as the source roads. DSLAM points were loaded into the facilities point feature class of the service area template using a 1000 foot snapping tolerance to help locate points to nearest roadway. Any points still not connecting to the road network were viewed and manually linked to the road network. Processing was run to create segment lines for each point and to create a detailed polygon area around each street segment area for each point. A 15,000 foot distance parameter was used and no impedances were placed on the streets.

Once the process was run, the created segment lines and polygon areas were linked to the original DSLAM point attribute table and exported from the analyst dataset into standalone polygon and line feature classes. These two feature classes were clipped to the provided wire center boundaries. These coverage areas were used to select covered census blocks and street segments for the data submission. Final broadband coverage estimates were reviewed with the provider prior to final submission.

Another unique processing issue occurred when providers submitted address-level fixed wireless data which would produce error through the new data model. As per discussion with NTIA, the unlicensed fixed wireless points were plotted and then buffered out to 800 feet. A shapefile was created and moved to the wireless feature class within the geodatabase.

One of the foremost issues of the fourth round of data collection, submitted in October 2011 was converting to 2010 Census Blocks. NTIA's decision to switch to 2010 Census Blocks did not leave much time during that data collection window to notify providers of the change. Many providers submitted 2000 Census Blocks, not 2010 Census Blocks. The conversion led to multiple inaccuracies between Round 3 and Round 4 submissions because of the problems intersecting 2000 Census Blocks with 2010 Census Blocks and errors of commission. Many block boundaries had been redrawn and the crosswalk file provided by the Census was in a very unwieldy format and not much help. For this fifth round submission, most of the providers submitted 2010 Census Block information and with the previous submission base data having been already converted to 2010 Census Block information, the processing techniques for 2010 Census Blocks has become integrated into the long-term maintenance process.

FRN Number Discrepancies

Discrepancies between Round 2 and Round 3 data submissions were noticed concerning FCC Registraton Numbers (FRNs). Effected providers were contacted directly to clear up these issues. FRNs that were loaded into the database come from direct contact with providers. FRNs are verified as a continued validation process during each data collection period.

Community Anchor Institutions

The process used to identify the Community Anchor Institutions was based on the information provided by NTIA. This included the categories of schools K-12, libraries, medical/healthcare, Public Safety, higher education and other community support consisting of either government or nongovernmental facilities.

All public schools in West Virginia were used for the K-12 category. Libraries consisted of all public libraries throughout West Virginia. Medical/healthcare included hospitals, nursing homes and primary care centers. The primary care centers are made up of main locations of the primary care centers along with satellite clinics and school-based health centers. Public Safety consisted of West Virginia police departments along with the correctional facilities and juvenile centers, fire departments and 9-1-1 centers. Higher education consisted of public and private universities located across West Virginia. The community support consisted of courthouses, regional development centers and workforce locations.

There was a cutoff created to focus on identifying main facilities as Community Anchor Institutions (CAIs). However, if there is a need to go and include more facilities, the State is open to adding those facilities for future updates.

The following agencies were contacted for information: West Virginia (WV) Department of Education, WV Library Commission, Hospitals located throughout the state, Nursing Homes located throughout the State, WV Division of Primary Care, WV Primary Care Association, WV 9-1-1 Center Directors, WV Emergency Management Directors, WV Regional Jail Authority, WV Higher Education Policy Commission, WV Courthouse Facility Improvement Authority, WV Workforce, WV Regional Development Centers and county addressing coordinators.

Data was collected and verified by the West Virginia Division of Homeland Security. Surveys were sent out to various facilities and included a section where their primary city-style address could be filled in. For those facilities that returned the survey, the statewide addressing and mapping data that the counties provided was used as a way to verify the address. Once the location was verified the latitude and longitude coordinates were added. In cases where surveys were not returned, the statewide addressing and mapping data was used to determine if the information could be matched. If this wasn't possible, then the Internet was used to find a Webpage with additional information. If this method was not successful, attempts were made to contact the facility directly. At this point in time, there is approximately a 90-95 percent match rate for the location of the CAIs.

Since the October 2011 data submission, additional surveys were sent by mail to healthcare facilities and fire, police and ambulance locations throughout the state. This amounted to approximately 1,500 surveys that were mailed out. Based on the information that was received back from the surveys, the primary city-style address, broadband technology, speeds and other attributes associated with the community anchor institution feature class were verified and updated where necessary. An on-line survey is planned to be released leading up to the October 2012 data submission with the objective of receiving further updates and also getting the survey, via email address, to those locations where the survey sent by mail was returned by the United State Postal Service due to invalid address information or a facility having changed location. Also, for the April

2012 submission, there are additional community anchor institution locations that are included in the map due to the NTIA allowing some 'unknown' classifications for attributes within the community anchor institution feature class.

Validation and Verification

Throughout the data gathering and data preparation processes for each data submission, the data verification has been continuous and has evolved based on the evolution of the data model. The focus has been on getting complete data from all providers and assuring that all data can be processed into the required data model for submission. Where providers did not submit data in acceptable formats for data normalization into NOFA formats or where they did not submit complete data or any data, there has been continued focus on working with the providers by WVGES to continue to improve the source information being provided. Data verification and validation is an on-going, long term process that will continue to evolve throughout the broadband data development program. With the fourth data submission in October 2011 being a much more complete broadband coverage across the State because of additional data supplied by providers, additional data verification methods, beyond what has been implemented to date, continue to be evaluated to refine the map, where applicable. This fifth submission incorporated further refinement to validate the provider supplied information against the Census 2010 geographies. Limited research was performed for specific areas of the map where any user feedback points to a gap in coverage or an over-estimate in coverage. The research was limited due to a small sampling of user feedback at this time. Plans to advertise surveys and the interactive broadband map continue to be executed and are described further in other sections of this document.

Validation Processes

Data validation begins within the data collection process to determine if the data submission by providers is formatted in a way that can be normalized into the required NOFA formats. Where data is deemed incomplete or in non-conforming standards, WVGES staff reached out to providers as necessary to improve the data submissions. After each round of data preparation the format for the updates being collected has improved.

Quality assurance and quality control has been a big focus of the data validation of the submittals assuring that the required data fields are populated properly and that data fields are populated with values that follow the data model rules. As the data model has evolved over each round of data submission these QA/QC checks have been modified to include the changes in fields, values, domains, etc. that are being required for submission.

Validation methods employed include the following:

- Assuring all applicable providers' datasets are propagated forward to each round of data collection
- Verifying that all required fields are populated with valid values and default values are used when appropriate. This includes:
    - Speeds valid for the technologies reported
    - Latitude/longitude coordinates fall within an acceptable range, given the state boundaries
    - The relationships between maximum and typical, and downstream and upstream speeds are valid
    - Service reported at the block level is done using blocks of the appropriate size (less than two square miles)
    - Speeds and technologies reported per provider are consistent between blocks and segments
    - Administrative information (provider name, doing business as [DBA] Name, FRN) is consistently reported per provider in each populated feature class.

Outreach to Providers

To further assure the providers' broadband footprints would be accurately represented in data submissions, "check maps" depicting each respective provider's served small census blocks and segments located in large blocks were distributed back to providers. Providers were requested to either approve their check maps as-is, or submit additional changes if their coverage was not accurately represented. Any modifications received as a result of this effort were incorporated into the broadband coverage maps. WVGES plans to incorporate future data reviews with providers using web collaboration tools.

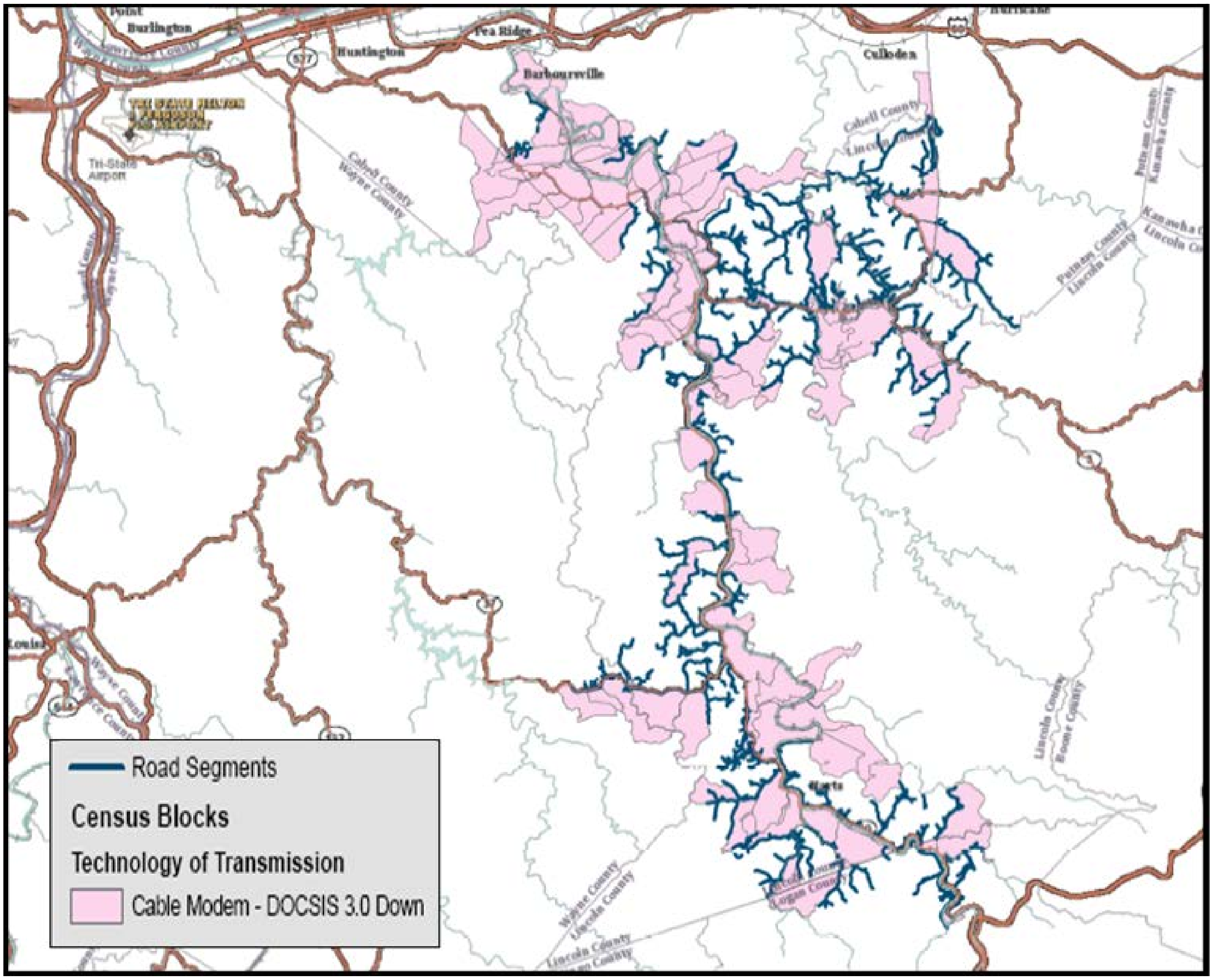

Figure 1—Example of a portion of a provider check map

The validation process for the April 2012 submission includes the use of the Python scripts for validation provided by NTIA.

Third Party Datasets

As data collections and data normalization processes progressed, additional validation was conducted using commercially available datasets. The following commercially available datasets were used as a reference for the specific technologies that their data represented.

- American Roamer datasets
- TeleAtlas Exchange boundaries
- Media Prints Cable boundaries

These datasets were used primarily as a validation source for provider service coverage.

State Broadband Interactive Map

The State of West Virginia released its interactive broadband mapping Website to the public in May 2011. The Website address is www.wvbroadbandmap.org. The Website provides consumers the opportunity to review broadband availability across the State.

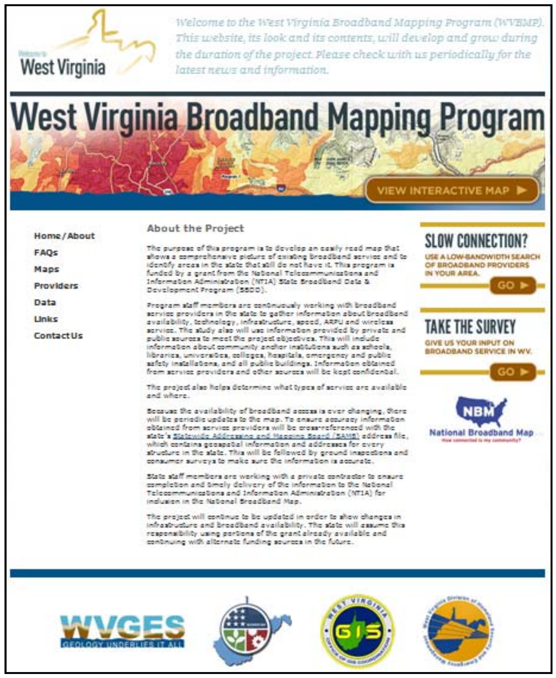

Figure 2—WVBMP main landing page

The main landing page for the West Virginia Broadband Mapping Program (WVBMP) provides background information on the program, contact information and a frequently asked questions section. The landing page has the main link to the broadband coverage map and a link to an address lookup tool for users with slow internet connections. This will allow them to view what coverage is available around their address or zip code without needing to view the entire map, which might not be feasible for users who might still be on dial-up connection speeds. By having this slow internet connection coverage tool, it allows feedback from those consumers even if they do not have the capabilities to bring up the interactive map application.

The Web application has the functionality for consumers and citizens using the State broadband map Web application to submit comments and feedback. The information gathered from that feedback is being reviewed as more potential source information for validating and determining confidence levels of the broadband coverage across the regions of the State. By comparing comments supplied by consumers about broadband availability to the broadband coverage, trends could be recognized where potential inconsistencies in the existing broadband map could exist. This could delineate the need for further focused validation or verification in specific areas that could refine the broadband coverage information for future data submissions.

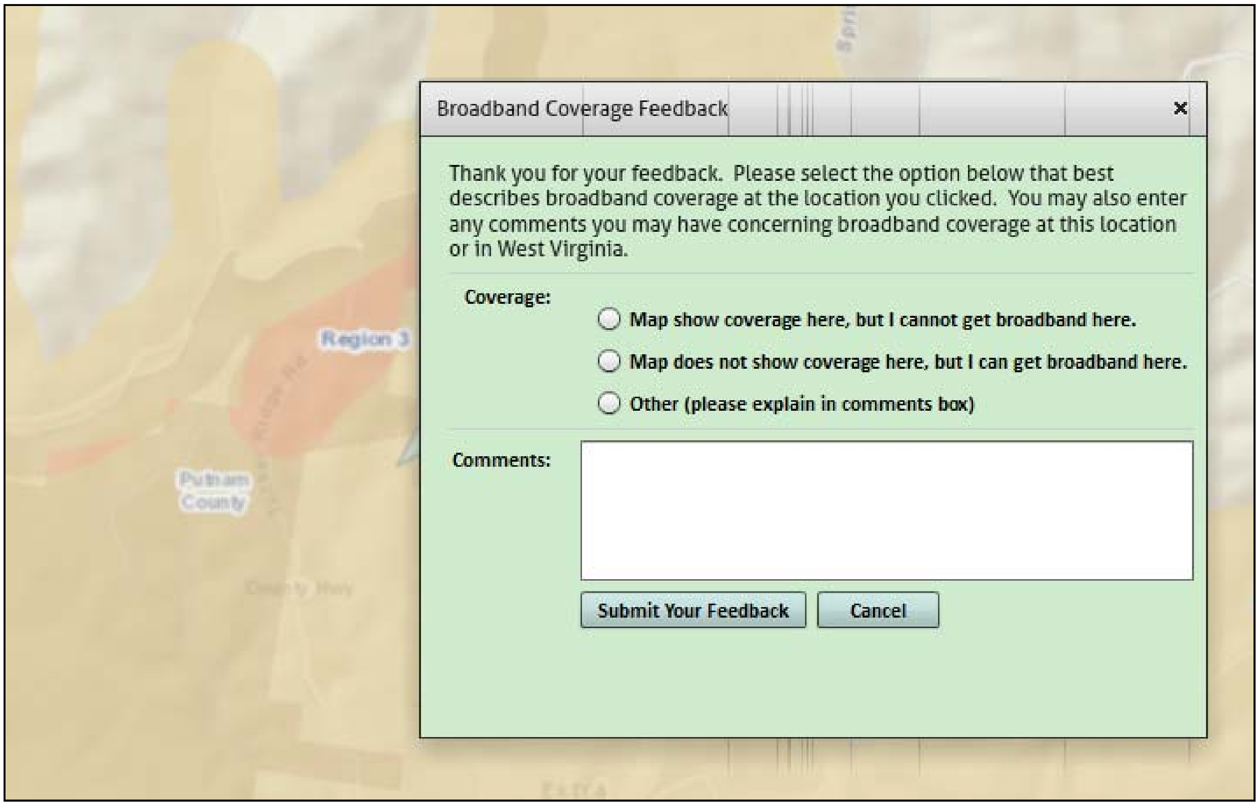

Figure 3—Example of feedback tool interface

For users that can browse the interactive map, they can click on any location on the map and choose to provide specific feedback for that location. This will store the coordinate information of the location that they selected allowing them to choose from a couple of coverage categories for their comment or choose other. Within the feedback tool, they can type in more specific details about their broadband coverage.

After the initial release of the broadband map, there was some initial feedback and comments mainly pertaining to a few areas that were not showing coverage. The feedback indicated that there should be coverage or scenarios where we were showing coverage. One resident made a comment that there was not cable service on a particular road or area. Some of the missing coverage was due to the acquisition of Verizon by Frontier as discussed above.

The State continues to implement plans to incorporate more advertising to the interactive broadband map and feedback tools. Continuing to work more closely with the regional planning councils to review coverage in their communities, a plan to include an advertisement of the interactive broadband map into local phone bills is being developed.

A speed test has been developed within the WVBMP interactive Website. The design of the Website includes links to the speed test developed using the Ookla broadband speed test tools. The speed test is embedded within a broadband survey wizard that allows consumers to provide specific information that will help the State analyze information about use and demand for broadband within the State. To get more users to take the speed test to obtain more results for analysis over the next six months, the speed test will be advertised along with the interactive Website. Speed test results and statistics will be leveraged to compare against the existing broadband coverage and help validate speed information. As stated previously, this could assist in determining if there are any trends or patterns in the information that could be an additional tool for prioritizing areas where more refined verification and validation might need to occur. To date there is still a lack of substantial data collected via the speed-test or surveys to be able to detect patterns or trends and continued planning within the regional planning councils could provide more exposure to the web sites and speed test at the grass roots level. Links to the speed test and the interactive map have also been added to additional web sites, including a new West Virginia Broadband Deployment Council web site (www.broadband.wv.gov) that was launched at the end of 2011.

Future Steps for Validation

Future plans for data validation continue to include establishing confidence levels to assign to broadband coverage based on comparisons with other source information collected, such as feedback from crowd sourcing results from the State broadband map and the national broadband map. Confidence rankings will be used to prioritize any areas where additional verification techniques might be used (consumer and business surveys).

As part of continued broadband planning activities and future validation of data, a third party dataset from Infogroup has been purchased. For broadband map validation, the Infogroup datasets provide consumer broadband use information including coordinate based location information along with provider name and technology that is being used by that particular consumer. The Infogroup data will allow the consumer information to be plotted on the map and compared against existing coverage maps to determine if there are any trends within the Infogroup data that help to determine where additional validation needs to occur. For example, there may be clusters of consumer points for a particular provider that exists in an area of the State where there is no coverage for that provider. The goal would be to identify the major patterns or trends that might need to be re-visited with a provider, if data appears to be missing. As of the March 2012, the Infogroup data has now been received and is being formatted for the analysis purposes described above and will be used to compare to existing broadband coverage.

Another dataset that is being considered for purchase for broadband planning activities and broadband demand analysis is Telogical's broadband statistical datasets that provide pricing information. Included in the datasets is information on broadband maximum advertised speed by providers which could help validate some of the speed data within the broadband mapping datasets.

Throughout the broadband data development program, as addressing information from the State Addressing and Mapping Board's addressing datasets are continually updated, address point information from providers will continually be re-verified prior to each submission to NTIA to improve geocoding results and refine the broadband coverage areas.

Providers

Non-Responsive Providers

Names of providers who were non responsive will be passed along to the WV Geographic Information Systems (GIS) Coordinator's Office to be contacted again.

Atlantic Broadband LLC
DBA: Atlantic Broadband, LLC
FRN: 0009596883
This provider was contacted eight times. Data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

**Skyweb, Inc
DBA: SKYWEB Inc.
FRN: 0018516799
**Tower locations were provided along with additional information for each tower site. Two computerized propagation studies were performed to approximate coverage for a local provider supplying broadband data. The two studies were predicted in the 900 MHz and 2.4 GHz bands that are utilized at these locations. The data was received from the provider that defined the tower sites currently utilized to provide coverage. Parameters provided include site locations, ground elevation, transmit power, antenna height above ground, and antenna gain. All of these components were compiled into EDX Signal software

program which calculates the associated link budget and in which the program takes into account terrain and land use land clutter (LULC). Propagation studies show potential coverage throughout the area. Additional assumptions made include a predicted reliability of 90 percent for any signal received by a device and no additional signal loss was taken into account for signals received inside buildings which may further impact the coverage predictions. Coverage areas based on the propagation studies do not seem to represent realistic coverage patterns and will need to be reviewed again with SkyWeb in the future.

Satellite Providers

Data requests sent to Satellite providers were met with the response of "We provide to the entire state." Attempts made at gathering more detailed data sets were unsuccessful for this round of data collection. Further attempts will be made for the next round of data collection.

Hughes Communications, Inc.
DBA: HNS Licensuse Sub, LLC
FRN: 0018483073
Detailed data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

StarBand Communications Inc.
DBA: StarBand Communications Inc.
FRN: 0005087457
Detailed data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

WildBlue Communications, Inc.
DBA: WildBlue Communications, Inc.
FRN: 0007843766
Detailed data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

Provider that Submitted Data

Provider Name	DBA Name	FRN
Armstrong Holdings, Inc.	Armstrong Telephone Company - Northern Division	0004311528
Armstrong Holdings, Inc.	Armstrong Telephone Company-WV	0004379731
Armstrong Holdings, Inc.	Armstrong Utilities, Inc.	0003765617
AT&T Inc	New Cingular Wireless Services, Inc.	0003766532
Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	0010296853
Cequel Communications, LLC	Suddenlink Communications	0015784663
Citizens Communications Company	Frontier Communications Corporation	0003576352
City of Philippi	City of Phillipi	0001984244
Comcast Corporation	Comcast Cable Communications Inc.	0003768165
Community Antenna Service, Inc.	Community Antenna Service Inc.	0004966131
Deutsche Telekom AG	T-Mobile USA, Inc.	0006945950

Provider Name	DBA Name	FRN
Gateway Telecom, LLC	Gateway Telecom LLC	0018536623
Hardy Telecommunications, Inc.	Hardy Telecommunications Inc	0002008043
Hardy Telecommunications, Inc.	Hardy Telecommunications,Inc CLEC	0013169313
Hickory Tech Corporation	Enventis Telecom Inc.	0008394322
Inter Mountain Cable, Inc.	Inter-Mountain Cable Inc	0001789080
Inter Mountain Cable, Inc.	Mikrotec CATV, LLC	0014471288
JB-Nets	JB-Nets	0016474868
Leap Wireless International, Inc.	Cricket Communications, Inc.	0002963528
Level 3 Communications, LLC	Level 3 Communications, LLC	0003723822
Level 3 Communications, LLC	Broadwing Communications, LLC	0008599706
LightEdge Solutions, Inc	LightEdge Solutions, Inc.	0015546443
Metropolitan Telecommunications Holding Company	Metropolitan Telecommunications Holding Company	0009806019
Micrologic, Inc.	Micrologic, Inc.	0018675256
New Edge Holding Company	New Edge Network, Inc.	0003720471
NTELOS, Inc.	NTELOS Communications Inc.	0004342762
NTELOS, Inc.	West Virginia PCS Alliance, L.C.	0002049328
Otelco Inc.	War Acquisition Corp	0018657858
Qwest Communications International, Inc.	Qwest Communications Company, LLC	0003605953
Shenandoah Telecommunications Company	Shentel Cable Company	0018024075
Sprint Nextel Corporation	Sprint Nextel Corporation	0003774593
Spruce Knob Seneca Rocks Telephone, Inc.	Spruce Knob Seneca Rocks Telephone, Inc.	0004337002
TelAtlantic, Inc.	West Side Telecommunications	0002009405
TelAtlantic, Inc.	Communications Plus, Inc.	0009281262
Time Warner Cable LLC	Time Warner Cable LLC	0013430244
TW Telecom inc.	tw telecom holdings inc.	0014942668
Verizon Communications Inc.	Cellco Partnership	0018506568
Verizon Communications Inc.	Verizon Business Global LLC	0010856284
Verizon Communications Inc.	Verizon West Virginia Inc.	0002011278
Visual Link Internet LLC	Visual Link Internet LLC	0017645813

Table 1—Providers That Have Submitted Data for SBDD Program

Appendix A WVGES Provider Data Request Letter

The WVGES Provider Data Request Letter can be found on the following page

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WEST VIRGINIA
GEOLOGICAL AND ECONOMIC SURVEY

1 Mont Chateau Road
Morgantown, WV 26508-8079

Earl Ray Tomblin, *Governor*
Keith Burdette, *Secretary, Department of Commerce*
Michael Ed. Hohn, *Director and State Geologist*

Phone: (304) 594-2331
Fax: (304) 594-2575
E-mail: info@geosrv.wvnet.edu
Web Site: http://www.wvgs.wvnet.edu

January 6, 2012
(Address of Recipient)

Re: Data Request in Compliance with the State Broadband Data and Development Grant Program and the Broadband Data Improvement Act

Response Requested by March 1st, 2012

Dear < >:

The West Virginia Geological and Economic Survey (WVGES) must collect certain data regarding the availability of broadband services, technology used to provide them, and the location of certain broadband infrastructure. The WVGES is required to provide the collected data to the NTIA every six months beginning March 2010 until October 2014. Entities that provide broadband service, as defined below, on either a commercial or noncommercial basis within West Virginia are subject to this request.

WVGES was designated as the single West Virginia entity eligible to receive a grant under the Broadband Data Improvement Act of 2008 (BDIA), 47 U.S.C. §§ 1301-04. In 2009, the WVGES successfully applied to the National Telecommunications and Information Administration (NTIA) for such a grant, pursuant to the NTIA's Notice of Funds Availability (NOFA).

The NTIA's State Broadband Data and Development Grant Program Notice of Funds Availability, Docket No. 0660ZA (July 8, 2009) (NOFA), defines broadband as follows:

> …two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and at least 200 kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users…

Please note that the broadband inventory maps derived from these data may result in government-subsidized broadband deployment in unserved and underserved areas. Providers that do not respond may face subsidized competition in areas they already serve.

Attached to this request are the Technical Appendix to the NOFA and a technical appendix written by the WVGES to clarify the data that needs to be collected. **Please note this appendix is new as of January 1, 2012.** These documents outline the broadband availability information WVGES is required to collect. Every broadband service provider within the state of West Virginia is expected to provide the information specified in the attached documents to WVGES **<u>no later than March 1st, 2012</u>**, in the format WVGES has specified.

Six Month Update:
Pursuant to the BDIA and the NOFA, WVGES must collect updates on broadband data on a six month rolling basis. **If you had submitted adequate information during the 2nd collection period of 2011 and there are no changes to your infrastructure, the WVGES requests a letter stating such**. If infrastructures changes have been made in the interim period, submissions of the changes are required.

Contact Information:
Please submit the requested data **<u>no later than March 1, 2012</u>** by CD or DVD to Michael "Ty" Clifford, West Virginia Geological and Economic Survey, 1 Mont Chateau Rd. Morgantown WV 26508-8079.

If you have questions about this request, contact Michael "Ty" Clifford by email at mclifford@geosrv.wvnet.edu, or by phone at (304) 594-2331.

Nondisclosure Agreement:
Data submitted to WVGES in response to this request will be protected under the confidentiality requirements set forth in Section 106 (h)(2) of the BDIA. This section states that, "[n]ot withstanding any provision of Federal or State law to the contrary, an eligible entity shall treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except as otherwise mutually agreed to by the broadband service provider and the entity." Further, the NOFA states that "[a]s a measure to protect the confidential or proprietary nature of the information received from broadband service providers and other organizations during the data collection phase, awardees may execute nondisclosure agreements (consistent with applicable law) that require awardees to treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except where mutually agreed upon by the information provider and the awardee, provided, however, that any such nondisclosure restriction a) will not restrict the providing of all data collected under this Program to NTIA, nor b) restrict NTIA's use of such data as contemplated under this Notice (including sharing such data with the FCC or other federal agencies)". NTIA expects awardees to enter into such agreements upon the request of the service provider. WVGES believes that these provisions will protect the confidentiality of information that broadband providers submit pursuant to this request and intends to enter into a nondisclosure agreement with any provider that wishes to do so.

Michael Ed Hohn
Director and State Geologist
West Virginia Geological and Economic Survey

Additional information may be obtained from the NOFA, available at 74 Fed. Reg. 32,545 or online at http://broadbandusa.sc.egov.usda.gov.

Enclosures:

- Letter from Gov. Joe Manchin III to Mr. Larry Strickling, Administrator NTIA (August 12, 2009)
- State Broadband Data and Development Grant Program, Notice of Funds Availability; clarification (August 7, 2009). Available at http://broadbandusa.sc.egov.usda.gov/ broadband_mapping.htm
- WVGES Guide to Broadband Submission January 1, 2012

Appendix B WVGES Guide to Broadband Submission

The WVGES Guide to Broadband Submission can be found on the following page.

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WEST VIRGINIA
GEOLOGICAL AND ECONOMIC SURVEY

1 Mont Chateau Road
Morgantown, WV 26508-8079

Earl Ray Tomblin, *Governor*
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E-mail: info@geosrv.wvnet.edu
Web Site: http://www.wvgs.wvnet.edu

January 6, 2012

West Virginia Geological and Economic Survey Guide to Broadband Submission

Purpose:
Several changes in submission guidelines have been made by NTIA since the writing of the original Technical Appendix. This document clarifies what is preferred and required for submission and the original NTIA Technical Appendix no longer adequately describes what is required.

Broadband definition:
Broadband Service is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream **and greater than 200 kbps upstream** to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end-users within the project area.

2010 census requirements:
Beginning in June 2011, all census block and road information **must be derived from 2010 Census Data**. All block and road data submitted **must have a unique identifier present**, such as census block # or **TLID.**
The WVGES has created two shapefiles which contain all census blocks in West Virginia less than 2 square miles and all roads contained in census blocks greater than 2 square miles. All census and road data must correspond to these master files.

The shape files are located at:
https://dssfm.kimballdata.com

```
Username: censusdata
Password: censusdata#1
```

Data preferences:
The WVGES prefers data to be submitted in the following order of preference:

- ESRI shapefile format with all required fields submitted.
- Service area boundary with defined speeds and fields that can be converted to blocks and roads.
- Flat Excel or comma-delimited files that contain all data field and unique identifiers.

Data Types and required fields:

Wireless Services not Provided to a Specific Address – Shapefile

Facilities-based providers of wireless broadband service that is not address specific (e.g., nomadic, terrestrial mobile wireless, or satellite), may provide WVGES with GIS-compatible shapefiles depicting areas in which broadband service is available to end users.

For this purpose, an "end user" of broadband service is a residential or business party, institution, or state or local government entity that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access service. Internet Service Providers (ISPs) are not "end users" for this purpose. An entity is a "facilities-based" provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

For this purpose, "broadband service" is "available" at a location if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end-users at that location. The data shall be submitted to WVGES as an ESRI Shapefile such that the associated data contains the following fields:

- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- All map areas must be closed, non-overlapping polygons with a single, unique identifier.
- Any variation in any of the required fields necessitates the creation of a separate closed, non-overlapping polygon.
- In the area covered by each polygon, subscribers must have broadband service with the speed characteristics shown in the data record 95% of the time to within 50 feet of the polygon's boundary.
- The technology of transmission should be entered as an integer based on the coding scheme shown below.
- The speed tiers should be entered as integers according to the reference in below.
- The data must be expressed using the WGS 1984 geographic coordinate system.
- Maps must be accompanied by metadata or a plain text "readme" file that contains a comprehensive explanation of the methodology employed to generate the map layer including any necessary assumptions and an assessment of the accuracy of the finished product.
- Since ESRI Shapefiles typically consist of 5 to 7 individual files including the associated metadata and geodatabase, data for the entire state or territory should be submitted as a single, zipped file containing all the component files. The file should be named "area_availability_XX.zip" where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Availability Area Data for Each Provider – Use Only in Connection with Wireless Services not Provided to a Specific Address

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
Technology of Transmission	Category of technology for the provision of service (see details following Part 1(a) for codes)	Integer	41
Spectrum Used	If technology of transmission is wireless, is Cellular spectrum (824-849 MHz; 862-869) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is 700 MHz spectrum (698-758 MHz; 775-788 MHz; 805-806 MHz) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is Broadband Personal Communications Services spectrum (1850-1915 MHz; 19301995) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155) used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, is Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz) used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, is Unlicensed (including broadcast television "white spaces") spectrum used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, but the spectrum used to provide service is not listed above, please identify as one of the following: Specialized Mobile Radio Service (SMR) (817-824 MHz; Spectrum Used 862-869 MHz; 896-901 MHz; 935-940 MHz), Wireless Text SMR Communications Service (WCS) spectrum (2305-2320 MHz; 2345-2360 MHz), 3650-3700 MHz, Satellite (L-band, Big LEO, Little LEO, 2 GHz).	Text	SMR
Maximum Advertised Downstream Speed	Speed tier code for the maximum advertised downstream speed available (see details following Part 1(a) for codes)	Integer	8

Maximum Advertised Upstream Speed	Speed tier code for the maximum advertised upstream speed that is offered with the above maximum advertised downstream speed available (see details following Part 1(a) for codes)	Integer	8
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details following Part 1(a) for codes).	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details following Part 1(a) for codes).	Integer	8

Middle Mile and Backbone Interconnection Points

In addition to the information shown in the tables below, awardees shall provide NTIA with a list of interconnection points of facilities in their state that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points").

Middle-mile and backbone interconnection points typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured.

Examples might include: points of interconnection enabling communications between an incumbent local exchange carrier central office and the Internet, between a cable aggregation point (headend) and the Internet, or between a wireless base station and the provider's core network elements that connect to other networks including the internet.

These data shall be submitted to NTIA as a tab-delimited text file in which each record has the following format:

- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- The capacity of the serving facility should represent the capacity as currently configured and be expressed according to the following reference:
- Coordinates must be expressed using the WGS 1984 geographic coordinate system.
- Data for the entire state or territory should be submitted as a single, tab-delimited plain text file named "middlemile_XX.txt" where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Middle-Mile and Internet Backhaul Connection Points Data for Each Provider

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	Doing-business-as name	Text	Superfone, Inc.
FRN	FCC Registration Number	Integer	8402202
Ownership	Is the facility owned (0) or leased (1)?	Integer	0
Serving Facility Capacity	Serving capacity of transport facility (see details below)	Integer	1
Serving Facility Type	Type of transport facility (1=Fiber; 2=Copper; 3=Hybrid Fiber Coax (HFC); 4=Wireless)	Integer	1
Latitude	Latitude in decimal degrees	Float	38.88456
Longitude	Longitude in decimal degrees	Float	-77.028123
Elevation	Elevation relative to grade to the nearest foot (positive integers indicate above grade, negative below grade)	Integer	-10

Serving Facility Codes

Data Rate Code	Interconnection Point Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 mbps and less than 600 mbps
4	Greater than or equal to 600 mbps and less than 2.4 gbps
5	Greater than or equal to 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

Service Address Service Associated with Specific Address

For each facilities-based provider of broadband service to specified end-user locations in their state, awardees shall provide NTIA with a list of all addresses at which broadband service is available to end users in the provider's service area, along with the associated service characteristics identified below.

For this purpose, "broadband service" is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream **and greater than 200 kbps upstream** to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end-users within the project area.

For this purpose, an “end user” of broadband service is a residential or business party, institution or state or local government entity that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access services. Internet Service Providers (ISPs) are not “end users” for this purpose. An entity is a “facilities-based” provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

For this purpose, “broadband service” is “available” at an address if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to endusers at that address. The list of addresses shall be submitted to WVGES as a tab-delimited text file in which each record has the following format:

- All fields are required.
- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- The ID field is a sequential integer ranging from 1 to the total number of addresses.
- Address data fields should be space-delimited in standardized Postal Service form. See http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf.
- Categories of end users should be entered as integers based on the following table.
- For reporting the technology of transmission, report the technology used by the portion of the connection that terminates at the end-user location. If different technologies are used in the two directions of information transfer (“downstream” and “upstream”), report the connection in the technology category for the downstream direction. The technology of transmission should be entered as an integer based on the following tables.
- Speed tiers should be entered as integers based on the following tables.
- Data for the entire state or territory should be submitted as a single, tab-delimited plain text file named “address_availability_XX.txt” where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Address Data for Each Provider

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	“Doing-business-as” name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

End User location/Service Data End-User Address	Complete address	Text	1401 Constitution Ave NW Washington DC 20230
End-User Building Number End-User Prefix Direction	Building number Prefix direction	Text	1401
End-User Street	Street name	Text	Constitution
End-User Street Type End-User Suffix Direction	Street type Suffix direction	Text	Avenue NW
End-User City	City	Text	Washington
End-User State Abbreviation	Two-letter state postal abbreviation	Text	DC
End-User ZIP Code	5-digit ZIP code (with leading zeros)	Text	20230
End-User ZIP Plus 4	4-digit add-on code (with leading zeros)	Text	0005
Category of End User	Category of End User Served at Address (see details below for codes)	Integer	3
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Maximum Advertised Downstream Speed	Speed tier code for the maximum advertised downstream speed available at the address (see details below for codes)	Integer	8
Maximum Advertised Upstream Speed	Speed tier code for the maximum advertised upstream speed that is offered with the above maximum advertised downstream speed available at the address (see details below for codes)	Integer	8
Typical Downstream Data	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

End User Codes

End User Category Code	End User Category	Description
1	Residential	Address denotes a residential living unit, individual living unit in institutional settings such as college dormitories and nursing homes and other locations designed primarily for residential use at which broadband service is available.
2	Governmental	Address denotes a state orl ocal govermnent location at which broadband service is available.
3	Small Business	Address denotes the location of a small business.
4	Medium or Large Enterprise	Address denotes the location of a medium or large enterprise.
5	Other	Address denotes a location not meeting any of the above descriptions.

Technology of Transmission Codes

Technology Code	Description	Details
10	Asymmetric xDSL	
20	Symmetric xDSL	
30	Other Copper Wireline	All copper-wire based technologies other than xDSL (Ethernet over copper and T-1 are examples)
40	Cable Modem - DOCSIS 3.0	
41	Cable Modem - Other	

50	Optical Carrier/Fiber to the End User	Fiber to the home or business end user (does not include "fiber to the curb")
60	Satellite	
70	Terrestrial Fixed Wireless - Unlicensed	
71	Terrestrial Fixed Wireless - Licensed	
80	Terrestrial Mobile Wireless	
90	Electric Power Line	
0	All Other	Any specific technology not listed above.

Speed Tier Codes

Upload Speed Tier	Download Speed Tier	Description
1	--	Less than or equal to 200 kbps
2	--	Greater than 200 kbps and less than 768 kbps
3	3	Greater than or equal to 768 kbps and less than 1.5 mbps
4	4	Greater than or equal to 1.5 mbps and less than 3 mbps
5	5	Greater than or equal to 3 mbps and less than 6 mbps
6	6	Greater than or equal to 6 mbps and less than10 mbps
7	7	Greater than or equal to 10 mbps and less than 25 mbps
8	8	Greater than or equal to 25 mbps and less than 50 mbps
9	9	Greater than or equal to 50 mbps and less than 100 mbps
10	10	Greater than or equal to 100 mbpss and less than 1 gbps
11	11	Greater than or equal to 1 gbps

Census Blocks Less than Two Square Miles

Record Format for Wireline Service by Census Block

(For Census Blocks no greater than two square miles in area in which broadband service is available to end users)

Field	Description	Type	Example
Provider Identification Data			
Provider Name	Provider Name	Text	ABC Co.
DBA Name	“Doing-business-as” name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

Census Block Identification Data			
Census Block FIPS Code	15-digit Federal Information Processing Standard (FIPS) Code identifying individual Census Block. Must include leading "0"	Integer	60750160001015
Census Block Square Mileage	Provide square mileage for specific census block number to the first decimal place	Number	1.8
Broadband Technology and Speed Data			
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

Roads contained within Census Blocks greater than two square miles

Record Format for Wireline Service by Street Segment

(For Census Blocks larger than two square miles in area in which broadband service is available to end users)

Field	Description	Type	Example
Provider Identification Data			
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

End User location/ Service Data			
Census Block FIPS Code	15-digit Federal Information Processing Standard (FIPS) Code identifying individual Census Block	Integer	60750160001015
Census Block Square Mileage	Provide square mileage for specific census block number to the first decimal place	Number	5.8
Street Name	Provide street name to identify street segment	Text	Van Ness
Street Type	Street type to identify street segment	Text	Avenue
Street Direction Prefix	Street Prefix to identify street segment	Text	N
TLID	Unique identifier for each street segment	Text	0015874962
Broadband Technology and Speed Data			
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

State Broadband Initiative Mapping Methodology

For the State of Wyoming Revised March 30, 2012

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

The following documentation provides an overview of how the fifth required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Wyoming.

This submission marks the first separation of distinct methodology deliverables for each state we work with. In terms of broadband data development and data presentation, we strive to maintain a consistent process across the States. This cross-state approach also helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning a sustainable program leadership to the respective states.

As our team enters the third year of the SBI program, more work has shifted to in state partners. Much of this work focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that our in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this third program year we also anticipate inState partners taking over the state web presence, both in terms of content and hosting.

As expected, this document rests heavily on the prior drafts, but has also been updated and expanded.

Significant changes include additions covering:

1. Trends in provider inputs
2. Modification to internal provider tracking
3. Increases in the amount of WISP coverage using propagation estimates
4. Requested changes based upon NTIA guidance
    a. Review of submitted speed with respect to NTIA supplied frequency table
    b. Review of NTIA anomalous WISP coverage patterns
    c. Review of NTIA speed guidelines and provider documentation
    d. Inclusion of Provider Universe Table (Appendix 4)
    e. Inclusion of Verification Summary Table
5. Transition planning with respect to capacity building within the State for Broadband map development (even while the technical data development components of the program continue to rest with CostQuest and the LinkAMERICA Alliance).

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods
3. Provider advertised speed and coverage validation

As anticipated, the SBI program continues to mature and evolve. Technical leadership and strong program office guidance has been appreciated. We continue to focus resources on establishing stable business processes to track submissions, verify received and processed data, test for temporal stability and provide reporting deliverables consistent with NTIA expectations.

In our view, the mapping deliverable reflects (1) a good faith effort, which results in a reasoned response to the NOFA, Technical Appendix A, as well as supplementary program office guidance and modifications offered in phone calls, emails, and webinars, (2) a stable foundation for improvement and prioritization of both NTIA and state needs and interests , (3) a valid data processing model to support online mapping, consumer feedback, provider verification and reporting, and finally, (4) a valid use of the evolving data transfer model and its intrinsic validation methods. More importantly, the resulting data and online coverage maps that follow from this work are providing good input and context for the Broadband planning teams working across the states we have the pleasure to serve.

We also note that the mapping deliverable is increasingly important to state policy makers as each of the states we work with continues to assess the policy ecosystem that supports the advancement of broadband access and adoption.

We close this methodology document with 4 appendices. Appendix 1 refers to efforts related to Community Anchor Institutions. Appendix 2 describes data collection challenges. This section describes some of the open issues, challenges and questions we are exploring. Our hope is to receive clarification and counsel from NTIA in how best to confront some of these issues, which are likely common across states. Appendix 3 describes the confidentiality framework explained by NTIA. Appendix 4 details the provider universe, those providers found to be non-NOFA compliant and those providing data.

Purpose of This Manual

This technical document was developed to provide transparency in our data production process.

Our goal is to illustrate a thoughtful process designed to meet the intent of the submission. Our hope is that we have developed a process that is reasonable, with respect to the data it deals with, as well as flexible enough to change with evolving NTIA requirements and lessons learned from the Broadband mapping community.

Data Sources

Developing the Provider List

Provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Independent web searches
- Interviews with key state staff members and important community influencers

As one would expect in a dynamic marketplace, provider identification is an ongoing and important component of our work. Mergers and acquisitions, the use of multiple regional DBAs, the lack of any universal identity management attribute, and the generally complex parent-subsidiary structure of many telecommunications companies, make provider identification and tracking very challenging. Because of this dynamic environment, the Provider list is reviewed on an on-going basis and changes are made as necessary to ensure that the list remains current.

At the start of each round, email and telephone contact is made to all known providers. This time consuming, but necessary, process ensures that the list of contact persons remains current, and that providers are aware of data request changes and deadlines associated with each round. Where necessary, we execute new NDAs with providers. We maintain this communication with providers throughout the Data Collection period, providing multiple paths and opportunities for participation in the program. Providers that respond too late to be included in the final dataset are flagged for inclusion in the next submission. Unresolved data concerns are also flagged and tracked so that we can begin working on a plan for resolution prior to the next data collection round.

As contact is made in each round, we qualify each provider by asking a series of questions regarding the type of service and speeds offered. If the provider does not meet the minimum specifications for a

Broadband provider (as defined in the NOFA) we make a note of the change in status.[1] Providers remain on our list and are included in program communications so that in the event that their service is upgraded or expanded their status can be updated accordingly.

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

To provide protection for all parties involved, LinkAMERICA continues to honor the terms of our NDA. If providers did not execute the NDA in previous rounds they were offered the opportunity to do so in this collection round. New providers were of course also supplied with a copy of the NDA.

To facilitate the execution of NDA's, LinkAMERICA continues to use the DocuSign online document management solution. This system allows providers to review and digitally sign the NDA in a legally binding manner, and has been instrumental in achieving rapid approval and execution of NDAs with the majority of providers. In some cases, NDA's were individually negotiated to address specific provider concerns. In all cases, minimum standards established by the NOFA are honored. In other cases, providers chose to submit data without executing an NDA.

Provider Survey

Since four prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 5. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 5 survey process was designed to accommodate both

[1] As with other Grantees, we struggle with appropriate and consistent classification for service providers who opportunistically provision Broadband services. In this submission we continue to bring them into the analysis as a provider type "other". As the inclusion of this category isn't our primary goal, we are working to process data as we can. We are similarly categorizing and retaining reseller information. Our datapackage.xls illustrates the categorization of non Broadband providers within our provider tracking and verification systems.

new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

New providers: New providers were routed directly to our standard survey where they were provided with templates for uploading data in tabular NTIA-compliant formats. As in previous rounds, if providers could not supply information in the requested format, alternatives were offered. These alternatives included uploading service-area boundary maps, exchange area maps, CAD drawings or customer address lists. From that information, the LinkAMERICA team developed a geographic representation of coverage and was able to build coverage features for each provider.

Returning providers: For Round 5 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 5 survey in early January 2012, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of January and February. The initial data submission deadline was set for February 17, but we continued to accept "straggler" submissions into March.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the vast majority of those we were unable to reach were providers who have simply ceased to exist[2].

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 5, given the data vintage of December 31, 2011, we began this process in January and the last submissions were accepted in March, 2012.

While we continue to successfully engage the majority of providers in each round, the amount of manpower required to solicit complete and timely responses should not be underestimated. This process is one of the most costly and complex within the entire SBI program.

Third Party Data Used

Beyond the data obtained from providers, we acquired the following commercial/restricted use data products:

[2]The list of known providers and important submission statistics are contained in the datapackage.xls file.

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- MapInfo ExchangeInfo, Professional. This data was used in the verification of telephone Broadband provider data. Where a public domain exchange boundary wasn't available, the MapInfo boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service. In very rough terms the contained boundaries were used to test the location of some provider data. FCC 477 restricted use data were analyzed to find valid providers within a given area.

We have included third party data sources which touch on each of the three major technologies analyzed within the SBI program. Each of these data sources tie back to a public domain data source, which provides a cross-verification mechanism for the commercial data product.

Although there are a large number of third party licensed data sources available, we remain conservative in our acquisition plans. From our limited analysis we are concerned about the ability to cross-verify additional third party licensed sources against public domain data. Further, we are unsure of how we may be able to integrate another data provider's view of valid Broadband providers within the definitions used by the NOFA (e.g. Are they using an FRN/DBA identity view or a marketing view? Can the provider supply in a 7-10 day window? Are they facilities based or not?). This leads us back to a statement we made in a 'lessons learned' Webinar (April 2010) about exploring a consortia to lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

Beyond these commercial data sources, we used a number of public domain sources. These included:

Geographic Data Files
US Census TIGER data[4]
Sources that helped isolate providers, identity management or provider service areas
NECA Tariff 4
State produced exchange boundaries
Carrier produced wirecenter boundaries (sometimes proprietary to provider)
FCC Coals reports (321/325)
FCC FRN API lookup tool
FCC/FAA Antenna Registration System
FCC FRN Lookup Tool (plain text search)
USAC High Cost FCC Filing Appendices

[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.
[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

Sources that helped isolate anchor institutions
USAC Grant lookup tool
USAC High-Cost FCC Filing Appendices
HRSA data warehouse
NCES data lookup
State managed lists of schools (K-12), post-secondary institutions and libraries
List of museums, conventions, and visitors bureaus from www.onlineatlas.us
In state relationships to key stake holders.

Finally, challenges exist when dealing with the inevitable conflicts between provider-submitted data and third party sources (public or commercial). There is no guarantee third party sources are more accurate or timely than the providers' own reports. Indeed, some third party sources are based upon different standards than those specified in the NOFA, perhaps making them less reliable than information collected directly from providers. At the very minimum, provider data has a lineage and temporal status that we can identify. A concern we have with increasing use of third party data is that we have no way to verify its quality or development methodology. Particularly in rural areas we are concerned about what third party data may reflect based upon what we assume to be a small sample of information.

In other words, we may hit a wall in which we can't determine how the commercial source derived its coverage conclusion. To us this means that third party data sources are beneficial, but represent a supplementary view, not an authoritative one, of the NOFA defined Broadband market.

In short, we have chosen to use provider data as the baseline. We will challenge provider reports when third party data shows major anomalies, when submitted data conflict with prior submissions or when a consistent volume of consumer feedback points to a potential error.

Confidentiality and the Use of Licensed Materials

As a mapping vendor, we are reliant upon the cooperation of Broadband service providers. In large part, what underlies this cooperation is trust that we will not violate the proprietary and confidential nature of the data provided to us.

We are thankful for the confidentiality clarification that NTIA shared with us (included as Appendix three). We use this as a guiding document to help us communicate with providers about what information NTIA considers to be confidential. Our suggestion is that NTIA publish this, or something comparable, to ensure a consistent interpretation of the NOFA and how it guides NDAs.

As some providers are non-responsive to requests for information, or lack resources necessary to put data into NTIA compliant formats, we have fallen back to the use of commercial data sources in several places.

For incumbent telephone providers we have used commercial wirecenter boundary products to filter Census Blocks and segments that are clearly out of their exchange areas. For cable providers we will use an estimate based upon Census Designated Places within MediaPrints named areas.

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the state programs overall and engage more citizens in the work at hand. In addition to the various opportunities the public has to provide input via the online service coverage maps and the related 'Broadband story' process, our crowd sourcing efforts are grounded in a time tested telephone survey approach focused on the consumer market. In addition, we continue to advance our process to include certain initiatives centered in two social media outlets – Facebook and Twitter. These initiatives are discussed below.

Consumer Surveys

Working under contract for the state of Alabama in 2009, our initial consumer survey was performed before the NTIA SBI grant was in place. Subsequent consumer surveys funded by the SBI grant were hosted in 2010 for the states of Idaho, Wisconsin and Wyoming and then again in 2011 for Alabama (as noted below). These surveys will be repeated after two years to establish and evaluate trends. Survey results from the most recent effort in Alabama are currently under evaluation. These primarily telephone based surveys include two distinct and carefully scripted tracks: one for Internet users and one for non-users. The telephone survey approach allows us to reach the non-Internet user group as well as the current Internet user. A secondary online approach is also used to augment input from current Internet users. In the most recent Alabama survey we added a third tier to our approach as we equipped local field survey teams with an iPad-based survey tool and targeted their time to reaching the younger market. For non-users, the surveys help determine why they don't have or don't use Broadband. For current Broadband users, the survey helps determine the nature of their Broadband access and how they use that connectivity in their daily lives. In addition to our state-specific surveys a nation-wide survey was also hosted to provide a broader view of consumer views for comparison purposes. State-specific surveys are, where possible, framed to match the state's regional Broadband planning structure (e.g., the updated consumer survey in Alabama was designed to produce results relevant to the state's twelve Broadband planning regions).

The resulting data is helpful on a number of fronts in the SBI's mission to advance the access and adoption to Broadband. Survey data provides an important, albeit broad, gauge for assessing coverage information obtained by providers. For example, areas with widely available coverage (according to provider information), but lower consumer subscription levels (according to survey results), or perhaps where survey results suggest Broadband is not available, can be examined in more detail. Survey results are also very important to the broadband planning (and capacity building) components of the SBI program in that they help inform and formulate Broadband advancement priorities. Survey results also help inform Broadband policy discussions on both the local and state levels. Finally, survey results provide important information to the service provider community regarding market demand and specific Internet use in specific communities (i.e., regions).

Our ongoing consumer survey process adheres to a consistent process. For example, consistent with prior practice the 2011 Alabama survey was launched in June 2011 with a test number of survey calls to confirm (and adjust as needed) the structure of the survey and the underlying survey process. Our surveys typically run for three to four months. All telephone surveys are completely random beginning with the acquisition of a list of state-specific, randomly selected landline telephone numbers. Mobile phones are not typically included in the surveys. Upon evaluation of the survey statistics, auxiliary surveys are executed to ensure appropriate representation is achieved on both demographic and geographic fronts. For example and as noted above, the recent Alabama survey was augmented with a field effort to ensure the younger demographic (i.e., age 18 – 25) was adequately represented. This secondary step is required because of the continued migration (by younger markets) to non-landline based communications. This younger market is also surveyed by reaching out through social media outlets (primarily Facebook and Twitter) to encourage their participation in an online survey process.

Survey statistics from the Alabama update survey are currently being developed and evaluated. Survey statistics from our initial surveys in Idaho, Wisconsin and Wyoming were summarized in our last filing. Survey volumes are designed to achieve statistical validity.

As noted above, our telephone survey process is augmented by providing online access to the survey. Participation in the online survey is promoted on all of our state-specific public web sites and selected social media.

As a final relevant point with respect to the consumer survey process the length of the survey is noteworthy. By survey standards, these tend to be long surveys. The surveys typically average just over fifteen minutes. While this clearly contributes to the number of survey call attempts that were required to reach the level of statistical validity, it is not insurmountable.

Social Media

The phenomenon of social media is widely documented and yet still emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Different states have different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. As noted above, we are able to promote additional input on the consumer surveys through a social media outreach program aimed at our younger market segments.

In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners. As we move into program year 3, distinct tasks are migrating to the responsibility of our State partners.

Within each State, transition planning and responsibility for specific activities is on a slightly different timeline. Much of this is driven by resource availability and partner identification within the State. For example we began transitioning the responsibility for Community Anchor Institution data to the State of Alabama in Round 3, starting with the use of interns to validate Community Anchor Institution data. In Round 4 the state's responsibility expanded to include collection of all CAI data, and in Round 5 the effort culminated with Alabama assuming responsibility for the CAI submission. LinkAMERICA supported this process with detailed transition documents and technical support.

Alabama plans to continue the transition process though the end of year 3 assuming more responsibility for the interactive State maps and website. In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs for this round. Other States are looking more towards the end of program year 3 and the in-State hire of a Broadband Coordinator as the initiation point to support their transition efforts. Broadband Coordinators were brought on board in both Idaho and Wyoming over the past six months. An open position is posted for Wisconsin and that position is expected to fill soon. Alabama has had a broadband coordinator in place for over a year.

Trends in Submitted Data

Overall we note several important trends in this data submission. The list below represents general trends and not a scientific survey.

We note the following trends:

The coverage of advertised speeds is increasingly important. More and more providers are specifically concerned about where the submitted NTIA footprint shows available of 4 x 1 Mbps or 6 x 1 Mbps service.

xDSL speeds are increasing. More and more xDSL is likely ADSL 2+, VDSL, shortened loops, pair bonded or some combination of these. As we talk to providers who trigger speed/technology tripwires, we receive more and more feedback about the presence of these new technologies to enable speeds comparable with DOCSIS systems.

DOCSIS 3 is becoming the norm. Most cable systems are becoming DOCSIS 3.0. Overtime we are seeing the DOCSIS 2.0 areas diminish. In some DOCSIS 3 areas there tend to be pockets of non DOCSIS 3 in predominant DOCSIS 3.0 markets.

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio

manufacturers specific to very high speed wireless services. Although the service can be deployed within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers.   It may be worth reconsidering the speed norms in this category.

Data Production Process

To support our objective of transitioning the data development process to our State partners, we continue to model and document our data production process.   We find this to be a very beneficial step for two purposes.

First, it helps us understand why (and if) a task is being done, and if it is being done efficiently. Much of this program started so quickly that it was difficult to plan logical integration and hand off points among the various workgroups. Further, we are currently in the process of consolidating much of the process data (check-ins, check-outs, metadata) and we can use this process model to efficiently plan cohesive information architecture.

Second, our process documentation and modeling helps explain why resources are being consumed in a particular way. This helps our State partners plan for in-sourcing specific tasks as their time and budgetary constraints allow.   It also helps our LinkAMERICA team better plan and cross-train members to deal with the work surge that occurs 30-45 days prior to submission.

Finally, documenting and modeling our process helps us to take advantage of increasing specialization and proficiency with certain types of data and management responsibilities.   In submission 3, we had identified data “czars” responsible for check-in and check-out of data. That data czar helped to bridge the gap among receipt functions, provider feedback, production and DBA. In round 5 the data czar was also tasked with alerting on speed/technology tripwires. This individual was responsible for taking the initial review of each submission and determining if an NTIA speed/technology warning would be triggered.

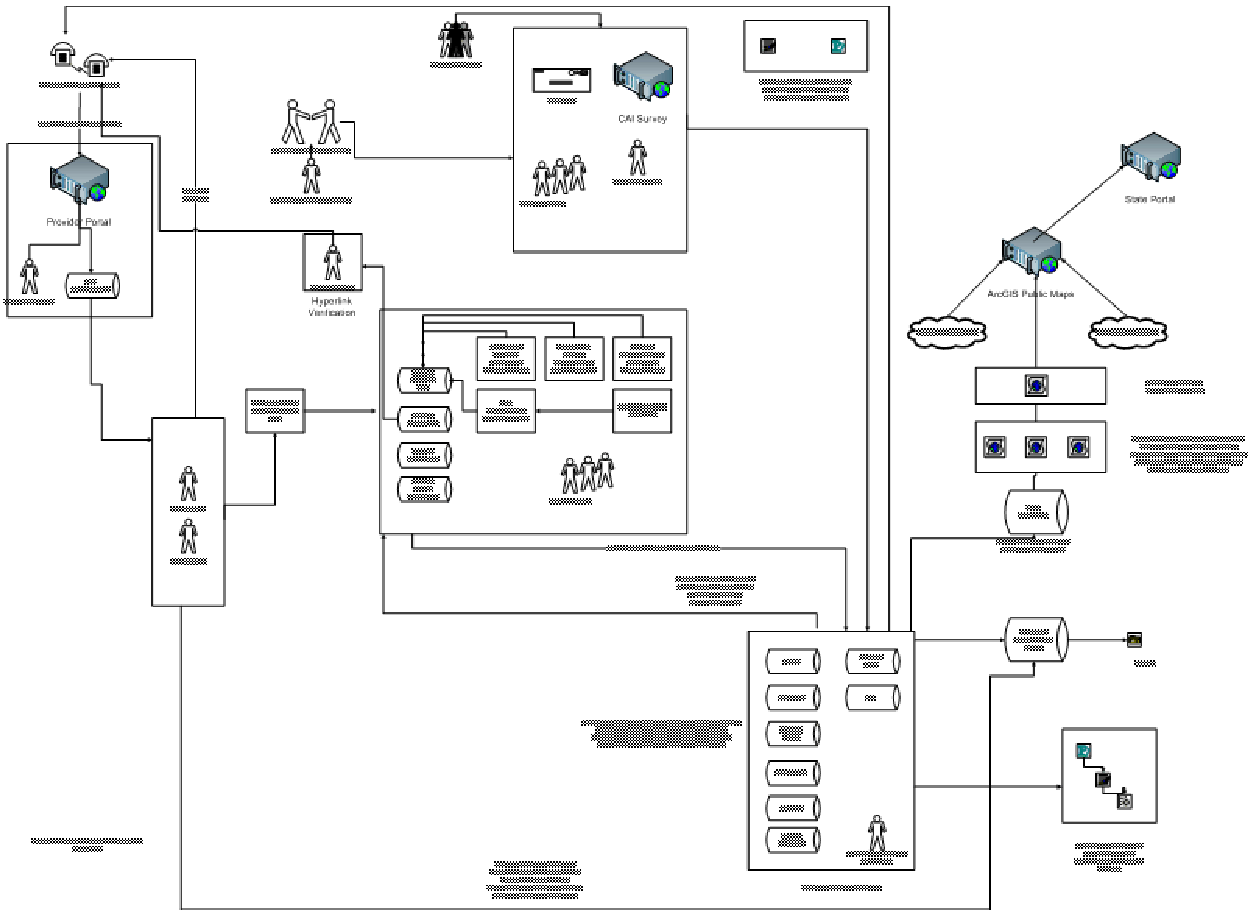

Figure 1—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

Prior to initiating the Round 5 survey, LinkAMERICA transitioned in house provider tracking systems to a Cloud based application, TrackVia.

The movement away from desktop solutions was based upon several factors. First the architecture these systems were designed under no longer met the program realities. For example deliverables like Datapackage.xls were not contemplated when the original provider tracking system was developed. Second the ability to share data across multiple geographic areas and organizations was becoming increasingly important as the program evolves and responsibility moves to in-State partners. Third, portions of this data need to securely transition back to State resources who may or may not be able to support a specific IT infrastructure. These factors combined to make the Cloud applications a valuable alternative.

As with any IT transition, the process has not been without challenges. Nonetheless the investment in time and resources has proven to be effective and worthwhile. We anticipate further movement away from desktop oriented architecture to a more open, Cloud type solution.

Data Production Methods

As raw data were received from the provider community, attention turned to normalizing the disparate submission formats[5]. The team considered each submission with respect to the following criteria. These criteria are important because they perform the basis for our verification and quality assurance process. In other words, we have to appropriately scale our data verification efforts to match the scale or ambiguity of the following:

- Locational certainty
- Speed certainty
- Temporal certainty
- Provider and network ownership certainty

The team's goal was NOT to quantify a particular degree of precision with respect to any of these criteria. Rather, we are working to attribute the above "certainty attributes" to each submission, and will continue to implement quality assurance and verification mechanisms that are resource-appropriate for each.

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

1. Coverage in Census Blocks (2010) of 2.00 or less square miles
2. Covered Street Segments (2010) in Census Blocks greater than 2 square miles[7]
3. Address Level Coverage (point data)
4. Wireless Service Areas (SHP file format)

With each submission, the team went through a series of steps to normalize and categorize the data. Since data arrived in many different formats, and at many levels of granularity, the following normalization procedures were used:

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Geo-referencing the data; QA the geo-referenced data
- Geoprocessing the geo-referenced response

[5] In line with NTIA Best Practices we continue to request and receive a large number of data input formats. This ranges from tabular Block lists to hand drawn maps.

[6] Speed, Anchor institutions and Middle Mile facilities are discussed in later sections.

[7] To help clarify issues relating to Census block area and vintages in use, our team published a technical paper to the Grantee workspace. Because we were unsure if this standard should be implemented uniformly, this document was never distributed to the provider community.

- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

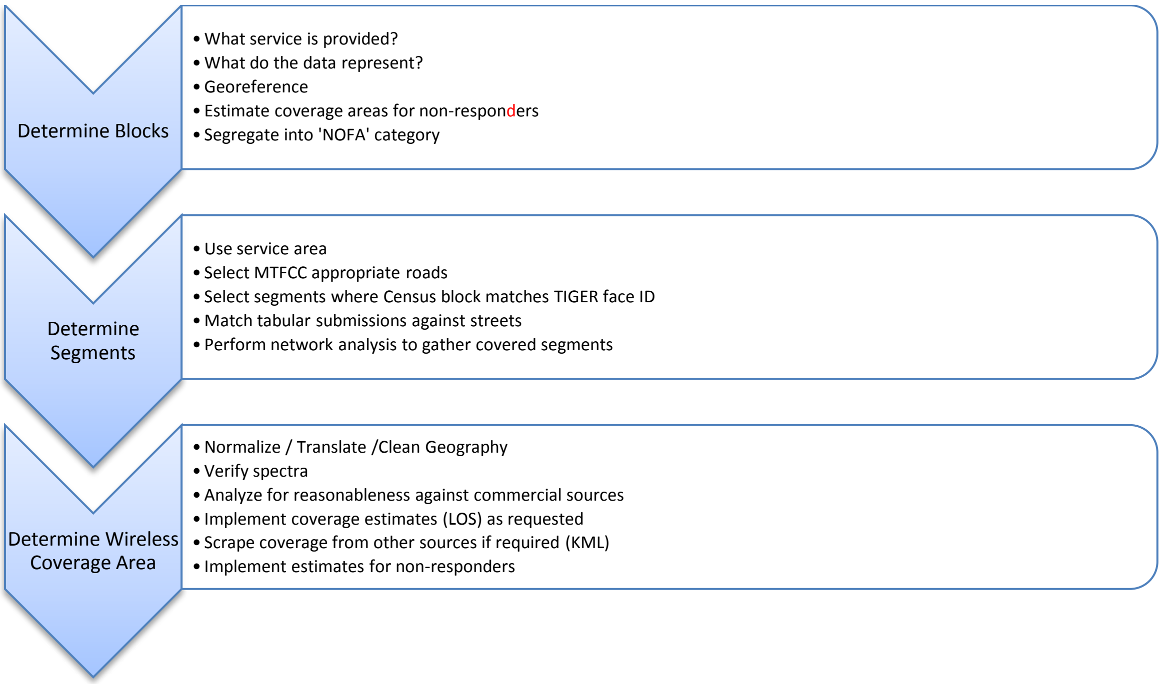

Figure 2-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 5.

Speed Examination

Given recent concerns about the depiction of speed and what that mapped speed represents, LinkAMERICA invests considerable time requesting detailed information on speed which appeared to be beyond normal speeds for a given Technology of Transmission given the NTIA supplied frequency tables.

Based upon these conversations we learned

A) For incumbent telephone providers; the speeds beyond the normal xDSL range represent significantly shortened copper loops, as well as upgrading DSLAMs and modems to support ADSL2+ or VDSL.

B) For cable providers the intermixing of DOCSIS 3.0 and non 3.0 systems in a market area is typical and sometimes reflects a circumstance where segments of plant cannot be upgraded to DOCSIS 3.0. This variance can be at a level below the Census block. In these cases the maximum advertised speeds remain to represent the market area but the plant variance is typical.

[8] When our team logs a submission into the staging database we record at least two attributes. One records the method used to derive the coverage, the other records the method by which speed was attributed to that object. Other attributes carried to NTIA carry source meta values as well.

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers.

E) There exists a minority of providers who submit a theoretical speed that is unmatched by their web advertising. In these cases we request clarification from the provider on the inconsistency. Our experience has been that providers will modify the speed to be consistent with their web coverage.

F) The maximum advertised speed offered is not always clear. Sometimes the speed is described in advertisements in terms of a combination of video and data. Other times it is data not video. Some providers allow a customer to select how much bandwidth they want to allocate to their data stream versus video stream. In other words the bandwidth available to a household is constant but how it gets allocated among the data versus video becomes a customer or service directed choice. This makes getting Maximum Advertised Downstream speed very difficult because it is not just a product of the broadband network which we are mapping but also the customer's selected service package.

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11) directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[10]. In some cases this involved using simple

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[9] We have requested from NTIA information on how provider matching is done within their QA process; beyond the relatively short whitepaper posted with the national map <http://www.broadbandmap.gov/blog/wp-content/uploads/2011/02/DataComparison_Methodology2.pdf>, we have not received any more detailed information on how providers are cross verified between submitted and third party sources at the national level. Our understanding is licensing concerns are holding the release of this information.

[10] We continue to process older submission data looking for information and methods by which we can estimate coverage information. This will be an ongoing process.

polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

In the weeks leading to submission 5 we received a request from NTIA to clarify the presence of unusual shaped wireless polygons. Our interpretation of this was a request for information relating to the source of these data which do not appear as propagated coverage. Although the 'unusual shapes request' represents a very small portion of the submitted data, it begs an important question about the expectations with respect to wireless coverage patterns. We look forward to working with NTIA to address these issues in a fair way across States and providers. We would not want to create a coverage dichotomy where advertised coverage was disallowed from the NTIA submission because of an expectation about how advertised coverage should appear. One concern we have when we develop a coverage estimate which differs from a providers advertised coverage pattern, which should we submit?

Finally, we have used the new provider type classification of 'other' to bring specific aspects of certain provider's data into our submission. There still seems to be confusion on how to handle provider types where a provider offers multiple paths to provision Broadband for typically business customers. Rather than waiting for certainty on the answer, we bring the provider in and list them as provider Type "other". Our sense is provider Type "other" will continue to expand in subsequent submissions.

Clearly one challenge is the data, but an equally significant challenge is appropriate messaging around this "other" provider type category. We do not want to leave consumers with the impression that they can get a high capacity fiber or microwave link despite the fact that the hospital next to them or in a nearby Census block can get this service.

After the Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[11]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

The next section discusses how data were georeferenced and geoprocessed given a particular submission format. We have yet to find a particular method that works across all submissions. Rather we tend to tailor our geoprocessing to meet the specifics of the service provider and data submitted.

In most cases, in Round 5 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[12]

[11] https://sbdd-granteeworkspace.pbworks.com/w/file/42309493/provider%20ClassificationFINAL.docx

[12] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to "belong" is highlighted. In this case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

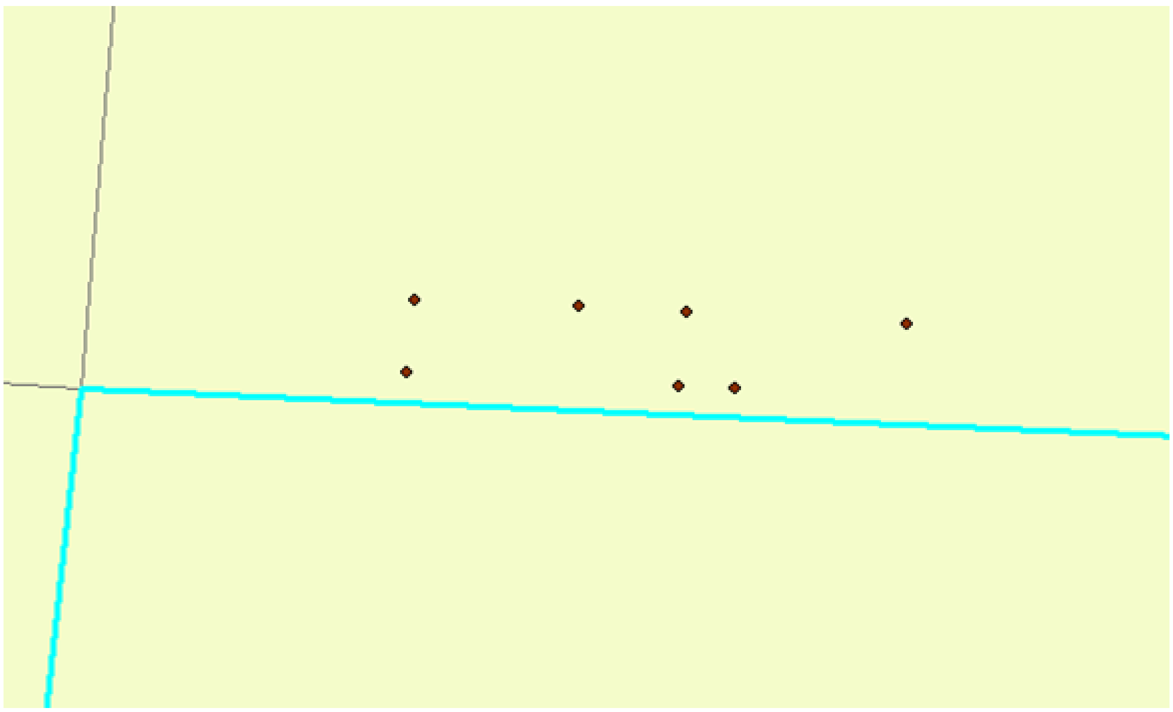

Figure 3-Internal inconsistency in submitted data

In other circumstances, we found that inconsistent geocoding standards may produce misleading results. The next image shows point level data, and the Blocks are colored based upon the counts of points intersecting Blocks. The challenge this presents is that if geocoding was performed on a different dataset than the block boundaries (the road traces are not coincident with block boundaries) and/or geocoding was done without an offset, it becomes problematic to assign coverage to a Census block based upon only the point locations.

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cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

Figure 4-Block Coverage

For this reason, where we were provided address point data and asked to generate covered Census blocks, we elected to use a 200-foot buffer to select Census Blocks that intersect our points.

We also see a number of providers submit customer data and facility data. Their intent is to allow us to have two primary sources from which to derive the most accurate coverage. In these cases we tend to look for clusters of customers in areas where we see no facility based coverage.

With respect to deriving Block level speed from sub-Block data, we have instituted a business rule where the predominant speed in a Block is the speed we attribute to the Block.

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

In other circumstances, providers submitted point level plant data. From what we could gather, these points tended to be customer-dedicated terminals. Typically, these providers were high speed Broadband producers—which may somewhat strain the definition of Broadband as other providers supplying comparable services specifically disclaimed the ability to provide high-capacity Broadband services in the required 7-10 day interval. In these plant point data submissions, we had similar concerns to the point level customer data, but two factors tended to make us use a more conservative intersection buffer. First, we tended to have far fewer points to work from, so our concern was grabbing too many covered Blocks as the Blocks tended to be much smaller in these urban areas.

Second, these plant points tended to be dedicated to distinct customers, but it was difficult to know which element of the customer's campus to attach coverage to.

In the case of the image below, given a small shift to the left, it would be easily possible to gather 1 to 3 Census Blocks from this point. Although orthoimagery is helpful in a circumstance such as this, it is still indeterminate.

Thus, in the circumstance of plant level point data, we used a 100-foot intersection buffer.

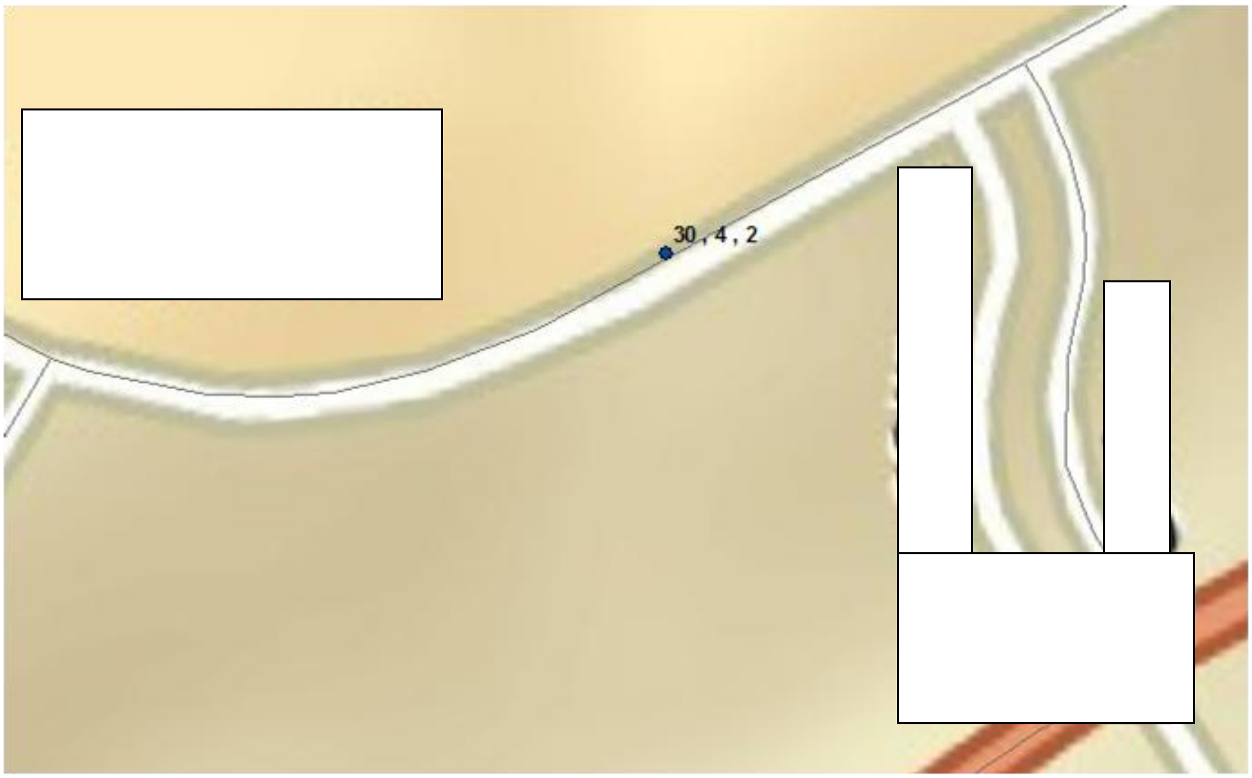


Figure 5-Plant Point level data

Coverage Derivation Using Linear Facilities Data

A number of providers submitted facilities data. We handled this data in different ways depending upon what we believed the facility data represented.

Most telecommunications networks are divided into two components. Feeder supplies higher capacity nodes (eg. DSLAMs, Fiber Nodes). Distribution usually supplies customer premises (NIDs, Pedestals, Taps, ONTs). Where we could discern what facilities we were provided, we used different methods.

The next image demonstrates a geo-referenced CAD image as given to us by a service provider. Note the light and dark green shading. We would infer that the lighter segments represent distribution and the dark green represents the feeder network.

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a

situation comparable to customer point level submission in that we have most of the network footprint captured.

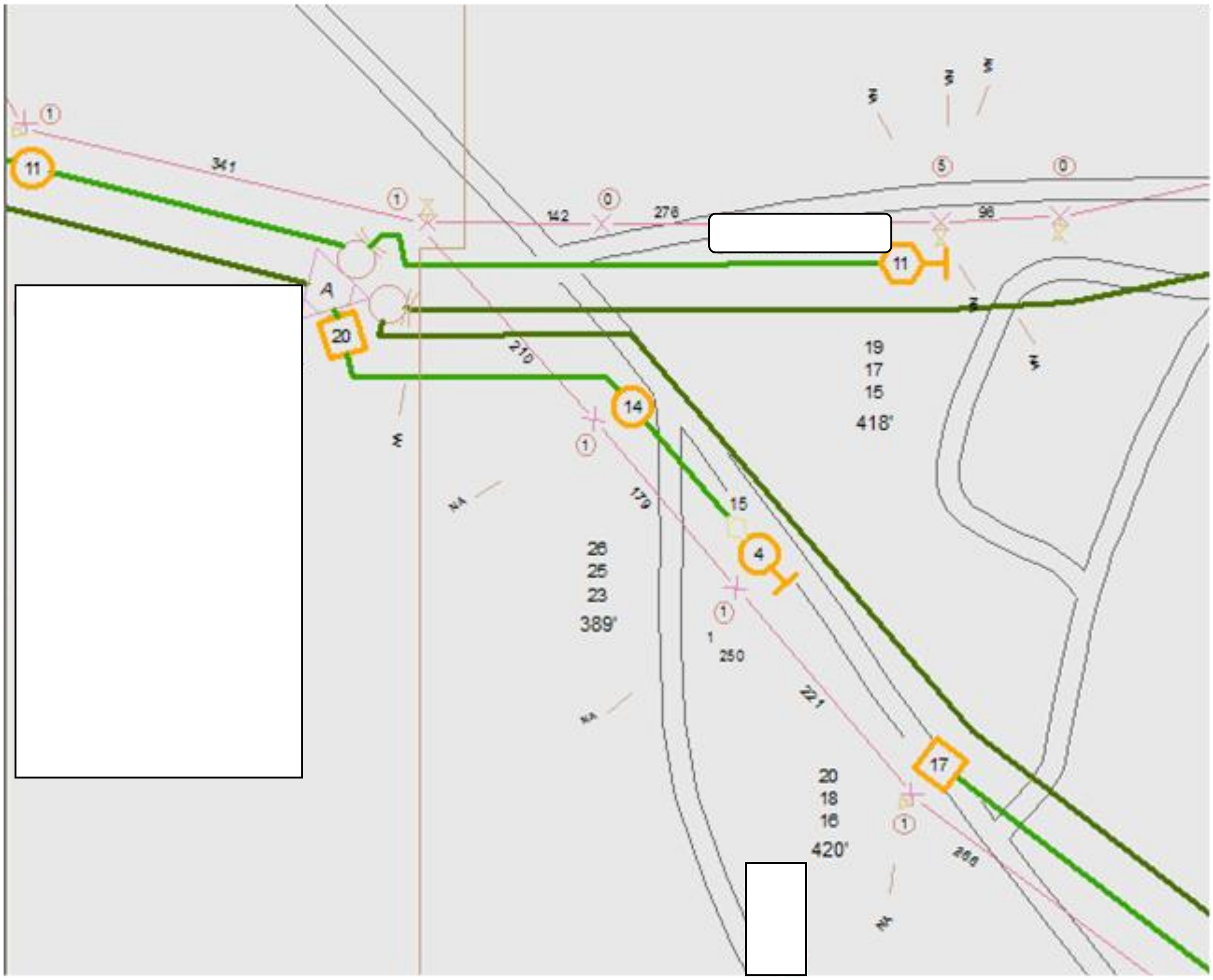


Figure 6-Georeferenced CAD information supplied by Broadband provider

In other circumstances, we were provided engineering information that we inferred to be feeder only. This inference was typically based upon the presence of fiber optic equipment only. In these cases, we used a more generous 2,000 meter Census block intersection. The 2,000 meter criteria was based upon an informal survey of population in proximity to the geo-referenced strand data, but it could be varied based upon a more complete survey.

Coverage Derivation Using Covered Street Segment Data

In some cases we were provided with covered street segment data. Covered segments tended to come from two sources.

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our

team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

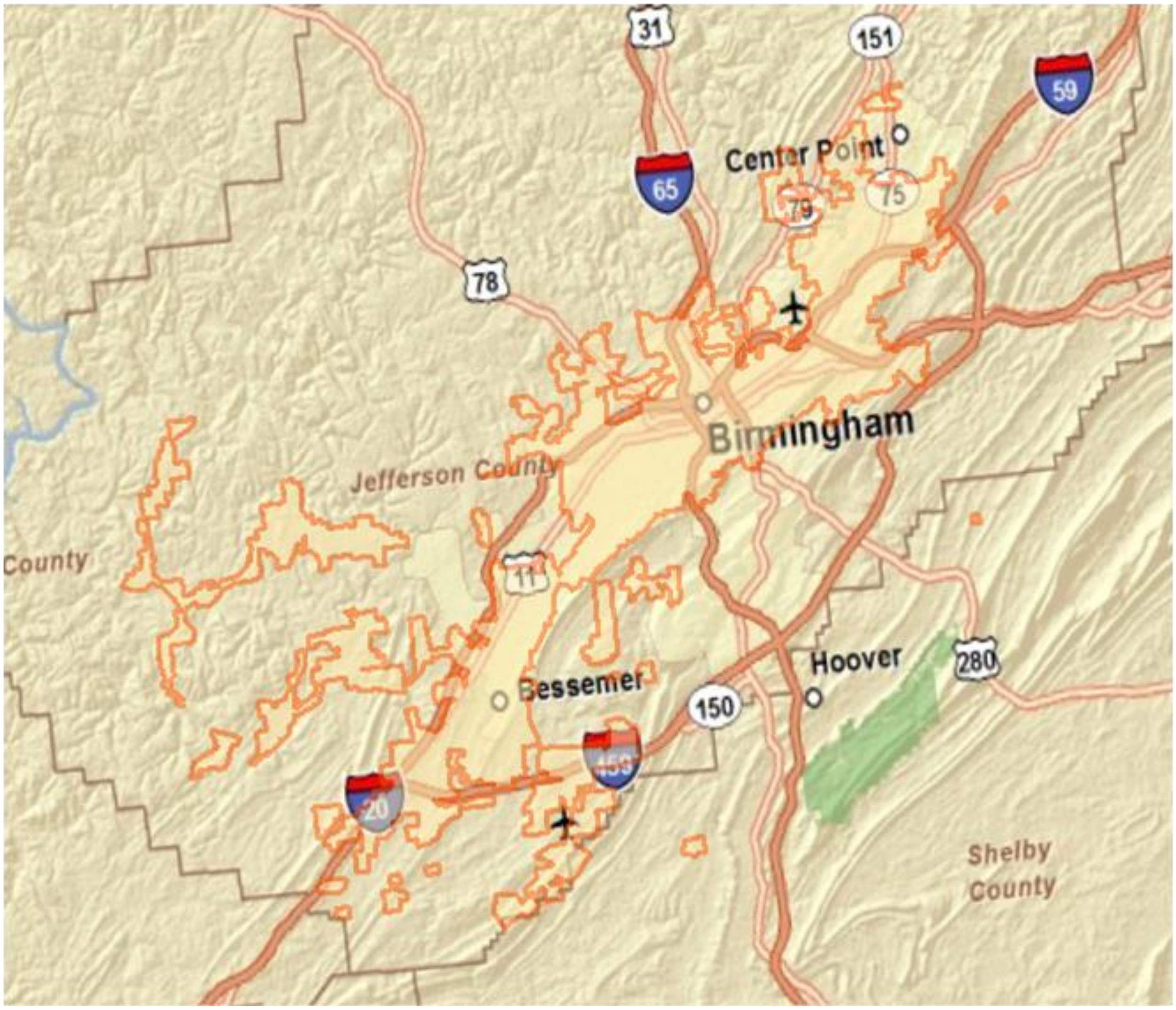


Figure 7-Coverage derived from street segments

In a second circumstance, street segment data was developed during coverage estimation. Handling the estimated data is discussed below.

Coverage Derivation Using Serving Area Point Submission Data

In other cases we worked with providers to derive service areas based upon point plant data. In these cases we were given a serving node and an appropriate road length service boundary. There is an important distinction from the plant data discussed above. In this specific case, the data submitted was a node that served many locations--such as a Central Office or DSLAM. This is contrasted with the earlier example in which the point represents a node serving only a few customers.

When trying to derive coverage from Central Office or DSLAM nodes, the team used ESRI Network Analyst to derive covered road segments honoring these road engineering parameters.

The figure below shows street level coverage derived from Central Office and remote DSLAM point data.

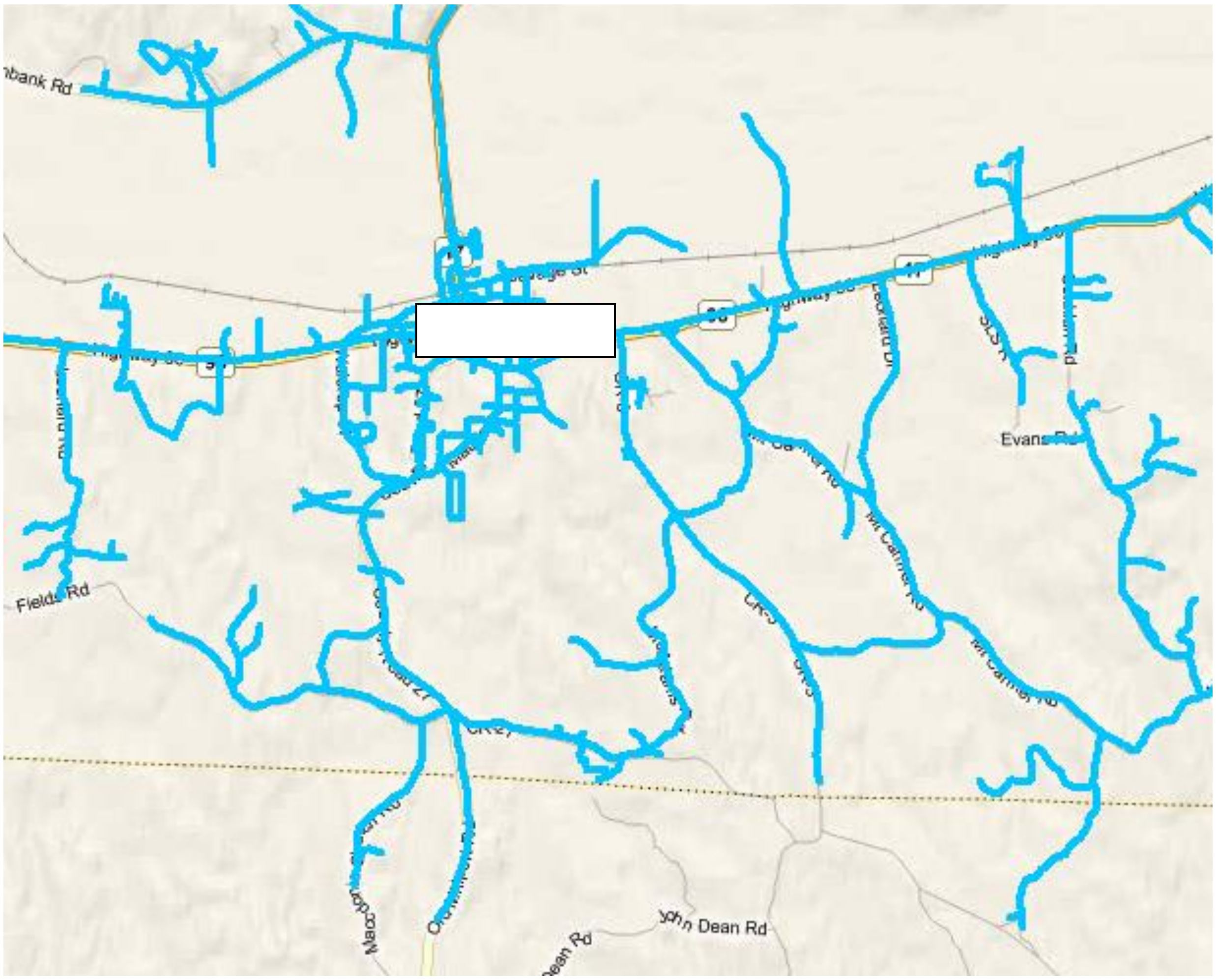


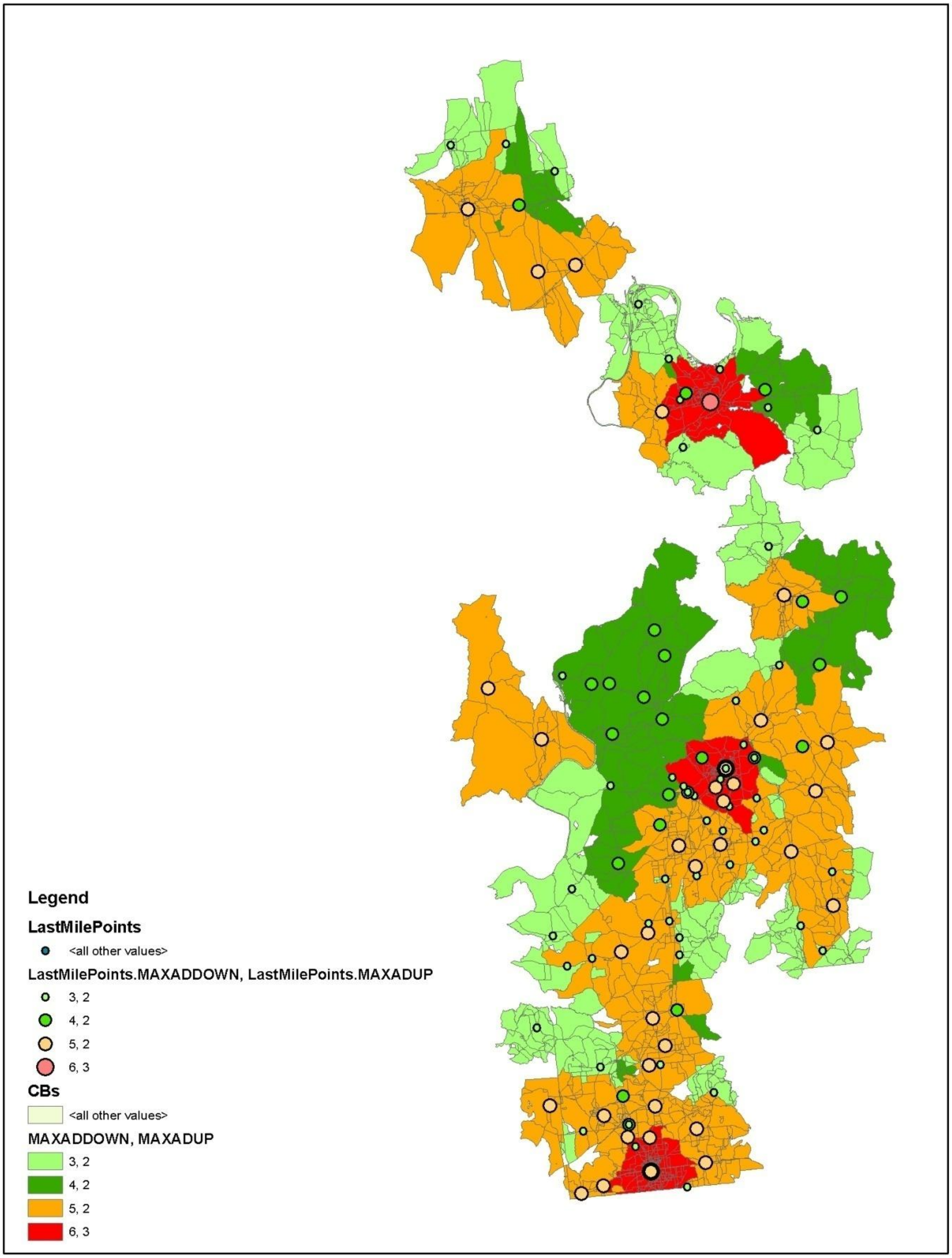
Figure 8-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[13]

The segment level coverage is easily extendable to derivations of Census block level speed. The figure below shows the attributions of block level speed based upon the Maximum Advertised Speed available from a DSLAM. Although the methodology isn't perfect, it does provide insight into the value of granular infrastructure data.

[13] Only TIGER features of MTFCC type S1100 and S1200 were excluded from use.

Over time we have seen an increase in the number of providers submitting this type of data for our use. Our sense is some providers find plant level data easier to generate and are satisfied with the results of derived coverage.


Legend
LastMilePoints
<all other values>
LastMilePoints.MAXADDOWN, LastMilePoints.MAXADUP
3, 2
4, 2
5, 2
6, 3
CBs
<all other values>
MAXADDOWN, MAXADUP
3, 2
4, 2
5, 2
6, 3

Coverage Derivation Using Polygon/Polyline Serving Areas

Broadband service providers sometimes submitted coverage in terms of served areas. This was either in direct geospatial formats, CAD files, or paper maps. The image below reflects a carrier's service area. Within that service area, there are variations in technology of transmission and served speeds. When polygons with speed data and technology of transmission were available, we used a spatial intersection to gather covered Census Blocks. In many cases, using covered Census Blocks resulted in a loss of the speed variation (sometimes the speed variation was at a level smaller than a Block and did not get picked up within a spatial query).

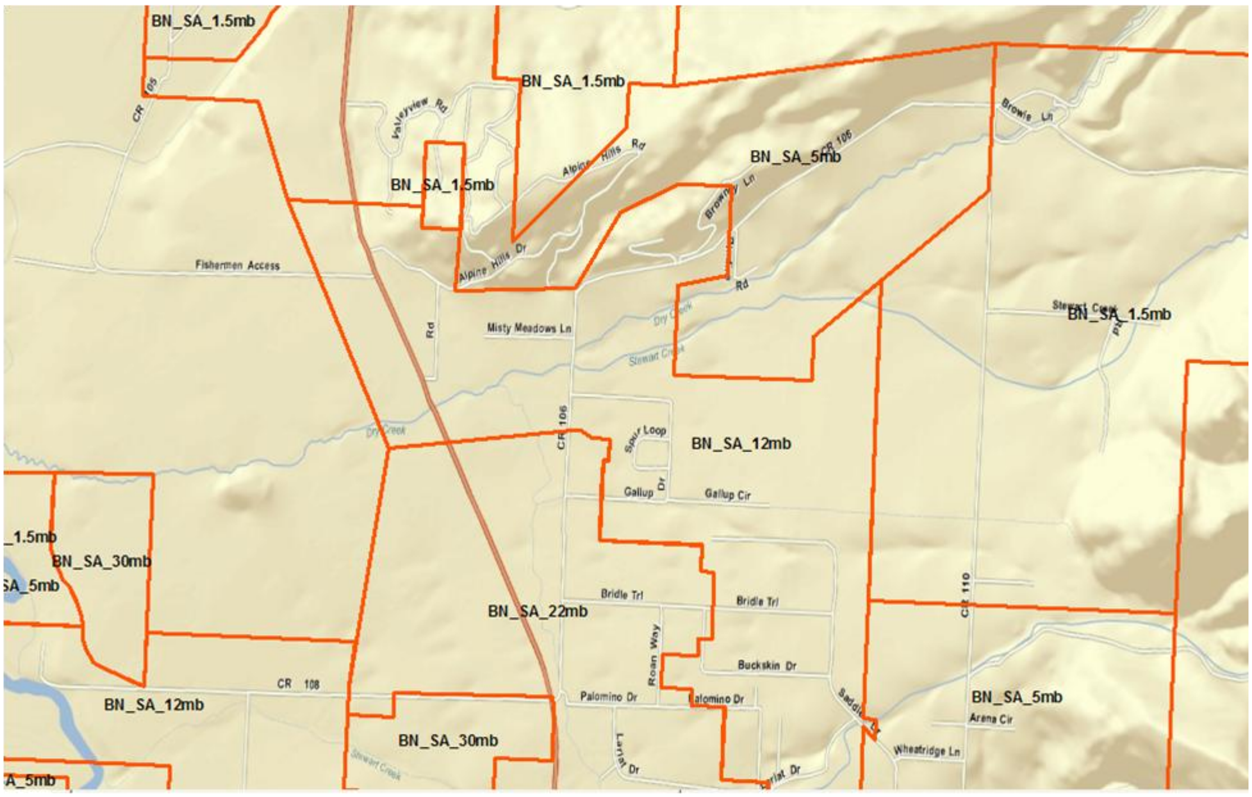


Figure 9-Coverage derived through serving area polygons

Although we cannot directly solve the loss of speed granularity due to Block shapes, we honor a business rule wherein we always select Blocks from the highest speed areas first, and then allow the lower speeds to select from the remaining Blocks. This is an arbitrary rule, but our feeling was that it should be a consistent selection, rather than an unordered selection.

Street Segment Derivation, Large Blocks

For those calculated Blocks greater than 2.00 square miles (large Blocks), we provided coverage in terms of covered street segments and corresponding geography.

With respect to segments we had four sources of data:

Covered large Blocks

Tabular street segments and address ranges for large Blocks

Geographic segments either with street attributes or without
Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format. Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded segment coverage pattern, like

the image shown below.[14]

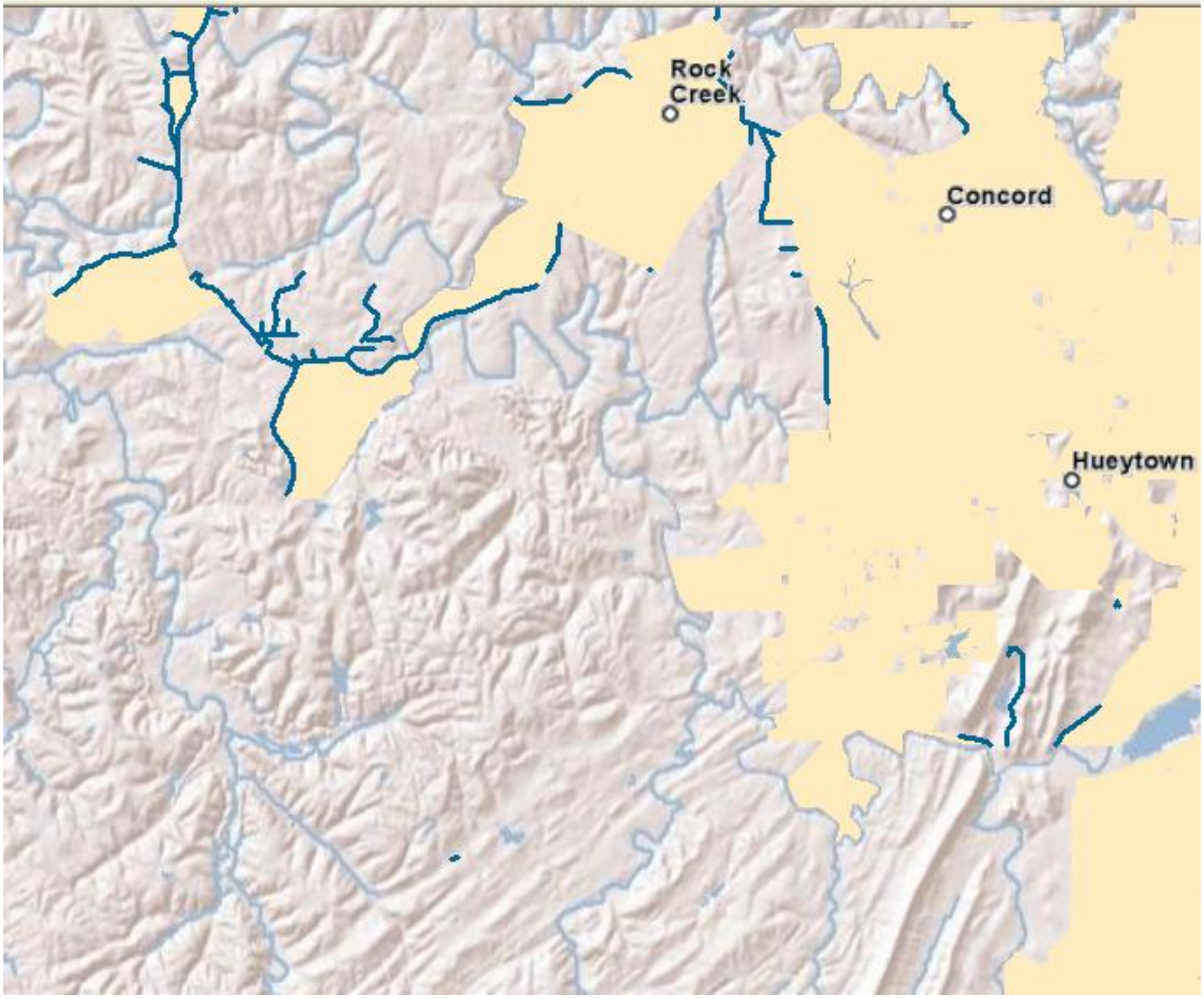


Figure 10-Blue road segments adjacent to peach covered small Blocks

A number of providers submitted geographic objects. In this case, our manual process was directed toward a conflation of data sources. The goal was to take provider submitted segments and put these segments in terms of our TIGER 2010 basemap. Although there is a trade-off in the accuracy using non-provider submitted segments, we felt it was more important to have a road set that would edgematch our Block features and remain consistent with the Block size standards we used for other providers. This is important for the appearance of the online maps, as well as potential verification work where we are attempting to judge a feature based upon its attachment to a covered small Census block. The figure below shows street segment input data.

[14] We continue to hear providers expressing concern that our request for either a geographic object or TIGER Line ID is beyond the scope of the NOFA clarification. Therefore, they cannot supply additional information to us.

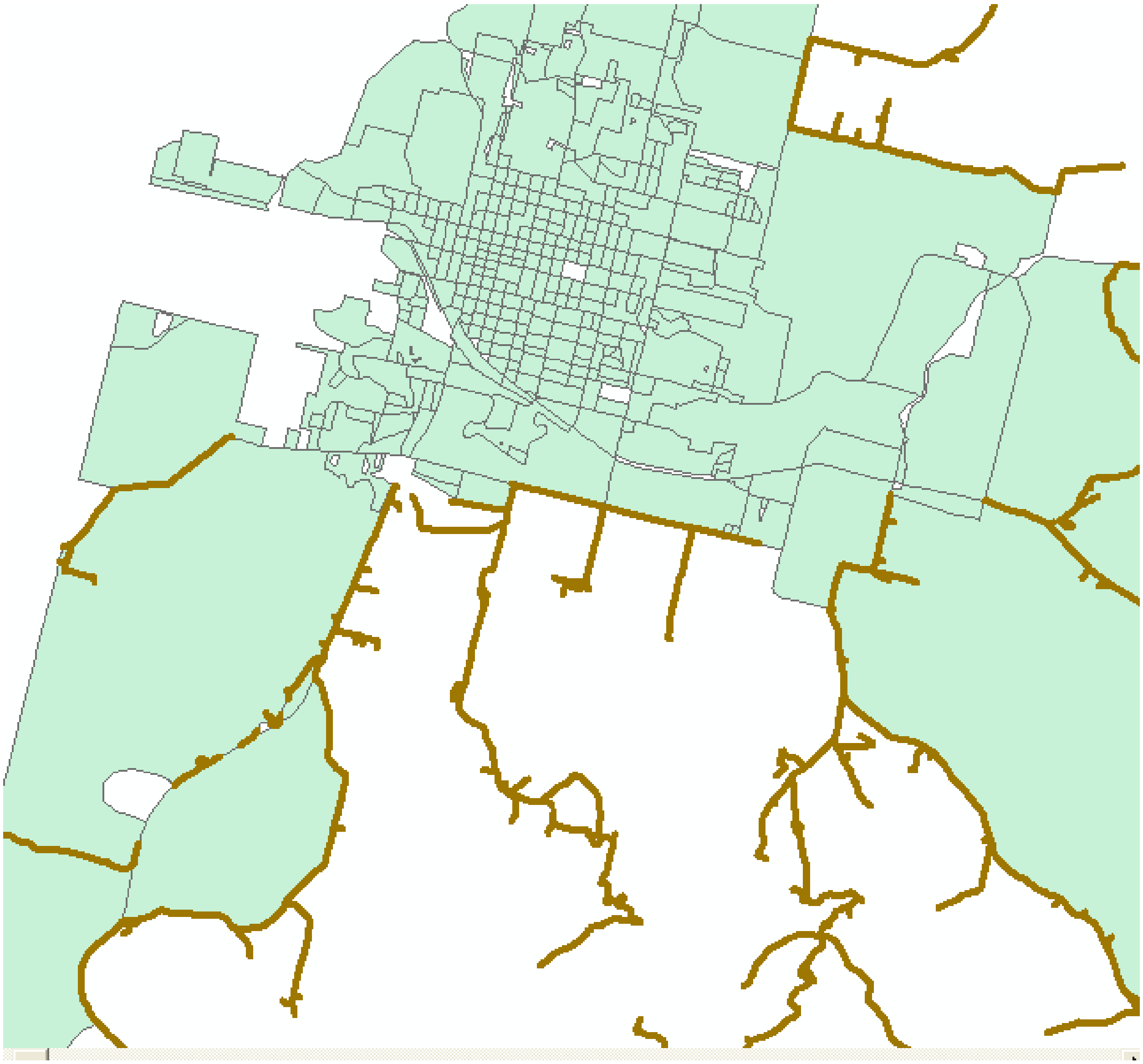


Figure 11-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

The figure following demonstrates the same area after the conflation process. Blue segments are the conflated TIGER roads which will be passed to NTIA.

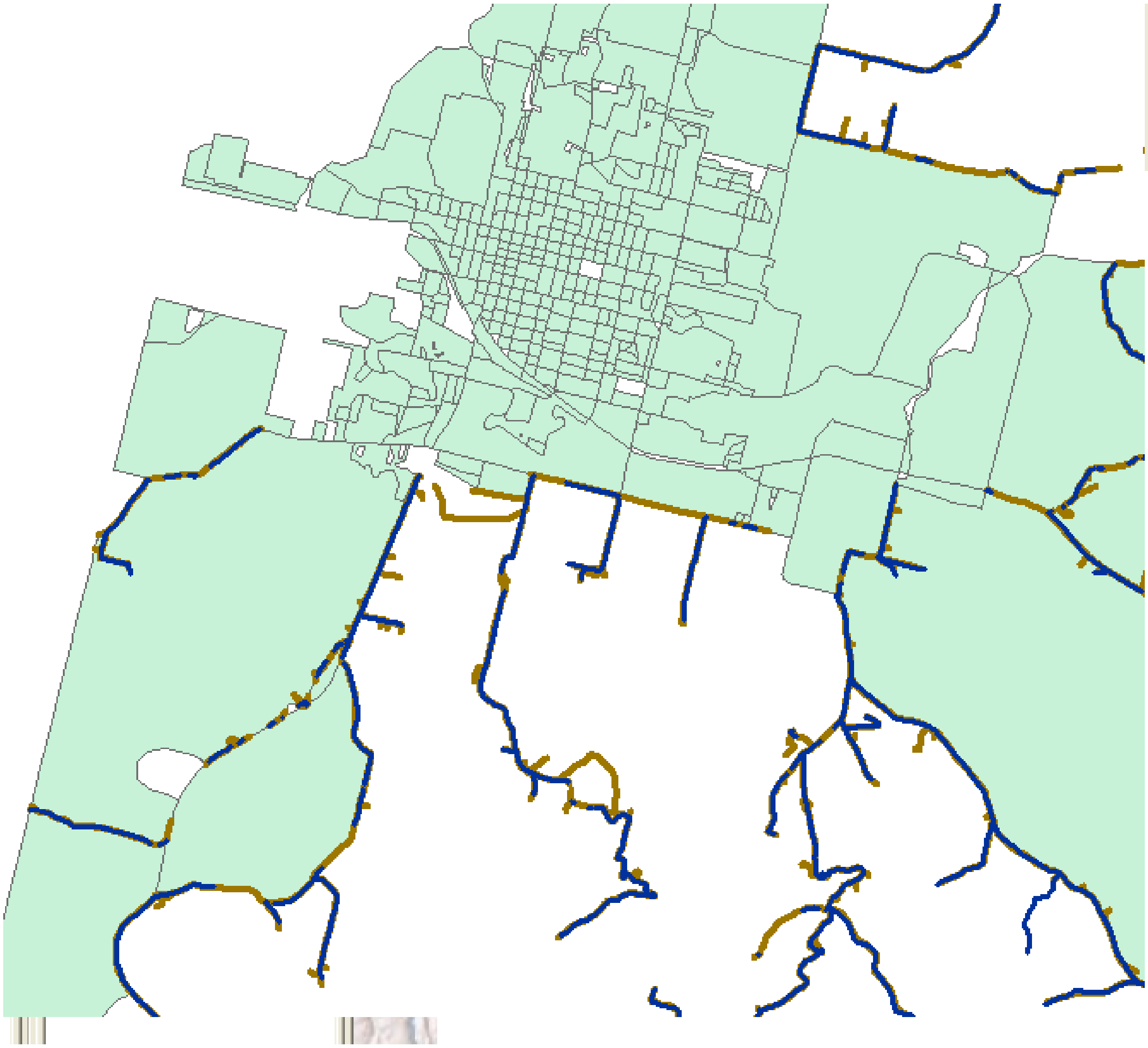


Figure 12-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

The final segment process was used when we were supplied with a Broadband covered area polygon. In this case, we found the segments within covered areas and eliminated those segments inside of Blocks less than or equal to 2.00 square miles.

Because there was more control over the format of the inputs (we knew we had a boundary and were working with TIGER segments), this was an automated process that followed this general format:

Select large covered Blocks by provider ID (from updated Large Block table)
Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider

Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
Join TIGER roads feature class to temporary table on TLID
Select covered segments (Python script)
Select service area polygons for provider
Clip selected facing segments with selected service area
Export clipped segments to staging feature class, keyed by providerID
In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[15]

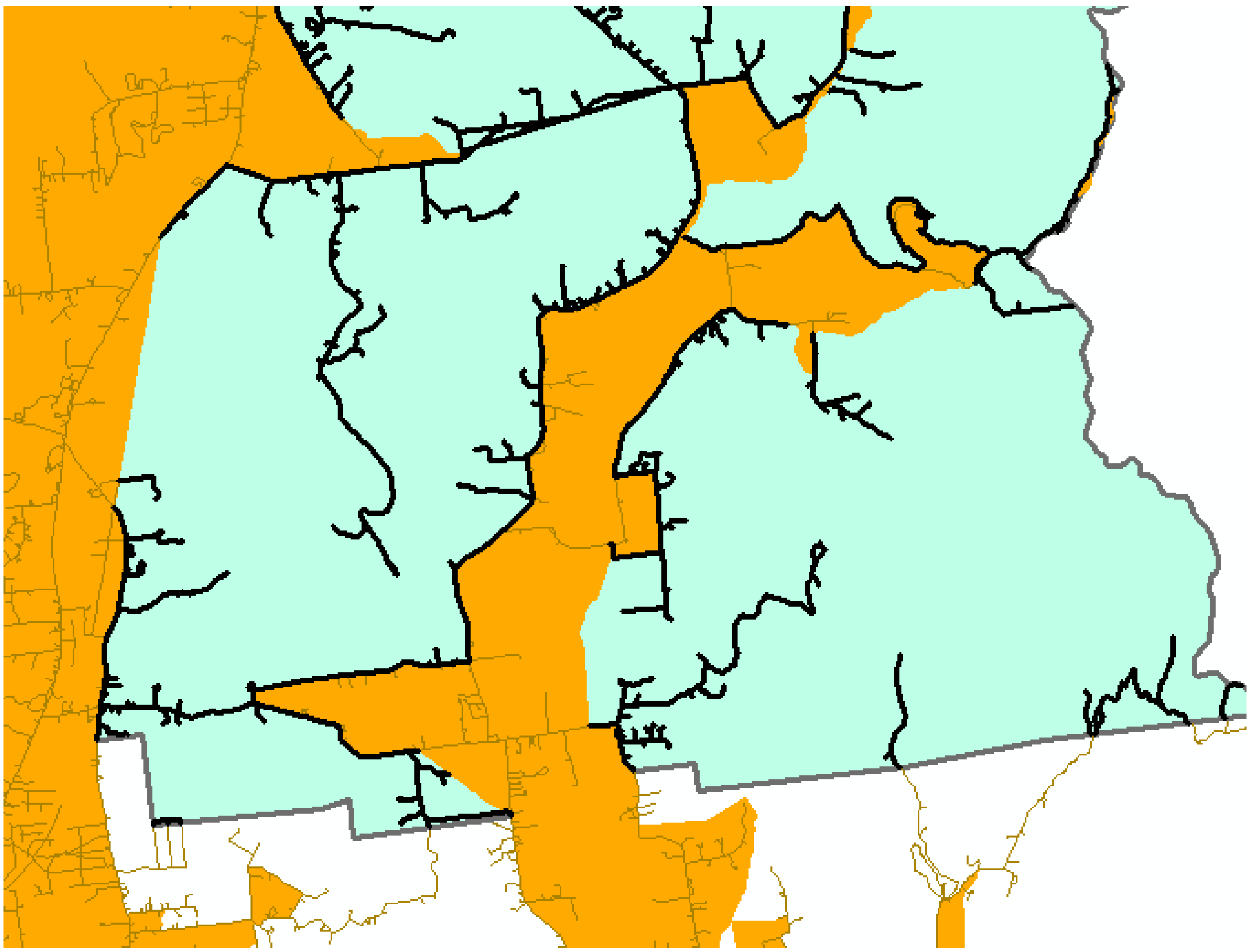


Figure 13-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[16]

[15] An outcome not discussed here is how to handle address ranges on segments. As NTIA is asking for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are nullable data elements.

LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid submission format.

In Round 5 fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored.

Other fixed providers were able to supply us with hand drawn maps or polygons/polylines drawn in Google Earth format. In these cases we did our best to georeference and verify the coverage areas with the WISP.

When we received coverage information in KML format, like the image below, we accepted the data as it was presented to us as the submitted coverage patterns were used in the provider advertising.

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16 Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.

As the image above shows, in some cases we were provided hand-drawn coverage, as well as infrastructure. Instead of estimating their coverage using a line of sight or RF study, we elected to stick with the provider's supplied information. Our decision was guided by two primary factors:

If the provider is advertising using this coverage they must have specific confidence in its accuracy.
If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information.

The downside, of course, is the polygon shown on the map may not represent our notion of how wireless coverage should appear.

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary strength (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location.. Fourth, it was very difficult getting providers to identify spectra used for Broadband data services[17]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area.

Service Address Point Process

A handful of providers have requested that customer level, service address point data be submitted to NTIA. In these circumstances we have done minimal processing to preserve the provider's intent with this deliverable and not bias downstream NTIA use.

Our verification included checks against commercial or Public Utility/Public Service Commission exchange boundary maps. Points not contained within three miles of a boundary are not submitted to NTIA. The percentage of excluded data varies cross providers, but it tends to be under 1% of the total submission.

We retain from the provider the provided latitude and longitude, as well as Census block. For some coverage data, if a provider is unable to supply a longitude, latitude or Census block, we fill in these attributes. In those circumstances where we do not have a Census block, but we do have a longitude

[17] One provider responded by email, "This mapping program is to provide the coverage area for Broadband provided by a company. Not to keep a detailed account of every aspect of a companies (sic) network."

and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[18] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[19].

We typically resorted to three possible estimation paths.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[20] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[21]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be

[18] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue is address quality but also difficulties in geocoding in very rural areas.

[19] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.

[20] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.

[21] Central Office location was derived from MapInfo ExchangeInfo Professional. Wirecenter boundaries also came from this commercial product.

provided, we used a view shed analysis and estimated line of sight coverage at 10mi per tower[22]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

Speed

Speed attributes are reported both at the block (typical) and higher levels (maximum advertised and subscriber weighted). We note that in many cases, providers did not supply typical or subscriber-weighted speeds. In some cases, it appears--although we cannot verify--that their maximum advertised speeds were used to populate typical speed columns.

We do have limited testing data on reported speeds, but we have been careful to not use our typical reported values with carrier-provided information. If we do not have a speed value from a provider, we report an empty value.

Several service providers claim they do not have data on typical speeds available, but estimate a 20% overhead factor between the advertised speed and what may be experienced by an end user.

We continue to request advertised speed at the block level. Nevertheless we appear to be getting speeds that do not vary over a large geographic area – leading us to believe that providers may still be submitting the maximum speed advertised in local media for the entire market. For the most part, we have been unsuccessful in messaging that advertised speed should not correspond to a market area, but instead, the maximum speed, which can be provided to a household—what some may describe as a 'qualified speed.'[23]

As a general rule, in circumstances where a provider supplies a range of speed attributes, we assign NTIA categories based upon the midpoint of the range. We follow this rule unless we can determine other grantees are handling the same submitted information differently.

To support NTIA program office requests, we have also modified the structure of the Service Overview table. Even if Maximum Advertised Speed is supplied at the market or county level, we push that speed down to the contained Blocks. The only records that remain in this table, will be those wireline records with either a non NULL nominal weighted speed or ARPU value.

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but

[22] In some cases we had an approximate radius of coverage but no height. In this case we used a 50' height estimate and then clipped the coverage to the provided coverage range. We also clipped wireless coverage to honor state boundaries but did not look for providers serving coverage with out of study state facilities.

[23] As an example of a response to our request for Block level advertised speeds, we received the following comment from one anonymous provider, "This is and of itself does not require anything new of us – just states the NTIA supports efforts focused on getting that information on the CB level." It would be helpful to have broader messaging so that providers understand this new direction.

extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted “something,” there was a significant variance in what that “something” represented.

The purpose of this section is to record some of the comments and questions we have received about Middle Mile. We hope this provides better context for our data submission.

Within the NOFA, Middle Mile was defined as (a) a service provider’s network elements (or segments) or (b) between a service provider’s network and another provider’s network, including the Internet backbone. (Collectively, (a) and (b) are “middle-mile and backbone interconnection points.”)[24]

Given the existence of the “or” in this definition, providers submitted a variety of information. Based upon the NOFA example, several fixed wireless providers interpreted Middle Mile in terms of the connection points from their towers to their own serving backhaul location. The topology was commonly Microwave from their distribution towers to their NOC. The NOC and towers were listed as the Middle Mile points. This seems to be consistent with the first definition clause (a).

Telephone, Mobile Wireless, and Cable providers tended to remain either silent on the question, or would provide a single location in which Internet peering occurred (clause b). A number of participants explained that the NOFA was quite ambiguous with data traffic moving back and forth over both TDM and IP networks--it was unclear where the distinction should be drawn. As a general rule it seemed like many providers listed a single location where Internet Peering occurred.

A number of providers refused to answer the question on grounds of confidentiality[25]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of “other,” we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for public / private networks.[26] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is “data” (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

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[24] From http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf at 54, visited March 28, 2010

[25] As received in email 9/30/10, “Due to security concerns and the risk of public disclosure of highly sensitive data, whether inadvertent or otherwise, ***REDACT***response to the Middle Mile and backbone interconnection request is limited to publicly available information available on {remainder not included}”

[26] As discussed in our readme.txt file, a number of middle mile points were lost in validation due to their location in adjacent state. This will cause a decrease in some providers relative to prior submission.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL). In Round 5, the check submission script no longer accepts negative elevation values. For a number of providers who submitted negative elevation data (facilities buried underground) we changed the value to zero, per Program Office direction.

To the extent possible in our timeframe, we verified the location of a sample of Middle Mile points. Where we could see infrastructure that appeared to be consistent in location with other provider infrastructure, we felt that the location was accurate. In some cases, the point provided seems sensible (is on a road, near other equipment), but using imagery, we couldn't find a place where this type of connection could occur. This wouldn't be unforeseen, in that Middle Mile connectivity likely takes place in a protected environment much smaller than a standard Central Office installation.

Mobile Wireless Coverage

We have received mobile wireless coverage from most mobile Broadband providers in each state. At this point we have cleaned the geometry of the data and attributed it with spectra, NTIA speed categories and FRN as required.

Where possible, provider derived coverage has been reviewed against the commercial licensed product for consistency. To a limited extent we also use licensing locations and tower infrastructure to spot-check supplied coverage. This mode of verification remains complex, given the lack of facility-based information with mobile wireless.

Finally with respect to mobile Broadband services, we note several trends.

First LinkAMERICA used the NTIA supplied frequency tables to report speeds consistent with other grantees. In circumstances where a provider supplied a range of experienced speeds, we used the portion of the range consistent with the most frequently reported Grantee value.

Second where a provider reports multiple frequency bands in use but doesn't distinguish these bands by submitted SHP file, we submit identical geometries but attribute one geometry to each submitted spectrum value.

Third we are seeing a trend toward increasing Broadband speed. As of this writing, there is not consistency across providers in how they attribute the advertised 4G speed values. In other words, for some providers 4G means advertised speed categories increase. For other providers, the speed value did not change.

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an

fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats and expands in more depth on the confidence analysis within the data.

Verification Methods Summary

Our overall verification standard is focused on the level at which we supply processed data to NTIA. This means that the vast majority of our verification process and resources will be focused on verifying provider identity, coverage, reported speed and appropriate metadata for Census block's less than or equal to 2 square miles.

We believe three broad verification themes are important to consider

a) The first step of broadband service verification is a consistently applied market definition—we call this provider identity verification.

b) There is probably not a single dispositive method of verification. Rather, a number of verification approaches are needed to appropriately classify confidence in data submitted to NTIA.

c) Verification approaches tend to meld together. As an example a web survey is complimented by a phone survey but expert review and external data may be necessary to reach a final informed judgment.

The table below demonstrates the various methods used across each feature class submitted to NTIA.

	Data Types			
Verification Method	**Census Block, Road segment or, address specific service availability**	**Mobile wireless service availability**	**Middle mile infrastructure locations**	**Community anchor institutions**
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD		METHOD USED

		USED		
Anchor institution review	METHOD USED			METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling	METHOD USED			METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

The following table defines each of these methods and provides a summary of why this method is used, and the value we gain from it.

	Definition	**Methodology**	**Purpose**	**Benefit**
Provider Verification	Provider verification is the process of assembling a broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	Provider verification involves combining multiple data sources, interviewing providers and classifying the broadband provider type.	Without a consistent understanding of the provider 'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	The main benefit of this verification process is understanding who is providing broadband services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is	Most of this validation is performed using our spatial databases and running queries that compare submissions.	The purpose of this type of validation is to understand how things change	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand

	the provider data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission consistent with the technical specifications of the service offered.	We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations which are unusual relative to other data received across all states.	over time and why. It also helps informs us for circumstances where we have data points which appear to be outside of the norm. If these outliers are detected, they can be pursued directly with the provider.	why there has been a change.
External data consistency checks	An external data consistency check is a measure of the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	External validation can be performed by verifying supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to tower locations.	We don't believe a single, exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	External validation provides an external measure of data quality assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider to ensure that translation into NTIA formats is fair and appropriately accurate.	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a	One of the more critical steps in broadband mapping is translating carrier supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier)	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation

		Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	is a an important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	with providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to improve/validate the submitted data.	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The maps are also discussed within the context of planning teams within each state. We receive feedback from these meetings.	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted data.	The benefit is to provide feedback and also display real time the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution broadband market.	We have used three methods to verify anchor institution data. The first is a targeted series of telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	As Anchor Institutions represent a different class of coverage information as well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data.	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps

	data.	wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross check on data from a second source—can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to understand ambiguous information in submissions.	Given the large number of submission formats and innovative ways to supply broadband, it is always helpful to have multiple sets of eyes available to reduce errors from misunderstanding .	support process transparency so there isn't a closed GIS driven process making all the decisions.
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information.
Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based surveys	Web based surveys can involve three dimensions. First a web survey (a form	In the case where a web survey is a compliment to phone or in person a survey, instrument is	The purpose in all cases is to gather additional information via	The benefits of web survey are its relatively low cost as well as the ability to gather specific information into a form that

	available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider information.	developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application. We currently use both approaches depending on our goal.	the Web.	can be easily used by downstream work processes.
Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording observations. To date most of our field survey work has been in engaging CAIs into the process. We have performed limited wireless testing and infrastructure verification.	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment presence or the strength of a wireless broadband signal.	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

Verification Standard

Verification is a broad term, but in our definition it boils down to determining if Broadband coverage is in the right place. For a given provider, the question is whether the coverage is assigned to appropriate Census Blocks, road segments or area features. Coverage verification can be further broken out into two distinct classes:

- Technology verification, which is determining if the provider is listed with a technology consistent with their marketing information.
- Speed verification, which is determining if the speed supplied for that block, road segment, point area file or market area is consistent with the technology and the marketing information received.

The final verification dimension is consumer feedback and crowd-source verification. This is a dynamic set of steps we are beginning to implement. One side of this is responding to consumer concerns. The second is using the crowd sourced data to validate provider claims and, if appropriate, update the map and the underlying data.

At this stage, our working hypothesis (confirmed by our experience) is that there will not be a single measure to indicate broadband coverage availability in a Census block or along a segment. From prior work, and examining our current provider submissions, we believe that there is too much variation below the submitted record to make a single binary yes/no indication. Rather, there will be a series of measures that combine to provide qualitative confidence (a classification scheme) in our indication of Broadband availability at the block, segment, or wireless polygon level. We believe such a qualitative classification scheme is both relevant to and supportive of NTIA interests, as well as the interests of our end-user community – that is, the states and citizens we serve through this program.

The intent of this section is to illustrate why our team is moving toward a particular verification methodology. Our team is learning as we go along, and will adjust and improve this thinking. But given our experience to date, this is our path. As stated above:

- First, coverage verification is at the level of data submitted to NTIA.
- Second, coverage verification is enhanced when there is a secondary measure of availability (such as infrastructure presence or serving area boundaries)
- Third, given the limited resources of this effort, the most important coverage verification process to implement is the erroneous dispersion of coverage. These are the “islands” of coverage isolated by significant distance from other covered areas. . In other words, Broadband Internet likely doesn’t exist far away from other areas with Broadband Internet access.
- Next we present several examples which illustrate the complexity of coverage verification.

The first example is taken from a gentleman who requested a map change in Alabama. His home is near the yellow dot. The darker grey Blocks are covered Census Blocks. The black lines are covered road segments. He cannot receive DSL from his incumbent provider, although his neighbors can. The incumbent carrier does have at least one structure in that block from which Broadband services can be provided; unfortunately his home is not served.

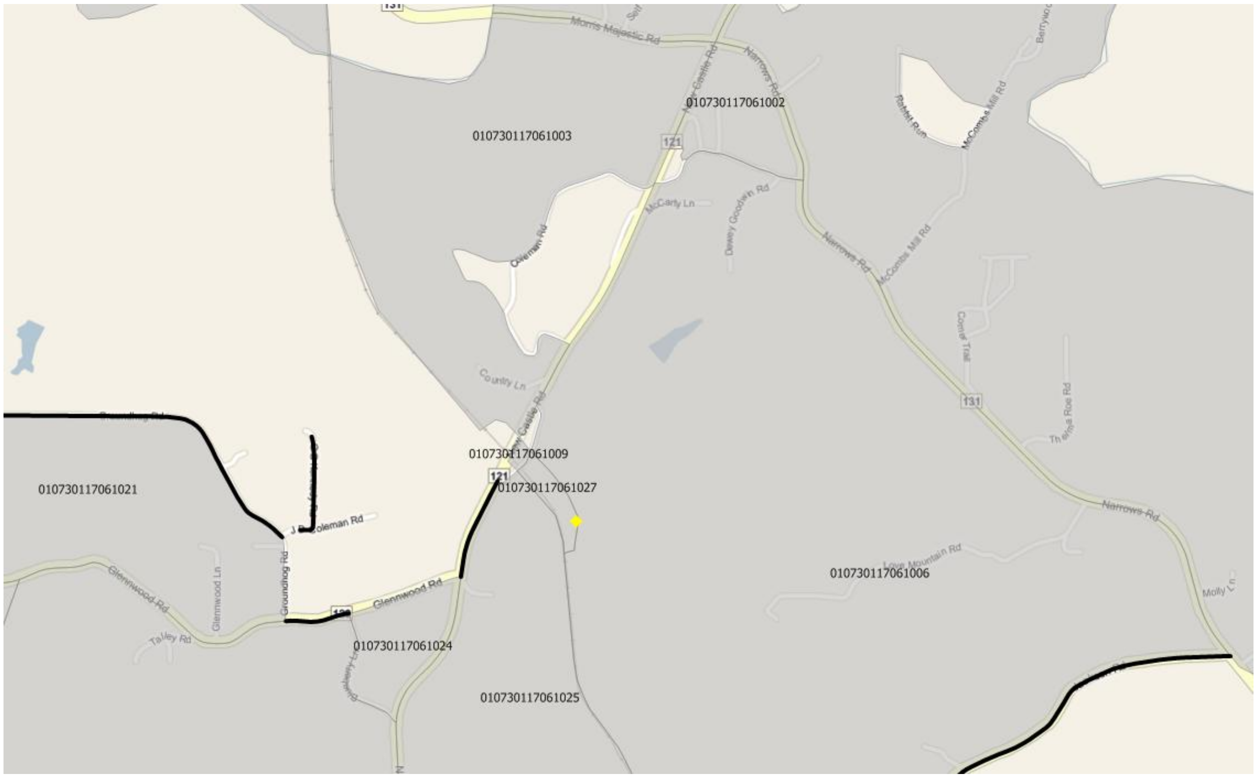


Figure 14--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

Beyond this type of one-off structure-level qualification, sometimes, as shown below, we have even larger gaps in provided coverage. The image here shows an "outlier" block that could be an error, or it could indicate missing Blocks along a major road that should have been filled in. In this figure, the outlier block is highlighted in turquoise.

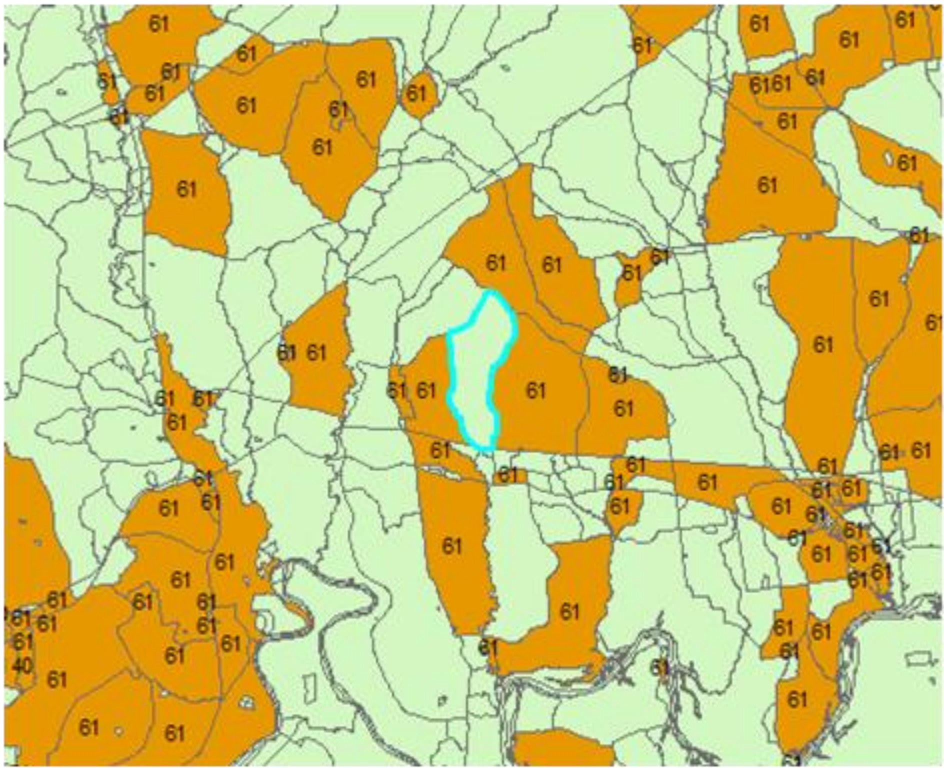


Figure 15--Dispersion in Submitted Data

In this particular case, we are faced with a different verification question. Based upon the properties of the neighbors, we believe this block should likely be covered (coverage interpolation,) but supplied data from the incumbent says otherwise. Although we don't have information to know how much of the data submitted to us is generated, our sense is that geocoded customers or plant are used. In this case the block dispersion could be the result of a side of the street assignment rather than an availability assignment. In other words the data may speak to where is plant rather than where could service be provided in 7 to 10 days.

The next example shows where an interpolation process could require some adjustment. The figure below shows a town level. There are some smaller Blocks that are likely covered by interpolation logic, but we also do not want to extend coverage beyond a franchise boundary as in the areas shown in a box on the bottom of the map.

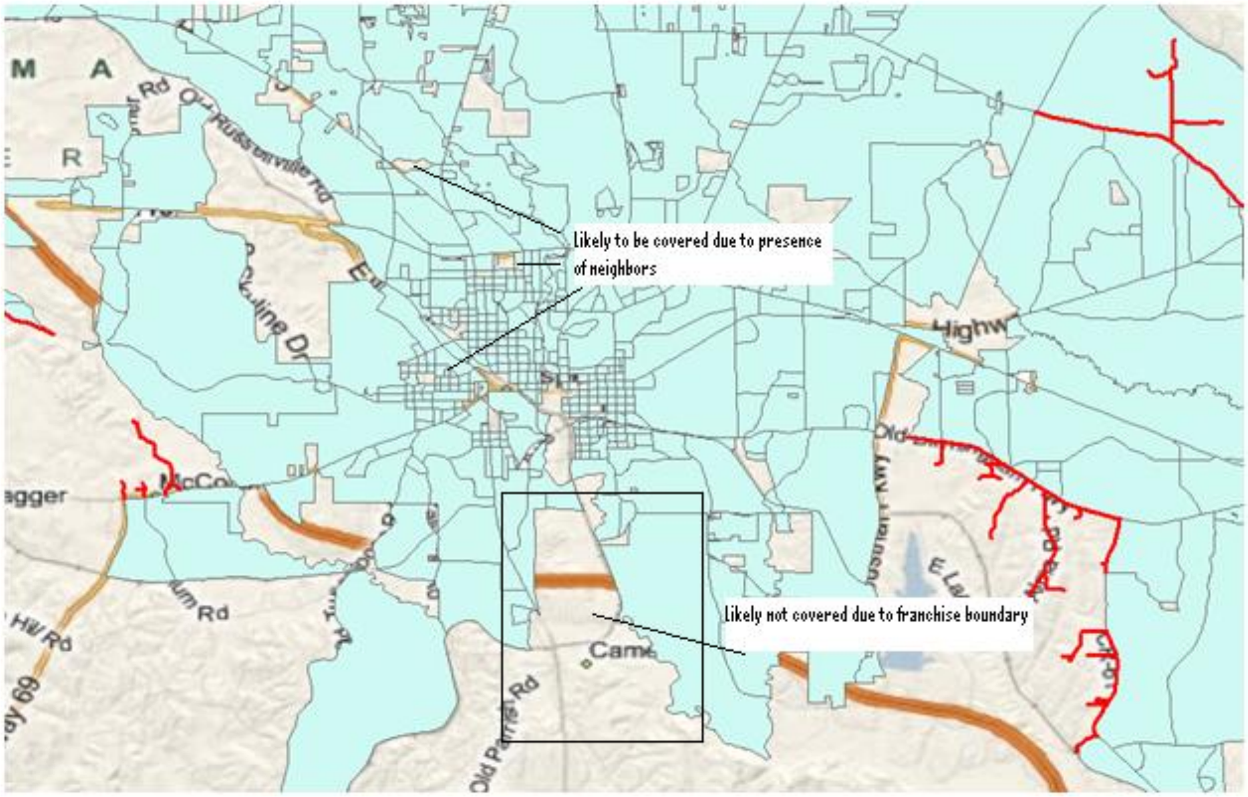


Figure 16-Where do you stop interpolating?

From what we can gather from some providers, the submitted data—data with consistently high degrees of dispersion or coverage holes—tends to come from geocoded billing records. In this paradigm, this means where there are no customers; service is not identified on a map. The interpolation verification question then takes on two dimensions.

First, if a provider has no customers in an area, how can we know if they would be able to provide service in a 7-10 day interval?

Second, if we use the properties of neighboring Blocks to interpolate coverage, when should we stop (e.g., at a franchise boundary, at a certain distance, etc.)?

Third, if we are comparing to a data source that examines coverage at a higher level (such as 477 Tract) do we use the Tract information to assign information block level coverage or do we use the tract coverage to filter out dispersions in coverage.

We continue to work with providers to get additional information to help us better understand and contend with this type of circumstance. However, we have not been entirely successful at getting franchise boundaries that would address much of the issue.

The final map shows this dispersion problem, but to an even larger degree. This solitary large block is likely the result of a bad geocode, but we don't know, given the data that has been submitted by the provider and the "single customer in a block standard" set by the NOFA clarification.

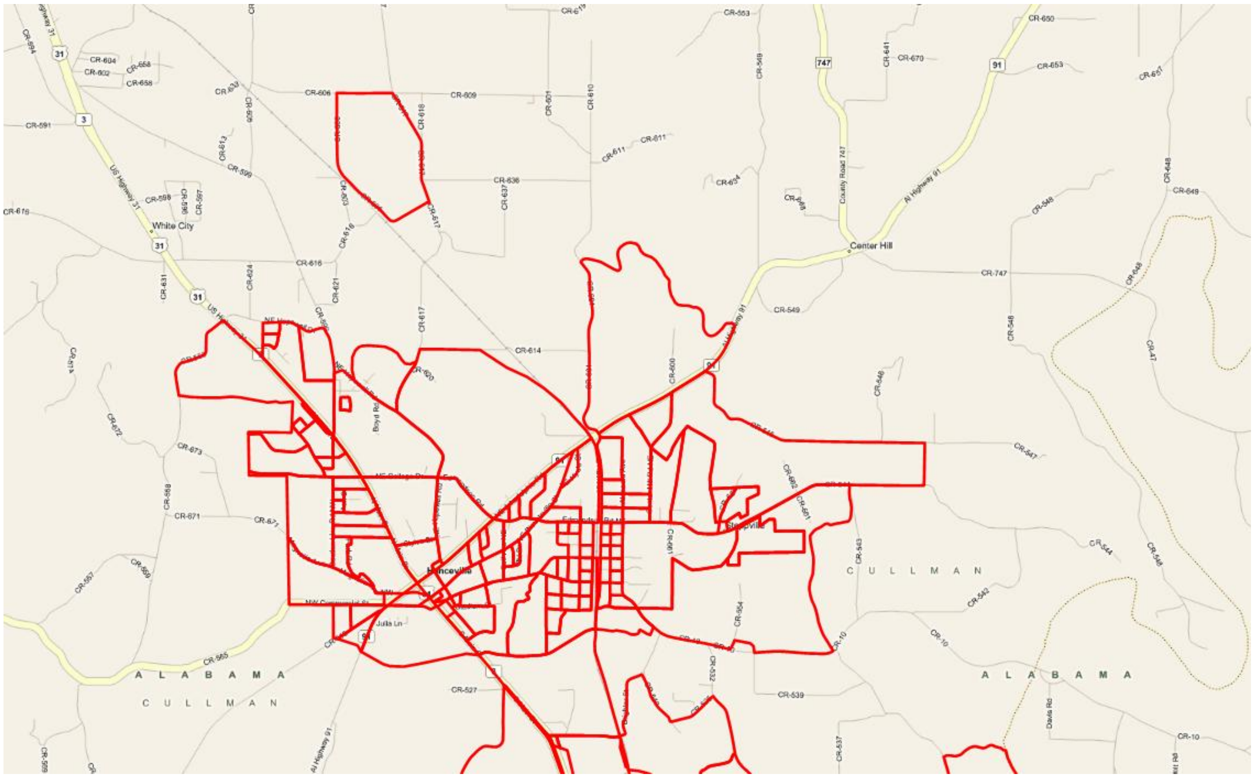


Figure 17-Dispersion in covered Blocks

Due to the fact that this situation is quite obvious in display, this type of problem is one that we are more aggressively trying to resolve. Where a single block has no neighbor offering comparable coverage and is a specified distance beyond an exchange boundary, our approach has been to filter these Blocks out. As of now, this filter is limited to incumbent DSL providers because we have a good source of exchange boundaries.

The exchange boundary dispersion verification method breaks down when examining smaller providers who are more likely to CLEC into neighboring territory. In the figure below, the black line represents the exchange boundary, while the continuity in the DSLAMs likely points to coverage extending along a road into another provider's territory.

Figure 18--DSL Coverage outside of exchange boundary

In sum, the variability in our source data continues to suggest that our dynamic verification process is relevant, appropriate and evolving in a manner consistent with the overall program. And, as noted above, we believe the more meaningful outcome of our verification processes will likely be a series of qualitative indicators or expressed confidence levels. Our concern, as with the development of any sort of classification process, is how rigid we should make this classification given the variation in our input data and the varied perceptions of service providers, map viewers and down-stream data consumers.

Verification Work Process

To support our dynamic multi-factor verification process, we have implemented the following steps.

Between submissions our provider relations team works to analyze our current broadband provider ecosystem and capture any changes such as acquisitions, mergers or cessation of operations. They also remain in touch with providers who have indicated when follow-up is necessary. The team confirms that the providers who submit data are NOFA compliant. Given these steps they begin a survey and awareness campaign to get data submitted for the program.

When data is received, an analyst reviews the submission and any immediate questions or concerns are sent back to the provider as quickly as possible. We have found this gatekeeping step very helpful in making sure we understand the intent of the submission.

For all providers who submitted data to us in the prior round, the provider received both a tabular data summary and mapped output[27]. Prior to releasing the "check maps" to providers, we had a team of analysts visually inspect each provider's coverage area. After this in-house review, we solicited a second level of feedback from providers and received a number of requested changes and corrections used in the development of the current dataset.

For those providers who submit only block or segment level coverage (i.e., in those cases where we have no infrastructure to test with) we test for coverage containment within known service boundaries. The intent of this validation step is to remove Blocks that are obviously erroneous.

We have also begun to perform a mechanical test against wireline providers. This is an examination to ensure that each feature submitted has some neighbor within 1 mile. We are testing this process to try to understand what the neighbor distance should be. This has proven to be a difficult process.

We also verify the submitted speeds against the typical speed ranges in the NTIA frequency tables. If we note a value outside of typical range, we ask the provider for clarification. These responses are recorded.

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a

[27] For the verification of round 3 data, we submitted both PDF and KMZ (Google Earth) format check maps. Some providers prefer to work with the Google format as it supports easier modification. Others continue to submit marked up PDFs.

series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

As our submissions have moved online, we have also begun to benefit from crowd source feedback. In some cases this has helped us identify and fix errors in our underlying data. In other cases, as we have shared with NTIA, we have encountered some perceptual issues rooted in how the data are developed and modeled to comply with the NOFA. Depiction of uniform coverage in small Census Blocks continues to be a challenge. Despite our best efforts to explain the full block coverage requirement, we continue to receive complaints that the coverage shown on the map is not accurate for a particular location within that block.

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

At this point, our external deliverables take three forms: State Broadband Maps, data transfer to NTIA used for the National Broadband Map, and text format data requested by outside parties.

Online Map Experiences

With our State maps online, we continue to harvest viewer feedback and comments. Because an online map allows someone to zoom in far below the scale of the data, a large number of comments reflect sub-Census block concerns. While important to the citizens reporting these issues and to our Broadband planning teams, this level of data is outside the scope of our core validation process, which as noted above, is focused on the level of data submitted to NTIA.

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Online Display of Consumer Feedback

We have completed development of a consumer feedback layer for our online maps.

The intent of the new layer is to show viewers the feedback of other map viewers. This layer went live after the Round 4 data was posted.

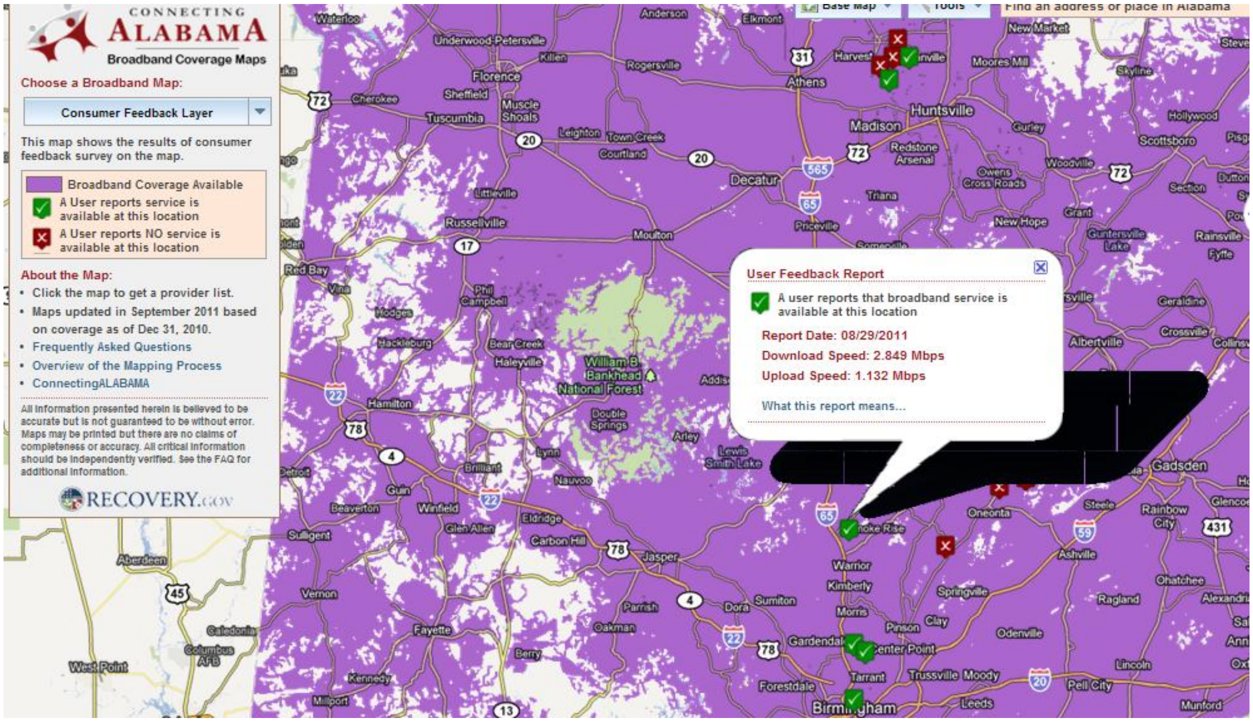
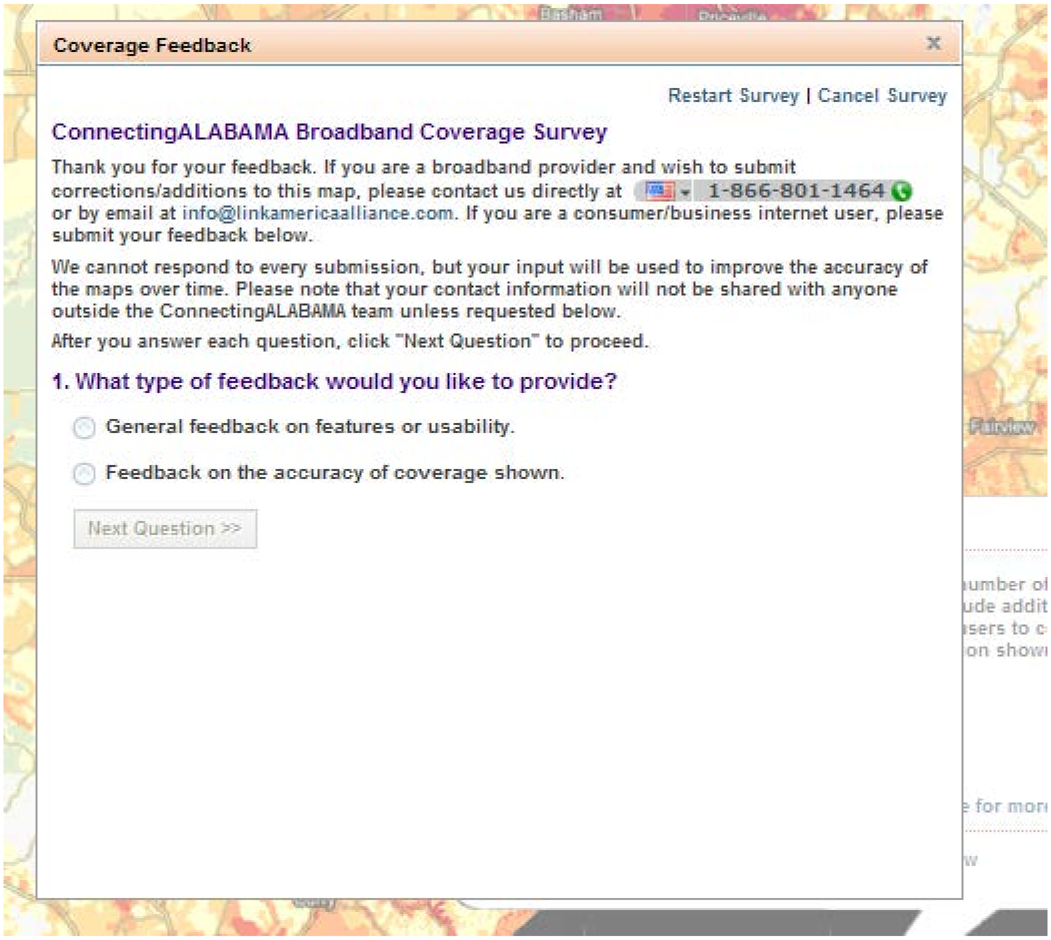


Figure 19--Consumer Feedback Layer

To gather feedback, we use a survey wizard which asks the end users to categorize their concerns. The survey went through several iterations of design and usability testing. Our experience has been unless we get a way to constrain the user feedback into manageable categories, it becomes very difficult to act upon.



As mentioned by other Grantees we struggle with how to use all of the feedback we receive. The qualified data points seem to fall below a volume in which we can infer significant modifications to the map data. Nevertheless, we believe it is important to gather structure and display the feedback to support project transparency.

Perception of Unfair Treatment Across Technologies

Several Broadband service providers have expressed strong concerns regarding how wireline services are displayed, as contrasted to how wireless coverage is displayed. This is an artifact of the SBI data model. As an example, consider the figure below.

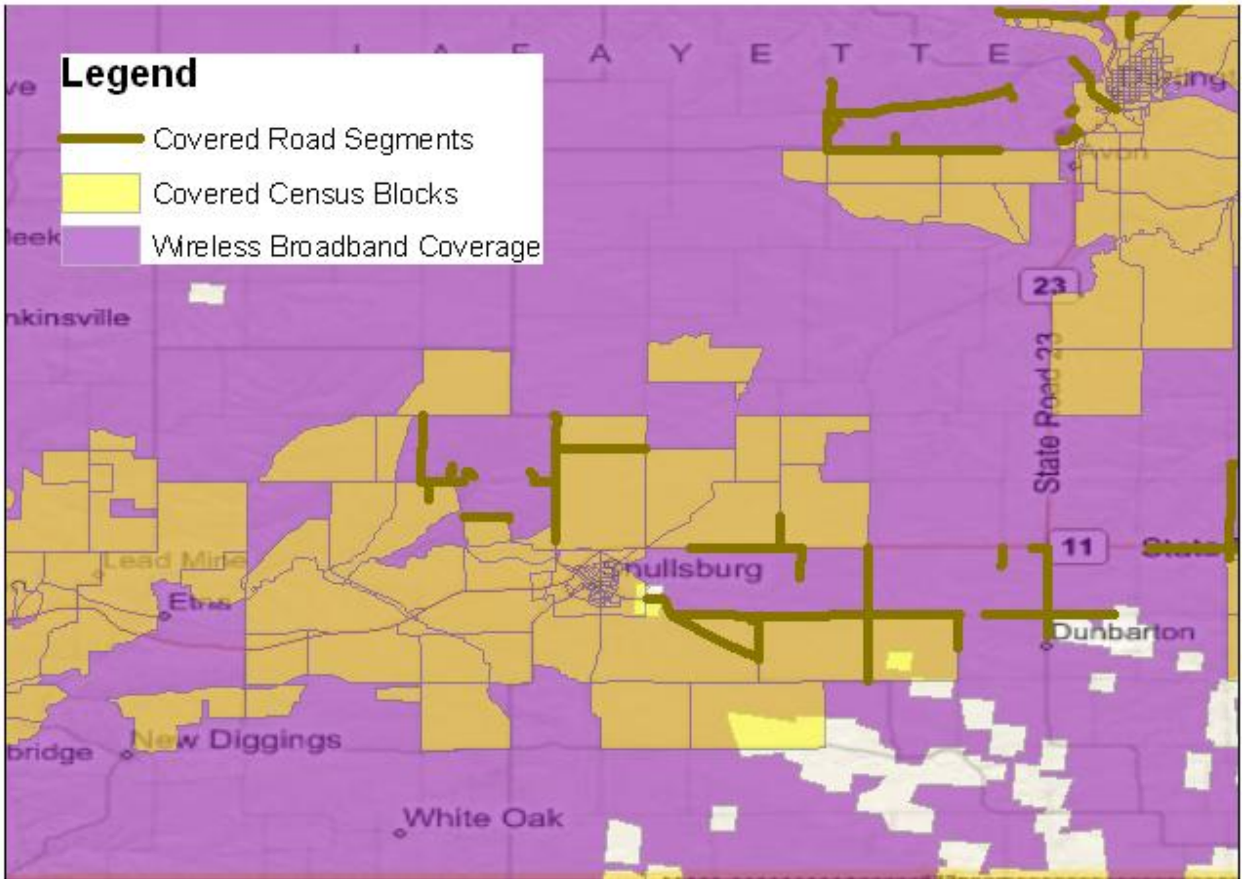


Figure 20--Multi Network Coverage portrayal

In this image, covered Census Blocks are light gold. Covered road segments are a darker gold and wireless coverage is purple. The concern seems to come down to how a wireline provider's coverage is shown in the large Census Blocks (greater than 2.0 sq mi). Some wireline providers have expressed dissatisfaction because their coverage is only tied to road geography, which leads to a visual "hole" in their coverage map. At the same time, they feel that it is unfair that the wireless provider's coverage is shown to be uniform in the same area. Put another way, if our maps show wireline in terms of Blocks and segments, why don't our maps show wireless the same way?

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many

dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

When a viewer of an online map clicks on the map (or zooms to an address), they are provided with a pop-up of service provider coverage in the area. The critical question is this: what is the area to which that pop-up window responds to? In the past, we reported back to the specific Census block, or buffered road segment intersected by the user click. As far as the map was concerned, once we move off of that road, or out of that segment, we have a new area to examine.

Our sense, given feedback received, is that our provider view should be a bit more tilted toward finding providers in a general area, rather than finding providers at a single-click location. If the goal of the map is to get someone to call a provider for service, our bias should be to include all of the potential providers in the general area, rather than giving potential customers a method to self-disqualify. That is, we want to cast a wider coverage net, rather than one too narrow. The problem with this approach is that it will create a number of false positive Broadband reports. As of this date we cannot determine if the claims of inaccurate coverage in online maps are due to the looser provider view standard or not. We keep this looser standard in place to minimize the likelihood of self-disqualifications.

Appendix One-Wyoming

Community Anchor Institutions

In earlier submissions, the Community Anchor Institution (CAI) process was referred to in terms of a learning curve. This continues to be an appropriate metaphor. The mapping team continues to focus on data that will support and help inform policy makers and the SBI planning process.

In the first submission, the team gathered information on what data was available and what resources will be required to engage these categories of important institutions. In subsequent submissions we have focused our efforts on obtaining connectivity information for CAIs through direct outreach to the specific institutions as well as through central sources within the state or institution associations. The October 2011 submission began a transitional phase, as we stabilized the dataset in preparation for work outside the core LinkAMERICA team.[28]

In the current submission we had the following objectives:

Update the physical addresses of the CAIs, with the goal of eliminating P.O. Boxes from the dataset
Raise awareness of the broadband mapping program to organizations associated with the CAI categories with special emphasis to relevant local and, state government agencies.
Continued outreach to unresponsive CAIs to invite them to become engaged with the SBI program by participating in the online survey.

4) Verify the available connectivity information based upon new survey information

CAI Philosophy

Our work with CAIs is guided by three principles.

First, CAIs are important stakeholders within the planning process. Our goal is to engage participants in regional planning that have strong ties into the CAI categories identified by NTIA. This has a direct benefit of engaging an established stakeholder community. It also allows broadband planning to tie into existing organizational and planning networks. In each of our states, key relationships with education, public safety, libraries, and economic development sectors are being identified and developed.

Second, we believe that CAIs will likely be one of the primary beneficiaries of targeted broadband funding. Our belief stems from the sense that many of the benefits of Broadband will extend from these community 'anchor points'. In other words, it isn't solely the existence of Broadband at a library that provides a benefit. It is people using applications that work only on a Broadband network to upgrade their skills (e.g., online training) and gain access to online content (e.g., job postings, goods and

[28] LinkAMERICA began transitioning the CAI data collection effort in the state of Alabama to ConnectingALABAMA in Round 3. For Round 4 ConnectingALABAMA assumed full responsibility for the CAI data collection effort in Alabama. In Round 5 Connecting ALABAMA assumed full responsibility for the CAI collection and NTIA submission, including the methodology.

services), etc. The targeted use of a specific application--that can only take place with Broadband networks-- is what produces the priority benefit. Put another way, there seems to be a realization that things are less about pure connectivity (for the sake of connectivity) than about connectivity in terms of an application (for the sake of the benefit obtained through the application).

Third, we continue to use a rational and targeted approach to derive information. This means we will utilize our planning teams for as much ground work as possible. This also means that a goal of our CAI process is not an exhaustive Census of anything that could be a CAI; rather, it is the discovery, inventory and integration of Broadband planning activities into those CAIs that stand to produce the greatest synergies with the SBI planning process.

The above implies two significant points. First, the team's goal is to document community anchor institution connectivity within a broader context of regional and statewide planning objectives. Second, if a particular category of CAI has an independent Broadband planning effort underway, we will encourage that organization to take the lead, and we will provide relevant expertise and support as warranted. For example, in one of our states, the public safety community is already engaged in a mobile Broadband survey effort. We have aligned our CAI data collection process with that effort and are sharing information and expertise (e.g., hosting a survey) to support their mission. In another state we are attempting to glean connectivity information from a municipal government survey. There may be some downside to this collaborative approach in that we may have to work with data spanning different times or we may not have all of the location-specific information we need, but this does prevent the same user from receiving multiple inquiries.

Anchor Institution Survey

During the third submission period we designed and developed a simple on-line survey system called CAVS (Community Anchor Verification Survey). The intent of the survey was to both verify received connectivity information and garner additional connectivity information from CAIs.   The link for the survey is housed on the Home Page of the State SBI website , thus providing the added opportunity for responding institutions to learn more about broadband activities in their state.   The survey remains open between collection periods so that the Regional Planning Teams can update information as they engage with the community, and to allow responding institutions access to update their data as necessary.

Although we have found that reaching out to central contacts, for specific institution groups, is the most fruitful way of collecting connectivity data we find value in inviting individual anchor institutions to participate through means of a survey.   In round 5 we reached out to CAIs using an adaptive approach that consisted of: 1) Emailing individual institutions inviting them to participate in the on-line survey 2) Follow-up phone calls to the CAIs to obtain/confirm contact information and encourage participation in the survey.   From our perspective, although this method is very time consuming and work intensive, it allows the opportunity to personally explain the objectives of the program and answer questions. It also provides an opportunity for the individual institutions to become engaged in the broadband planning process.

Anchor Institution Trends

At this point we have focused our CAI attention on schools and libraries, with respect to connectivity. We benefit from strong relationships throughout the education sector (K-12 and Post-Secondary). We have also found excellent resources with State librarians.

To supplement the education and library information we have formed organizational relationships with the major hospital associations and other key health organizations within each state. Our goal with these relationships is to cull information from their planning process and partner with them on outreach. As in the prior submissions, we rely on public domain sources of information for the public safety-category. Collecting connectivity data for this group continues to be one of our most significant challenges. Our hope is that in subsequent submissions, we will reduce the size of this category and connectivity information specific to root nodes of the public safety network--such as County Emergency Operation Centers.[29] At this point we have had minimal success gaining this information.

Because we have a wide ranging population of CAIs in our data set we have a variety of Broadband services that don't always fit NOFA parameters. Services like PRI or T1 are classified into "other copper," We also had difficulty obtaining both the upstream and downstream channel capacities. In most instances, when it was logical to do so, we made the speeds symmetrical, but this is an assumption on our part. If a site records bandwidth across several services (eg. video and data), we record the total bandwidth to give a picture of available site bandwidth. We are also working to standardize our response to NTIA in circumstances where an entity shares a Broadband connection among a campus which is fiber fed. In this case we use the total campus bandwidth and use the primary campus Internet connection.

As a final verification step, we attempt to screen the CAI data for duplicate values. Because many CAI are closely clustered together we perform the de-duplication based upon the ANCHORNAME within the ZIP5.

[29] Within the public safety category, it is also very difficult to derive precise locations as many CAI are addressed to PO boxes. This is further complicated due to the many Volunteer Fire Departments used in Rural Communities which often do not have a physical location.

Appendix Two

Data Collection Challenges

This section summarizes some of the challenges we have experienced with data collection and processing. The team believes it is important to categorize these challenges as they help inform the geoprocessing and verification methods used. It is also our hope that some of the more global issues can be discussed and decided within the Grantee community.

We begin with several global issues and then continue toward more granular challenges.

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

As has been discussed in webinars and also within the context of NTIA data assessments, much reported speed information continues to be reported at the market level (MSA/RSA) and then uniformly pushed down to the Census blocks. This has a tendency to create a problem with NTIA speed tripwires since the technology is reported by block but the maximum advertised speed is reported at a regional level.

This challenge gets further amplified at a block level when comparing to a third party data provider. It can create a mismatch between third party data generated at an area larger than block level versus block level generated speed and vice versa. To minimize the potential confusion, it might be helpful to be able to provide a flag at the submitted record level which indicates the geographic basis by which the Maximum Advertised Speed is reported.

Census Block and Road Standards are not clear

There seem to be several methods by which providers are calculating the Census block area. So the distinction at 2.00 square miles can be uniform, it would be ideal to articulate an operational area calculation definition.

Providers Not Wishing for Block Level Aggregation of Their Data

For providers who submit address point data, we do minimal additional processing. Our main test is to ensure that points are contained within 1 mile of exchange boundaries; the only other processing was normalization into NTIA formats.

Broadband providers not Meeting the NOFA “provider” Definition

Comments on PBWorks appear to reflect a concern among a number of grantees about what a Broadband provider is--and how that definition impacts mapping.

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[30]. Further, the need for clarification around a facilities-based provider,

[30] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location, versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day

versus the reseller, has injected even more ambiguity. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

Given mergers and acquisitions in the CLEC space we are noticing a drop off in participation in this program by several national CLECs. We hope this is an artifact of the mergers and resource constraints rather than a long term trend.

Again, we do not want to exclude a service provider, but we believe there needs to be further clarification around the “7-10 day rule,” the definition of a “reseller,” and better interpretation of facility-based providers, versus equipping UNEs, SpA or leased lines.

We have used the provider Type of ”Other” to classify a number of providers who offer Broadband services, but we do not offer them in a manner consistent with Technical Appendix A definitions.

To What Extent Should We Begin “Classifying” the Data and Maps?

The question immediately preceding gets to the intent of a Broadband provider. This question gets to the intent of the Data and Maps.

Earlier in this document we discussed the question of what type of bias we should introduce to our online map messaging. In an online environment, do we want to more likely create an overstatement of coverage for a provider than an understatement? In other words, is the larger problem allowing a consumer to self-disqualify, versus calling a number of neighboring providers? There is a related issue to this. Clearly in our maps there is a lot of scatter in data that we believe should be more continuous. These are the islands of coverage from an incumbent provider[31]. There are a number of processes that could be put in place to deal with this type of scatter, but without more information from the service provider-- essentially the last mile facilities-- it will be difficult to perform this clean up in an informed manner. On the one hand, we can aesthetically clean the maps up and reduce the scatter, but we have little sub-block engineering information upon which to make this decision. Right now our preference is to put out a somewhat aesthetically messier deliverable and work with providers to get better information to clarify their submission. If that isn’t forthcoming, we are limited in what can be done given the lack of facility level information. In summary this yields two questions

In our online maps should we error on overstating coverage to prevent consumer self-disqualification? In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?

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window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

[31] For a provider who sells opportunistically (not within a franchise area) it becomes even more problematic to classify their coverage because the points are more related to the type of consumer purchasing the service than a bounded offering. In a matter of speaking, the ProviderType is more determined by the technology and/or location than a type of business. The core intent of the NOFA and our grant application was centered around the 7-10 day providers but we believe maintaining information on provider Type “Other” and “Reseller” is important to assist in validation and market segment analysis as resources are available.

As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results.

Community Anchor Institution Surveys

Over time the base of participation in CAI surveys has broadened. Our teams are interacting with more organizations interested in broadband planning. This is a benefit because it helps integrate the importance of Broadband mapping, planning and capacity building within their organizational framework. But it also begins to create challenges in data collection. There are two noticeable trends in this area.

First, CAIs are organizationally diverse. For a school, you expect to have a centralized entity that can answer and support questions about Broadband services. For a rural, volunteer fire department answering questions about broadband may go to the Chief. The way that he/she answers about Broadband is probably specific to her experience and context. The implication is two-fold. First saying that some percentage of CAIs in a state has access to broadband can be misleading because the formality of a school or government building is much different than the formality of a volunteer fire department. Second, that volunteer fire department may get broadband via a 3G mobile hotpsot when they need it…but the presence of *this* type of broadband is a very different thing than the presence of a responder who has mobile LTE broadband.

Second, technical knowledge of the survey respondent differs within each organization. This complicates our data collection. It is not uncommon for someone to say yes we have Broadband, I just don't know how we get it or how fast this is. So in response we report they are broadband served but unknown speed or technology. This doesn't mean they haven't been surveyed, it just means the response was unknown. As there are now a large number of people collecting this data, it would be helpful to have some consistent national business rules from which we can answer questions about the meaning of any particular data element. As an example, when should "no" be used versus when should "unknown "be used. In other words, what is the standard for the difference between never made contact with the CAI versus a respondent didn't know/couldn't answer. We have guidelines internally but are unsure if this is consistent across states.

Finally, as we survey groups we find a wider sampling of broadband technologies used. Fixed wireless and mobile wireless definitely exist in the CAI universe. NTIA may want to reconsider the automatic warning that comes from the check submission script from a non-wireline technology.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute

accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to December 31, 2011. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

The NOFA is clear on submitting a list of Blocks in which a provider delivers Broadband service. This is a different objective than perfectly reflecting service territories. If a firm's accuracy standard is a reflection of their service area, then the data created under the NOFA will not meet their perception of accuracy. This leads to two other issues: First, using Census Blocks rather than serving area may overstate or understate a particular provider's Broadband serving area. This was a significant concern of ***REDACT*** who specifically required us to submit only address-level qualification data. The second issue this brings up is how or if, there should be some standard on how much of a Census Block needs to be covered to call it covered.

Confidentiality

Several providers have noted concerns with CPNI-related issues and have stated this as a reason for non-participation. We have also heard expressions of comparable concern regarding identifiable responses to Anchor Institution information.

Unclear on Definitions

As discussed earlier, several providers claimed confusion on several key terms involved in Middle Mile. We note a consistent stream of questions around the interpretation of Maximum Advertised Speed. Some providers understand this to be the most common speed package bought within the mass market, while others view this as a speed that can be purchased for an additional cost above a mass market offering (e.g. a Turbo option for an additional fee per month). Others interpret this as the fastest speed that is available for that particular location--in terms of xDSL, a structure qualified speed, for example.

Perception of Data Use

There seems to be some hesitancy releasing speed information because no one is sure of how the information will be used, or what the speed is intended to reflect. A number of providers have verbally indicated that typical speed will be about (on average) 80% of purchased speed due to overhead. But there are many other factors (such as a user's home network) that influence speeds measures. Providers are concerned about introducing statistics without a clear understanding of how those statistics are derived and will then be used. Also, as advertised speed is pushed down to a block level, we sense more trepidation to report speed values. This quickly begins to touch on parity across network types (why is wireline down at the block when wireless is half the state, etc.).   Finally we note a

significant increase in speed values reported to us. This may be due to network upgrades or competitive concerns to match the theoretical network speed.

Location Uncertainty In Source Data

Within this document we have noted concerns about the impact of source data accuracy. Our geoprocessing methodology provided what we believe is a relatively conservative tolerance to account for the scale issue in the source data, but we are unsure of how this may impact downstream users. Clearly, it also impacts the verification process because we can't attempt to verify received data beyond a scale at which it was developed.

Covered Segment Process

Deriving Broadband covered segments in Census Blocks greater than 2 square miles has proved to be a challenge. Moving from a NOFA specified tabular deliverable to a requested geographic deliverable also increases the complexity of the effort.

Record Level Metadata

It would be helpful to have one or two additional fields in each feature class transmitted to NTIA. One User Defined field could be helpful as an expression of record level confidence. The second field could be used as a Key between the transfer geodatabase and our systems. Ideally, both fields could be large text fields, (50 char), so the Grantee can use them to express a variety of attributes.

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

1. There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
2. In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
3. We believe some providers are trimming their coverage to honor license area boundaries.
4. Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
5. In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
6. As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
7. We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed over 10 Mbps.
8. We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.

9. We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the lower of the speed tiers.
10. Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.
11. In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.
12. In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to different than what would be returned in geocoding.
13. We made a modification to the NTIA supplied verification script. For the CAI layer we allow the TRANSTECH to be-9999, as per the default value in the fGDB.
14. We made a modification to the NTIA supplied verification script. In the script. The ' theST' variable is not correct for Wyoming.
15. We are aware of several warnings from the output of the validation script. The majority of the warnings are related to speed. In the cases where xDSL speeds are faster than 10 Mbps, we note in our data processing notes discussions with provider. This warning impacts address points, census blocks and road segments. In the case of cable broadband (Techtrans 40, 41) we have warnings associated with speed tier 8. In these cases we have verified the speed availability. Nonetheless, speed category 8 creates a warning for both DOCSIS 3 and non-DOCSIS 3 systems. We have one fail related to address points with multiple speed. Per the webinar on 3/26/12, the address fail is allowable.

Appendix Three

This appendix contains the confidentiality clarification supplied in a series of emails between CostQuest and NTIA.

Feature Class	*Metadata*	*NOFA Confidential?*	*Online Map*	*Public Disclosure*	*Exemption*
Last Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Middle Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Service Address	Constraints on accessing and using the data	No	No	Yes	
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
CAI	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				

Census Block	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Service Overview	Constraints on accessing and using the data	No	Yes	Yes	The only provider who may not show up on this table is a provider who has provided only confidential data (last mile, Middle Mile, address point with provider name)
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Road Segment	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None.				
	Use constraints:				

	There are no restrictions on distribution of the data by users.				
Wireless	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users				

Appendix Four-Wyoming

This appendix details our analysis of the potential and actual broadband provider market. We include both our internal tracking description document and then our categorization for each provider. As this extract was made prior to final submission, there may be differences between provider categorization and the attributes on the day of submission to NTIA.

Provider Categorization

Provider Type and Status Definitions

The Provider Type is based upon categories provided by NTIA, while the Provider Status is based upon categories developed internally for tracking purposes. It should be noted that the Provider Status discussed here relates to the provider's overall status within the program. **Provider Type Codes and Definitions:**

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant. Satellite providers are currently included in this category due to uncertainty over satellite reporting requirements.
4	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

Once the proper Provider Type has been assigned to an entity, and overall Provider Status must be established. The Provider Status codes are specific to the Provider Types, and are not interchangeable. The following table lists the status codes associated with each Provider Type.

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.
	S	Satellite	Satellite providers .
	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
N/A	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
X			No status codes associated with this Provider Type

Provider Disposition

Provider State	Provider ID	Provider Name	DBA	Provider Type	Provider Status
WY	680	360 NETWORKS (USA) INC.	360 NETWORKS (USA) INC.	O	NC
WY	130000	ACTION COMMUNICATIONS, INC.	ACTION COMMUNICATIONS INC.	R	R
WY	588	ALL WEST COMMUNICATIONS, INC.	ALL WEST COMMUNICATIONS	P	P
WY	130020	ALL WEST COMMUNICATIONS, INC.	WYOMING, INC.	P	V
WY	597	ALL WEST COMMUNICATIONS, INC. (FNA ADELPHIA CABLE)	ALL WEST	P	V
WY	710	ALL WEST COMMUNICATIONS, INC. FNA WINDJAMMER	ALL WEST	P	P
WY	611	ALLRED RADIO (SEE NOTES - SVWI.NET)		X	NP
WY	612	ALLURETECH/COFFEYNET	ALLURETECH/COFFEYNET	P	NR
WY	596	AT&T INC.	AT&T CORP.	P	P
WY	130001	AT&T INC.	NEW CINGULAR WIRELESS SERVICES, INC.	P	V
WY	130022	AT&T INC.	AT&T MOBILITY CORPORATION	P	V
WY	130002	ATLANTIS HOLDINGS LLC	ALLTEL CORPORATION	P	V
WY	613	AVICOM/KDIS	KDIS.NET	P	NR
WY	598	B & C CABLEVISION		N/A	NP
WY	605	BYRON CABLE	BYRON CABLE	N/A	NP
WY	599	CABLEVISION SYSTEMS CORP. (CSC HOLDINGS)	CABLEVISION FNA - BRESNAN COMMUNICATIONS	P	P
WY	130023	CAMS CABLE	CAMS	R	R
WY	589	CENTURY TEL/EMBARQ	EMBARQ CORPORATION	P	V
WY	663	CENTURYTEL, INC.	CENTURYLINK	P	P
WY	130021	CENTURYTEL, INC.	CENTURYLINK	P	V
WY	631	CERENTO	WYOMING.COM	P	P
WY	762	CERENTO	WYOMING.COM	X	0
WY	600	CHAMPION CABLE	CHAMPION CABLE	P	E
WY	670	CHUGWATER TELEPHONE COMPANY	CHUGWATER TELEPHONE COMPANY	P	P
WY	763	COLLINS COMMUNICATIONS	COLLINS COMMUNICATIONS	P	E
WY	641	COLUMBINE TELEPHONE COMPANY, INC.	SILVER STAR COMMUNICATIONS	P	P
WY	606	COMCAST SPOTLIGHT	COMCAST	X	NP
WY	601	COWLEY TELECABLE	COWLEY TELECABLE	X	NP
WY	771	DEUTSCHE TELEKOM AG	T-MOBILE USA, INC.	p	P
WY	721	DIGITAL BRIDGE COMMUNICATIONS	BRIDGEMAXX	P	P
WY	657	DSLNET COMMUNICATIONS, LLC	DSLNET COMMUNICATIONS, LLC	O	P
WY	590	DUBOIS TELEPHONE EXCHANGE, INC./RANGE TELEPHONE COOPERATIVE	DTE	P	P
WY	616	EXTREME HIGHSPEED	EXTREME HIGHSPEED	P	NR
WY	617	FASCINATION	FASCINATION	P	P

WY	130004	GLOBAL CROSSING NORTH AMERICA, INC.	GLOBAL CROSSING TELECOMMUNICATIONS, INC	R	R	
WY	642	GOLD STAR COMMUNICATIONS LLC	SILVER STAR WIRELESS	P	P	
WY	130005	GOLDEN WEST COMMUNICATIONS	GOLDEN WEST COMMUNICATIONS	N/A	NP	
WY	130006	GREAT AMERICAN BROADBAND INC		O	U	
WY	602	GREEN RIVER CABLE (SEE SWEETWATER)	GREEN RIVER CABLE	P	V	
WY	130007	GREENFLY NETWORKS, INC	CLEARFLY	R	R	
WY	130008	HUGHES COMMUNICATIONS, INC.	HNS LICENSE SUB, LLC	O	S	
WY	628	INVENTIVE WIRELESS OF NEBRASKA, LLC	VISTABEAM	P	P	
WY	688	JAB BROADBAND - SKYBEAM	JAB BROADBAND - DIGIS	P	P	
WY	619	JACKSON HOLE COMPUNET	JACKSON HOLE COMPUNET	P	D	
WY	607	JAMES CABLE, LLC	COMMUNICOMM	P	E	
WY	620	KDIS.NET (DUP SEE PN 613)		X		0
WY	608	KLIP, LLC	KLIP (BULLDOG CABLE?)	N/A	NP	
WY	130024	KUDERA INC.	COWBOY COMMUNICAITONS	NA	NP	
WY	621	LARIAT	LARIAT	P	D	
WY	659	LEVEL 3 COMMUNICATIONS, LLC	LEVEL 3 COMMUNICATIONS, LLC	P	P	
WY	130009	LEVEL 3 COMMUNICATIONS, LLC	BROADWING COMMUNICATIONS, LLC	P	V	
WY	622	LONE TREE/WYOMING NETWORK (RESELLER)		R	R	
WY	656	MEGAPATH, INC.	MEGAPATH	O	P	
WY	623	MICROSERV TELECOMPUTING		P	NR	
WY	130025	MILLHOUSE ELECTRONICS INC.		P	P	
WY	130010	MTPCS LICENSE CO., LLC	CELLULAR ONE	O	U	
WY	741	MYVOCOM, INC.	MYVOCOM	P	NR	
WY	130011	N.E. COLORADO WIRELESS TECHNOLOGIES, INC.	VIAERO	N/A	NP	
WY	130012	NE COLORADO CELLULAR, INC.	N.E. COLORADO CELLULAR INC.	O	U	
WY	676	NEW EDGE NETWORK, INC.	NEW EDGE NETWORKS	O	NC	
WY	691	ORBITCOM, INC.	ORBITCOM, INC.	O	NC	
WY	739	PAETEC HOLDING CORP	MCLEODUSA TELECOMMUNICATIONS SERVICES, INC.	N/A	NP	
WY	664	PROJECT TELEPHONE	NEMONT	P	P	
WY	591	QWEST COMMUNICATIONS COMPANY, LLC	CENTURYLINK	O	NC	
WY	592	RANGE TELEPHONE COOPERATIVE, INC.	RT COMMUNICATIONS, INC	P	P	
WY	636	RANGE TELEPHONE COOPERATIVE, INC.	RANGE TELEPHONE COOPERATIVE INC	P	P	
WY	681	RANGE TELEPHONE COOPERATIVE, INC.	ACT	P	P	
WY	593	SILVER STAR TELEPHONE COMPANY, INC.	SILVER STAR COMMUNICATIONS	P	P	
WY	652	SPRINT NEXTEL CORPORATION	SPRINT	P	P	

WY	130013	STAR VALLEY WIRELESS (SVWI)		P	NR
WY	130014	STARBAND COMMUNICATIONS INC.	STARBAND COMMUNICATIONS INC.	O	S
WY	586	STRAT NETWORKS PKA -UBTA-UBET COMMUNICATIONS	STRATA NETWORKS	P	P
WY	625	SUNDANCE WIRELESS	SUNDANCE WIRELESS	P	NR
WY	637	SURF COMMUNICATIONS, INC.	FIBERPIPE INTERNET	P	P
WY	609	SWEETWATER TELEVISION CO, INC	SWEETWATER CABLE TV	P	P
WY	587	TCT WEST, INC.	TCT WEST, INC.	P	P
WY	615	TCT WEST, INC.	DIRECTAIRNET	P	V
WY	130015	TCT WEST, INC.	LOVELL CABLE TV	N/A	NP
WY	603	TONGUE RIVER CABLE TV, INC.	TONGUE RIVER CABLE TV, INC.	P	P
WY	594	TRI COUNTY TELEPHONE ASSOCIATION, INC.	TRI COUNTY TELEPHONE ASSOCIATION, INC.	p	P
WY	595	UNION TELEPHONE COMPANY	UNION TELEPHONE COMPANY	P	P
WY	130016	VERIZON BUSINESS GLOBAL LLC	VERIZON BUSINESS	O	NC
WY	712	VERIZON COMMUNICATIONS INC. WIRELESS	CELLCO PARTNERSHIP	P	P
WY	604	VIKING BROADBAND	VICKING BROADBAND	N/A	NP
WY	627	VISIONARY COMMUNICATIONS, INC.	VISIONARY COMMUNICATIONS, INC.	P	P
WY	130017	WAMSUTTER	WAMSUTTER.US	P	NR
WY	685	WERCS COMMUNICATIONS	WERCS COMMUNICATIONS	P	P
WY	668	WILDBLUE COMMUNICATIONS, INC.	WILDBLUE COMMUNICATIONS, INC.	P	P
WY	130018	WYOMING 1 - PARK L.P.	WYOMING 1 - PARK L.P.	R	R
WY	629	WYOMING INTERNET RESOURCES	WYOMING INTERNET RESOURCES	P	D
WY	610	WYOMING PBS	WYOMING PBS	N/A	NP
WY	630	WYOMING WIRELESS INTERNET	WYOMING WIRELESS INTERNET	P	NR
WY	730	WYRLESS INTERNET	WYRLESS INTERNET	P	P
WY	130019	ZAYO GROUP, LLC (FIBERNET)	ZAYO ENTERPRISE NETWORKS	O	NC

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