

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



October 2012

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COVER LETTER

October 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 October 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
Executive Director
Partnership for a Connected Illinois, Inc.

INTRODUCTION

The data submission cycle ending on October 1, 2012 marks the third 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 69 out of the 138 carriers included in the submission. This round PCI continued to refine its data verification process through the use of GeoPDF maps and third party data sources. PCI also continued to make improvements to its Community Anchor Institution database through telephone verification of data and a focus on library public Wi-Fi and URL variables.

In the spirit of cooperation with the other 55 State Broadband Initiatives (SBIs), PCI was in contact with other states to help its outreach for this cycle. PCI used the National Broadband Map to find if other states had been able to contact and map providers that have never participated in Illinois. Specifically, PCI made contact with CostQuest Associates (AL, WI, ID, and WY), Sanborn (OK), and the SBI in Georgia. PCI also tried to help other states by working with them on providers that cross Illinois' boarder, posting on the SBDD wiki forum website, and participating in webinars held by the NTIA. PCI aspires to be a leader in the SBI world, and to make the National Broadband Map as accurate as possible.

In this round, the Partnership for a Connected Illinois (PCI) took major steps in its three-fold mission to collect and publish broadband data, to ensure broadband access throughout the State, and to maximize broadband's impact. Assuming this data collection role is vital to achieve the State's goals with regard to improving broadband access and adoption. PCI appreciates the assistance provided by NTIA as PCI improved its collection, processing, and verification of broadband data for submission according to NTIA standards.

PCI has continued to refine the Broadband Illinois web site. This consumer-friendly interface allows residents of the State to intuitively access the information collected by PCI – it is a portal to actual speed data, and a tool that consumers can use to verify the data provided by broadband providers. Since the last submission cycle that ended on April 1, 2012, 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 July 16- through July 20, 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 6 submission to the NTIA and for the update to the Illinois Broadband map. For

those providers who had not previously established a Non-Disclosure Agreement with PCI, a copy of PCI's draft version accompanied these maps.

This entire outreach process was tracked on Salesforce, PCI's contact management tool. As maps were created, distributed, and verified, fields were populated in Salesforce to denote that a map that met the approval of the provider had been created. For those providers who did not respond to their initial map request, multiple follow-up e-mail and phone call attempts were made. PCI also tracked whether there would be an update to the data for this submission, what version number of the data PCI would be submitting, and the dates in which an NDA had been established.

This section will explain the way in which PCI conducted its outreach to the carriers and the different ways in which it received data. It will outline some of the major updates that were received in this round as well as describe both quantitatively and qualitatively the extent to which data was updated in this round.

NDA

PCI continues to offer and abide by the terms of our NDA. If providers did not establish an NDA in a previous round, they were given the opportunity to do so in this round. In other instances, NDA's were individually negotiated to address specific provider concerns.

When an NDA was established with a provider, the date that the NDA was established was recorded in Salesforce. A field in Salesforce was also populated as to whether or not the provider would be submitting new data for this Cycle 6 submission. If a provider responded with no change to the data, PCI removed priority from that provider and refocused attention on those providers who reported that there was a change to their data up to June 30, 2012. PCI wanted to establish the NDAs by focusing on those providers with new data to submit.

UPDATES TO DATA

Of these 138 providers submitted as part of the data package in this round, edited data has been submitted for 69 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 14 new carriers: Shelby Electric Cooperative, Network Business Systems, StarBand, Ag Prospects, Metro Service Center, S&B Technologies, XL Internet, Netoption, Maxwire, SkyCasters, Cygnus, Sharon, Rural Comm and Illinois Valley Cellular.

Broadband service providers submitted coverage in terms of the areas that they served, either in edited GeoPDFs, direct geospatial formats, CAD files, Excel databases, Google Earth files, or as paper maps. The submitted polygons were overlaid on the census block polygons and those blocks touching were selected and used. The proper speed tier categories were assigned as necessary.

Throughout August and early September, the PCI data team formatted data as it was received. A cutoff date of September 21, 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	69
Previous provider provided an update to coverage area that was included in this cycle.	55
New provider for this round	14
Total number of providers included in this submission	138

Total number of providers included in this submission	138
Identified Illinois providers that have never participated in mapping project	41
Total number of providers identified in the State of Illinois	179

Changes and Corrections

On August 19, 2011, PCI along with the other SBDD's designated entities submitted a changes and corrections document to the NTIA for the data that was submitted in Round 3. PCI felt this was a very useful document, and would like to incorporate it into this narrative to demonstrate the extent to which PCI updated its data in this round. While the last section quantitatively expressed how data was changed, this section qualitatively explains each of the updates that were made. Some of the more extensive changes and corrections will be described in later sections.

Provider	Change	Correction	Description
Kraus Electronics		x	Speed Increase to Speed Tier 7 across entire coverage, No change in footprint
Telecommunications Management, LLC	x	x	Corrected Missing Cable in Richland County and Vermillion County, Added Coverage and Infrastructure Improvements, speed increases in the north, added towns in Vermillion County. T140 now in Perry and Franklin Counties.
Adams Networks		x	Speed Increase in local towns, adjusted DSL and Fiber coverage
MidCentury		x	Speed Increase in local towns, adjusted coverage to fill in gaps
Mediacom		x	Table contained FIPS codes for census 2000 blocks, but had to be built. Also removed records from the raw table that did not have bb_aval with a "Y"

NOW Wireless, LLC		x	Increased Speed in areas that were speed tier 3 in Round 5
Joink		x	Claimed PCI Overstated Coverage in R5, Changed to KML Overlays Provided by Joink
Qwest		x	Change DBA to Century Link, Ownership Change
Zayo Broadband		x	Acquired 360Networks, Ownership Change
US Cellular	x		Added 4G Coverage, 3G Unchanged
Leap Wireless/Cricket Communications	x		Smaller Footprint, Full Dataset submitted
Wabash		x	Expanded coverage to show full footprint
Zito Media		x	Was called GalaxyCablevision, Provider and dba name change, speed increase
Verizon Wireless	x		Expanded 4g footprint
T-Mobile	x		Expanded 4g and 3g footprint, better data quality in Rockford, IL area
Cass Telephone Company		x	Properly formatted Provider Name/DBA Name, corrected missing coverage
Cass Cable TV, Inc.	x	x	Properly formatted Provider Name/DBA Name, corrected missing cable towns, added FTTH coverage
Green County Partners, Inc.	x	x	Properly formatted Provider Name/DBA Name, corrected missing cable towns, added FTTH coverage
Frontier	x		Added More DSL coverage
T6	x		Acquired KeyOn and CTI
Royell	x		Acquired Corn Belt, Added several Towers, added VDB network.
Highland Communications	x	x	Data Refinement using online household map. Added some Census blocks to fill in holes, deleted some census blocks as well. First time Provider has approved.

AT&T	x	x	Provided Higher Quality Data, Speeds now associated at Block Level instead of the CBSA level, Also provided 4G Coverage
Sprint	x		Full New Dataset
Montrose	x	x	Speed Increase, filled in some coverage gaps.
Harrisonville/HTC	x	x	Increased Speed in TT10 and TT20, Increased ADSL Footprint near Columbia, Added to FTTH coverage in Red Bud, Added DSL Central Offices Fixed TT70 Speed
Charter	x		Filled in the holes mostly, did reduce coverage in some areas.
Clearwire	x		New and Complete Dataset, No noticeable changes
HughesNet		x	Have always claimed to cover entire state. Changed date to reflect this.
MegaPath	x		Name Change from Covad, Increase in Coverage and Speed
RCN Regulatory	x	x	Data Refinement. Reduced TT40 but added coverage TT41. Also included TT30 for the first time. Also corrected Middle Mile Data and Updated Service Addresses
Century Link	x		Increased coverage and speeds in some areas, removed coverage in other.
Tw Telecom of Illinois LLC		x	Middle Mile Only, Updated FRN number. No other changes
Sidera Networks	x		Middle Mile Only, Added 6 Middle Miles Points
Cequel	x		Full New Dataset., Added and removed coverage
Flat Rock	x	x	Increased Speed Across the board, Increased upload speed.
Barbeck	x		Increase in Coverage and Speed
Jo-Carroll	x		Increase in Coverage
Computer Dynamics	x		Increase in Coverage
Park TV & Electronics	x	x	Corrected Coverage to include unincorporated town of Armstrong, Speed Increase,

			Added one wireless tower.
Sonic	x		Increase in Coverage and Speed
Rural Comm		x	New Provider
Egyptian	x		Increase in coverage, increased speed for Fixed Wireless
Oneida	x	x	Oneida wire center now 100% FTTH, removed DSL coverage in the Oneida wire center. Increased speed in the FTTH and the Rio DSL footprints.
Comcast	x		Increase Speeds in Metropolis, IL. Comcast is now 100% DOCSIS 3.0 in IL
ViaSat	x		Name Change from WildBlue, Increased Speed to Speed Tier 7
SkyCasters		x	New Provider, Satellite
Cygnus	x	x	New Provider, TT20 and TT 70
Sharon	x	x	New Provider, TT10
Bergen	x		Added Coverage, Speed Increase
Illinois Rural Electric Coop	x		Increased Speed, slight increase in coverage. Upgraded infrastructure
Ag Prospects		x	New Provider
Metro Service Center		x	New Provider
S&B Technologies		x	New Provider
XL Internet		x	New Provider
Netoption		x	New Provider
Maxwire		x	New Provider
StarBand		x	New Provider, Satellite
New Wave Net Corp	x	x	True Propagation ran this round from Round 5 data, add towers as well.
MTCO		x	Had coverage in many small towns around Peoria, and was missing coverage around Peru area. Added FTTH
Network Business Systems		x	New Provider
Shelby Electric Cooperative		x	New Provider
Leaf River/LC Communications	x		Added Fixed Wireless Coverage
Illinois Valley Cellular		x	New Provider

Wisper ISP	x		Increased Speed and slight Coverage expansion
Grafton	x	x	Added the Jerseyville
A-G Long Distance	x		Added FTTH Coverage, Increased DSL Speed
Hofnet Communications	x		Increased Speed and Added Coverage
One-Eleven	x		Increase Speed and added coverage
New Windsor Telephone	x		Added FTTH Coverage to the North
Shawnee	x	x	Added FTTH and DSL Coverage, Increased DSL Speed

SBDD DATA TRANSFER MODEL METHODOLOGY

The submission of the broadband dataset for October 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, 2012:

<u>NOFA Requirement</u>	<u>Data Transfer Model</u>	<u>Data Description</u>
Appendix A: 1(a)	BB_Service_Address	List of addresses at which broadband service is available to end users in the provider's service area.
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census blocks Larger in Area Than Two Square Miles
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing

The provider data collected by PCI on behalf of the State of Illinois have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBDD Data Transfer Model. Wireline availability is contained within census blocks and road segments. Wireless availability is contained as polygons of coverage areas. Middle-mile connections and community anchor institutions are contained as point data. The subscriber weighted nominal speed (if available) is contained within the overview feature class. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

In this round, we are again including the state boundary. Commenting on previous round of data submission, NTIA cited issues with data gaps near the borders of the state and recommended using the U.S. Census Bureau state boundary data. Thus, in this round of data submission, we are including the U.S. Census Bureau 2010 Census Illinois state boundary in GCS_WGS_1984 coordinate system.


DATA PRODUCTION METHODS

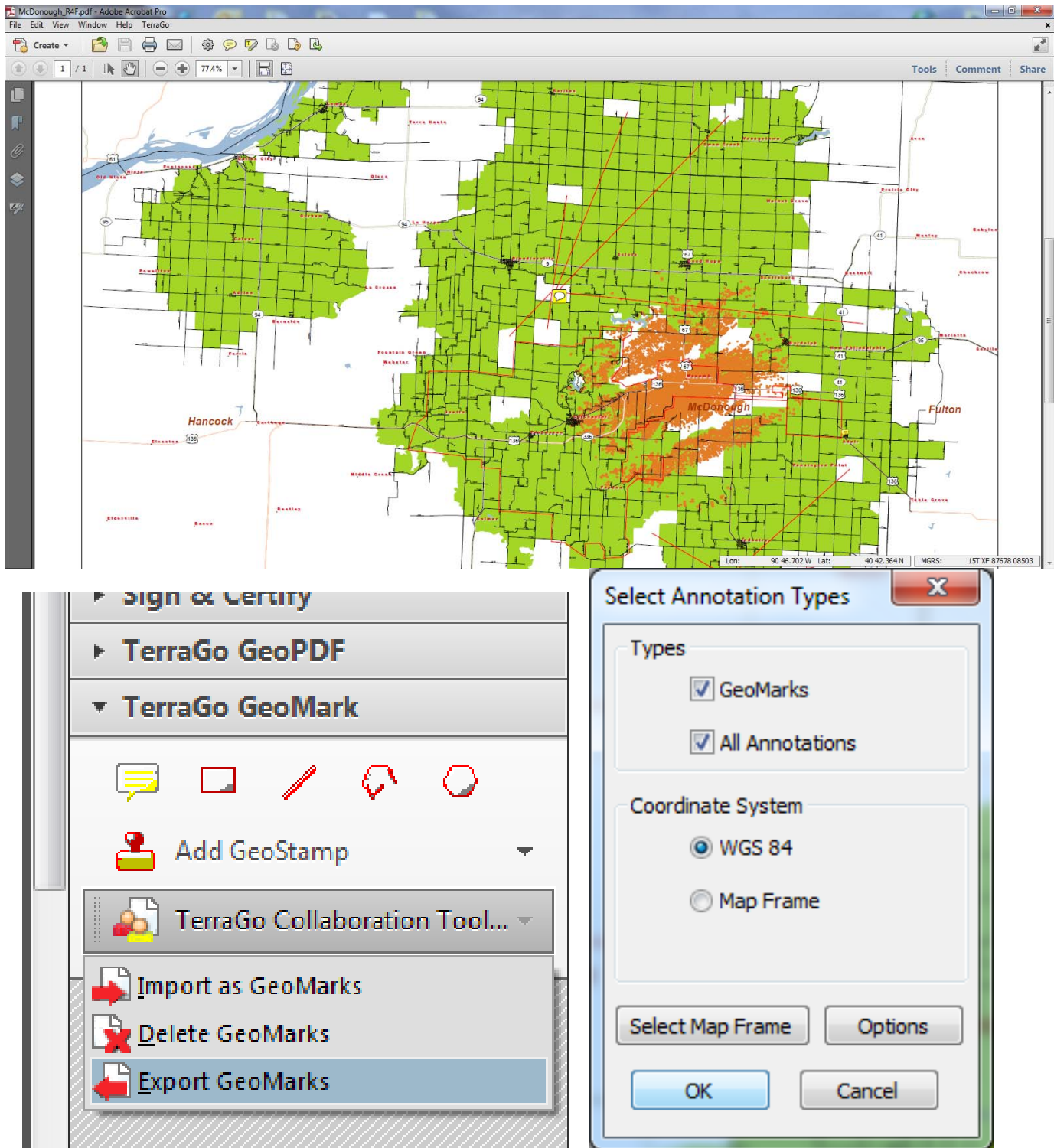
As mentioned, data was received in a number of formats that required processing in order to prepare the data for submission in accordance with NTIA requirements. This section discusses how PCI processed provider data, as well as how PCI assisted the provider in making the update process as easy as possible. It examines each layer and the steps PCI took in making the updates.

GEOPDF AND TERRAGO TECHNOLOGIES TOOLBAR (DSL & FTTH)

In the initial outreach made to the providers from July 16- through July 20, 2012, they received a map of their existing coverage area. These maps are in the TerraGo Technologies GeoPDF format. This allows the provider to mark up the map with corrections and allows PCI to bring those corrections into ArcGIS. Instructions on how to install and use TerraGo GeoPDF were made available here: <http://broadbandillinois.org/maps/Carrier-Maps/About-GeoPDF-Maps.html>.

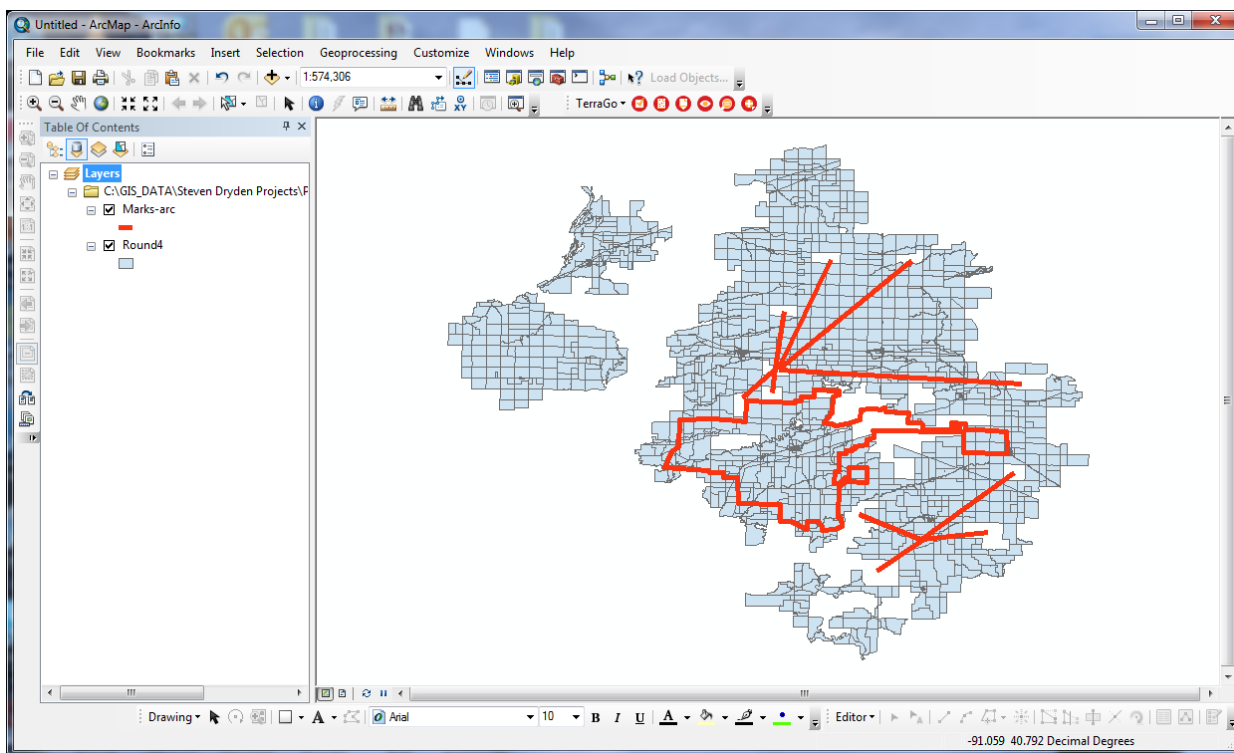
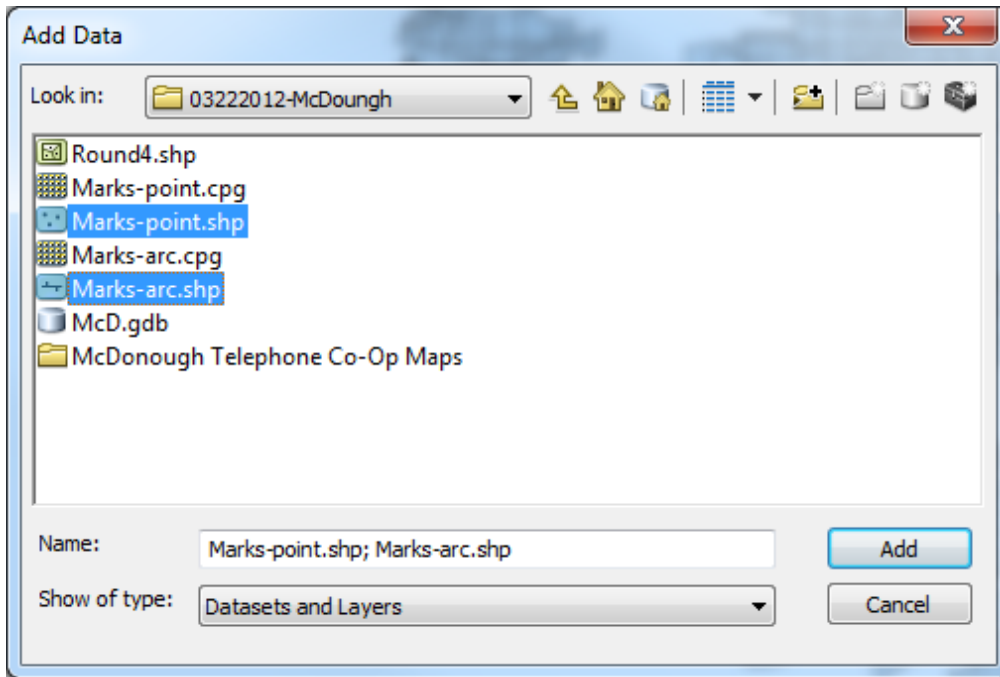
This toolbar created several opportunities for the provider to really zoom in and edit their coverage area. When it comes to verifying carrier level data, PCI felt the GeoPDF and the virtual meetings where PCI and the provider started carving up the data were extremely useful. The images on the next several pages demonstrate how DSL and FTTH providers were able to use the toolbar to carve up coverage areas to update their data.

The provider, upon opening the map was instructed to use the  icon to turn layers on and off, and follow the instructions to mark up the map. The image below is a marked up GeoPDF of McDonough Telephone Cooperative in which they indicate where they have had FTTH deployment since their previous submission.

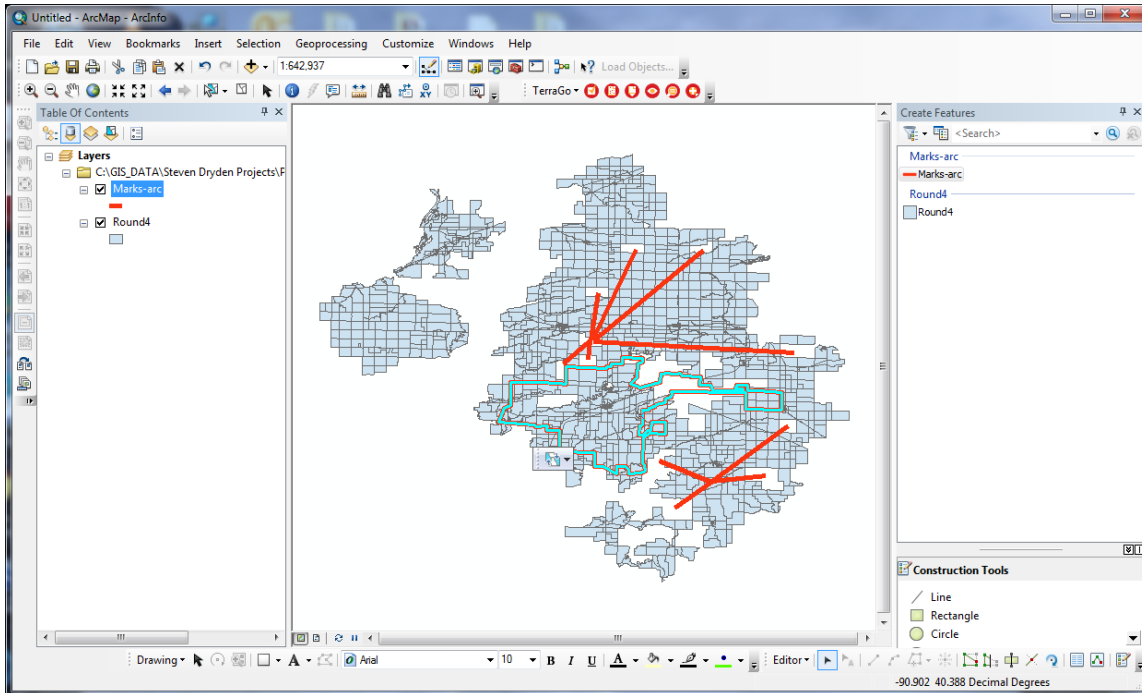


With this tool, providers can draw lines, comments, polygons, and points as indicated in the image to the top-left. From here we can export comments and geomarks as an ESRI Shapefile as demonstrated by the images above.

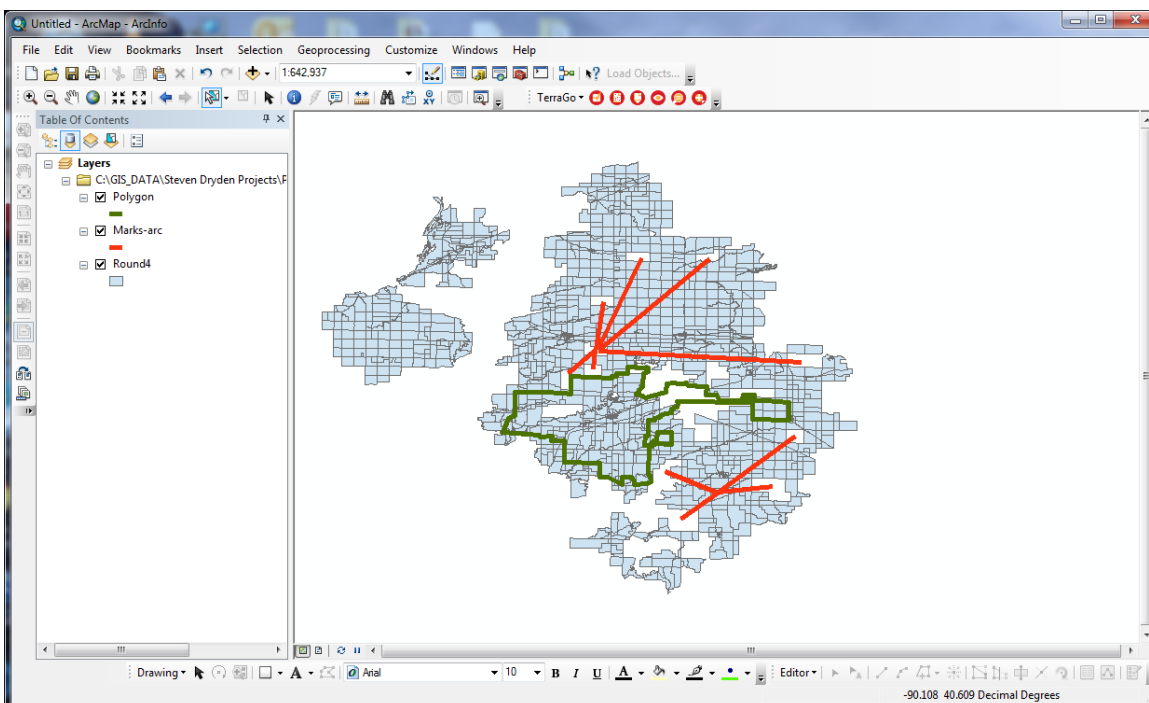
After exporting the geomarks from the GeoPDF, we can now import them into ArcGIS. This provider has drawn lines to show where they have added FTTH and where they want us to fill in holes in their other census block coverage. The geomarks are indicated by the red lines on the bottom image.



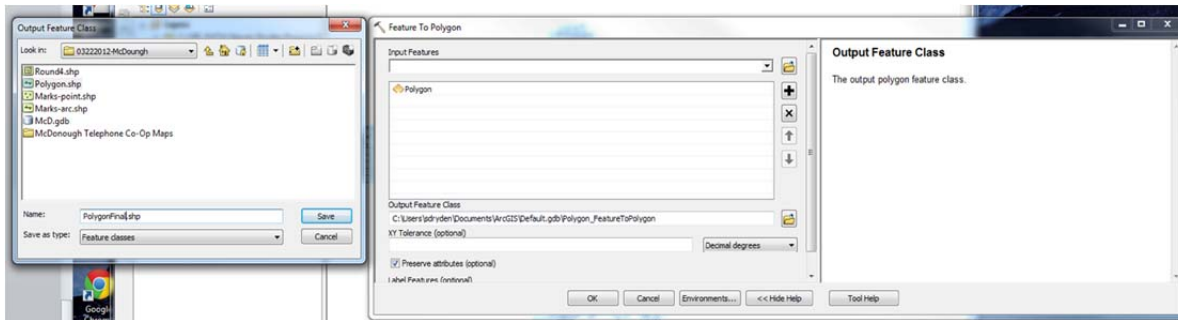
From here, we add Census Blocks as needed. For lines that represent an area, we can convert to a polygon so we can easily select Census Blocks. First we select the lines that need to be converted into a polygon (highlighted in Blue), we will export the selected.



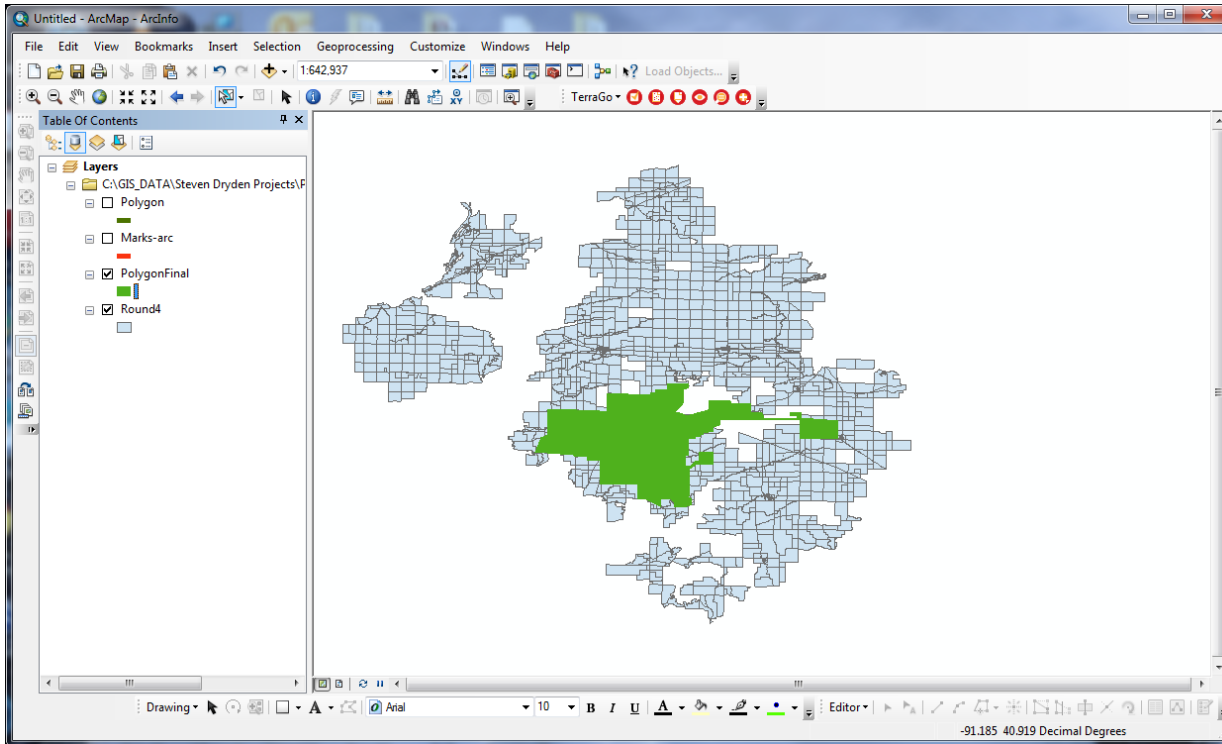
Here you can see we now have separated the polygon line we need. Now we can convert this to a true polygon.



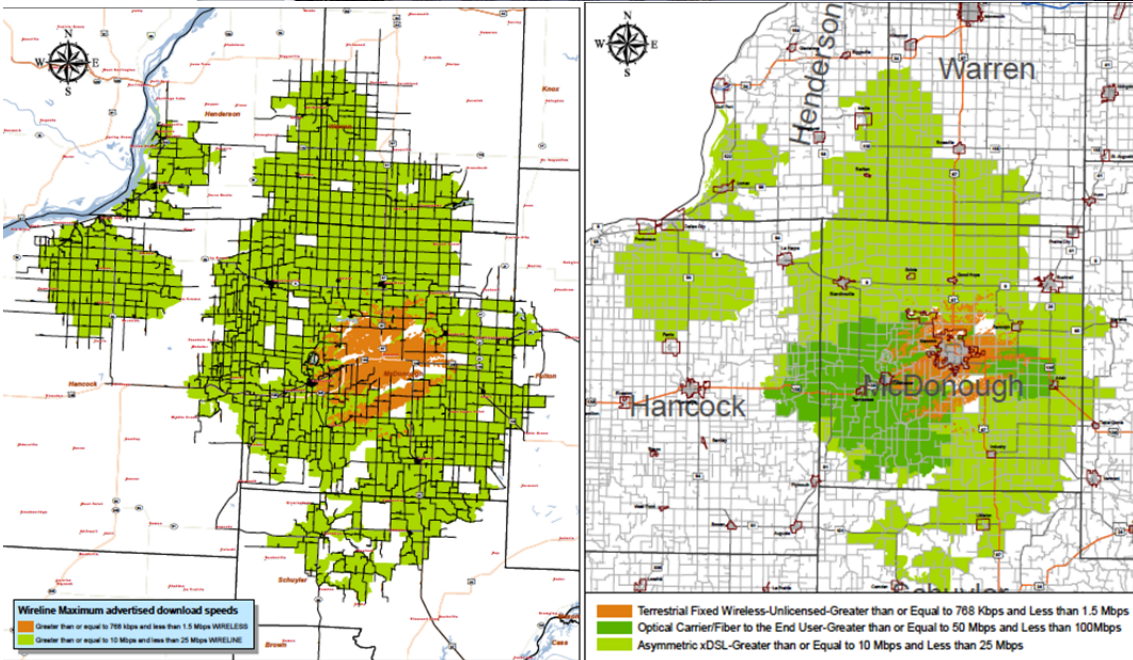
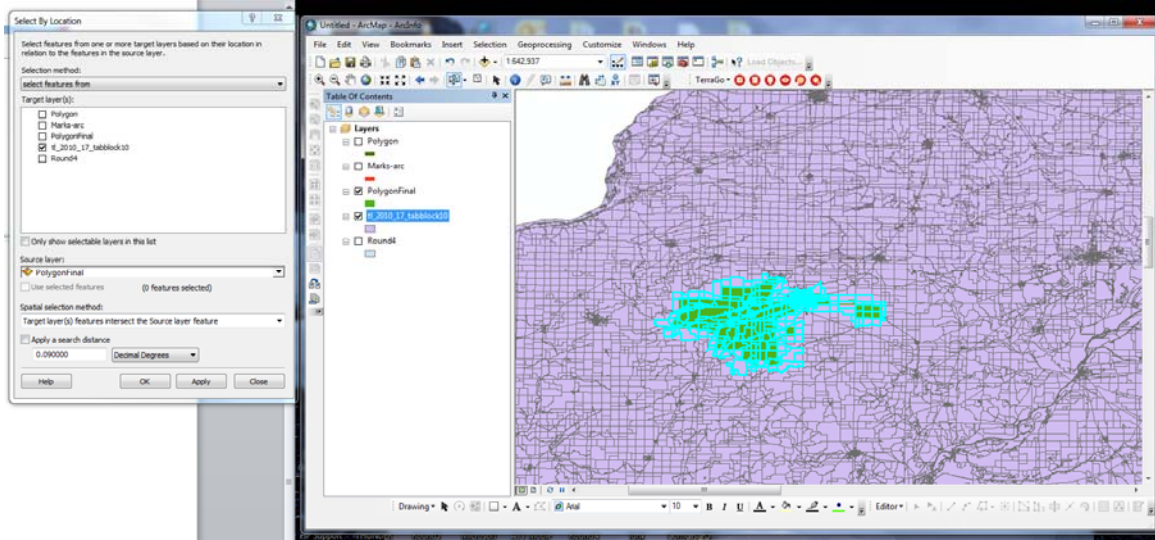
To convert a line to a Polygon, we used the Feature To Polygon tool in ArcGIS



The end result is a polygon that will be used to select census blocks that are inside or touch the boundary of the polygon.

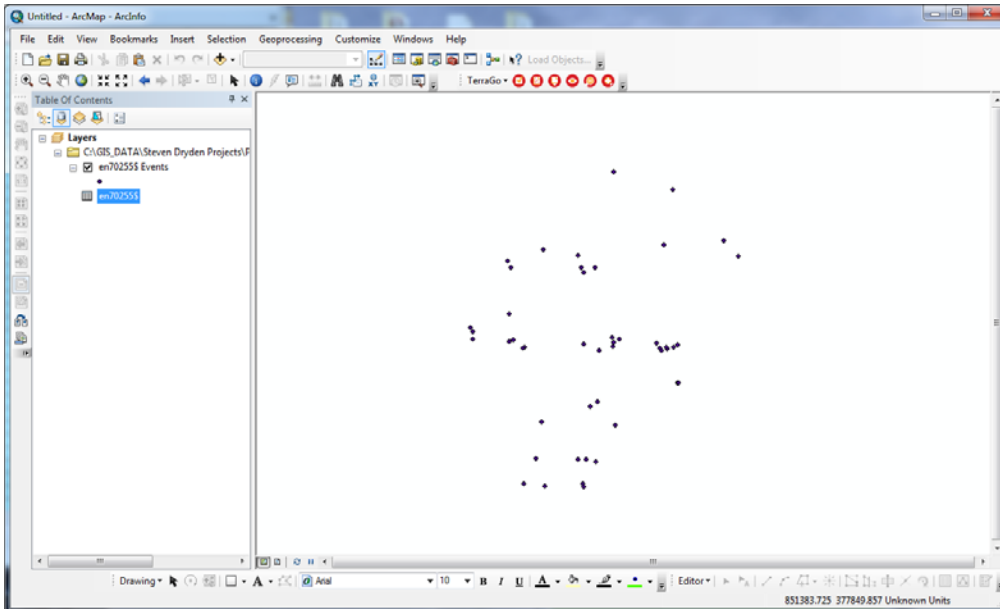


To obtain the Census Blocks needed, we used Select By Location process. As you can see, the census blocks are now selected. All that is needed now is to export the specified census blocks out, and provide the data with attributes as indicated by the provider. The maps below show the initial data and the data after the updates are made through the GeoPDF software.

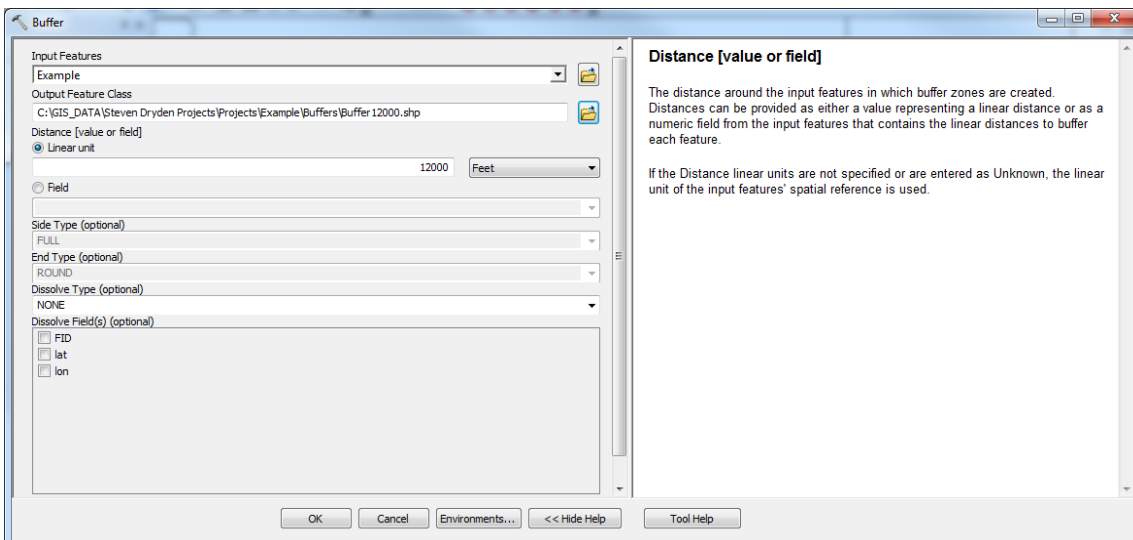


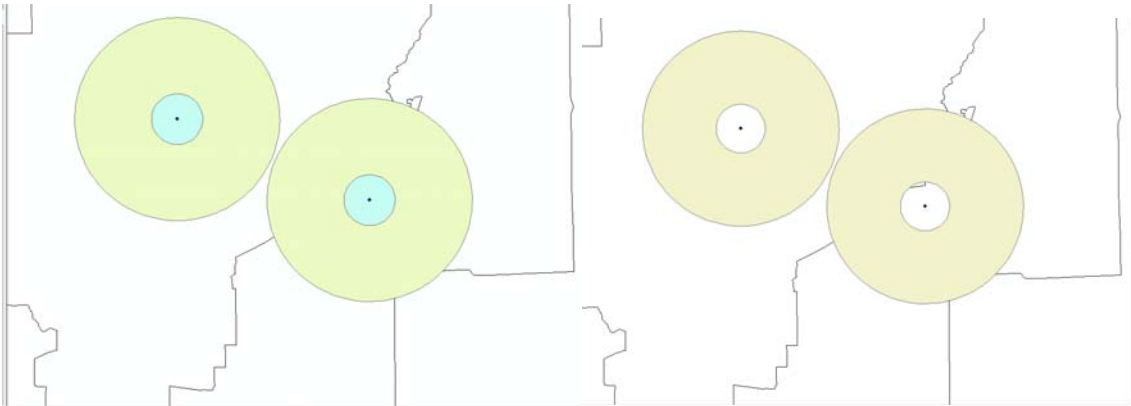
WIRE CENTER BOUNDARY CLIPPING

Some DSL providers sent an Excel table that displays latitude and longitude for central office and remote terminal locations. This creates a special challenge for us because DSL service extends 12,000 feet from the center, but is not allowed to cross the wire center boundaries. Also, we must factor in that at 3000 feet from the wire center, speed decreases from speed tier 5 to speed tier 4. First, we load the Excel table into ESRI ArcGIS. In ArcGIS, we can use latitude and longitude information to display data on a map using the Display XY Data function. We use this here to get a working shapefile.

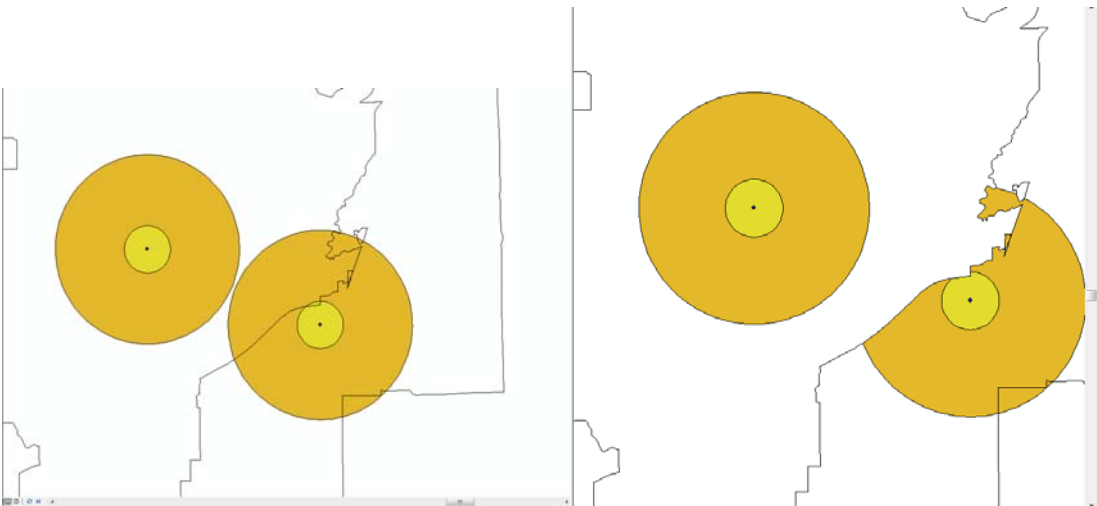


With a working shapefile, we next buffer around each point for speed and coverage. We use two buffers of 3000ft and 12000ft.



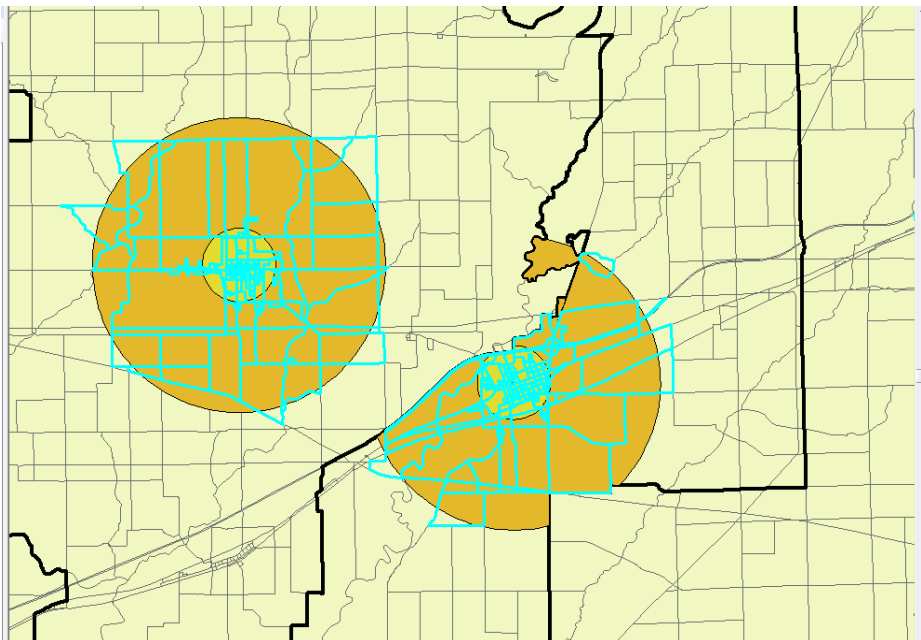
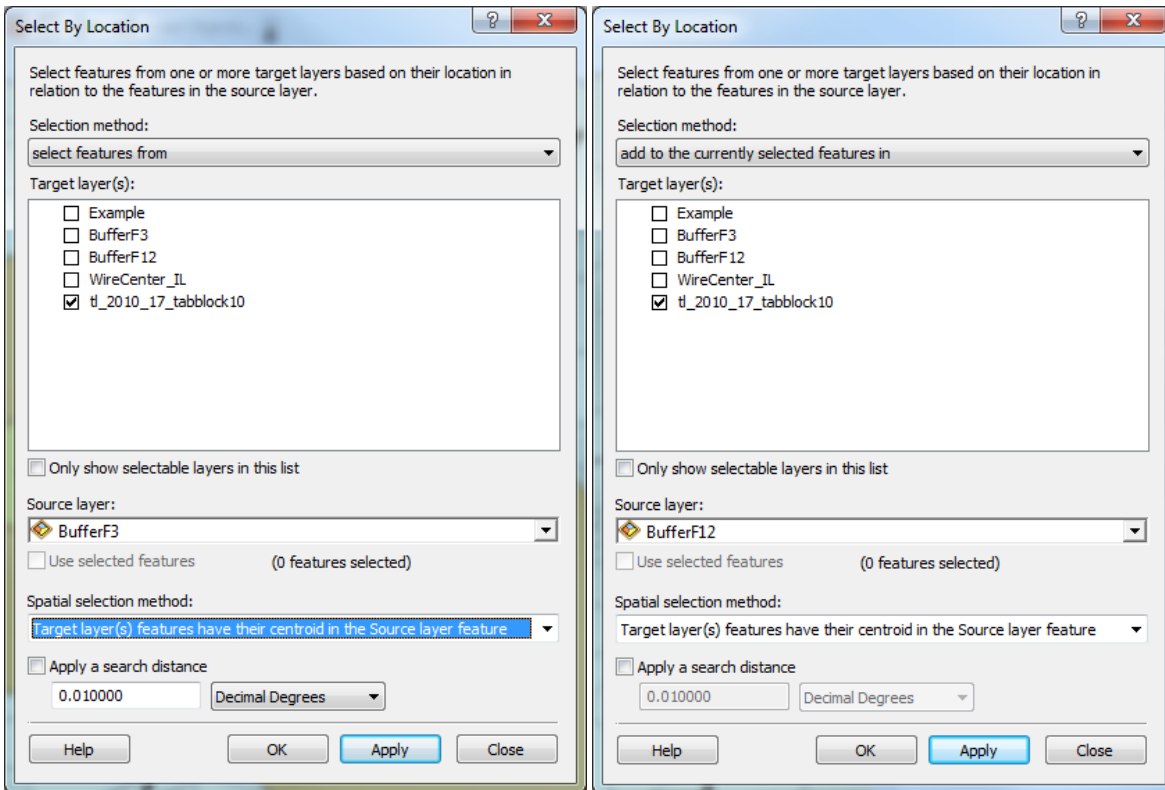


The resulting buffers are found in the above image to the left. We next clip the innermost 3000 feet from the 12,000 foot buffer. In the image on the right, we have turned off the 3000ft Buffer to show that there is nothing under them now. Coverage for wire centers can not cross wire center boundaries, so we now need to trim the buffers so that they remain inside the boundary where they are located. We next use the Intersect tool to break apart the coverages based on the wire center boundaries.

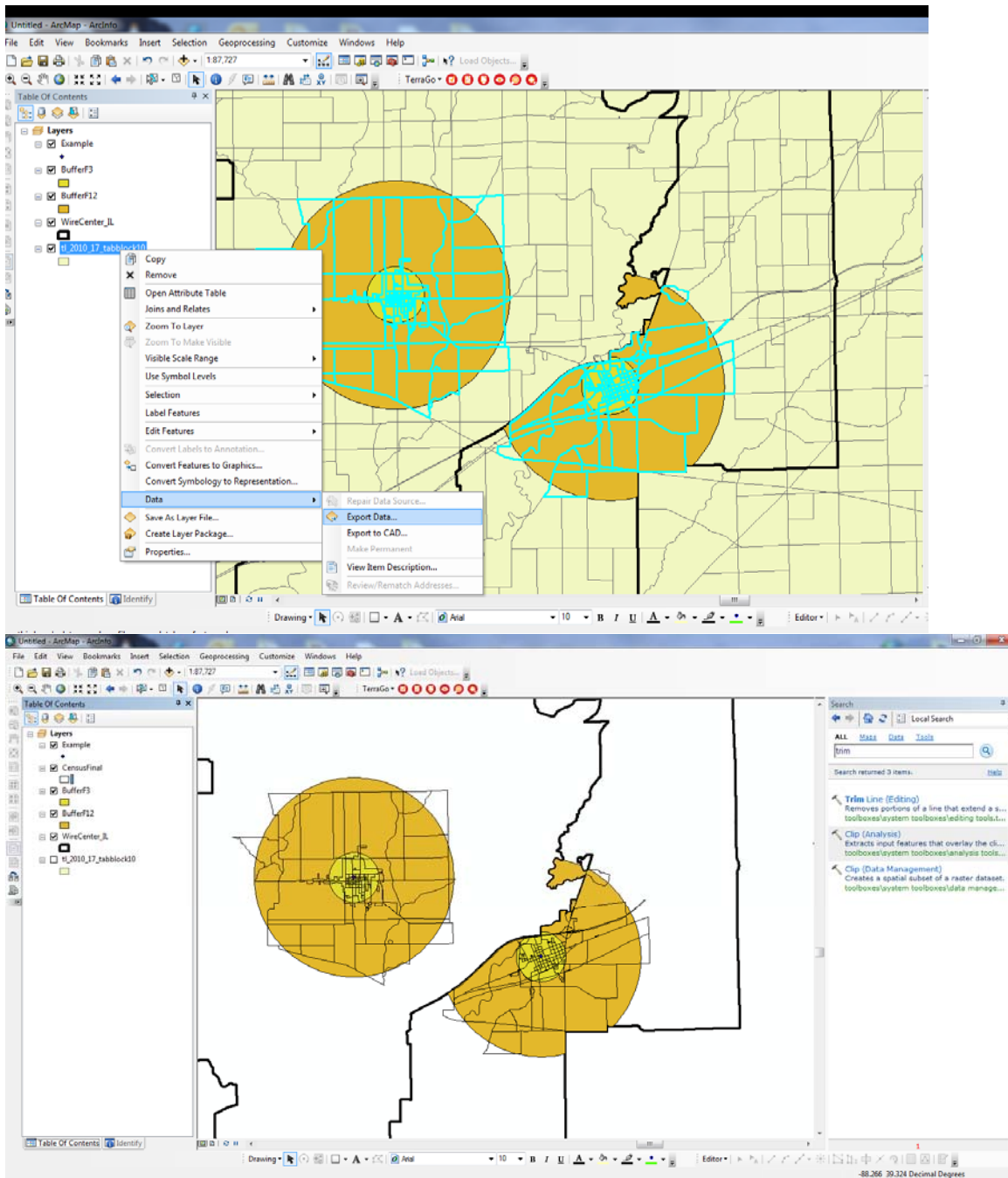


As you can see, the polygon is now broken apart by the wire center lines. From here, we next start an editing session and delete those areas that fall outside the wire centers boundary. Select the area outside the boundary and press “delete” to remove those census blocks.

We do this for all wire centers, and then save our edits. After we are through with this, we next use these buffers to select census blocks by location. In this case we specify that a census block centroid be within either the 3000ft buffer or the 12000ft buffer in order to count.

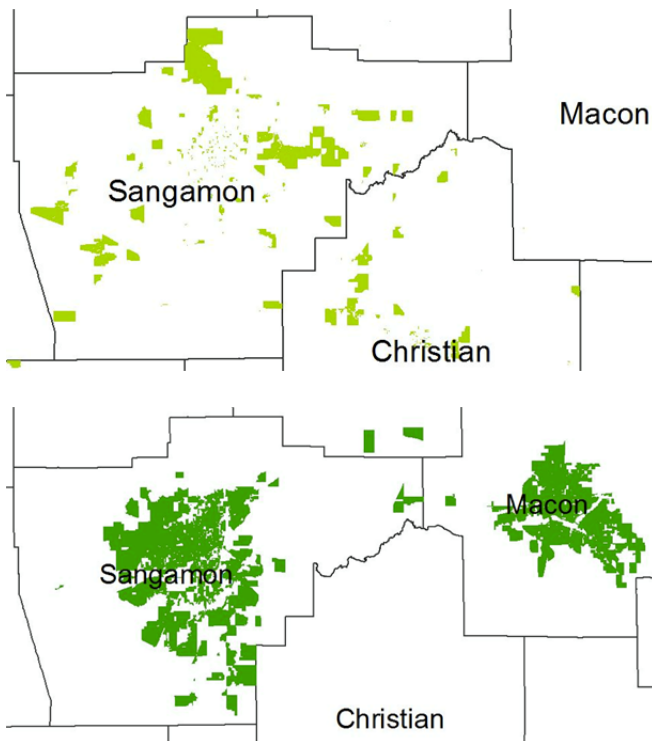


At this point we are ready to export the selected Census blocks, and assign speeds based on which buffer the census blocks fall within.



After we provide the census blocks with attribute information, we next send a GeoPDF to the carrier for approval, and then load it into the master geodatabase.

CABLE COVERAGE



Some cable carriers submitted their service area coverage data in the form of a spreadsheet citing customer addresses. These addresses were converted to a point layer via a geocoding process. These points were then superimposed on top of a 2010 census block layer, and all of the census blocks that had one or more address-derived points associated with them were selected. The selected blocks were then converted into a polygon layer which was attributed with appropriate broadband provider information such as provider name, technology of transmission, maximum advertised downstream speed and so on. A portion of the Mediacom map above indicates an example of this in the above map.

Other cable carriers including Comcast submitted a series of spreadsheet records which were matched with the corresponding Illinois 2010 census blocks polygon layer. The matching polygons were then superimposed on the Census CBSA layer which was joined with the provided maximum advertised (MAXAD) speeds spreadsheet. This way each individual census block was attributed with the

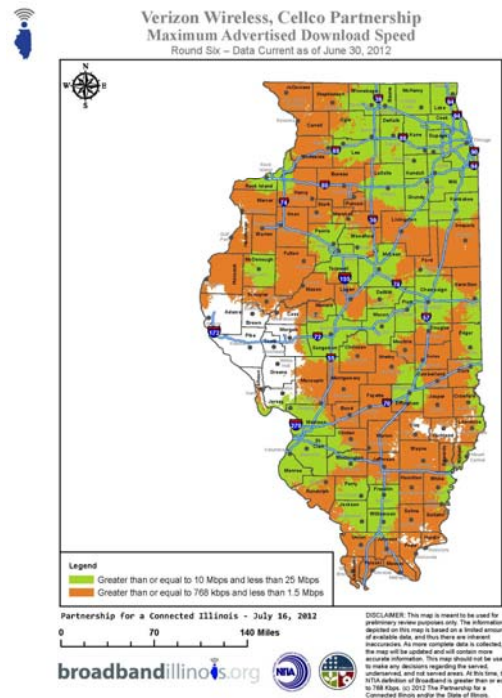
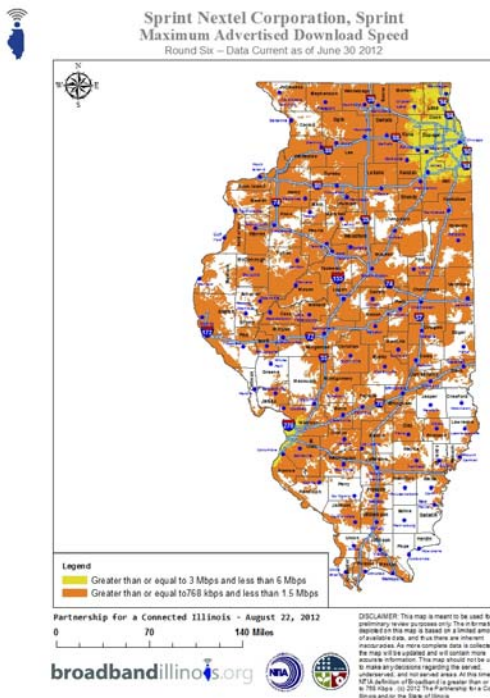
corresponding MAXADDOWN and MAXADUP value.

Street segment spreadsheet data records were geocoded based on mid-point value of the reported street segment address range. A point layer thus derived was next overlaid with the 2010 census street layer. Census street layer segments that were associated with the geocoded points were then examined, one-at-a-time, to make sure that they matched the reported street, city and census block information. Some of the reported records had to be discarded as they could not be located via the above process.

A GeoPDF map depicting both, census block and road segment data, was reviewed by Comcast and a number of census block records were deleted as a result of Comcast feedback.

MOBILE WIRELESS COVERAGE

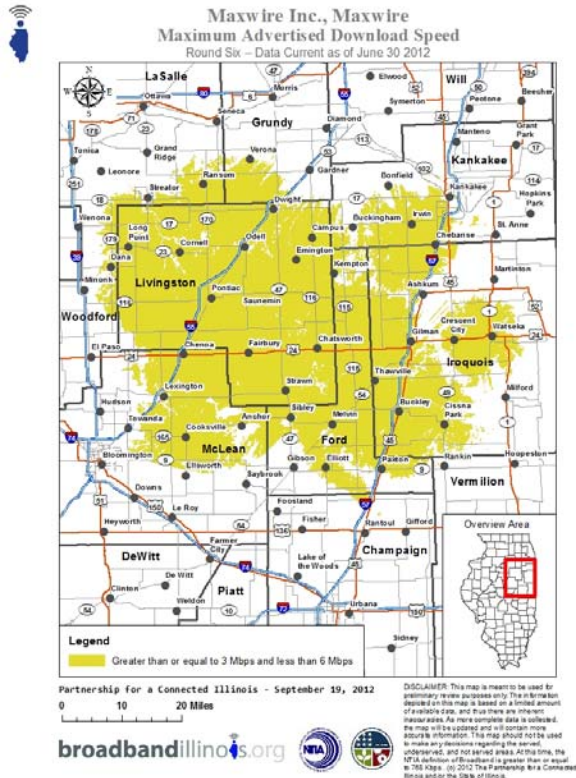
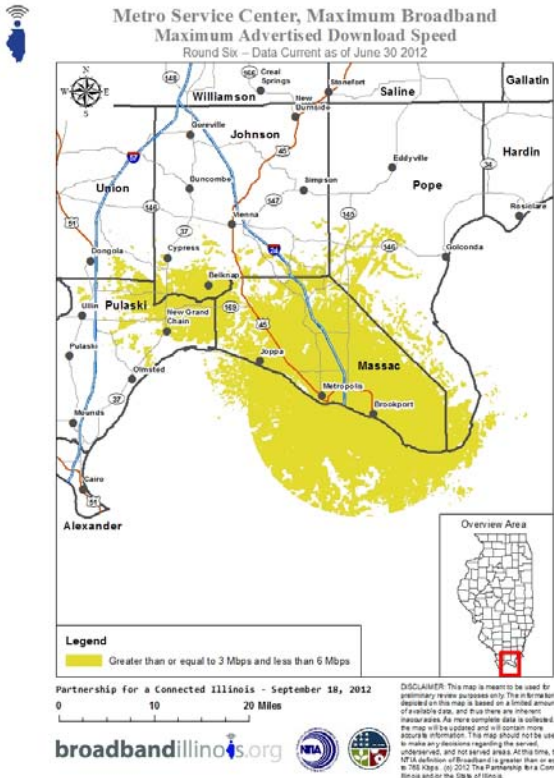
PCI has collected mobile wireless coverage from most providers in the State. These shapefiles were imported into the database and assigned attributes. All but two wireless providers submitted updated data in this round. Thirteen new wireless providers were added in this cycle. An example of this data is below.



WIRELESS METHODOLOGY

Once again, almost every fixed wireless provider allowed us to use their tower locations, antenna heights, equipment selection and direction/spread of coverage to derive coverage areas. With the provided tower information, professionally prepared radio frequency coverage studies were conducted and converted to shape file format. These studies have proven to be very accurate and represent service areas where the maximum advertised speeds can be delivered. These studies take into account full consideration for terrain and tree clutter data. For any carriers who could not provide their own RF propagation coverage polygon, RF propagation studies were done in house. The Longley-Rice propagation model was used. Studies were conducted using 10 meter resolution terrain data. Tree and vegetation clutter data resolution is 30 meters. All propagation results had a minimum of a 10 dB signal fade margin built into the results in addition to losses calculated for clutter. Signal level minimum thresholds were set on the study maps to a level that each carrier deems reliable and serviceable at those speed tiers, not just the minimum to establish a connection. These maps are not based on the manufacturers best case scenario radio capabilities in a lab environment. These coverage polygons represent what can be delivered in the face of interference in the shared spectrum used for those with transtech codes of 70 and spectrum code 6.

There appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary strength (e.g. -80 dB, -98 dB, -120 dB, etc.) to provide the appropriate quality of service for data services and still be able to deliver the maximum advertised speeds. While we took these issues into account for our internally generated RF propagation studies, we do not have specific details for carrier provided polygons such as cellular mobile data and 4G service footprints.



SATELLITE

This round of data updates includes two old broadband satellite service providers – ViaSat (formerly, WildBlue Communications) and HughesNet, as well as two new satellite service providers – Skycasters and StarBand. All of these providers communicated that their service area encompasses the full extent of the state of Illinois.

Apart from the name change, during the first quarter of 2012, ViaSat has launched two new services named Exede 5 and Exede 12. Exede 5 has a maximum advertised upload speed of 1 Mbps and a maximum advertised download speed of 5 Mbps. Exede 12 has a maximum advertised upload speed of 3 Mbps and a maximum advertised download speed of 12 Mbps. ViaSat’s legacy WildBlue service has a maximum advertised upload speed of 256 Kbps and a maximum advertised download speed of 1.5 Mbps.

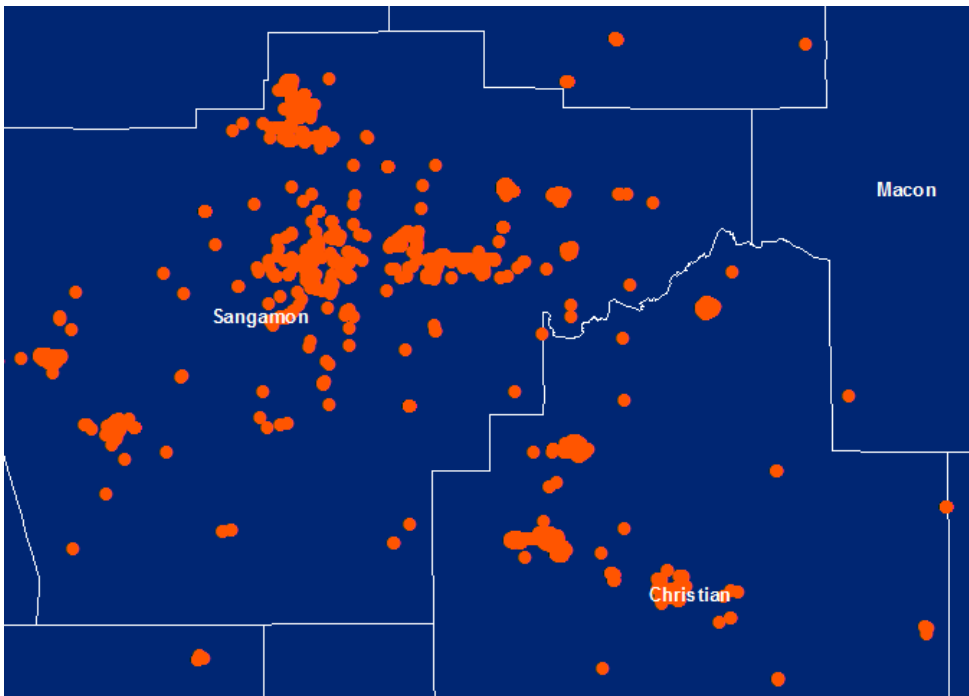
MIDDLE MILE

Middle-Mile (MM) data is acquired via either a direct carrier submission in the form of a spreadsheet or a text document citing specific MM hub coordinate pair values, or by obtaining the general MM hub location from the carrier’s web site.

In the case where specific coordinate pair values are available, a point layer is generated using ArcGIS software. This process entails bringing tabular XY coordinate pair values into ArcGIS, and creating an “event theme”. The “event theme” is then exported into a stand-alone point layer which is then attributed with the necessary information.

General, web-derived locations are converted to a point layer by citing towns where the MM hub presence is identified by the carrier. Town point locations are next attributed with relevant data.

ADDRESS LAYER DATA



Service address information in this round was provided by the same three carriers that provided it in the last round - Mediacom Illinois LLC, FairPoint Communications and RCN Telecom Services of Illinois, Inc. Mediacom and RCN reported new data in this round; FairPoint data did not change.

Supplied address data was geocoded. Great care was taken to successfully rematch addresses that were not matched during the initial geocoding run. Spelling errors were the most common reason an address failed to geocode correctly. Such errors were resolved via web or Google Earth searches. The resulting point layer was used to

derive the missing LATITUDE and LONGITUDE coordinate pair values which were then added to the Service Address layer attribute table. The geocoded results were also used to generate data for the census block layer. Above map illustrates the service address layer.

METADATA

Metadata, which literally means data about data, represent PCI's attempt to document procedures, coding, and overall methodology used in managing broadband supply data. Both short and long terms goals of developing PCI's metadata are to improve communication on Geographic Information Systems (GIS) data management issues for both internal and external partners. PCI's metadata is organized and structured around Federal Geographic Data Committee (FGDC) standards associated with key information impacting the following issues:

- What GIS data layers are managed by an organization?
- How is data coded or classified in assisting outside partners or organization use of the GIS data developed?
- When was the data developed and how often is it updated?
- Who developed the data layers and who should be contacted if anyone has questions?

The net result of developing PCI's metadata connects to the idea of communication and standards. When applied correctly over time PCI's metadata will assist in educating other users on essential questions needed when applying

GIS data. In addition, it will assist PCI internally as metadata will help the organization identify and document critical developing issues shaping data development. Any new employee or organization will be pointed to metadata files when asking questions relating to methodology, attribute codes, dates of data edits or updates, and follow-up contact information within PCI's data team.

DATA VERIFICATION

Verification has become an evolving and ongoing process at PCI. The continued evolution of the Broadband Illinois website, along with the use of the GeoPDF process has created a feedback loop between provider and consumer and PCI that allows PCI to verify the carrier level data that it submits semi-annually to the NTIA. PCI continues to cultivate eTeams throughout the state that are able to take county and provider level maps and visualize the data and begin indicating areas where the data may not be accurate. PCI has also published a Supply Side Inventory in which PCI developed a system to rank Illinois's counties by broadband connectivity and looked at two major sets of third-party data to verify the data it had collected. The following sections go in to greater detail on the verification process but the outline below shows the basis for the verification process:

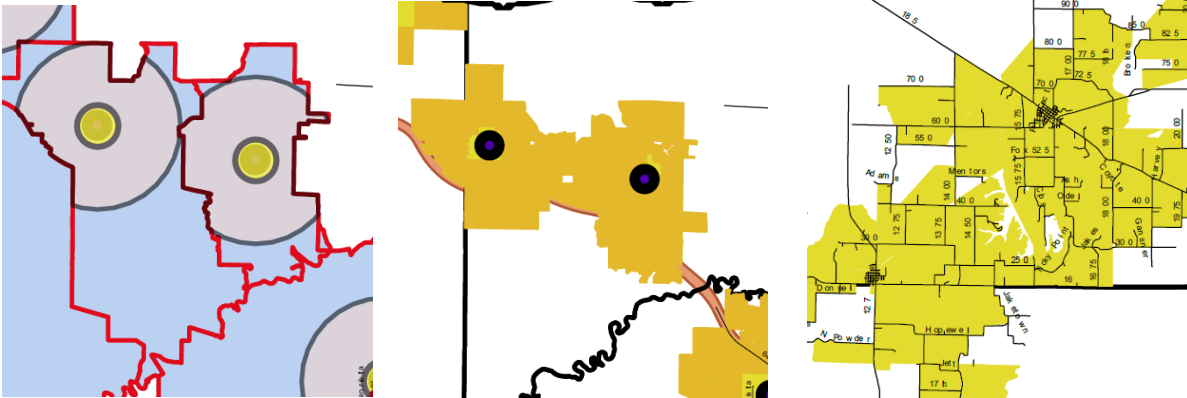
- Provider verification through extensive mapping GeoPDF process
- User verification through online web tools
- Trusted user verification through eTeam groups
- Third Party verification using third party data sets (ex. Gadberry, FCC Speed Test)

PROVIDER

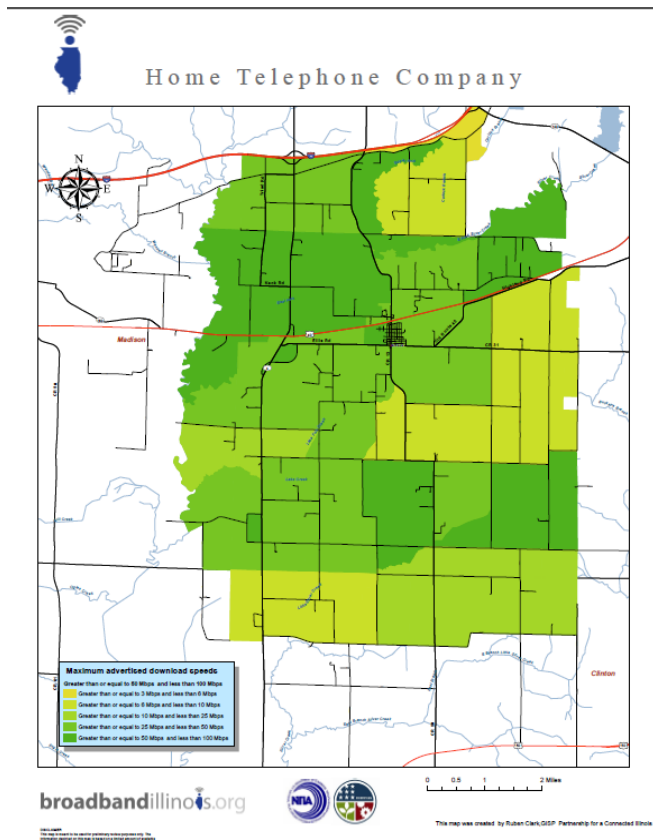
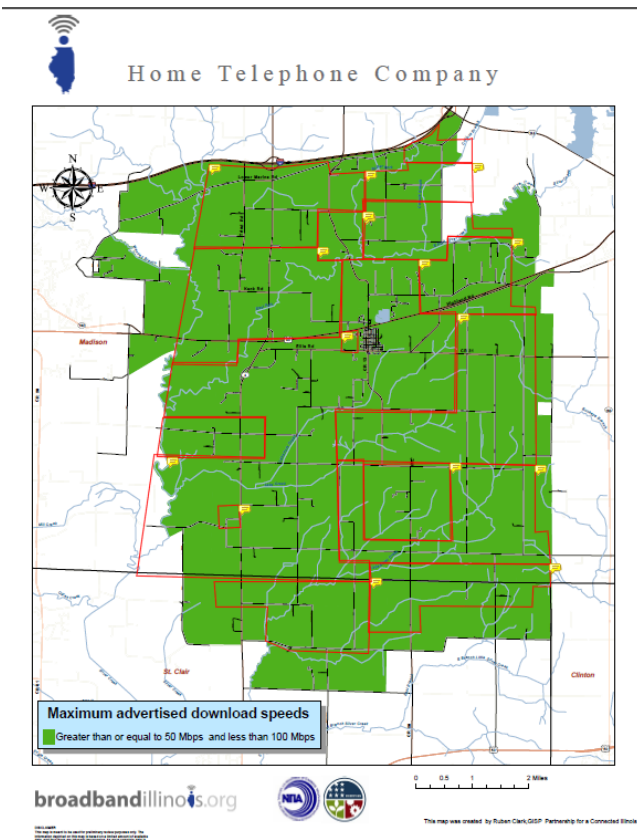
In this Round, PCI worked very closely with the provider sending back versions of the GeoPDF until the data was represented according to the provider. PCI considers this process to be the first of five forms of verification PCI has and will continue to carry out to ensure the data that is submitted to the National Broadband Map is as accurate as possible.

Previously, PCI purchased a set of wire center boundaries, which PCI used to map out DSL coverage for a couple of providers. Knowing that a DSL provider's Central Office or Remote Terminal that fell in a certain wire boundary could not extend service outside that boundary allowed PCI to map out these locations and create buffers around these locations based upon the speed. PCI recognized that locations 7500 feet from a DSL C.O. or R.T. would not receive the same speeds as locations only 1000 feet from that location. These buffers allowed PCI to make these changes. Due to confidentiality of these locations, maps that contain these locations with these buffers and boundaries are protected under the NDAs that have been established.

However, the images below provide an example of how PCI would use a C.O. or R.T. location to map out the coverage that a provider is able to provide in that wire center boundary. The image on the left shows two wire center boundaries that contain a C.O. The buffers are indicating that the areas closest to the C.O. receive speeds that are in Tier 5 while areas outside that initial ring receive download speeds in Tier 4. The second image shows how the data beneath these buffers looks when the wire boundaries and buffers are removed. The third image shows how the previous mapping contractor would have submitted this data in a previous round. As you can see, the same flat speed is dispersed across the entire region surrounding C.O. and R.T. locations. This is undoubtedly a form of verification.



PCI has worked through this process for one of the two largest DSL providers in Illinois as well as a handful of small telephone companies throughout the State. In some instances, small telephone companies admittedly 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.

3 carriers serve this area

Sort by **Fastest** Slowest Carrier Technology

CARRIER	MAX ↓	TYP ↓	MAX ↑	TYP ↑
Cass Telephone Company Asymmetric xDSL Accurate? 20 Yes 10 No	 3-6 Mbps	 3-6 Mbps	 1.5-3 Mbps	 0.2-0.7 Mbps
Is this service available to you at the reported speeds? Why do we ask? <input type="text" value="Share your thoughts..."/>				
<input type="button" value="Save"/> <input type="button" value="Cancel"/>				
Verizon Wireless Terrestrial Mobile Wireless Accurate? 2 Yes 0 No	 3-6 Mbps	 0.2-0.7 Mbps	 1.5-3 Mbps	 0.7-1.5 Mbps
Sprint Terrestrial Mobile Wireless Accurate? Be the first	 0.7-1.5 Mbps	 0.7-1.5 Mbps	 0.2-0.7 Mbps	 0.2-0.7 Mbps

TRUSTED USER

The third form of verification comes from the Trusted User. PCI has created GeoPDFs of all 102 of Illinois's counties that are available on the Broadband Illinois website. In this round, the Partnership for a Connected Illinois made great progress with its regional outreach strategy. PCI now has ten functional eTeam groups in ten regions throughout the State. The purpose of the groups are to aggregate demand for broadband, work with providers to fill gaps in access, find creative applications for the maps and data, and to educate consumers and businesses on the benefits of a high speed Internet connection. Over the last six months, each regional eTeam group has hosted at

least one, in some cases as many as four regional meetings where area stakeholders are invited to come and talk about using broadband as an economic development deliverable. While some eTeam groups are certainly further along than others, projects exist in each region to help utilize broadband to bring the region to the next level. Among these projects are working with providers on eRate in underserved regions, hosting an agriculture technology summit to talk to local farmers about the benefits of a broadband connection, and bringing together healthcare professionals to talk about needs with Health Information Exchanges.

Since the last round of data collection, the www.broadbandillinois.org has uploaded a multitude of new features and content with several other structural changes planned for this upcoming round. PCI has made available several of the maps they have created through analysis of the data. Among these maps are broadband competition maps and regional, educational, and county ranking maps. Also at <http://www.broadbandillinois.org/maps/Carrier-Maps.html>, there are individual pages for each carrier in the State of Illinois. Contact information, mapping data, and any news stories that have been published about that provider are available on these pages. These provider pages are also geotagged so that they are available as providers are referenced throughout the rest of the website. As per the previous two rounds, geotagged county map pages also exist at <http://www.broadbandillinois.org/maps/County-Data-Maps.html>. The raw data that PCI provides to the NTIA semi-annually has also been made available.

The website also has an events section, where regional eTeam meetings, other broadband interest events, and computer training opportunities have been made available to website visitors. In this round, PCI has also developed a newsletter that serves as regular communication to upwards of 1,500 stakeholders in Illinois. These newsletters and other special interest news stories are available in the news section of the website. Finally, in the eTeams section, eTeam groups are able to have a repository for mapping data, events, and news most relevant to their region.

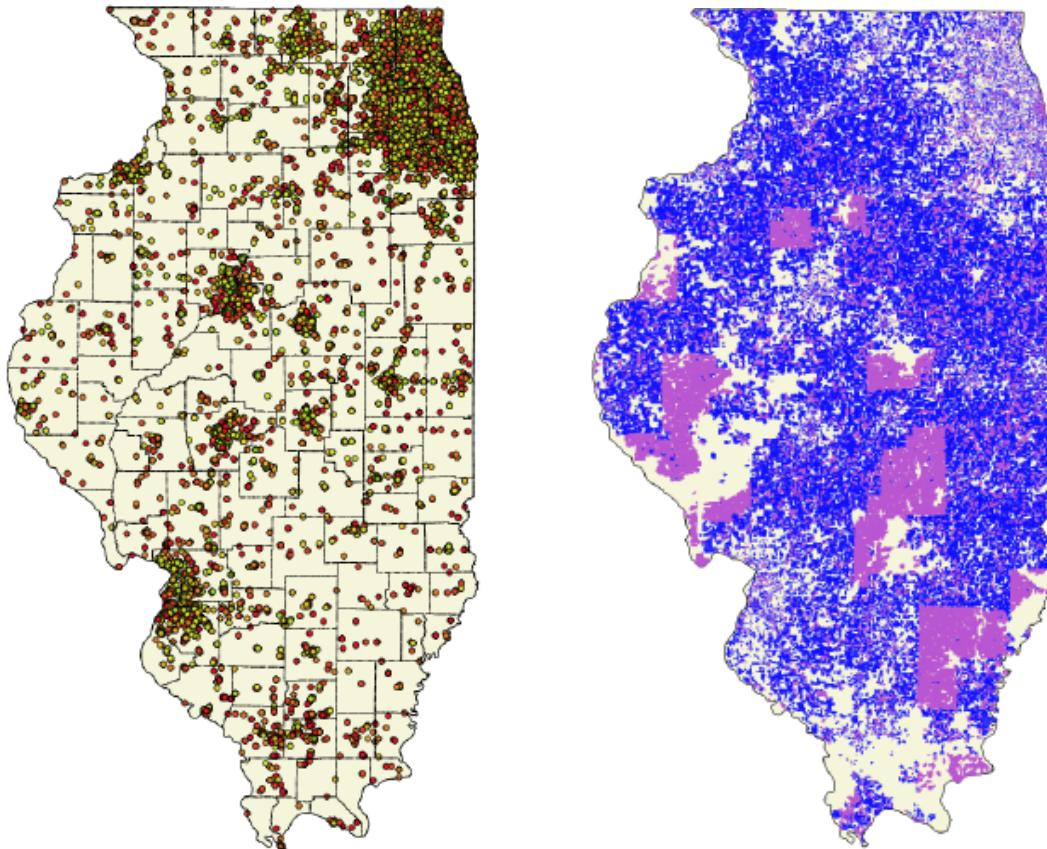
THIRD PARTY DATA SOURCES

PCI published Supply Baseline Study, “Broadband Access in Illinois: A Baseline Snapshot”, that summarized the state of broadband supply in Illinois. The report, a product of data analysis by the PCI data team, aims to quantify what is known about broadband data in Illinois and publish it along with an analysis of Third-Party data sources. An update of this report is under way.

The first method of third-party verification used in this examination was user speed test data through the broadband.gov website. Through this website, the NTIA and the FCC solicited street address information with each speed test. They provided PCI with speed test data gathered over a 12 month period. This has been mapped and some limited studies have been conducted. These speed tests were accompanied by mini surveys which allowed for some analysis. The users were asked to input their street address and the type of internet connection they were using.

The second set of third-party data used for verification in this study was gathered by the Gadberry Company. The Gadberry data is a combination of various user/crowd sourced data sets. They indicate if there is broadband activity at the street address level and they then incorporate that information at the census block level. We have compared blocks showing coverage as stated by the carriers against the user reported information. There are some areas of the state where there are low or no user reported information.

The maps below show these third party data sources projected on a map of Illinois. The map on the left shows the location and results of the FCC speed tests, while the image on the right shows census blocks where the Gadberry dataset did not provide enough results for a significant analysis. On the Gadberry map, census blocks in blue indicate where there is a low sample rate, and census blocks in pink show where no samples were obtained. For more information on these third party data analyses, the Supply Side Baseline report is available on the following PCI website: <http://www.broadbandillinois.org/Research/Infrastructure.html>



ILLINOIS COMMUNITY ANCHOR INSTITUTIONS

PCI has established an ongoing procedure for gathering data on the physical location and broadband connectivity of Community Anchor Institutions (CAIs) in accordance with the data requirements of the SBDD NOFA Technical Appendix.

The table below summarizes the set of data that PCI 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 12,383 – 115 records have been deleted since the last submission cycle as a thorough examination of the database netted a number of duplicate records. This culling out of records has improved the overall quality of the database.

Cat	Oct 2012			April 2012			Oct 2011		
	Total	Connected Points	% with connectivity data	Total	Connected Points	% with connectivity data	Total	Connected Points	% with connectivity data
1	5,302	3,258	61.45%	5,331	3,278	61.49%	5,314	3236	60.90%
2	1,321	703	53.22%	1,338	710	53.06%	1,422	721	50.70%
3	1,336	191	14.30%	1,373	200	14.57%	1,327	138	10.40%
4	2,302	492	21.37%	2,314	496	21.43%	2,319	449	19.36%
5	285	143	50.18%	294	146	49.66%	271	115	42.44%
6	1,520	1,519	99.93%	1,527	1,526	99.93%	1,446	1445	99.93%
7	317	134	42.27%	321	135	42.06%	235	37	15.74%
Totals	12,383	6,440	52.01%	12,498	6,491	51.94%	12,334	6,141	49.79%

In Round 4 PCI made some of the greatest data improvements to the K-12 and library datasets. In Round 5, some of the most substantial increases have occurred within the healthcare, public safety, higher education, and other non-governmental categories. In this submission cycle, PCI focused on updating the library records in our CAI database. Starting out with 1338 records, 17 library records have been deleted as duplicates or as inappropriate records, such as those associated with law firms and private businesses. PublicWifi and URL fields were updated through individually contacting each library. The following table summarizes vast improvements brought about by this effort:

Library Records Update Summary

	R5		R6	
Total Libraries	1338	100%	1321	100%
Public Wifi Yes	96	7.2%	1053	79.7%
Public Wifi No	2	0.1%	133	10.1%
Public Wifi Unknown	1240	92.7%	135	10.2%
Libraries with Websites	80	6%	1050	79.5%

In the next submission cycle, PCI plans to expand our public Wi-Fi dataset, as we are developing a Wi-Fi locator mobile application. The application's dataset is almost identical in structure to that of the CAI database for ease of import.

In the past, the non-governmental anchor institution category included only workforce development centers and other computer training centers. The anchor institutions that are now in category 7 include economic development centers, park districts, farm bureaus, and other community hubs.

PREVIOUS ROUNDS

Outreach in Round 1 focused on collecting the point and address data while subsequent submissions in Rounds 2 & 3 focused heavily on survey development, web site database research and teleconferences. Together with the Illinois Department of Commerce and Economic Opportunity (DCEO), PCI engaged in a process of working with CAIs on an organized basis. Other state agencies and organizations have included the Illinois Commerce Commission, Illinois Board of Education, and the Illinois State Police.

PCI created a survey using Survey Monkey and both carrier and price information were requested, and the speed test became a required item for completion of the survey. The speed test(s) that was administered was the one on the Federal Communications Commission web site.

PCI worked with a number of organizations in gathering data for these submissions. We are encouraged that the relationships with these organizations have continued to develop and facilitate other facets of our organization. These organizations are listed below:

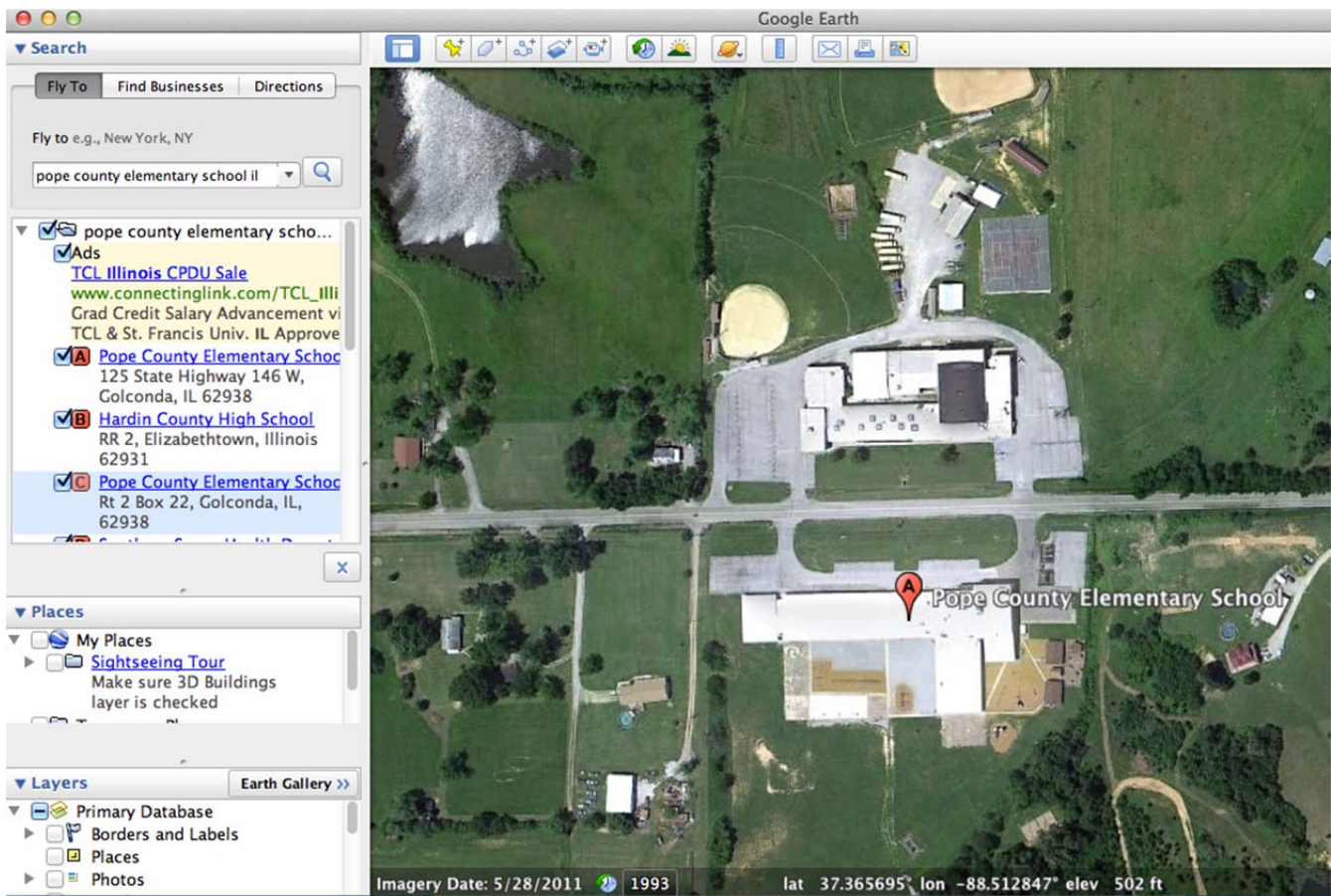
K-12	Illinois Association of Regional School Superintendents, Illinois State Board of Education
Libraries	Illinois Library Association
Healthcare	Illinois Critical Access Hospital Network, Illinois Rural HealthNet, Illinois Healthcare Association
Public Safety	Existing Database
Colleges & Universities	Illinois Community Colleges Board
Other Government	Existing Database
Other Non-Government	Illinois Workforce Development

In Round 4, as opposed to previous rounds where PCI submitted secondary CAI's that did not fit perfectly into NTIA parameters, PCI decided to submit only those CAI's that clearly fell into the seven categories laid forth by the NTIA. This led to a significant decrease in the total number of CAI's submitted, but a significant increase in the quality of the data that was submitted.

For example, of the 26,599 locations submitted in April 2011, there were 14,000 Category 3 Healthcare locations which were geocoded, yet had no connectivity data. Many of these were for actual practitioners as opposed to clinics, or what might be considered institutions. PCI elected to remove this larger number for the October filing. PCI also removed duplicates where they existed in the other categories. For instance, the previous mapping contractor included a record for each individual college and university in both the K-12 and Higher Education categories. PCI felt it made sense to include only one record of this category in only the Category 5 Higher Education category.

Also, in Round 4, PCI enhanced the quality of the data in the K-12 category through the use of an eRate database that showed what schools had applied for the eRate and what providers were servicing their location. This allowed PCI to populate the BBService and TransTech fields for those CAI's.

In Round 5, a total of 787 anchor institutions geocoded to the center of the city due to rural route addresses, PO Box addresses, slight misspellings, and/or incomplete addresses. All 787 of the anchor institutions were individually mapped using Google Earth software. The 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 round 5, the latitude and longitude that was indicated in Google Earth was captured.



Since this process resulted in moving the geometry of the issue CAI points, the associated attribute table XY coordinate pair values were recalculated to accurately reflect the new point locations. Corresponding census block code (FULLFIPSID column) values were likewise recalculated via a spatial join between the CAI points and the 2010 census block layer.

BROADBAND ILLINOIS WEBSITE

The Partnership for a Connected Illinois is constantly expanding and improving our website. Since April of 2012, our additions and improvements include:

- **Coverage crowd sourcing** – When a user searches for available broadband on broadbandillinois.org, carrier information is displayed. Users can now vote with a “thumbs up” or “thumbs down” on the validity of the carrier reported speeds and availability.

Find broadband near you [\(Find me\)](#)

Latitude, Longitude (40.505446,-90.26367)

Not your location? Type a new address in the box above.

3 carriers serve this area

Want better options?
Request better service

Sort by **Fastest** Slowest Carrier Technology

CARRIER	MAX	TYP	MAX	TYP
WildBlue Communications, Inc. Satellite Accurate? <input type="thumbs-up"/> <input type="thumbs-down"/> 1 Yes, 20 No	3-6 Mbps	-- Mbps	1.5-3 Mbps	-- Mbps
U.S. Cellular Cellular Accurate? <input type="thumbs-up"/> <input type="thumbs-down"/> 3 Yes, 0 No	1.5-3 Mbps	1.5-3 Mbps	0.7-1.5 Mbps	0.7-1.5 Mbps
WildBlue Communications, Inc. Satellite Accurate? <input type="thumbs-up"/> <input type="thumbs-down"/> 1 Yes, 20 No	1.5-3 Mbps	-- Mbps	0.2-0.7 Mbps	-- Mbps
Verizon Wireless Cellular Accurate? <input type="thumbs-up"/> <input type="thumbs-down"/> 15 Yes, 13 No	0.7-1.5 Mbps	0.7-1.5 Mbps	0.2-0.7 Mbps	0.2-0.7 Mbps

- **Embeddable Widget** - The addition of an embeddable widget to be placed on any website or blog, and allows anyone to find broadband by entering an address

Broadband Widget

Interested in helping Illinois residents find high speed internet service in their area? PCI wants to help you help others. Just select and copy the code below, and paste it on your blog or website. It's that simple. Have questions? Contact Tara at tara.davin@broadbandillinois.org or (217) 886-4037.

Customize your widget

Width pixels Auto width

Height pixels

Grab the code

Copy and paste this code into your website. Data will be submitted to our servers without taking your users off of your website.

```
<script
src="http://www.broadbandillinois.org/w
idget.js" type="text/javascript">
</script>
<script type="text/javascript">new
BBIL.Widget({width:"250",height:"440"})
</script>
```

Live preview

The live preview shows the widget's user interface. It features the 'broadbandillinois.org' logo, a 'Find Broadband' heading, and a sub-heading: 'Looking for high speed internet in a particular location? Use this widget to get a list of providers that serve that area.' Below this is an 'Address...' input field. A large blue button prompts the user to 'Enter your address above to see broadband carriers in your area.' At the bottom, there are social media sharing options for Facebook and Twitter, and a copyright notice for 2012 Broadband Illinois.

- **Newsletter Pages:** PCI has a weekly newsletter that is sent to a group of broadband enthusiasts and stakeholders. We have devoted a section of our website to these newsletters so that they may be accessible anytime.
- **County Pages:** We have created a page for each and every county in Illinois. These pages contain the latest coverage maps, as well as a link to each carrier page available in that county.

- **Carrier Pages:** We have created a page for each carrier in Illinois. Each carrier page contains the latest coverage maps as well as contact information for each carrier.
- **Maps:** We continue to make more and more of our maps available online. We have added all previous rounds' raw data files and shape files, as well as broadband competition maps, and area ranking maps.
- **Events Page:** Our "Events" page technology has been upgraded to allow for easier downloads through iCal and Google Calendar. Users can also subscribe to specific categories through our RSS feeds.
- **Videos:** We have added multiple videos to our site to allow this additional medium to relay our messages regarding grant opportunities, broadband adoption, and carrier relationships.



Upcoming Additions

- **“Census Block Concept”** - We are currently working on a major upgrade to our website that will allow users to easily search all available data (news, events, training, coverage maps, carrier information, grant and employment opportunities) by region, county, zip code, address or even census block.

Due to the size of Cook County, with this addition each of the 77 Chicago neighborhoods will have their own broadbandillinois.org page where users can find pertinent information for their local area., and not just Chicago-wide data.

- **Blogs** - Each region will have it's own blog, where eTeam coordinators can communicate publicly and private with their volunteers and members.
- **Public Wi-Fi Locations** - PCI has recently been awarded the Institute for Emerging Issues' Rural Digital Advocacy Grant to build a Wi-Fi locator mobile application. We will be collecting data on all public Wi-Fi locations throughout Illinois for the application. This will include private businesses as well as community anchor institutions. Data collected through this effort will also be made available on our website.

- **Raw Data** – The web site provides access to raw, non-confidential data submitted to NTIA as well as analysis data produced in-house.

PCI's web site is built around an open source Application Program Interface. This free tool allows software developers to build upon, and add to, the data on the Broadband Illinois website. Documentation for the PCI's API is available at <http://developer.broadbandillinois.org>.

CONCLUSION

The data submission cycle ending on October 1, 2012, has been the third 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 control over this process, it has brought the data "closer to home" for Illinois. PCI has taken major steps in its three-fold mission to collect and publish broadband data, to ensure broadband access throughout the State, and to maximize broadband's impact, and the data has helped drive each of these steps.