

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





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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 Fall 2012 data submission reflects conditions as of June 30, 2012.

The paper is divided into eight sections:

Section 1 - Data Description: describes October 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 DESCRIPTION

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

DC_SBDD_20121001.zip – Consolidates all other files for the purpose of data transfer.

DC_SBDD_2012_10_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_10_01.xls – A report on broadband providers contacted and the status of their submissions.

DC_2012_10_01.txt – An analysis of DC_SBDD_2012_10_01.gdb known as the “data submission receipt.” This file is created by an automated script supplied by NTIA.

DC_Methodology_2012_10_01.pdf – An electronic version of the following document.

DC_Readme_2012_10_01.txt – A reduced file with the same information found in the header and section 1 of this white paper.

SECTION 2 - PROVIDER PARTICIPATION

- The Public Service Commission contacted 125 prospective broadband providers.
- Of those, 33 are believed to be providing broadband service in the District and are listed in DC_DataPackage_2012_10_01.xls.
- Of those, 23 meet the NOFA definition of available (either wireline and or wireless).
- 10 providers submitted middle mile data.

SECTION 3 - DATA COLLECTION

Collection of Broadband Availability Data

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

Process Steps

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

- OCTO will provide the data to NTIA for the National Broadband Map.
 - The service territories of individual providers will not be made public by OCTO, but OCTO has created [a public web site](#) that allows users, including potential broadband service subscribers, to enter any valid address in the District of Columbia and be referred to all the broadband service providers offering service at that location.
 - Form 477 subscriber count data from all companies will be aggregated by OCTO at the Census Tract level. OCTO will use this information to estimate the residential broadband adoption rate by Census Tract. Estimated broadband service adoption rates will be made public, but the market share of individual broadband service providers will not be revealed.
- **Provider Submission Form** - The form is a Microsoft Excel based questionnaire which is accompanied by a glossary. **Appendix 3** contains a copy of the form and glossary. The form collects information on:
 - The Provider (Includes: business name, DBA name, FRN#, URL, etc.)
 - Transmission Technology
 - Business type (facility based or reseller)
 - Service Territory
 - Maximum advertised and typical upload and download speeds
 - Wireless spectrum
 - Middle mile connection points
 - **Technical Document** – The document provides detailed information on the requested data, data formatting, and data submission. The document is sent to providers that meet the NTIA definition of broadband availability.
 - **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 Kbps 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
	County	Tract	Down	Up	Tech		Residential	%Residential
1	1	18.03		2	3	1	1	100
2	1	18.04		2	3	1	2	100
3	1	21.01		2	3	1	1	100
4	1	22.01		2	3	1	1	100
5	1	22.02		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.

Technology of the connections: **Cable Modem**

Census Tract: State: **DC** County: **District of Columbia** Census Tract: **1.00**

DOWNLOAD 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
UPLOAD INFORMATION TRANSFER RATE:								
Less than or equal to 200 kbps Number of Connections:	15							
Percentage Residential:	100.000 %							
Greater than 200 kbps and less than 768 kbps Number of Connections:	5	12		2	2			
Percentage Residential:	100.000 %	100.000 %		100.000 %	100.000 %			

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

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

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

requested the internet service type and service speed at the institution's location(s). **Appendix 4** contains a copy of the Community Anchor Institution online survey form.

- **Data Review and Consultation with Providers**

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

SECTION 6 - DATA VALIDATION

During this stage, data from providers are compared with data from other sources. Discrepancies are noted and sent to the contributing provider for comment. Validation techniques vary by the type of data submitted [wireless, wire line, or middle-mile]. The following steps were taken to validate the data submitted:

- **Wireless Validation** - The District completed drive testing of major wireless providers. Drive tests were completed in a single vehicle employing multiple laptops and GPS. This was accomplished by installing computer and GPS hardware and software in a vehicle and testing and mapping upstream and downstream transmission speeds. At this time, the District has not shown the drive test data to providers nor discussed our collection techniques with them. This data was collected with public funds and is not covered by NDAs, but DC has not made a decision to release it publically at this time. All providers who claim to be providing citywide wireless service are providing it, and to that end the District will declare all providers who submitted service territories to be "valid". That said, speed of service does drop below the definition of broadband, and does vary across providers, place, and time. The District did not conduct new drive testing for fall 2012. The fall 2010 drive testing results can be found in **Appendix 5**.
- **Wireline Validation**
 - The District, through PSC, has made extensive use of FCC Form 477 data. The Form 477 is used to, verify that we have contacted the correct providers, compare the technology of transmission and speed of transmission between what was reported to the FCC and what was submitted by the provider, compare the geography reported to the FCC by census tracts with the areas submitted to the District by census blocks. When discrepancies are found, the providers are asked for more information.
 - The District purchased a database of broadband subscribers from a commercial mailing list company InfoUSA. This dataset and the FCC broadband test data are used to crosscheck data coming from providers. When discrepancies are found, the providers are contacted to determine the validity of the data.
- **Middle Mile Validation** – To date the district has not attempted to validate middle mile data other than checking locations against GIS base data to be sure they are plausible.
- **Final Review** - All data undergoes a standup review conducted jointly by OCTO and PSC staff. Do service territories seem plausible? Do speeds seem realistic? How do speeds compare to other

providers using similar technologies? What is the total DSL, Cable, Fiber coverage and does it seem plausible?

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

SECTION 7 - DOCUMENTATION AND SUBMITTAL

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

- Have you obtained a new clean Transfer Data Model?
- Have you followed the instructions for loading data into the Transfer Data Model?
- Have you run the receipt process (SBDD_CheckSubmission) and resolved all data integrity issues?
- Have you included your receipt text file as part of the package?
- Have you populated the metadata fields?
- Have you 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 Group #1 BSP Contact]:

The District of Columbia ("District") Public Service Commission ("Commission") and the Office of the Chief Technology Officer ("OCTO") would like to thank you for [Insert name of Company or Companies.] continued participation in the District's Broadband Service Mapping Program. To meet the objectives under the National Telecommunications and Information Administration ("NTIA") State Broadband Data and Development Grant Program, the Commission requests the assistance and cooperation of all broadband service providers that enable a residential, business, institutional, or government entity located within the District to use broadband Internet services. At this time, the Commission is now requesting broadband service availability data **current as of June 30, 2012** for processing and review before submittal to NTIA for the Fall 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 Friday, September 7, 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 [Insert name of Company or Companies.] Broadband Service Report for the District of Columbia (Form 477) filed with the Federal Communications Commission ("FCC") on or before September 1, 2012. This will help OCTO identify any improvements or changes in the adoption rates for broadband services within the District. The Non-Disclosure Agreement with OCTO will continue to be honored.

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

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

Your secure login account is provided as follows:

Username:

Password:

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

Thank you for your assistance,

Betty Ann Kane

Chairman

District of Columbia Public Service Commission

ATTACHMENT (1): DC SBDD Technical Document Fall 2012.pdf

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

Dear [Insert name of Group #2 or Group #3 BSP Contact]:

The District of Columbia (“District”) Public Service Commission (“Commission”) and the Office of the Chief Technology Officer (“OCTO”) would like to thank you for [Insert name of Company or Companies.] interest in the District’s State Broadband Mapping Program.

At this time, the Commission is now requesting broadband service availability data current as of June 30, 2012 from providers that meet the definitions described below for processing and review before submittal to National Telecommunications and Information Administration (“NTIA”) and inclusion in the National Broadband Map update. **The Commission requests broadband service providers submit their data updates by Friday, September 7, 2012, to allow an adequate time period for OCTO to process and review the data submission.**

Overview

To meet the objectives under the NTIA State Broadband Data and Development Grant Program, the Commission requests the assistance and cooperation of all broadband service providers by submitting data on the availability, technology of transmission, and downstream/upstream services if their company or organization:

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

Definitions

For the purposes of this Program, NTIA has adopted the following definitions:

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

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

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

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

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

Data Request

If your company or organization meets the NTIA’s terms, as described above, and **has not** participated in a previous data submission to the Commission or OCTO, please contact 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 so as to provide the Commission a better understanding of broadband services offered in the District and at the national level.

If your company or organization does not meet the NTIA’s terms, as described above, I respectfully request that the attached service data questionnaire be completed. While not a requirement under the NTIA grant program, it will provide the Commission a better understanding of broadband services offered in the District, see attached “DC Broadband Mapping Questionnaire – Fall 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 to submit the questionnaire by Friday, September 7, 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, please provide a description of such action as that can have an impact on OCTO’s data submitted to the NTIA.
2. If your company or organization does not currently provide broadband Internet access services to a residential, business, institutional, or government entity located within the District, please provide a confirmation of such.

Form 477

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

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

- Submit a new dataset to 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 to:

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 services available in the District.

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

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

Thank you for your assistance,

Betty Ann Kane

Chairman

District of Columbia Public Service Commission

ATTACHMENTS (2):

1. DC Broadband Mapping Questionnaire – Fall 2012
2. Broadband Data Definitions – Fall 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 not be shared by OCTO with DC Net as an organization or its employees.
 - d. Advise each such individual, before he or she receives access to the Information, of the obligations of OCTO under this Agreement, and require each such individual to maintain those obligations.
2. This Agreement imposes no obligation on OCTO with respect to any portion of the Information received from Company which: (a) was known to OCTO prior to disclosure by Company, (b) is lawfully obtained by OCTO from a third party under no obligation of confidentiality, (c) is or becomes generally known or publicly available other than by unauthorized disclosure, (d) is independently developed by OCTO or (e) is disclosed by Company to a third party without a duty of confidentiality on the third party.
3. This Agreement imposes no obligation on OCTO with respect to any portion of the Information unless such portion is: (a) disclosed in a written document or machine readable media marked as "COMMERCIAL / PROPRIETARY INFORMATION" at the time of disclosure, or (b) disclosed in any other manner and summarized in a memorandum mailed to OCTO within thirty (30) days of the disclosure. Information disclosed by Company in a written document or machine readable media and marked "COMMERCIAL / PROPRIETARY INFORMATION" includes, but is not limited to, the items, if any, set forth in the request for broadband service data from the District of Columbia Public Service Commission ("Commission"); attached hereto. The Commission's request for broadband service data is incorporated herein by reference. OCTO hereby acknowledges receipt of the items listed in the Commission's request for broadband service data, if any.
4. The Information shall remain the sole property of Company.
5. In the event of a breach or threatened breach or intended breach of this Agreement by either party, the other party shall be entitled to preliminary and final injunctions, enjoining and restraining such breach or threatened breach or intended breach.
6. OCTO agrees it will not export, directly or indirectly, any technical data acquired from Company or any product utilizing any such data to any country for which the U.S. Government or any agency thereof at the time of export requires an export license or other governmental approval, without first obtaining such license or approval.

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

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

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

Office of the Chief Technology Officer of the District of Columbia

By

Name: _____

Title: _____

Date: _____

(Company)

By:

Name: _____

Title: _____

Date: _____

Appendix 3

Technical Document

DISTRICT OF COLUMBIA
SBDD DATA SUBMISSION TECHNIAL DOCUMENT
FALL 2012

REQUESTED DATA

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
 - **NTIA is requesting that typical upload and download information be included in the data submission.**
- Middle mile infrastructure
- FRN (FCC Registration Number)
- FCC Form 477 (September 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 AVAILABILITY 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 Fall 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, 9th Floor
Washington, DC 20005

- The provider can edit the previous submission through the provider portal mapping application to current as of June 30, 2012.

FCC FORM 477 SUBMISSION OPTIONS

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

- The provider can submit a new dataset to 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, 9th Floor
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, Maximum Up/Down speeds, and Typical Up/Down speeds. If more than one transmission type services an address, it must be reported as a separate record. The data will be aggregated to the census block geography. Refer to the code tables at the end of the document to populate the table.

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

**NTIA is now requesting this information be included in the Fall 2012 data submission*

Census block table definition

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

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

**NTIA is now requesting this information be included in the Fall 2012 data submission*

WIRELESS PROVIDER DATA FORMATS

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

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

**NTIA is now requesting this information be included in the Fall 2012 data submission*

MIDDLE MILE DATA FORMAT

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

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

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

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

NTIA CODE TABLES***Provider Technology of Transmission Codes***

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

Speed Tier Codes

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

End User Category Codes

Code	Description
1	Primarily Residential user
2	Primarily Business/Governmental user
5	Residential and Business/Governmental user

Wireless Spectrum Codes

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

Middle Mile Serving Facility Type Codes

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

Middle Mile Serving Facility Capacity Codes

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

Middle Mile Ownership Codes

Code	Description
0	Owned
1	Leased

Appendix 4

Provider Questionnaire

District of Columbia - Mapping Questionnaire Spring 2012

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

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

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

--

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

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

1.3 If your company is a reseller, 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		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 Kbps 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.

The screenshot shows a web-based form for Form 477 by Census Tract. At the top, it says "Technology of the connections: Cable Modem" and "Census Tract: State: DC County: District of Columbia Census Tract: 1.00". Below this is a section titled "DOWNLOAD INFORMATION TRANSFER RATE" with a table of transfer rates and corresponding number of users. To the left of this table is a section titled "UPLOAD INFORMATION TRANSFER RATE" with a table of transfer rates and corresponding number of users. A red circle highlights the "Number of users" column header in the upload section, and another red circle highlights the "Number of users" column header in the download section. A red arrow points from the "Number of users" column header in the upload section to the "Number of users" column header in the download section.

UPLOAD INFORMATION TRANSFER RATE	Number of users
Less than or equal to 200 kbps	100,000
Greater than 200 kbps and less than 768 kbps	5
Greater than 768 kbps and less than 1.5 mbps	12
Greater than 1.5 mbps and less than 3 mbps	2
Greater than 3 mbps and less than 6 mbps	2
Greater than 6 mbps and less than 10 mbps	
Greater than 10 mbps and less than 25 mbps	
Greater than 25 mbps and less than 100 mbps	
Greater than 100 mbps	

DOWNLOAD INFORMATION TRANSFER RATE	Number of users
Less than or equal to 200 kbps	100,000
Greater than 200 kbps and less than 768 kbps	100,000
Greater than 768 kbps and less than 1.5 mbps	
Greater than 1.5 mbps and less than 3 mbps	100,000
Greater than 3 mbps and less than 6 mbps	100,000
Greater than 6 mbps and less than 10 mbps	
Greater than 10 mbps and less than 25 mbps	
Greater than 25 mbps and less than 100 mbps	
Greater than 100 mbps	

Proceed to Sheet 2.

Provider Name

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

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

--

Proceed to Sheet 3.

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Appendix 5
Community Anchor Institution
Data Request Letter and Survey Form

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

Dear Anchor Institution,

The District of Columbia [State Broadband Initiative \(SBI\)](#) is requesting information on the level of broadband service at Community Anchor Institutions across the District. The collection effort is being led by the District's Office of the Chief Technology Officer (OCTO) and is funded by a grant from the [National Telecommunications and Information Administration](#).

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

To facilitate this data collection request, OCTO has developed a [web-based broadband survey mapping application](#). The survey can be completed in a few minutes by following these steps.

- 1) Access the broadband survey website [here](#).
- 2) Login to the survey with the account information provided below.

User: Password:

- 3) Select your Anchor Institution from the drop down menu.
- 4) Complete the survey questionnaire.

Note: Fall 2011 and Spring 2012 CAI survey participants should see their responses pre-populated. Please verify and update as needed.

- 5) Update contact information as needed.
- 6) Logout when finished.

We request that your institution(s) complete the survey by September 14, 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 davidy.jackson@dc.gov or phone 202.724.5135.

Sincerely,

David Jackson

Direct URL to CAI survey portal:

<http://broadband.dcgis.dc.gov/DCLogin.aspx?ReturnUrl=%2fDCcaisurvey.html>

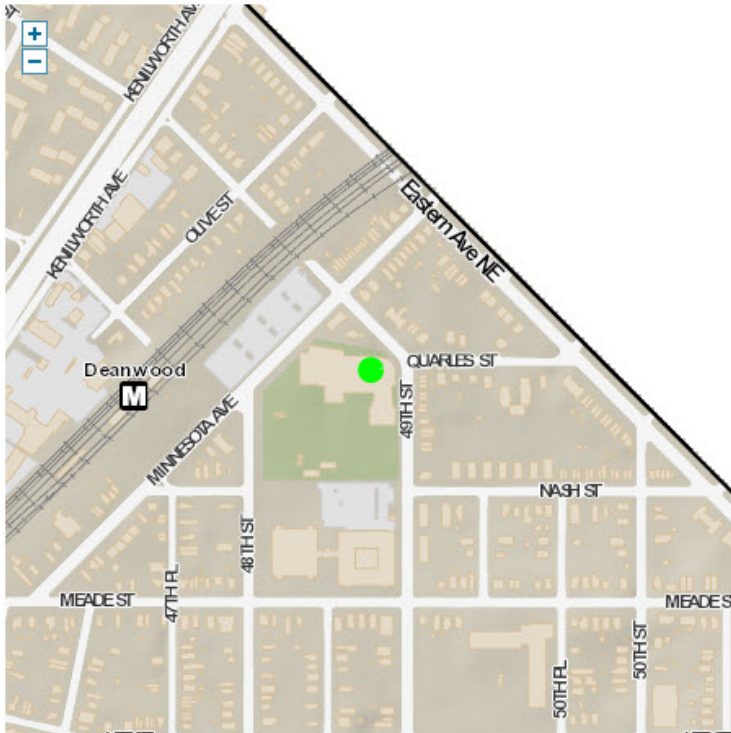
CAI Survey

Please answer the following questions to the best of your knowledge.

Please select the Institution

Deanwood Neighborhood Library

Mapped Location



Location address of Institution:

1350 49TH STREET NE

1. Website address of Institution

2. Does the Institution subscribe to broadband service at this location?

☒ Yes ☐ No

3. Who is the broadband provider at this location?

4. What type of technology is used for the Institution's broadband transmission? [Click here to view Technology Definitions.](#)

5. What is the DOWNLOAD speed advertised by the broadband provider?

6. What is the UPLOAD speed advertised by the broadband provider?

7. Is the broadband service sufficient to meet the Institution's needs?

☐ Yes ☐ No

Please Elaborate

8. Does the Institution provide public access to broadband at this location?

☐ Yes ☐ No

9. Does the Institution have publicly available Wi-Fi at this location?

☒ Yes ☐ No

10. How many public access terminals are available (answer must be a number)?

11. Are you currently physically located at the Community Anchor Institution address provided above?

☐ Yes ☐ No

Appendix 6

Wireless Validation

**Mobile Broadband Mapping
Commercial Cellular Networks
District of Columbia**

***Bob Pavlak
Chris San-Gaspar***

September 29, 2010

Mobile Broadband Mapping of Commercial Cellular Networks: District of Columbia

Executive Summary

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

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

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

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

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

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

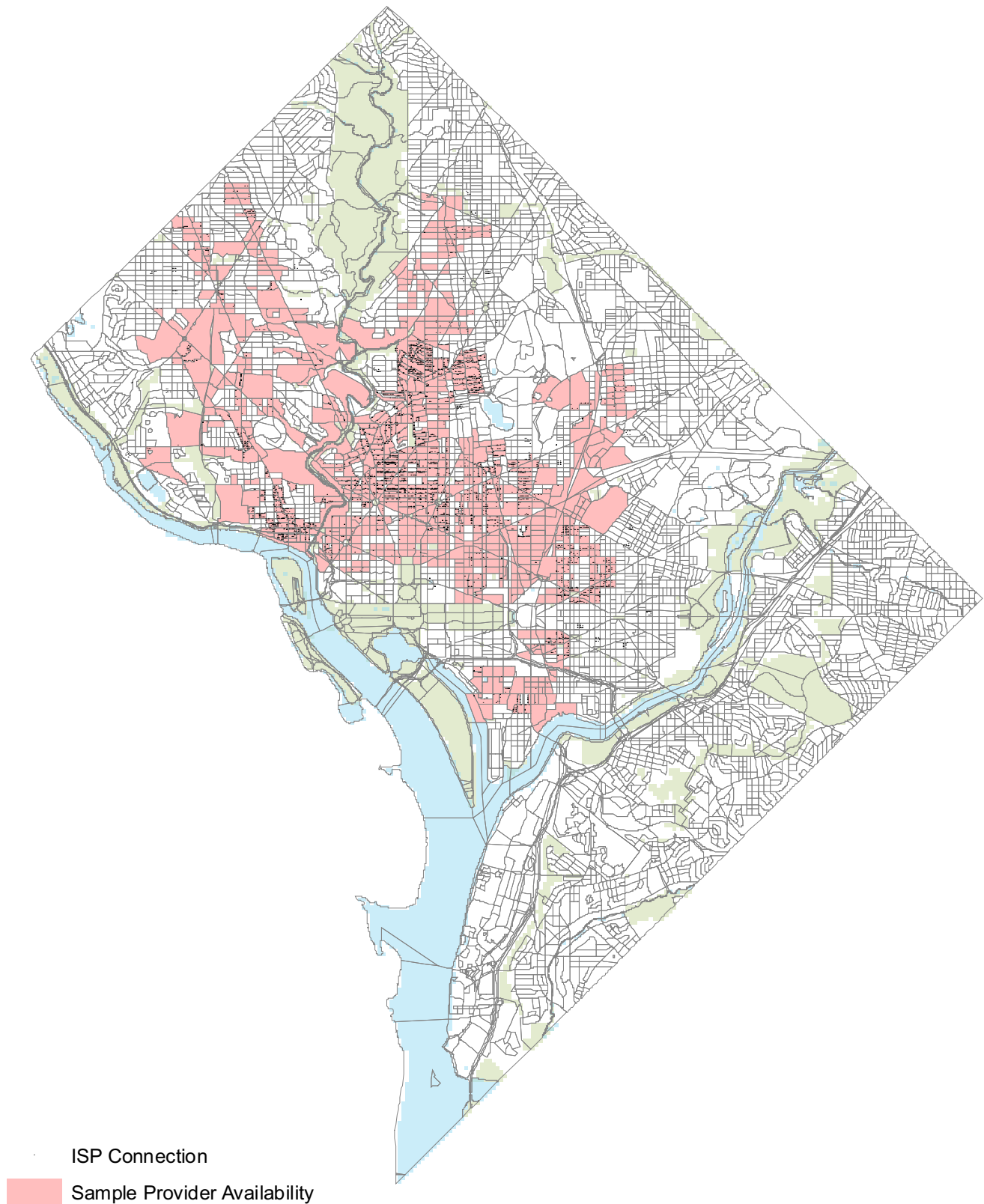
The authors wish to thank Felix Igbedior for his assistance in performing the drive tests with Chris San-Gaspar.

Appendix 7

Wireline Service Area Validation

Sample Map

Sample Provider Reported Availability vs. InfoUSA ISP Connections



Appendix 8

Contacted Providers

PROVIDER LIST

1-800-Reconex, Inc. d/b/a USTel
360Networks (USA), Inc.
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
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.
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
Cat Communications International, Inc. d/b/a CCI
Cbeyond Communications, LLC
CityNet Telecom, Inc.
Clearwire Corp.
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
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.
Google
Granite Telecommunications, LLC
Great American Networks, LLC.
Hughes Network Systems
Hypercube Telecom d/b/a/ KMC Data LLC
IDT America, Corp.
Infotelecom, LLC
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.
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
New Horizons Communications Corp.
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.
RapidDSL & Wireless Inc.
RCN and RCN Business Solutions
Reliance Globalcom Services, Inc. f/k/a Yipes Enterprise Services, Inc.
RNK, Inc.
Roadstar Internet, Inc.
Shenandoah Telecommunications Company d/b/a Shentel Converged Services, Inc.
Sidera Networks, LLC
Smart Choice Communications, LLC
Spectrotel, Inc.
Sprint
StarBand Communications Inc.
Stratos Global Corp.
Telefonica Data Corp. SA d/b/a Telefonica USA, Inc.
Telovations, Inc.
T-Mobile USA. Inc.
Trans National Communications International, Inc.
Transbeam, Inc.
Trident Internet Systems, Inc. d/b/a Trident Wireless Internet
TW Telecom Inc.
VDL, Inc. d/b/a Global Telecom Brokers
Vector Data Systems LLC
Verizon Communications, Inc.
Verizon Wireless
ViaSat Inc.
Wave2Wave Communications, Inc.
Wholesale Carrier Services, Inc.
Windstream Communications
XO Communications Services, Inc.
YMax Communications Corp.
Zayo Bandwidth LLC