Application to DHCD Submitted through CAMS

Mathews County

Four County ABB Regional 2021

Application ID:	75707132020110133
Application Status:	In Progress - DHCD
Program Name:	Virginia Telecommunications Initiative 2021
Organization Name:	Mathews County
Organization Address:	50 Brickbat Road Mathews, VA 23109-0839
Profile Manager Name:	
Profile Manager Phone:	
Profile Manager Email:	

Project Name:	Four County ABB Regional 2021
Project Contact Name:	Julie Kaylor
Project Contact Phone:	(804) 725-7172
Project Contact Email:	jkaylor@mathewscountyVA.gov
Project Location:	PO Box 839 Mathews, VA 23109-2344
Project Service Area:	Caroline County, Lancaster County, Mathews County, Middlesex County

Total Requested Amount: $5,187,674.00

Required Annual Audit Status: No Current Audits Found

Application to DHCD Submitted through CAMS

Budget Information:

Cost/Activity Category	DHCD Request	Other Funding	Total
Telecommunications	$5,187,674.00	$3,739,200.00	$8,926,874.00
Construction	$5,174,158.00	$3,728,339.00	$8,902,497.00
Construction Related Soft Costs	$13,516.00	$10,861.00	$24,377.00
Total:	$5,187,674.00	$3,739,200.00	$8,926,874.00

Budget Narrative:

This application comes out of a collaboration between Atlantic Broadband (ABB) and the four counties of Caroline, Lancaster, Mathews, and Middlesex. This coalition was created because of the similarities to the challenges they face as rural, coastal Chesapeake Bay communities. Fortunately, Atlantic Broadband has a footprint throughout this region, being the only wireline ISP to provide high-speed connectivity to most of the bigger cities and surrounding areas. Regardless, this does still leave out those communities that are just not economically justifiable to build out. That is why funding opportunities such as VATI are so invaluable. These counties have put in a great deal of legwork to prepare for opportunities like VATI, as they understand the need sufficient, equitable access to broadband holds for the future of their communities. Both Lancaster and Middlesex have established their own Broadband Authorities, while Mathews and Caroline have Broadband Advisory Groups that report to their respective Board of Supervisors. Through their work, they have garnered support from local organizations who also see the need for digital equity. This project intends to serve a total of 54 project areas , with 1,558 passings built to1,518 residences and 40 business buildings. This is Option A of the application. Due to the fact that Lancaster actively has a pending USDA RUS ReConnect application in review, they might withdraw from this application. This creates Option B, which has 31 project areas with 1,061 passings, made up of 1,034 residences and 27 businesses. This creates a different VATI funding request for each option. The counties will provide $1,200 per number of passes in their respective areas, with ABB matching that amount. Option A asks $5,187,647.00 (58.11% of total project cost) from DHCD, with the counties/ABB providing $3,739,200.00 (41.89%). The total request for Option B is $3,116,762.00 (55.04%), with the committed funding at $2,546,400.00 (44.96%).

Questions and Responses:

1. Project Description and Need

   Describe why and how the project area(s) was selected. Describe the proposed geographic area including specific boundaries of the project area (e.g. street names, local and regional boundaries, etc.). Attach a copy of the map of your project area(s). Label map: Attachment 1 – Project Area Map.

Answer:

At this time, ABB has substantially complied with Virginia's 30-homes-per-mile mandatory service requirement, while also responding to customer requests for service. However, they are not obligated to expand their physical plant in lower density areas. A successful award of this grant would prove a saving grace for these unserved communities, as the counties and ABB are prepared to contribute $1,200 per pass for all new construction. These projects can be seen in Attachment 1 – "Project Area Maps". The maps show ABB's existing network in blue, and planned expansion in red. Detail regarding each counties' project areas are as follows:

Caroline

Caroline County is one of the last mostly rural counties located between the two large metropolitan areas of Washington D.C. and Richmond, Virginia. Those surrounding areas are also well known globally for being high-tech data hubs that attract huge businesses for the quality of their connections, which can be challenging in many large portions of the county.

Each of the homes and businesses that Caroline is hoping to serve in their two project areas currently have no service available to them.

The western project area contains homes that are spread out over a wide area that lies directly between Comcast and Atlantic Broadband. Comcast does not provide service in the county east of I-95, which is where both project areas reside. Numerous attempts have been made to have Comcast expand current service into this area, but they have denied the request each time. Fortunately, Atlantic Broadband has been willing in this regard.

The eastern project is separated by Fort A.P. Hill. Providers are forced to "pipe" service into this area across the Rappahannock River from King George County. Among other things, the size of the fort and the restrictions on road shoulder access make bringing broadband in from Bowling Green next to impossible. A small portion of this region is currently served by ABB; however, in order to expand service to the unserved area, the backbone must be upgraded. The proposed project would complete that upgrade and cover unserved areas both north and south of the town of Port Royal. Otherwise, it will be several years before these citizens will ever see internet availability. This area has a topography that would not allow fixed wireless to serve every home.

Lancaster

Since the beginning of this Century, residents of Lancaster County have suffered from a chronic loss of economic opportunities. Since 2008, the County has experienced a sustained downward trend in real estate values and has also observed differential educational outcomes for its K-12 students, 73% of whom qualify for free or reduced-price school lunch. These issues are exacerbated by lack of broadband access. In response, the Lancaster County Board of Supervisors formed a Broadband Authority in July of 2018. The Lancaster County Broadband Authority (LCBA) secured a Telecommunications Planning Grant from DHCD and embarked on a process to determine the exact needs to provide internet to the 44% of County residents who are unserved. With the Center for Innovative Technology (CIT), LCBA examined all aspects of the available services and documented their deficiencies.

To address the situation, LCBA set priorities based on extensive analyses. The Authority divided the county into three regions based multiple factors, such as existing service, if any. Region 3 is the Southwestern portion of the County where the majority of these proposed projects take place. Region 3 includes 23 separate pockets of unserved residents. These residents are living on what are essentially "islands" cut off from ABB service by water. The best way to connect all these "islands" is for ABB to "build the bridge" and fill in the gaps. Accordingly, this VATI grant request is for that purpose. Universal coverage in this area will allow Lancaster to concentrate its next efforts on Regions 1 and 2, where service is virtually non-existent.

Mathews and Middlesex

Mathews County is a small spot of land on the Chesapeake Bay with less than 9,000 people. Middlesex is similarly positioned, being the neighbor to the north. Middlesex also has a relatively small population of less than 11,000 people. Their heritages are deeply rooted in water-based businesses: seafood, aquaculture, boatbuilding, seafaring, merchant mariners and ship captains. While this geography adds a character to the counties, it also creates some issues in providing adequate broadband services to areas that have challenging terrain and cost prohibitive buildouts relative to the density served.

In response to citizen outcry, the Mathews Broadband Advisory Board (BAB) was appointed by a resolution from the Board of Supervisors (BoS) and directed to search for high-speed solutions for Mathews County. Early on, a survey was sent out which had a 28% return rate. It reported that 45% needed new or improved broadband service and 19% had tried and were unable to get it. Disregarding the overrepresentation of the FCC report, Microsoft's data showed access at 25 Mbps was close to 19% based on their monitoring of actual usage. The vote to unanimously approve this application is a long way from the hard-fought three votes of approval for $18,000 that was seen last year.

Middlesex County does not differ much, having suitable access in most of the county, but a steep drop-off in many of the outlying pockets. The Middlesex Broadband Authority was formed in early 2018 and has enacted some initiatives to combat the lack of access, such as Middlesex Surfs and open Wi-Fi hotspots around the county. While these initiatives are helpful, they still require too much of the citizens' resources.

Through this collaborative effort, ABB has been very open to redesign and revamp plans in order to reach as many neighborhoods as possible. Providing service to these areas without assistance would be difficult and add years to the build-out. With VATI assistance, that is a different story. It is worth noting that none of the counties participating in this project have received federal funding for upgrading their infrastructure to serve those without access. Providing this level of access would be the only way to truly achieve what was set out in these counties' strategic plans and futureproof the region so broadband is no longer a barrier to overcome.

2. List existing providers in the proposed project area and the speeds offered. Please do not include satellite. Describe your outreach efforts to identify existing providers and how this information was compiled with source(s).

Answer:

The predominant wireline terrestrial service provider in the four counties is Atlantic Broadband. DSL coverage, as well as cell phone and satellite coverage are available, but these media do not meet the existing standards of adequate broadband access. Caroline County has services from Comcast and Verizon FIOS is parts of the county, but not in the proposed project areas. In Lancaster County there are also two nominal wireless providers, but neither provides service that is recognized by the FCC. Signa Wave is an unlicensed provider that broadcasts in scattered locations around the County, but does not have a significant presence in Region 3. Virginia Broadband, a WISP that broadcasts from a tower located on the Eastern Shore, claims to provide service at "up to 25/3Mbps," but InternetAdvisor.com, an independent internet location and rating service, lists Virginia Broadband speed in Lancaster County at 3 Mbps asymmetrical service. This is further documented in the most recent FCC maps published for the counties, which does not show any broadband service available in the areas of the counties which are not receiving service from ABB.

Also used for this analysis was the website BroadbandNow.com. This website is similar to InternetAdvisor.com in that it displays the available providers in the proposed project areas (see Attachment 3 – "Documentation Unserved VATI Criteria"). This reinforces the common theme that ABB is the only wireline provider in these areas, and subsequently, the only provider of adequate services for VATI criteria (25/3Mbps).

This data was corroborated by each county in this application. The selected areas that display the provider popups were all chosen because they were green, listing three providers in the area. This is the most any county listed, usually in the highest population areas. The only non-satellite provider was Verizon fixed wireless. Similarly to Virginia Broadband, the effective speed that was reported from their own website was not as advertised – it was only 3 Mbps, which can be seen at the end of Attachment 3.

For Lancaster, the ReConnect grant application included the same area that is currently the subject of this VATI application, which was unchallenged.

3. Describe if any areas near the project have received funding from federal grant programs, including but not limited to Connect America Funds II (CAF II), ACAM, ReConnect, and Community Connect. If there have been federal funds awarded near the project, provide a map verifying the proposed project area does not conflict with these areas. Describe if there are Rural Digital Opportunity Fund (RDOF) eligible census blocks located in the proposed project area. Label Map: Attachment 2 – Documentation on Federal Funding Area.

Answer:

Attachment 2 shows all of the listed funded areas through web tools that aggregate this information in one source. The first is from the USDA's Telecommunications program. It displays Reconnect awards, Community Connect awards, and CAF2 awards, all which can be seen to have no polygons in any of the applying counties. The second is from the Universal Service Administrative Company, which administers the Universal Service Fund under guidance of the FCC. This presents both CAF2 and A-CAM awards, and in a similar fashion, no counties on this application have received funding from these programs. As mentioned earlier, these counties have not received any money for providing access to unserved areas.

Section 3 shows the RDOF eligible census block groups, which a majority of proposing areas have overlap. Because of how these RDOF areas were determined (not served by incumbent price cap carrier or an unsubsidized competitor with adequate service), it provides reassurance that most of these project areas are eligible for the VATI funds. Further, none of the counties have applied for funding from this auction.

4. Overlap: To be eligible for VATI, applicants must demonstrate that the proposed project area(s) is unserved. An unserved area is defined as an area with speeds of 25/3 mbps or less and with less than 10% service overlap within the project area. Describe any anticipated service overlap with current providers within the project area. Provide a detailed explanation as to how you determined the percentage overlap. Label Attachment: Attachment 3 – Documentation Unserved Area VATI Criteria.

Answer:

ABB is the only wire line service provider in the area proposed for the VATI funding, which as referenced earlier, can be seen in attachment 3. Because ABB is also the proposed VATI partner, and they are expanding their network to areas that currently do not have access, it is seen that there is no overlap. Virginia Broadband and Verizon, which claim to provide wireless service and high-speed DSL in the area, are non-factors, as discussed in question 2 above.

5. Total Passings: Provide the number of total serviceable units in the project area. Applicants are encouraged to

prioritize areas lacking 10 Megabits per second download and 1 Megabits per second upload speeds, as they will receive priority in application scoring. For projects with more than one service area, each service area must have delineated passing information. Label Attachment: Attachment 4 – Passings Form

a. Of the total number of passings, provide the number of residential, business, non-residential, and community anchors in the proposed project area. Describe the methodology used for these projections.

b. Provide the number of serviceable units in the project area that have 10/1 mbps or less. Describe the methodology used for these projections.

Answer:

The number of passings broken down can be seen in Attachment 4 – Passings Form. The VATI grant request is to fund the completion of ABB coverage in the four counties, filling in all service gaps by eliminating islands while serving 1,518 additional households and 41 brick-and-mortar businesses passings.

Virginia Broadband and Verizon claim to have service in the area, but no documentable adequate service has been found. All of the passings are currently served only by cell phone and/or satellite service providers. Because these are not considered for the purposes of the VATI grant, all the proposed passings are currently receiving less than 10/1 mbps.

The maps included as Attachment 1 and Attachment 3 show existing and proposed ABB coverage in these counties. Existing service is shown in blue and the newly covered areas are red and starred in the former. Passings were determined by up-to-date records of GIS address data shared by the counties and verified by ABB, while businesses were determined by existing master business lists and cross referencing with the proposed areas. ABB reviewed all the service it offers in the project areas and validated the number of passings with field checks for each proposed service addition. Homes located on roads that have ABB cable installed at the curb were considered to have service, whether they subscribe or not. Homes on roads where no ABB cable is currently installed were considered not to have service.

6. For wireless projects only: Please explain the ownership of the proposed wireless infrastructure. Please describe if the private co-applicant will own or lease the radio mast, tower, or other vertical structure onto which the wireless infrastructure will be installed.

Answer:

N/A

7. Speeds: Describe the internet service offerings, including download and upload speeds, to be provided after completion of the proposed project. Detail whether that speed is based on dedicated or shared bandwidth, and detail the technology that will be used. This description can be illustrated by a map or schematic diagram, as appropriate. List the private co-applicant’s tiered price structure for all speed offerings in the proposed project area, including the lowest tiered speed offering at or above 25/3 mbps.

Answer:

The counties are committed to making the best possible use of the public funds that will be invested in broadband infrastructure expansion. It is axiomatic that the demand for speed and capacity is growing exponentially. For this reason, ABB and the four counties have expressed their intention to invest in state-of-the-art technology, fiber-to-the-home. All parties recognize that this will be more costly to install, but when investing public funds, long term outcomes must be considered. Below are the service packages to be offered through this expansion, and an explanation of services:

Essentials: (30 Mbps Download / 5 Mbps Upload) - $54.99*

Essentials Plus: (50 Mbps Download / 6 Mbps Upload) - $69.99*

Advanced: (100 Mbps Download / 15 Mbps Upload) - $79.99*

Premier: (250 Mbps Download / 20 Mbps Upload) - $94.99*

Extreme: (400 Mbps Download / 20 Mbps Upload) - $99.99*

GigaEdge: (1 Gbps Download / 50 Mbps Upload) - $124.99*

* Rates effective September 1, 2020. There is an unpublished package for documented low-income families.

The above rates are the published ones reported to the FCC and Franchise Authorities. There are multiple discounted offers (door-to-door, call center, online) that are lower than these published rates. As these projects are completed, ABB's intention is to use door-to-door sales and Direct Mail with varying discount offers.

While Middlesex County and Lancaster County do not have the GigaEdge product available within the existing footprint due to pending Network Upgrade spread over multiple years, the new build within the stated Project Areas in these two counties will be able to receive the GigaEdge product.

A $10 per month discount is available if the customer signs up for AutoPay and an annual contract, except for the Essential package above, for which AutoPay and an annual contract are not applicable.

Additionally, ABB has Enterprise level services via Direct Internet Access (DIA), with symmetrical speeds from 10 Mbps to 100 Gbps (determined by the end user). This service is scalable, and 100% fiber based, and proactively managed and monitored 24/7/ 365 and backed by competitive network and service SLAs.

ABB utilizes fiber connectivity from a minimum of six Internet peering points: Ashburn, VA; Boston, MA; New York City, NY; Atlanta, GA; Pittsburgh, PA and Philadelphia, PA. The peering points are used in support of ABB's Virginia system to provide broadband service to the Northern Neck and Middle Peninsula.

8. Network Design: Provide a description of the network system design used to deliver broadband service from the network's primary internet point(s) of presence to end users, including the network components that already exist and the ones that would be added by the proposed project. Provide a detailed explanation of how this information was determined with sources. If using a technology with shared bandwidth, describe how the equipment will handle capacity during peak intervals. For wireless projects, provide a propagation map for the proposed project area with a clearly defined legend for scale of map. Label Map: Attachment 5 – Propagation Map Wireless Project.

Answer:

The Network System Design varies depending on the location:

PLAN “A”

1. Lancaster County existing network consists of Hybrid Fiber Coaxial (HFC).
    1. Proposed Network Design:Combination of FTTH (Fiber-To-The-Home), HFC (Hybrid Fiber Coaxial) and RFOG (Radio Frequency Over Glass).
    2. Length:57.52 Miles (303,698’)
    3. Passings:497 total consisting of 484 Residential + 13 identified Business passes.

2. Middlesex County existing network consists of HFC (Hybrid Fiber Coaxial).
    1. Proposed Network Design:Combination of HFC (Hybrid Fiber Coaxial), RFOG (Radio Frequency Over Glass) and FTTH (Fiber-To-The-Home).
    2. Length:15.46 Miles (81,607’).
    3. Passings:147 total consisting of 147 Residential.

3. Mathews County existing network consists of Hybrid Fiber Coaxial (HFC).
    1. Proposed Network Design:Combination of HFC (Hybrid Fiber Coaxial), RFOG (Radio Frequency Over Glass) and FTTH (Fiber-To-The-Home).
    2. Length:40.47 Miles (213,688’).
    3. Passings:402 total consisting of 397 Residential + 5 identified Business passes.

4. Caroline County existing network consists of FTTH (Fiber-To-The-Home).
    1. Proposed Network Design:Combination of FTTH (Fiber-To-The-Home) and HFC (Hybrid Fiber Over Glass).
    2. Length:49.65 Miles (262,173’).
    3. Passings:512 total consisting of 490 Residential + 22 identified Business passes.

Total 4-County Project: 163.10 Miles (861,166’) Passing 1,518 Residential + 40 Businesses

The Network System Design varies depending on the location:

PLAN "B"

1. Middlesex County existing network consists of Hybrid Fiber Coaxial (HFC).
    1. Proposed Network Design:Combination of HFC (Hybrid Fiber Coaxial), RFOG (Radio Frequency Over Glass) and FTTH (Fiber-To-The-Home).
    2. Length:15.46 Miles (81,607').
    3. Passings:147 total consisting of 147 Residential.
2. Mathews County existing network consists of Hybrid Fiber Coaxial (HFC).
    1. Proposed network Design:Combination of HFC (Hybrid Fiber Coaxial), RFOG (Radio Frequency Over Glass) and FTTH (Fiber-To-The-Home).
    2. Length:40.47 Miles (213,688').
    3. Passings:402 total consisting of 397 Residential + 5 identified Business passes.
3. Caroline County existing network consists of FTTH (Fiber-To-The-Home).
    1. Proposed Network Design:Combination of FTTH (Fiber-To-The-Home) and HFC (Hybrid Fiber Coaxial).
    2. Length:49.65 Miles (262,173').
    3. Passings:512 total consisting of 490 Residential + 22 identified Business passes.

Total 3-County Project: 105.58 Miles (557,468') Passing 1,034 Residential + 27 Businesses

9. Project Readiness

Describe the current state of project development, including but not limited to: planning, preliminary engineering, identifying easements/permits, status of MOU or MOA, and final design. Prepare a detailed project timeline or construction schedule, identifying specific tasks, staff, contractor(s) responsible, collection of data, etc., and estimated start and completion dates. Applicants must include Memorandums of Understanding (MOUs) or Memorandums of Agreement (MOAs) between applicants (drafts are allowable). Label Attachments: Attachment 6 – Timeline/Project Management Plan; Attachment 7 – MOU/MOA between Applicant/Co-Applicant.

Answer:

Attachment 6 is a project timeline developed by ABB that details the process of implementing the network expansion for each county. The preliminary 30% design has been completed, with routes shown in Attachment 1. Before award of the grant, ABB will conduct a walkout of project areas to verify the pre-engineering and make the steps necessary to formulate a full engineering design. Middlesex and Lancaster's design and permitting process will begin two months prior to the rest, which will be concurrent with selection of the contractors in each county. This step is contingent on receiving notification of award by the start of the year, January 1, 2021. Construction is projected to start March/April 2021. Construction end date and close of project are estimated to be September 1, 2022. All services will be available to residents by or before that projected date unless ABB encounters any unforeseen issues with pole owners or other third parties beyond its control.

A Memorandum of Agreement has been drafted and will be signed by all parties after all terms of the agreement have been properly vetted by each signer, and a final version has been agreed upon. Included as Attachment 7 is the current draft of this agreement as of submittal. The finalized, signed version will be sent to DCHD upon completion. ABB has provided an agreement to participate and an agreement to fund, the former being attached in the optional section, and latter in Attachment 9.

10. Matching funds: Complete the funding sources table indicating the cash match and in-kind resources from the applicant, co-applicant, and any other partners investing in the proposed project (VATI funding cannot exceed 80 percent of total project cost). In-kind resources include, but are not limited to: grant management, acquisition of rights of way or easements, waiving permit fees, force account labor, etc. Please note the a minimum 20% match is required to be eligible for VATI, the private sector provider must provide 10% of the required match. If the private co-applicant's cash match is below 10% of total project cost, applicants must provide financial details demonstrating appropriate private investment. Label Attachments: Attachment 8 - Funding Sources Table; Attachment 9 – Documentation of Match Funding.

Answer:

ABB and each county have committed to provide $1,200 per pass for this project. The counties plan to continue their involvement in the project to document and keep the public informed about performance. The counties will also make every accommodation within its jurisdictional ability to facilitate the project's completion. The letters from county administrators are attached.

11. Leverage: Describe any leverage being provided by the applicant, co-applicant, and partner(s) in support of the proposed project.

Answer:

Collectively, these counties leverage a number of activities that pertain to providing high speed internet. Combined there are years of developing and mapping many of the datasets required to submit, manage, and maintain grant funded infrastructure upgrades to the areas identified in Attachment 1 – "Project Area Maps". In an effort to support grant submittals, county GIS Managers have created multiple datasets (e.g., student locations, parcel values by regions, ABB fiber/coaxial infrastructure, residents with copper/fiber, preliminary designs with costs, etc.) that can be used in this effort. Plenty of prior work has been done by each counties' broadband steering groups to provide studies and strategic plans for guiding the best approach to expand broadband services.

The counties leverage their economic investment to provide a sizable match to ABB for their portion of this multimillion-dollar project. A significant investment by the county helps ensure that the project will be completed on time and within budget by utilizing county resources (i.e. administrative, management, financial) to execute the contract.

As an in-kind contribution, the Counties offer the services of their broadband boards/authorities to continue throughout the project. The counties will remain active throughout the project's construction and implementation phases. They will also assist ABB with its marketing, as described in the next section. If requested by ABB, the counties will provide in-kind assistance. Board members are also exploring potential funding sources, such as the FCC's Lifeline Program, which may help citizens afford the monthly connection cost.

Atlantic Broadband understands that in order to complete a project of this magnitude, it will need to begin make-ready work before the grant is formally approved. The value of ABB's efforts to prepare for the work needed by ordering materials and beginning make-ready work will be included as leverage in anticipation of approval.

12. Marketing: Describe the broadband adoption plan.

a. Explain how you plan to promote customer take rate, including marketing activities, outreach plan, and other actions to reach the identified serviceable units within the project area. Provide the anticipated take rate and describe the basis for the estimate.

b. Describe any digital literacy efforts to ensure residents and businesses in the proposed project area sufficiently utilize broadband. Please list any partnering organizations for digital literacy, such as the local library or cooperative extension office.

Answer:

ABB implements numerous activities to advertise broadband capabilities to residents. During the construction phase, ABB will place a door hanger at each home notifying residents of the construction planned in their area to offer ABB service. They will use various communication activities to notify residents of availability. These can include door hangers, direct mail pieces and visits by an ABB Direct Sales Representative to residents' homes to review products and pricing and the option to subscribe to a service. Once service is established, ABB may communicate through many media types such as video, radio, print, paid social, web banners, FSI and direct mail. Because there is currently no service to any of these project areas, and many of them also are close to areas that do have existing ABB service, this type of outreach should be effective in informing anyone who wants to have broadband access, but currently doesn't. It is estimated by ABB, based on past trends, that there will be a 50-60% take rate in these project areas over two years from activation.

The counties have their own approaches to community outreach and digital literacy. They will assist in marketing by providing the information needed to make contact with new potential subscribers, and will mount outreach campaigns to inform the public at large of the VATI grant.

Mathews has outlined a broad strategy that will serve to educate those who will positively benefit from the new access. First, schools must push to educate parents, students, and teachers in the intricacies of virtual remote learning. Teachers and students can facilitate this process by holding forums and sharing actions and findings. Hiring educators that can conduct training to other teachers and students while reaching out to other school systems who have had success to share strategies will also be implemented.

Second, citizens who work from home (those who do, those who have tried to, those who would like to); address them and the options in an open forum with all interested/concerned. Presenters will be those who actively do so successfully. Based on demand, organize training sessions, and ask companies that allow work from home to come in and do training.

Third, local businesses can meet with business owners of all sizes and explore their needs. What do they need to be able to work in a pandemic situation? What do they need to know to expand their business using broadband? Working with the Chamber of Commerce, sessions can be conducted for local business owners.

Fourth, for all citizens who are interested in tele-health: hold multiple forums with presenters from local home health care providers, pharmacists, and physicians. Contact regional hospitals to bring in tele-health specialists to be presenters and to provide training.

This framework can be adopted, not only to the other counties in this application, but other rural counties who find themselves with increased access, or even an overwhelming interest from their constituents. One of the major outcomes of preparing a successful VATI application is that local organizations start mobilizing to fill the gaps in need for these types of endeavors. For example, Mathews has had digital literacy and training efforts through their local libraries. Since the announcement of this year's intent of application, a partnership has formed between Mathews' and Gloucester's two library systems to strategize on how they can collaborate to revive digital literacy efforts, with a push to involve more counties in progress.

The Lancaster Community Library already offers digital literacy classes free to County residents. In addition, there are 20 computers for community-use free of charge. LCBA is committed to continuing and expanding these efforts.

In Caroline County, for several years, the Caroline Library has offered digital literacy training to citizens. Caroline County IT plans to partner with The Caroline Library, a County-operated library system, and the Caroline County Sheriff's department to assist in offering online safety education to its citizens through a combination of in-person training when current COVID restrictions are lifted, and through remote webinars that can be viewed on smart phones where service is available.

13. Project Management: Identify key individuals who will be responsible for the management of the project and provide a brief description of their role and responsibilities for the project. Present this information in table format. Provide a brief description of the applicant and co-applicant's history and experience with managing grants and constructing broadband communication facilities. Please attach any letters of support from stakeholders. If applicant is not a locality(s) in which the project will occur, please provide a letter of support from that locality. Attachment 10 – Letters of Support.

Answer:

Atlantic Broadband Project Management Team

Name	Organization	Role
Danny L. Jobe	Atlantic Broadband	Vice President of Operations
William Newborg	Atlantic Broadband	Director of Grants and Funding
Michael Scott	Atlantic Broadband	Construction Supervisor

David Sadler	Caroline County	County Representative
Cassie Thompson	Lancaster County	County Representative
Judy Rowe	Mathews County	County Representative
Kevin Gentry	Middlesex County	County Representative

Bios for everyone listed can be viewed in Attachment 17 - "Personnel Bios".

Atlantic Broadband History and Experience in Constructing Broadband Facilities

ABB has been in operation since 2004, though it can trace its origins back many decades through the companies it has acquired. It is a subsidiary of Cogeco Cable Inc. (TSX: CCA), the 8th largest cable operator in the United States. The company provides TV, Internet, Phone and Enterprise business services to more than 450,000 business and residential customers located in eleven states: Connecticut, Delaware, Florida, Pennsylvania, Maine, Maryland, New Hampshire, New York, South Carolina, Virginia, and West Virginia.

In the past two years, ABB has successfully completed over 160 miles of new HFC and/or FTTH construction to previously unserved areas in the Virginia market alone. It has extensive experience constructing, operating, and managing state-of-the-art broadband networks.

The company currently provides broadband connectivity in Caroline, Essex, King George, King William, King & Queen, Lancaster, Mathews, Middlesex, Northumberland, Richmond, and Westmoreland Counties.

In addition, ABB provides commercial and enterprise services to many of the schools, government entities, as well as many of the small and medium sized businesses in the local Virginia market.

14. Project Budget and Cost Appropriateness

Budget: Applicants must provide a detailed budget that outlines how the grant funds will be utilized, including an itemization of equipment, construction costs, and a justification of proposed expenses. If designating more than one service area in a single application, each service area must have delineated budget information. For wireless projects, please include delineated budget information by each tower. Expenses should be substantiated by clear cost estimates. Include copies of vendor quotes or documented cost estimates supporting the proposed budget. Label Attachments: Attachment 11 – Derivation of Costs; Attachment 12 - Documentation of Supporting Cost Estimates.

Answer:

Budget and cost estimates are attached in Attachment 12 - "Documentation of Supporting Cost Estimates". These are based off of site evaluations that ABB have completed in the past while they were surveying these areas as possible future expansion sites. This attachment has an overview of cots per each county, then costs broken down by what is required for each individual project area.

15. The cost benefit index is comprised of three factors: (i) state share for the total project cost, (ii) state cost per unit passed, and (iii) the internet speed. From these statistics, individual cost benefit scores are calculated and averaged together to create a point scale for a composite score. Provide the following:

a. Total VATI funding request
b. Number of serviceable units
c. Highest residential speed available in proposed project area

Answer:

1. Option A: $5,187,674; Option B: $3,116,762
2. Option A: 1,558; Option B: 1,061
3. Both Options: 1 Gbps Down/50 Mbps Up

16. Commonwealth Priorities

Additional points will be awarded to proposed projects that reflect Commonwealth priorities. If applicable, describe the following:

a. How the proposed project fits into a larger plan to achieve universal broadband coverage for the locality. Explain the remaining areas of need in the locality and a brief description of the plan to achieve universal broadband coverage.

b. Businesses, community anchors, or other passings in the proposed project area that will have a significant impact on the locality or region because of access to broadband.

c. Unique partnerships involved in the proposed project. Examples include electric utilities, universities, and federal/state agencies.

d. Digital equity efforts to ensure low to moderate income households in the proposed project area will have affordable access to speeds at or above 25/3 mbps.

Answer:

A big factor with rural connectivity is that it depends primarily on real estate taxes for revenue. With such limited funds, all the essential services that the county provides must be taken into consideration. This brings up a difficult problem in that either these counties must cut services to fund broadband or raise real estate taxes on those who are financially vulnerable. There is a similar problem for private entities that offer broadband services in that the customer base and revenue models are not sufficient enough to justify the very significant investment required to install new physical plant. The opportunity of VATI support for collaborative efforts between these entities is just the first, albeit crucial, step in a larger approach of addressing the unserved and upgrading overall infrastructure to be suitable for decades to come.
This project is complementary to the regions' larger plan to bring universal broadband access to each county. Attachment 3 shows eligible RDOF census blocks, illustrating the unserved areas that will remain after this

project. Assuming this application is approved, the counties will turn their attention to servicing these areas, some of which are as densely populated as those currently connected. Through the direction of their broadband committees, these counties will continually be pursuing opportunities to help reduce the cost of expansion.

In Lancaster's case, they will revise this year's ReConnect grant application to resubmit next Spring. This revised application will be even stronger than the current proposal because the areas to be served will be 100% rural. This will be a similar case with Caroline and Middlesex and their future funding applications, as after this project, the remaining areas will be those that are mostly far away from any kind of service. It is also likely that they will pursue a multi-pronged grant strategy by submitting a 2022 VATI application for the remaining areas.

In terms of county specific efforts, the BoS for both Caroline County and Mathews County have established a Broadband Committee to act in an advisory capacity. Middlesex and Lancaster have both created their own Broadband Authority vested with the powers outlined in Virginia Code at sections 15.2-5431. These groups meet often and have established individual Broadband Strategic Plans that will be part of a larger comprehensive plan. Each entity has also conducted their own outreach surveys that show overwhelming favor and enthusiasm for expanded access.

The project areas in all four counties also contain churches, agri-business, and other parties that would benefit greatly from a quality internet connection. Strategically, this expansion would also a quality backbone within reach of areas that are also in need of broadband service. It would also bring additional fiber into each of the four counties that will support ABB's next level of expansion.

Fortunately, many of the counties' main community anchor institutions are already served with ABB. However, here are some of the proposed service additions that will have a significant economic impact:

- Two service additions cover 38 vacant lots located in nascent housing developments that have languished because of general economic malaise, contributed to by the lack of internet availability.
- Another service addition covers three apartment buildings that are comprised mostly of short-term vacation rentals that will increase in value when internet is provided. These three passings will serve 24 units in this development.
- Additionally, one of the passings is for a property that is zoned for commercial development as an industrial/technology park. This property too has been underutilized because of the lack of internet and it will be an anchor institution of the future if service is provided.
- The tax revenue from so many properties will be significant in small counties such as these.

Also noteworthy are budding partnerships in two of the counties in this application. The Chesapeake Bay and Rivers Realtors Association (400 members in this region and including all of these counties) has reached out to Mathews County to work towards finding solutions to the lack of access due to the concern of its impact on home sales. Additionally, Middlesex County has a campsite that is frequently used to hold various public and secular events throughout the year, including the Attorney General sponsored Virginia Rules, which is an important outreach program for youth development. This has been one of many factors in local law enforcement getting involved in partnering with the Middlesex Broadband Authority.

It is also worthwhile to mention that ABB has shown great enthusiasm in helping the counties achieve their overall broadband goals. From inception, ABB has been flexible in this initiative by considering the needs of each county in their approach. More so, ABB is considered a committed municipal and economic partner, and as part of that commitment ABB shall install extra backbone capacity throughout its system, in anticipation of future economic growth and projects within the partner counties.

ABB will be encouraged to make the most beneficial pricing available and to offer introductory rates. All parties are most interested in assisting low-income residents, particularly families with school age children, to afford internet service. ABB has an unpublished list of prices for internet service that is available for documented, qualified low-income residents. The counties' respective broadband groups will work to identify these residents to assist in their access to broadband.

In order to address digital equity, the Middlesex Broadband Authority created a program called Middlesex Surfs. Its mission is to fund capital installation costs through generous low interest loans based on the idea that if a customer were able to finance the hookup, they could more easily afford the cost of subscribing. With grant funding, the expansion will drastically reduce the number of businesses and residents who have to rely on this option. While still not the perfect solution, this model can be replicated throughout the region in between grant initiatives.

Senator Mark Warner's staff is working with the counties to provide the information about the Lifeline Program, aiming to make available a low-cost package for broadband service to those who qualify.

17. Additional Information

17. Provide any other information that the applicant desires to include. Applicants are limited to four additional attachments.

Label Additional Attachments as:
a. Attachment 13 – Two most recent Form 477 submitted to the FCC or equivalent
b. Attachment 14 – XXXXXXX
c. Attachment 15 – XXXXXXX
d. Attachment 16 – XXXXXXX
e. Attachment 17 – XXXXXXX

Answer:

This section details specific challenges faced by the applying counties and anecdotes from citizens affected by lack of access:

The need for broadband has increased to a critical level since the spread of COVID-19, with people being encouraged to stay at home and socially distance, making quality broadband as important as electric and telephone coverage.

Many homes in the Chesapeake Bay region are secondary residences. Anecdotal information suggests that many of those owners would move here full-time if they could get reliable broadband. That was before COVID-19; now it is even more in demand. One stakeholder on the Mathews' BAB works for a D.C. company, lives in Middlesex, and works from her son-in-law's church in Mathews. A new full-time resident in White Stone rents space at a local art gallery because she has no internet at home. Another White Stone resident who owns a home-based business conducts his business between 2 a.m. and 6 a.m. because that is the only time of day his satellite service delivers a full-strength signal and data caps are lifted. There are similar reports in each of the four counties.

Tele-medicine/tele-health have also been highlighted as necessary, especially due to the impacts of COVID-19. A home health care worker in Mathews has reported on how difficult it is to treat and monitor patients without broadband, even with her high-tech equipment supplied by the regional hospital. She often has to go back to her home office and log in to access doctors and records. Upon hearing her story, the technology specialist from the library reported that he sees many home health care nurses come into the library daily to utilize their services.

This problem also extends into the education system. Plans approved by Caroline County school officials will require that all public-school students attend class remotely this fall. It is estimated that as many as 33% of all student homes have no broadband service. Based on several surveys by the Mathews County Public School system, 10% of families with school age children have no connection, and there are about 30% who do not have sufficient connection to do schoolwork.

For many teachers, video lessons are impossible to create and upload, and the same is true for students trying to stream courses. Quality broadband connections are currently only available in the more densely populated parts of the county. This leaves large swaths students without adequate access to continue their education during this era of social distanced education. It is estimated that 39% of homes in Caroline's project area house public school students. Lancaster's project will provide service to 73 K-12 students who currently have none.

This anecdote from a teacher in Middlesex illustrates both sides of the problem well:

"I am an administrator at Middlesex County Public Schools. To be effective at my job, I must be available outside of working hours[…]. Unfortunately, the amount of work I can do for my students and staff is limited to the internet I can get on my phone. […] I cannot work in many databases from my phone, so I often find myself going into school to use the internet. Oftentimes, I will end up doing work twice, once in an offline spreadsheet and then transferring to online portals. My students participate in online learning, and it is ironic that I am unable to rely on internet to the level in which the programs are intended. I preach 21st century skills, but I can only practice them within the walls of the school (which is the opposite of 21st century thinking).

Another reason limited internet access […] has negatively impacted me is through my own work as a student. I am a doctoral student at VCU. The program in which I am enrolled is largely an online program […]. My classmates and instructors have had to deal with delays due to buffering internet during many of our meetings. It has been a bit of a joke among my cohort that I'm on "Middlesex internet." While it's all said in fun, it sends my colleagues a message that internet is subpar in the area of collaborating and technology."

College students who return home on school breaks and over the summer are not able to keep connected. In the pre COVID-19 world, this might have been considered an inconvenience. Now, with colleges and universities closed, and many local libraries also shuttered, it is an obstacle.

The Mathews County Sheriff also joined the push for broadband because the office frequently gets calls concerning suspicious vehicles parked for a long time on the side of the road or in an empty parking lot. A deputy would respond by getting out of the vehicle carefully, only to find someone trying to get onto the internet or trying to get a cell signal. It seemed humorous until he reminded us that it was time taken away from more serious happenings and it might be dangerous for a uniformed police officer to approach a car.

Additionally, people in the installation and repair business often carry credit card readers for customers to access to pay their bill. These often do not work in rural areas. In Mathews, parts of these project areas have little or no cell service, so even the use of LTE data is often impossible.

Lack of access also has other effects on the economy, especially relating to real estate. Lancaster real estate professionals maintain that lack of broadband internet is a significant factor in this sustained market downturn. Lancaster's project area includes two large residential real estate developments that have stalled because of market conditions exacerbated by lack of broadband connections. Many real estate agents in Mathews have also reported that the first question about a property for sale is, "Does it have access to broadband and cell phone service?" If the answer is no, the client refuses to look at the property. Summer rentals are hearing the same. However, at this time, there appears to be a surge in home sales due to the COVID-19 situation and historically low interest rates, but it is hard to tell if access or the lack of it will be a factor in this specific market surge activity. Regardless, the property tax (and occupancy tax) revenues from real estate has the potential to be significant, along with the general boost in economic activity that is sure to accompany additional development.

Attachments:

Documentation supporting project costs (e.g. vendor quotes)

Attachment12DocumentationofSupportingCostEstimates816202062611.pdf

Two most recent Form 477 submitted to FCC

Attachment13ABBForm477SupportingSheets816202083350.zip

Optional

Attachment14ABBAgreementtoParticipateandExpansionFundCertification816202083354.pdf

Optional

Attachment15ABBFinancialsCogeco2019AnnualReport816202083400.pdf

Optional

Attachment16PersonnelBios816202083407.pdf

Optional

Attachment17AdditionalCountyStudiesandData817202015836.pdf

Application to DHCD Submitted through CAMS

Mathews County

Four County ABB Regional 2021

Map(s) of project area, including proposed infrastructure

Attachment1ProjectAreaMaps816202062355.pdf

Documentation of Federal Funding (CAF/ACAM/USDA, etc…) in and/or near proposed project area.

Attachment2DocumentationonFederalFundingArea816202062433.pdf

Documentation that proposed project area is unserved based on VATI criteria

Attachment3DocumentationUnservedAreaVATICriteria8172020101851.pdf

Passings Form (Please use template provided)

Attachment4PassingsForm816202062451.pdf

Timeline/Project Management Plan

Attachment6ProjectManagmentPlan816202062503.pdf

Funding Sources Table

Attachment8FundingSourcesTableTwoOptions816202062513.pdf

Documentation for match funding

Attachment9DocumentationofMatchingFunding816202062522.pdf

Letters of Support

Attachment10LettersofSupport8172020101643.pdf

Derivation of Cost (Project Budget)

Attachment11DerivationofCosts816202062552.pdf

Notes:

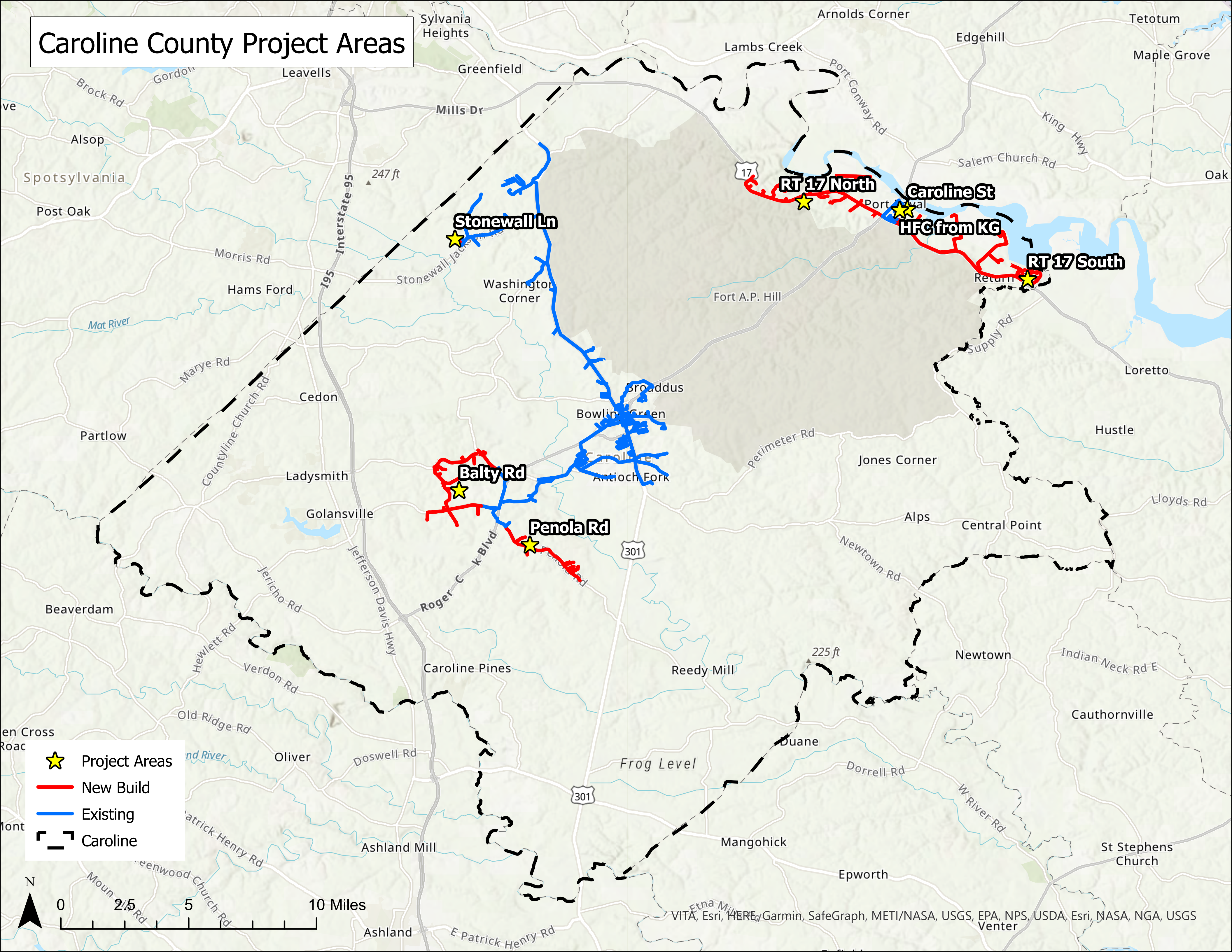
Additional attachments are as follows: Attachment 14 - ABB Agreement to Participate and Certification of No CAF Funding. Attachment 15 - ABB Financials Attachment 16 - Bios of Personnel Mentioned in Question 13 Attachment 17 - Additional County Studies and Data (MPPDC Regional Plan, CIT Middlesex Study, Caroline Survey Results, Lancaster Additional Data)

Attachment 1 – Project Area Maps

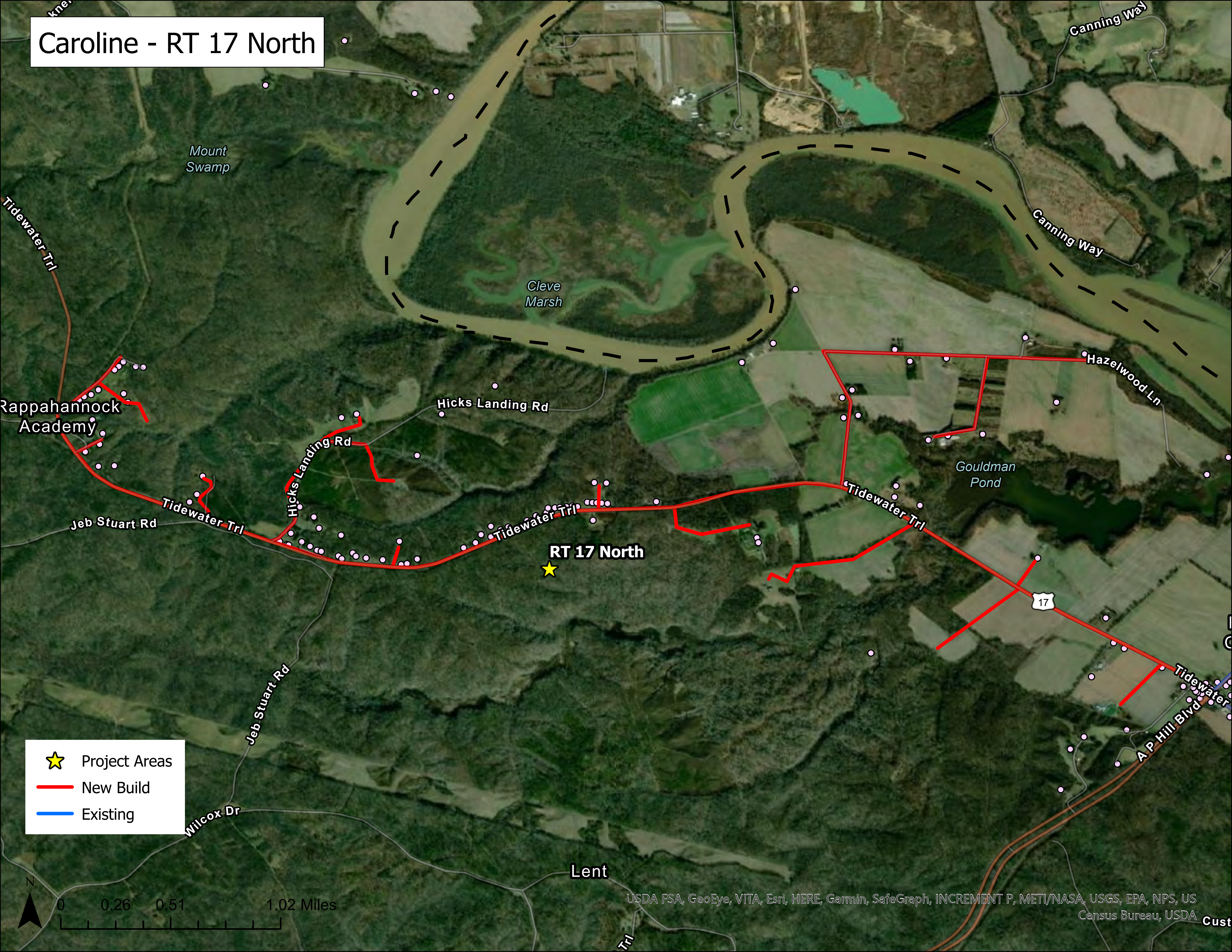
Option A: Caroline County, Lancaster County, Mathews County, Middlesex County

Option B: Caroline County, Mathews County, Middlesex County

Project Area Maps

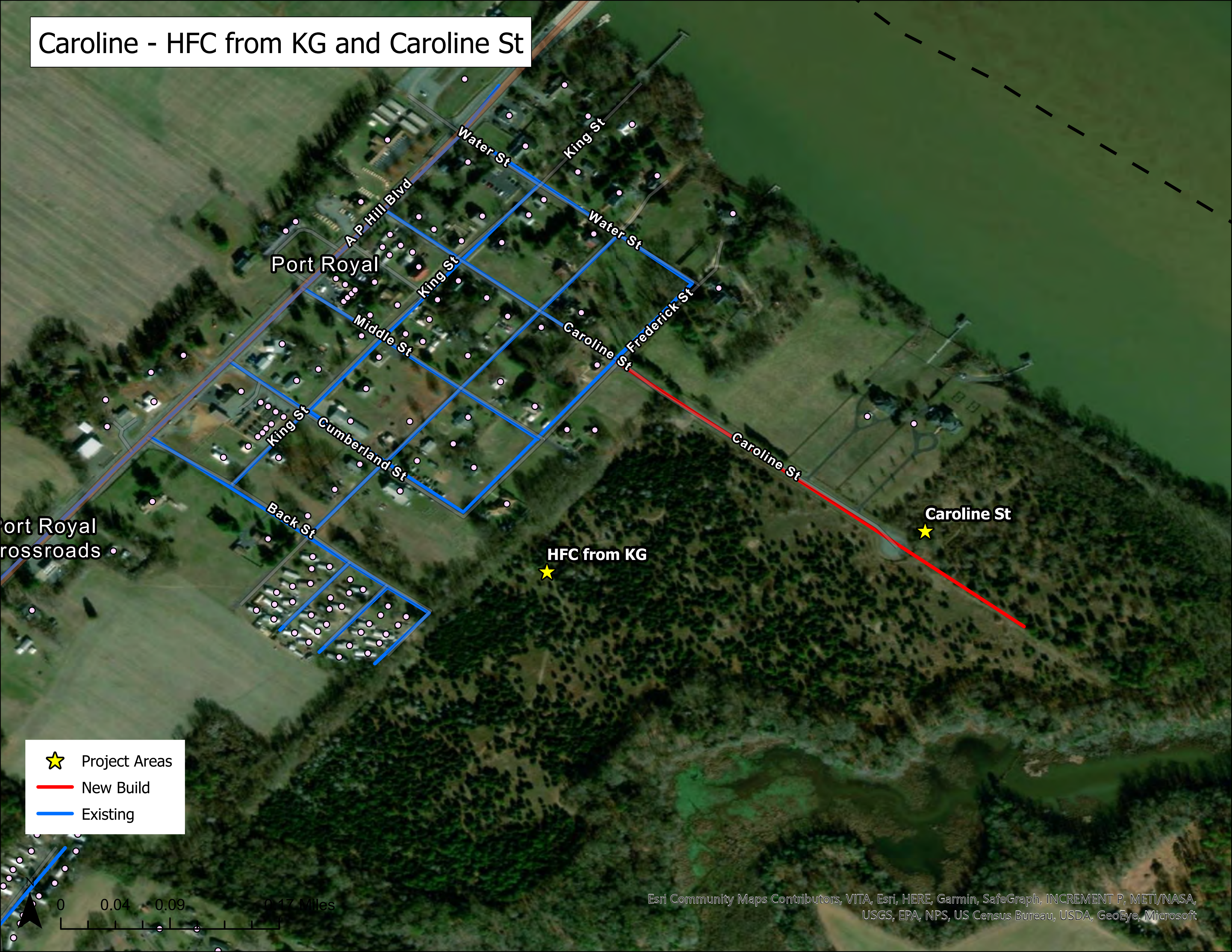

Caroline County Project Areas
Stonewall Ln
RT 17 North
Caroline St
HFC from KG
RT 17 South
Balty Rd
Penola Rd
Project Areas
New Build
Existing
Caroline
0
2.5
5
10 Miles
N
VITA, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Esri, NASA, NGA, USGS

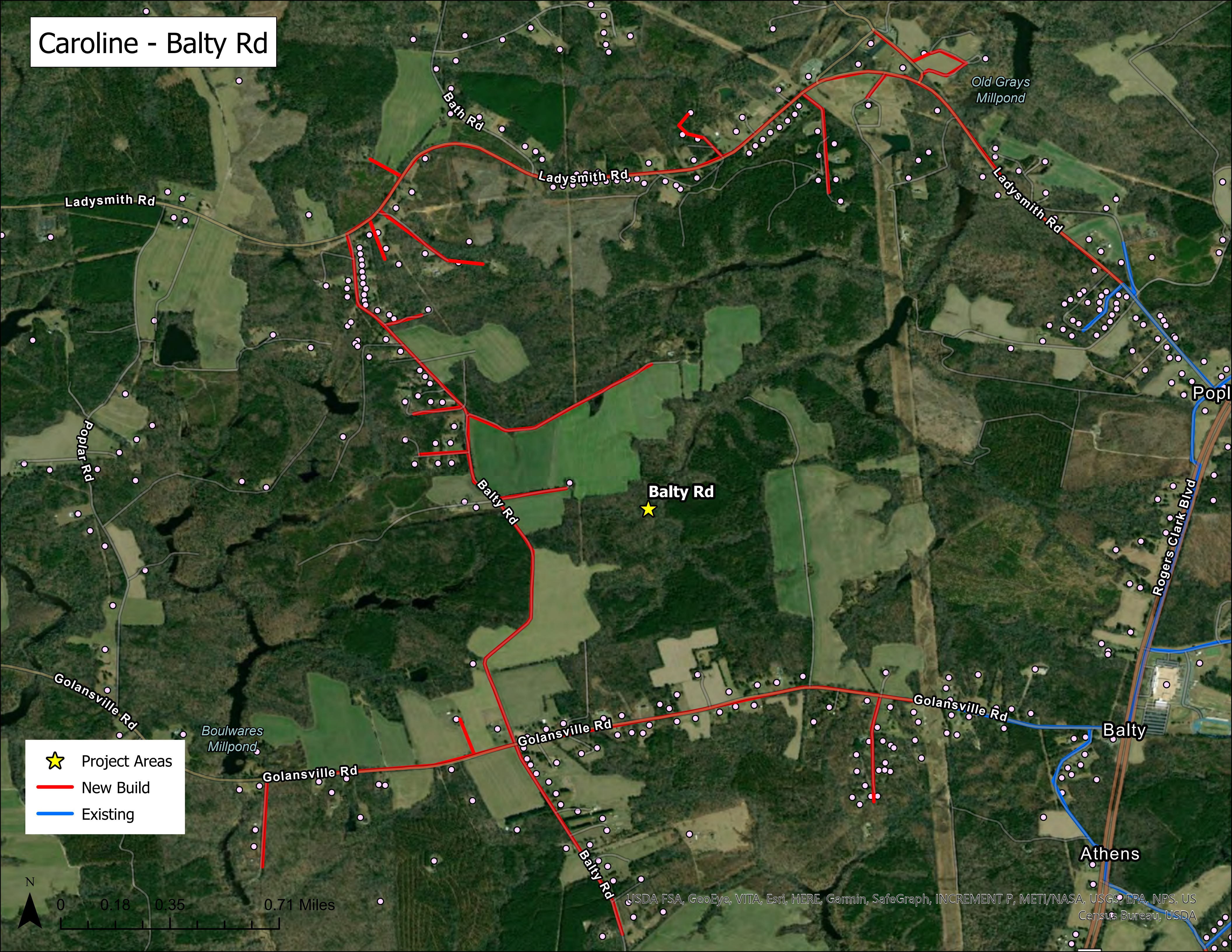
Caroline - RT 17 North

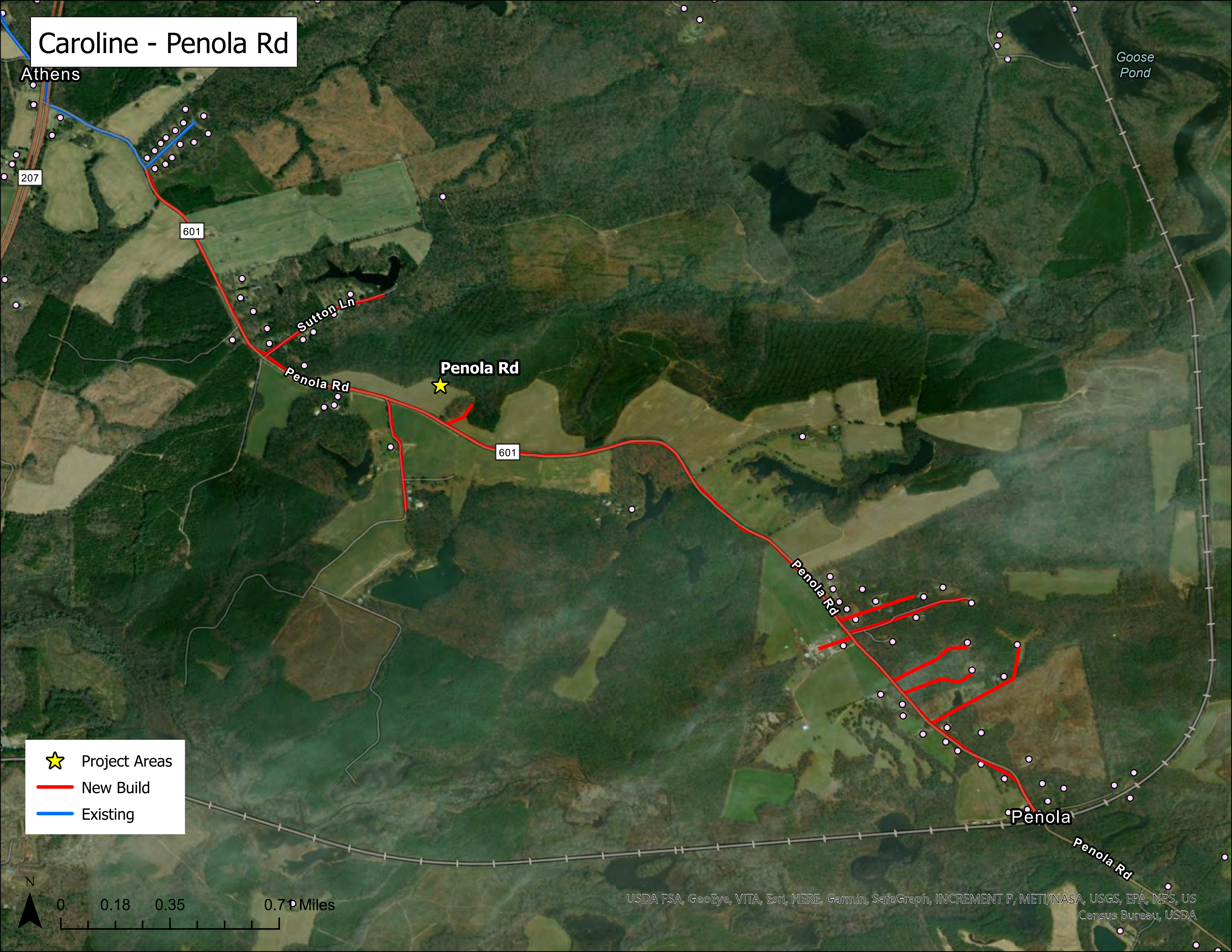


Caroline - Rt 17 South

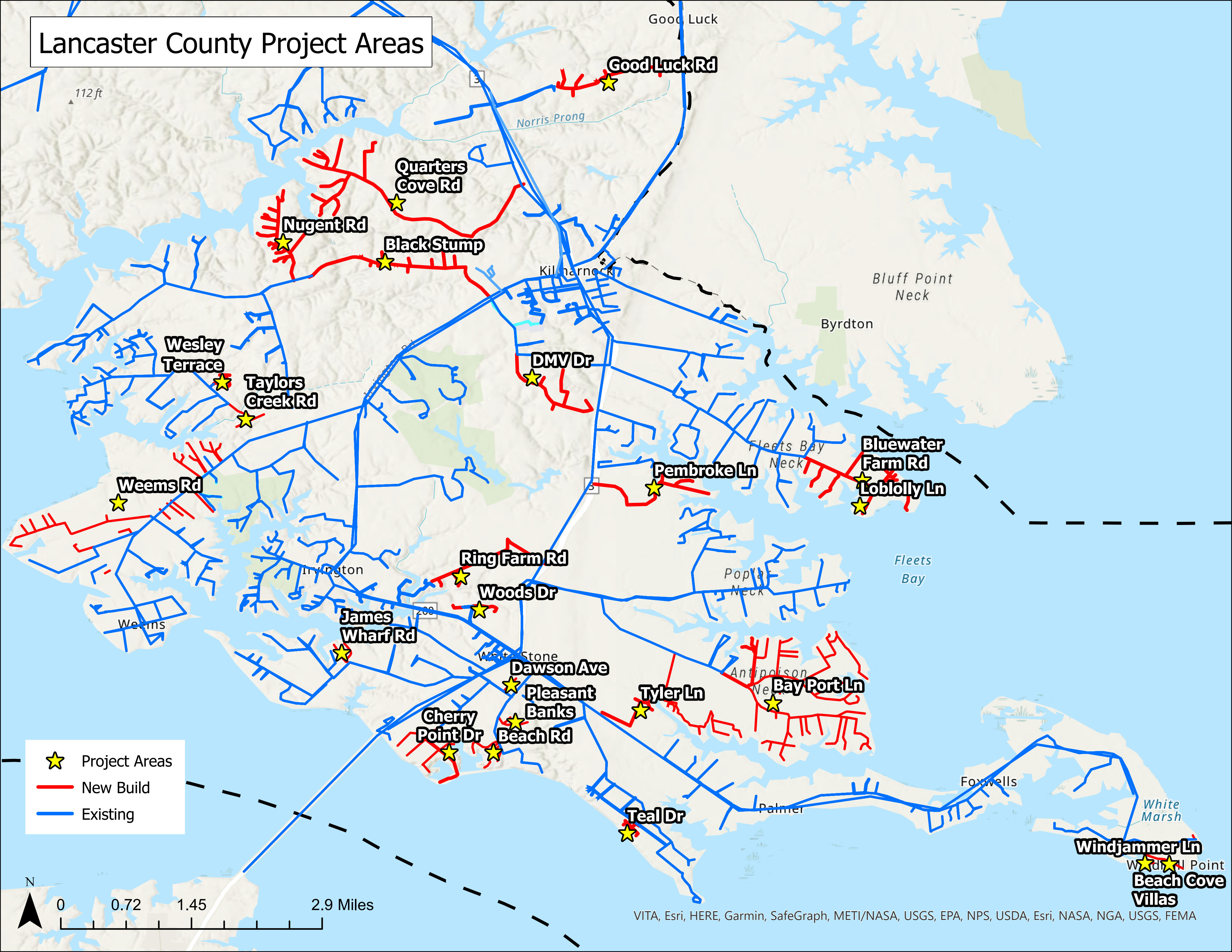
Caroline - Stonewall Ln
Claiborne Crossing Rd
Macedonia Rd
Stonewall
606
Stonewall Ln
Ormesby Ln
Stonewall Jackson Rd
Rozell Rd
Guinea Station Rd
Guinea
Claiborne
Poni River
Project Areas
New Build
Existing
N
0
0.1
0.2
0.4 Miles
USDA FSA, GeoEye, Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA


Caroline - HFC from KG and Caroline St
Water St
King St
A P Hill Blvd
Port Royal
Water St
King St
Frederick St
Middle St
Caroline St
King St
Cumberland St
Caroline St
Caroline St
Back St
Port Royal
Crossroads
HFC from KG
Project Areas
New Build
Existing
0 0.04 0.09 0.17 Miles
Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, GeoEye, Microsoft


Caroline - Balty Rd
Ladysmith Rd
Bath Rd
Old Grays Millpond
Poplar Rd
Balty Rd
Rogers Clark Blvd
Golansville Rd
Boulwares Millpond
Balty
Athens
Popl
Project Areas
New Build
Existing
N
0 0.18 0.35 0.71 Miles
USDA FSA, GeoEye, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA



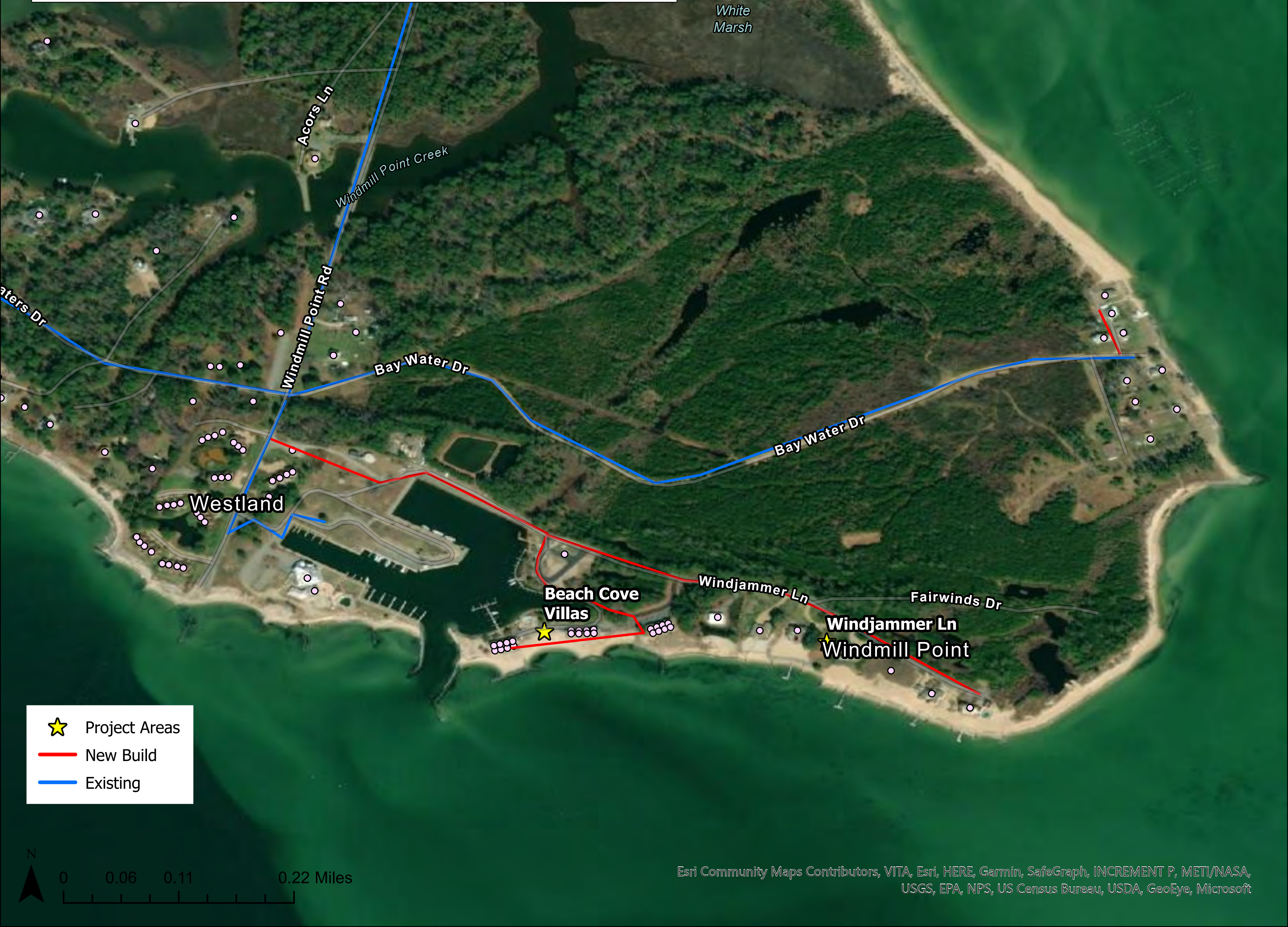
Caroline - Penola Rd
Athens
207
601
Sutton Ln
Penola Rd
Penola Rd
601
Penola Rd
Penola
Penola Rd
Goose Pond
Project Areas
New Build
Existing
N
0
0.18
0.35
0.71 Miles
USDA FSA, GeoEye, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA


Lancaster County Project Areas
Good Luck
Good Luck Rd
112 ft
Norris Prong
Quarters Cove Rd
Nugent Rd
Black Stump
Kilmarnock
Bluff Point Neck
Byrdton
Wesley Terrace
Taylors Creek Rd
DMV Dr
Fleets Bay Neck
Bluewater Farm Rd
Pembroke Ln
Loblolly Ln
Weems Rd
Fleets Bay
Ring Farm Rd
Irvington
Poplar Neck
Woods Dr
James Wharf Rd
Weems
White Stone
Dawson Ave
Pleasant Banks
Antipoison Neck
Bay Port Ln
Tyler Ln
Cherry Point Dr
Beach Rd
Foxwells
Palmer
White Marsh
Teal Dr
Windjammer Ln
Windmill Point
Beach Cove Villas
Project Areas
New Build
Existing
N
0
0.72
1.45
2.9 Miles
VITA, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Esri, NASA, NGA, USGS, FEMA

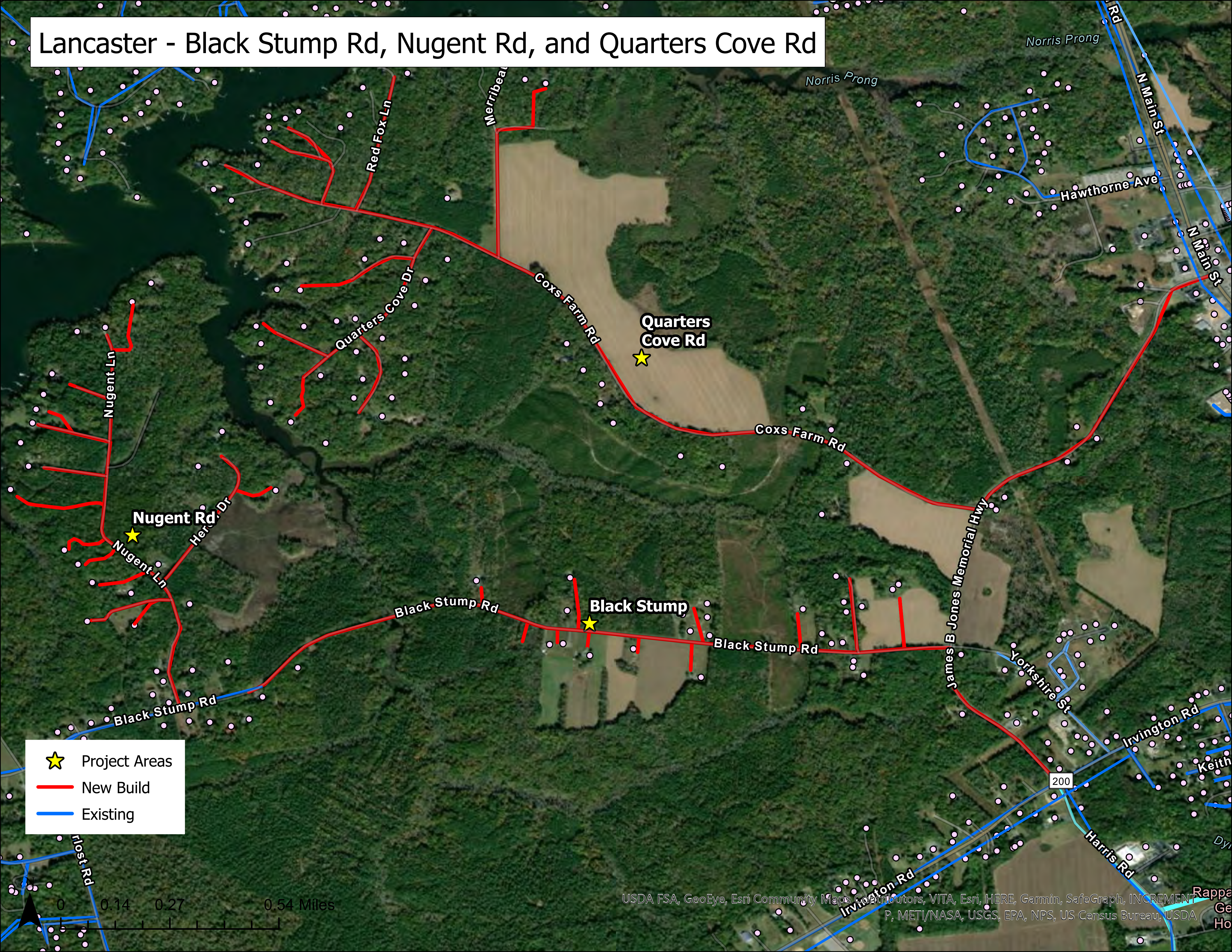
Lancaster - Teal Dr
Bay Port Ln
Tyler Ln
Project Areas
New Build
Existing
Scott Rd
Little Bay Rd
Little Bay Rd
Hadlea Dr
Crossing Cove Way
Dameron Dr
Blue Heron Ln
Dungeons Thicket Rd
Chesapeake Trl
Pine Trl
Tammy Dr
Little Bay Rd
Clark Point Dr
Deep Water Dr
Walker Rd
Bluefish Rd
Windmill Point Rd
Robbins Ln
Cypress Ln
Windmill Point Rd
Fox Den Rd
Antirap Dr
Osprey Ln
Palmer
0 0.13 0.27 0.53 Miles
N
USDA FSA, GeoEye, Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA


Lancaster - Beach Rd, Cherry Point Dr, and Pleasant Banks
Rivers Lndg
Mary Ball Rd
Cherry Point Dr
Old Mail Rd
Beach Rd
Pleasant Banks Ln
Pleasant Banks
Cherry Point Dr
Beach Rd
Cliff View Rd
Project Areas
New Build
Existing
N
0
0.07
0.14
0.27 Miles
USDA FSA, GeoEye, Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Lancaster - Beach Cove Villas and Windmill Point

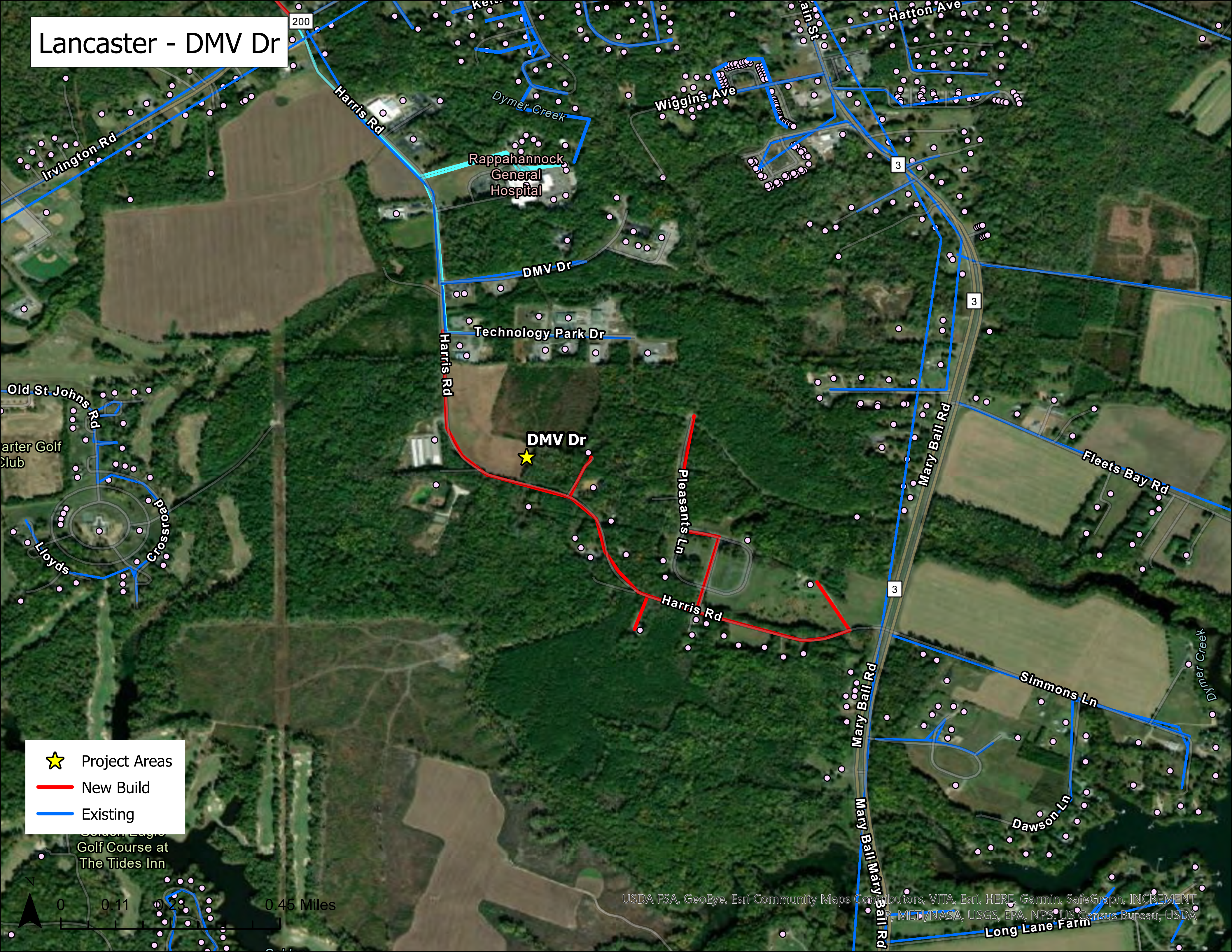


Lancaster - Black Stump Rd, Nugent Rd, and Quarters Cove Rd



Lancaster - Bluewater Farm Rd and Loblolly Ln

Lancaster - Dawson Ave
Boles Ave
Birch Dr
Taft
Beach Rd
Dawson Ave
Dawson Ave
Shady Ln
Beach Rd
Pine Dr
Beach Rd
Project Areas
New Build
Existing
N
0
0.03
0.06
0.11 Miles
USDA FSA, GeoEye, Esri Community Maps Contributors, VITA, BuildingFootprintUSA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA



Lancaster - DMV Dr
DMV Dr
Harris Rd
DMV Dr
Technology Park Dr
Rappahannock General Hospital
Dymer Creek
Irvington Rd
Wiggins Ave
Hatton Ave
Pleasants Ln
Mary Ball Rd
Fleets Bay Rd
Simmons Ln
Dawson Ln
Long Lane Farm
Old St Johns Rd
Lloyds
Crossroad
Golf Course at The Tides Inn
200
3
Project Areas
New Build
Existing
0
0.11
0.45 Miles
N
USDA FSA, GeoEye, Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

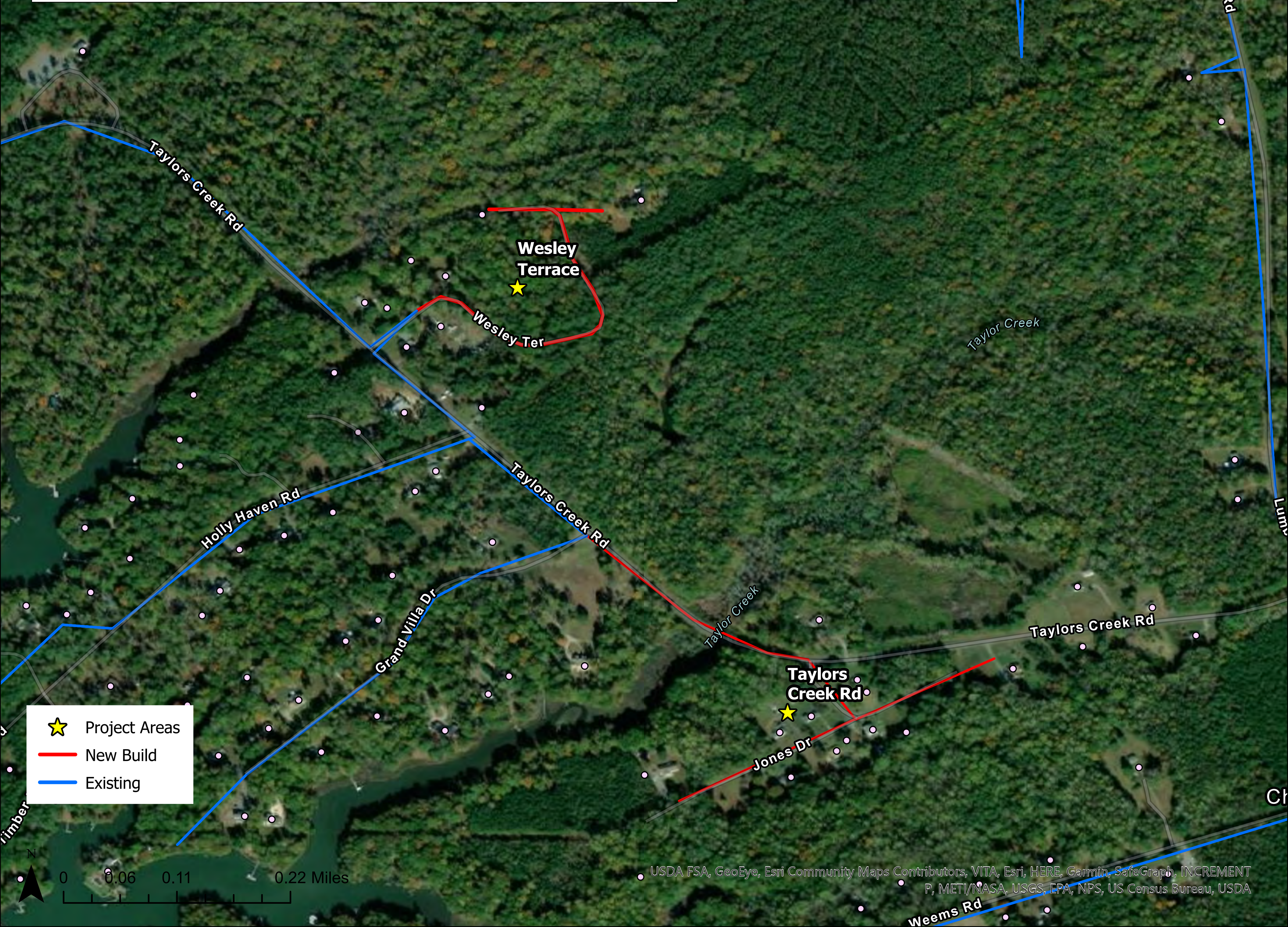
Lancaster - DMV Dr
James Wharf Rd
Oyster Pt
James Wharf Rd
Breezy Pt
James Wharf Rd
Jacks Cove Ln
James Wharf Rd
Crab Point Rd
Project Areas
New Build
Existing
N
0
0.05
0.09
0.18 Miles
Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, GeoEye, Microsoft


Lancaster - Good Luck Rd
Good Luck
200
Jessie Dupont Memorial Hwy
Goodluck Rd
Good Luck Rd
Goodluck Rd
Norris Prong
Norris Prong
Norris Prong
Project Areas
New Build
Existing
N
0
0.07
0.14
0.28 Miles
Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, GeoEye, Microsoft


Lancaster - Pembroke Ln
Pembroke Ln
Mary Ball Rd
Long Lane Farm
Long Lane Ct
Pembroke Ln
Flowering Fld
Chases Rd
Townley Farm Rd
Townley Farm Rd
Townley Farm Rd
Chases Rd
Chases Rd
W Bay Dr
Bay Dr
Apple Grove Blvd
Peach Tree Ln
Project Areas
New Build
Existing
N
0 0.06 0.12 0.24 Miles
Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, GeoEye, Microsoft


Lancaster - Ring Farm Rd and Woods Dr
Ring Farm Rd
Ring Farm Rd
Ring Farm Rd
Old Salem Rd
Old Salem Rd
Mary Ball Rd
Ocran
Ocran
3
Mary Ball Rd
Mary Ball Rd
Mary Ball Rd
3
Woods Dr
Kenner Dr
Woods Dr
Rd
Irvington Rd
Project Areas
New Build
Existing
N
0 0.06 0.12 0.24 Miles
Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, GeoEye, Microsoft

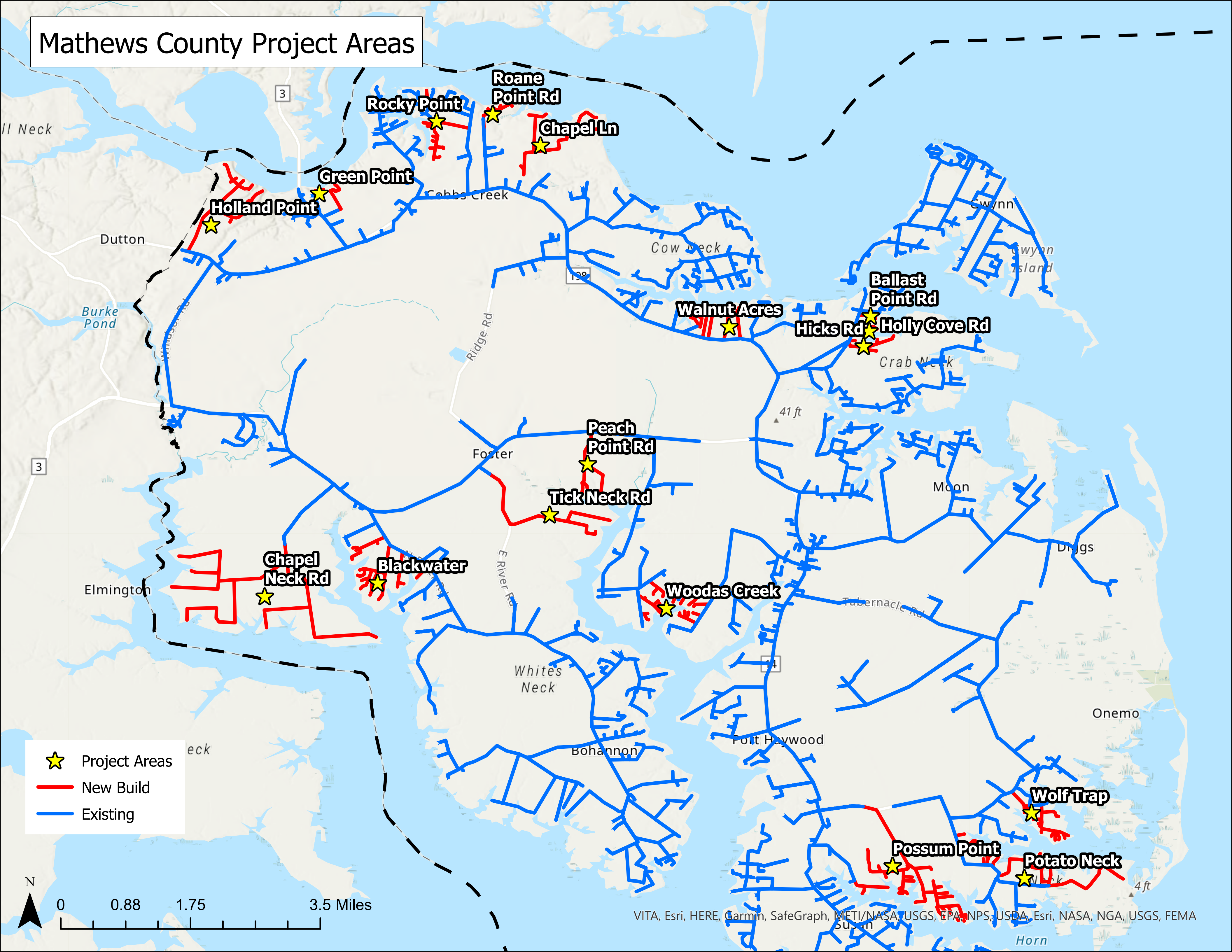
Lancaster - Taylors Creek Rd and Wesley Terrace



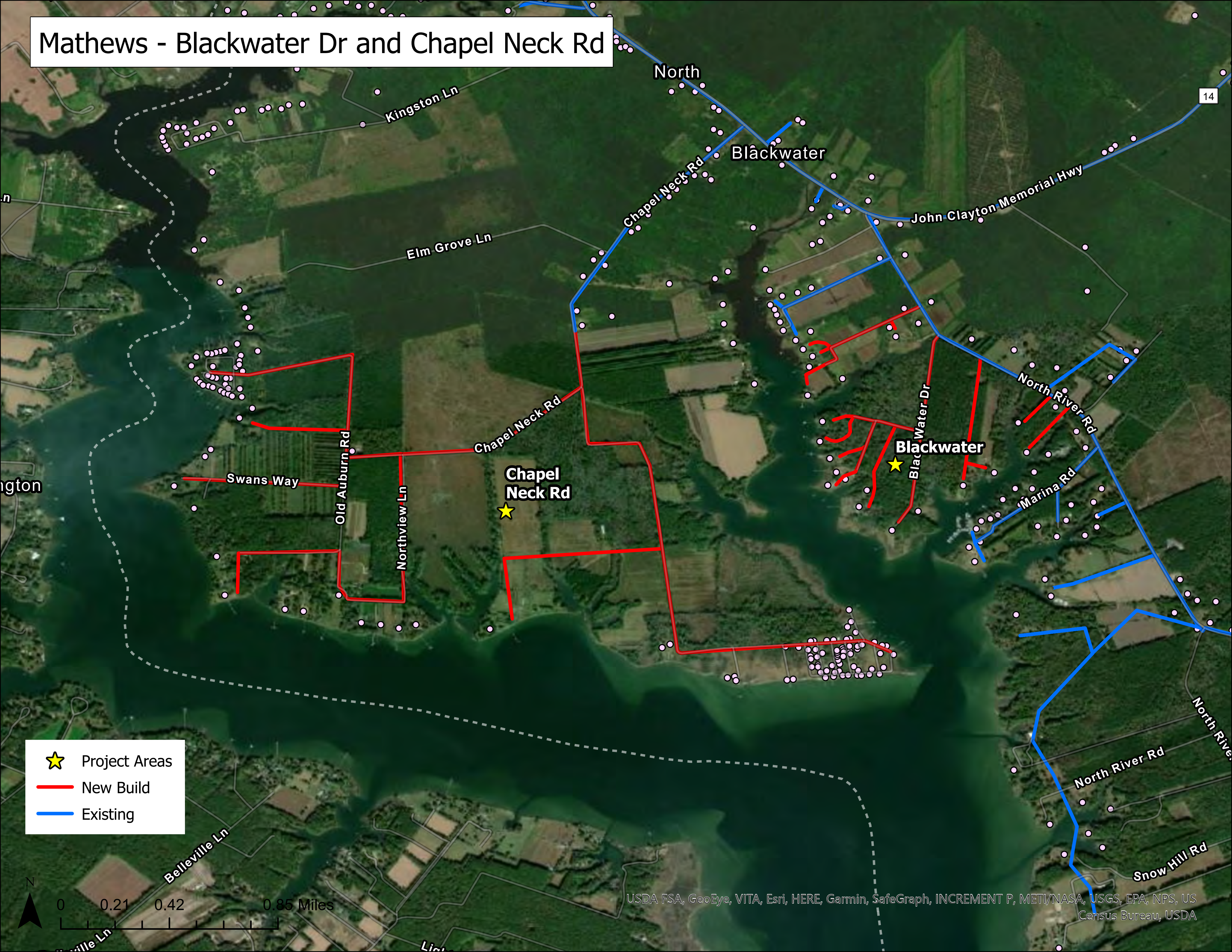

Lancaster - Teal Dr
Churchill Cir
Churchill Cir
Mosquito Point Rd
Mosquito Point Rd
Muskreek Rd
Summer Duck Ln
Teal Dr
Teal Dr
Mosquito Point Rd
Mosquito Point Rd
Mosquito Beach Ln
Project Areas
New Build
Existing
N
0 0.06 0.12 0.24 Miles
USDA FSA, GeoEye, Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Lancaster - Weems Rd
Weems Rd
North Weems
Indiantown Rd
Indiantown Rd
Benson Rd
Cedar Pointe Dr
River Village Dr
Weems Rd
Old School St
Oak Leaf Dr
Hayden Rd
Johns Neck Rd
Highland Dr
Tom Morris Dr
Norris Dr
Moccasin Trl
Weems
Project Areas
New Build
Existing
0 0.11 0.23 0.45 Miles
N
USDA FSA, GeoEye, Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Mathews County Project Areas

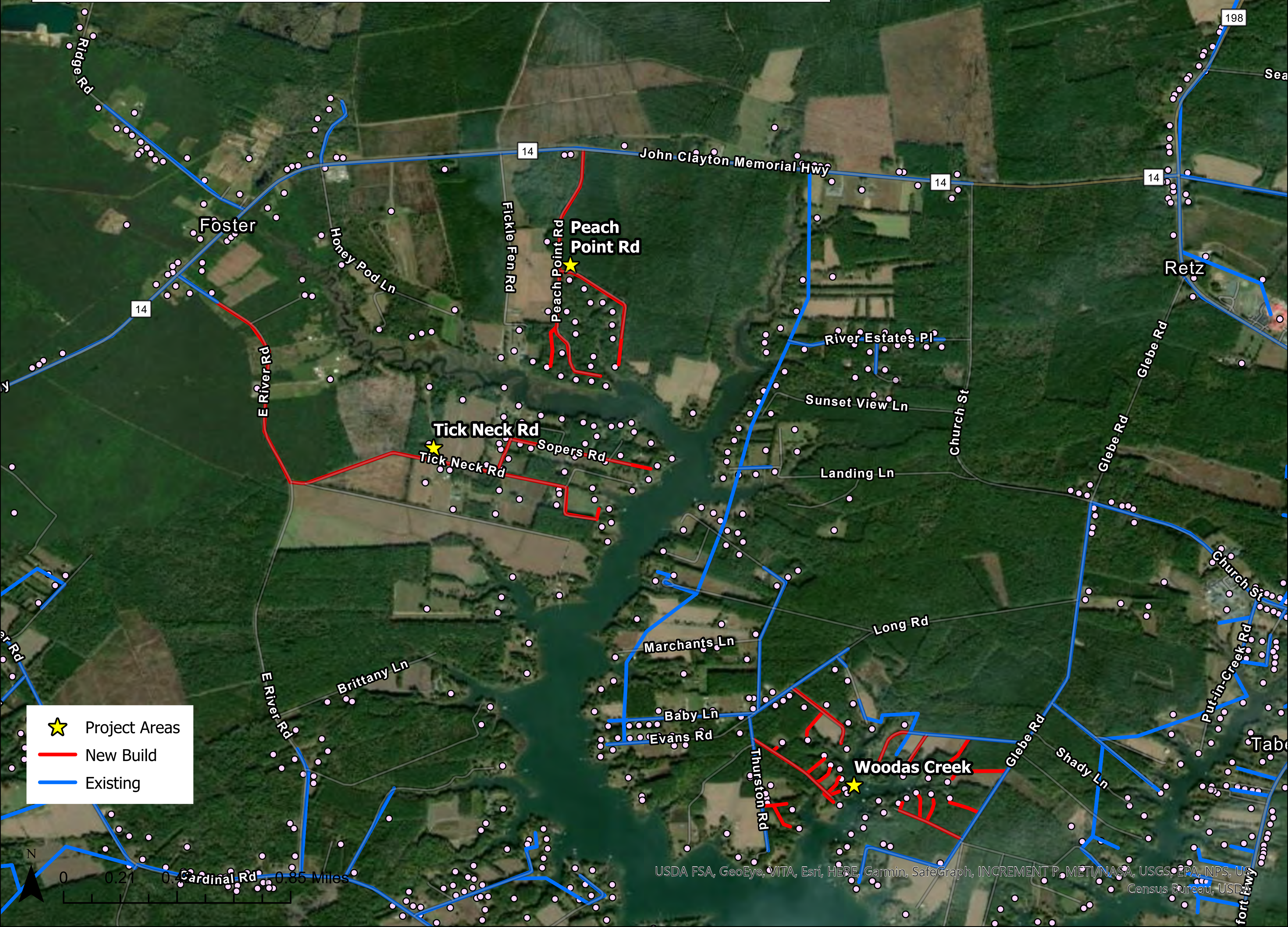


Mathews - Ballast Point Rd, Hicks Rd, Holly Cove Rd, and Walnut Acres

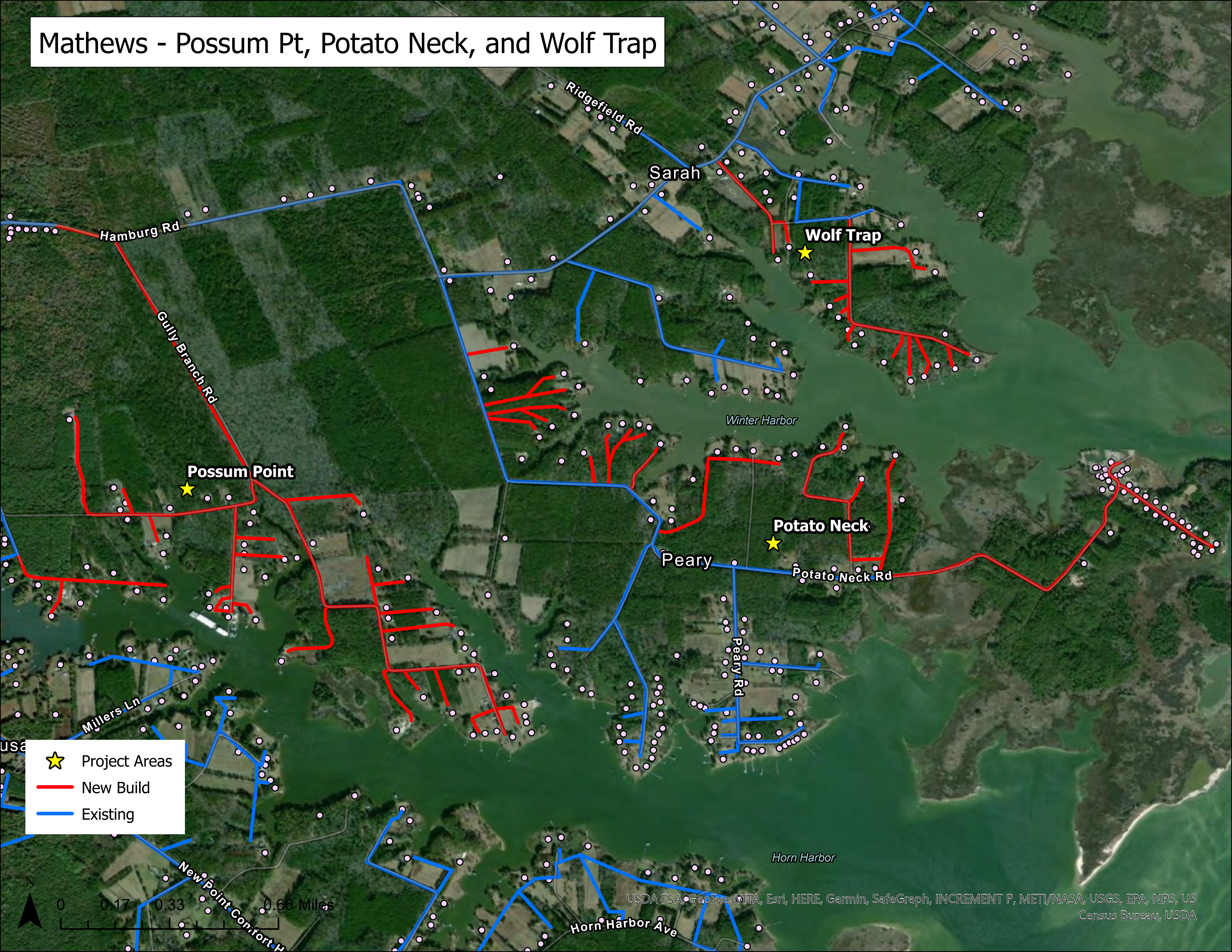

Mathews - Blackwater Dr and Chapel Neck Rd
North
Blackwater
Kingston Ln
Chapel Neck Rd
John Clayton Memorial Hwy
14
Elm Grove Ln
North River Rd
Blackwater
Chapel Neck Rd
Swans Way
Old Auburn Rd
Northview Ln
Marina Rd
North River Rd
Snow Hill Rd
Belleville Ln
Project Areas
New Build
Existing
0 0.21 0.42 0.85 Miles
USDA FSA, GeoEye, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Mathews - Green Point and Holland Point

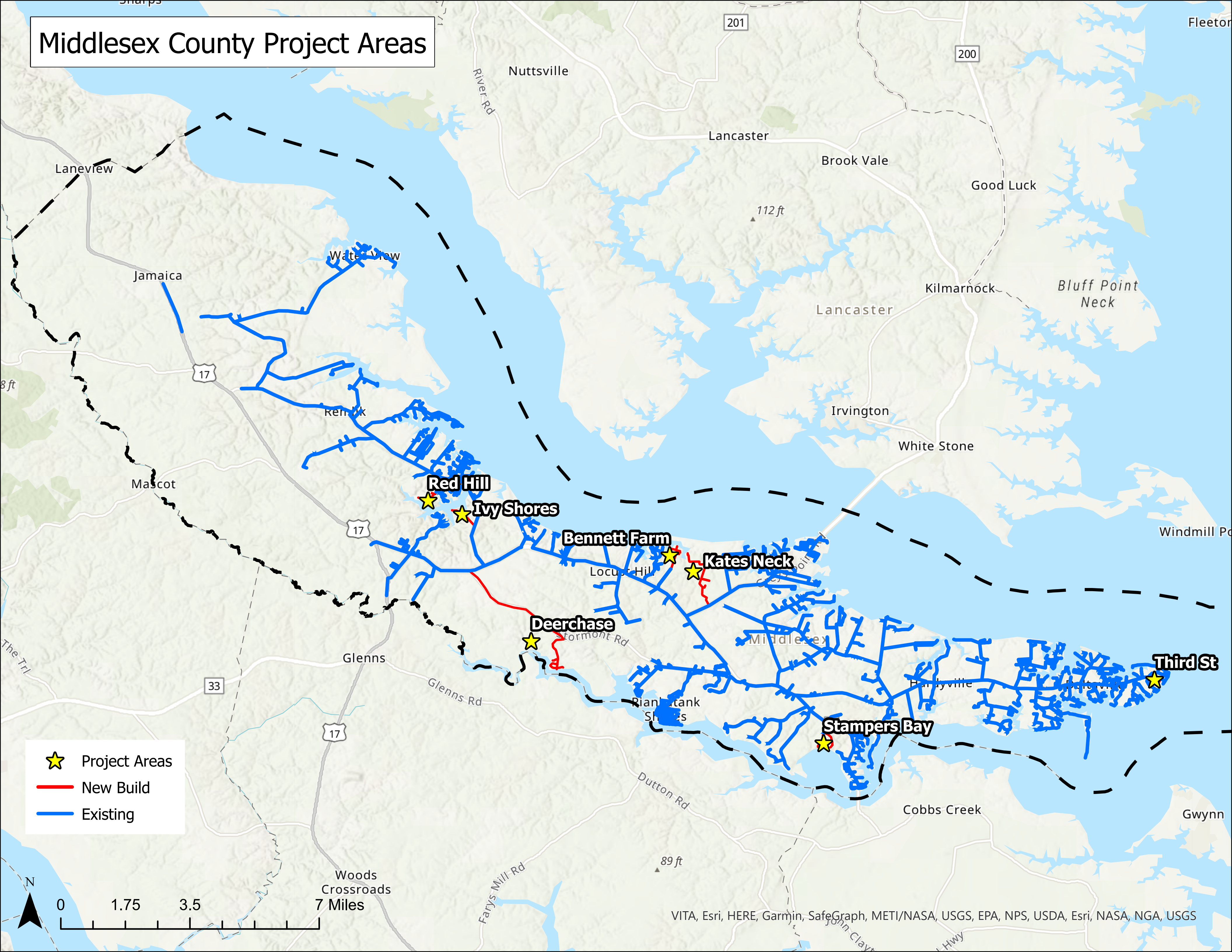
Mathews - Peach Point Rd, Tick Neck Rd, and Woodas Creek



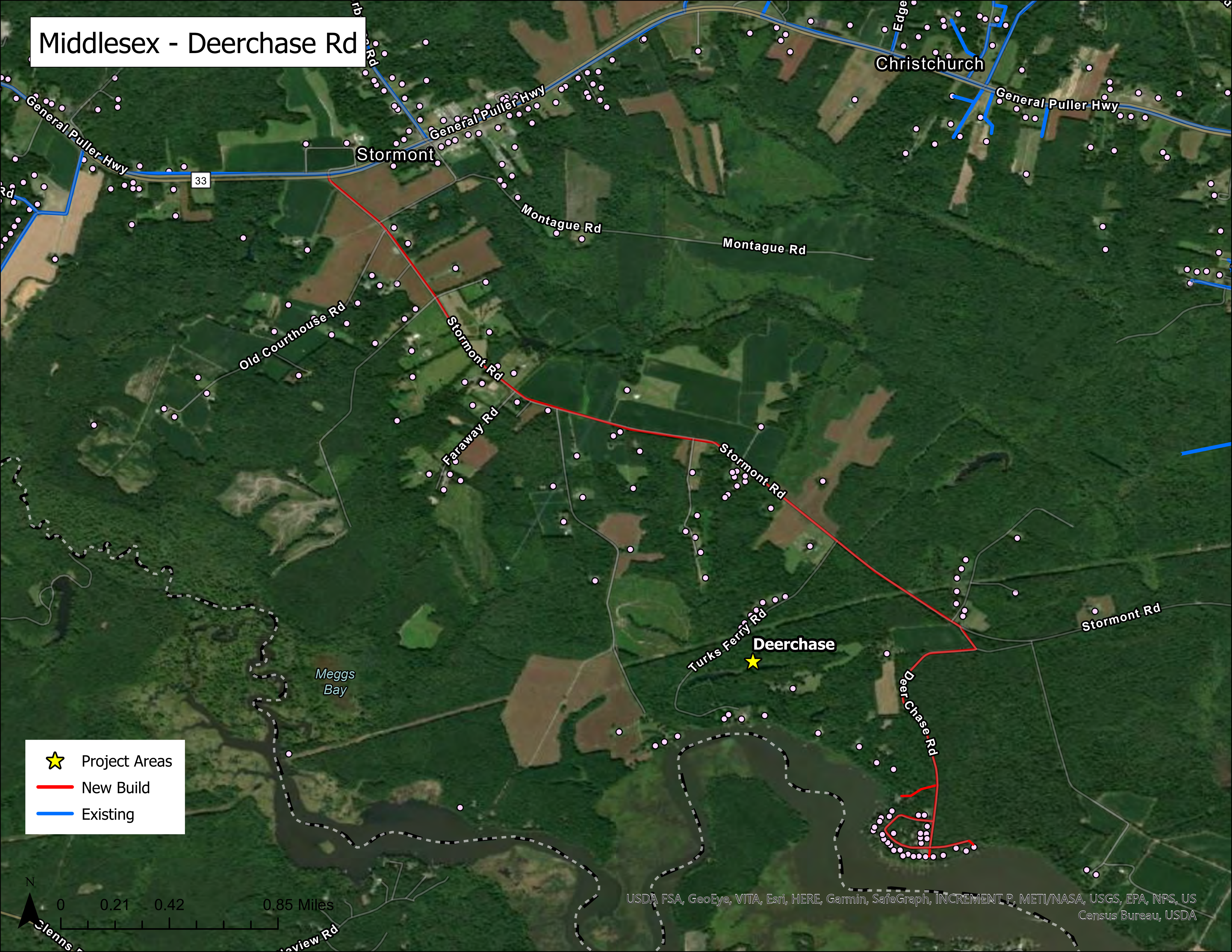
Mathews - Possum Pt, Potato Neck, and Wolf Trap



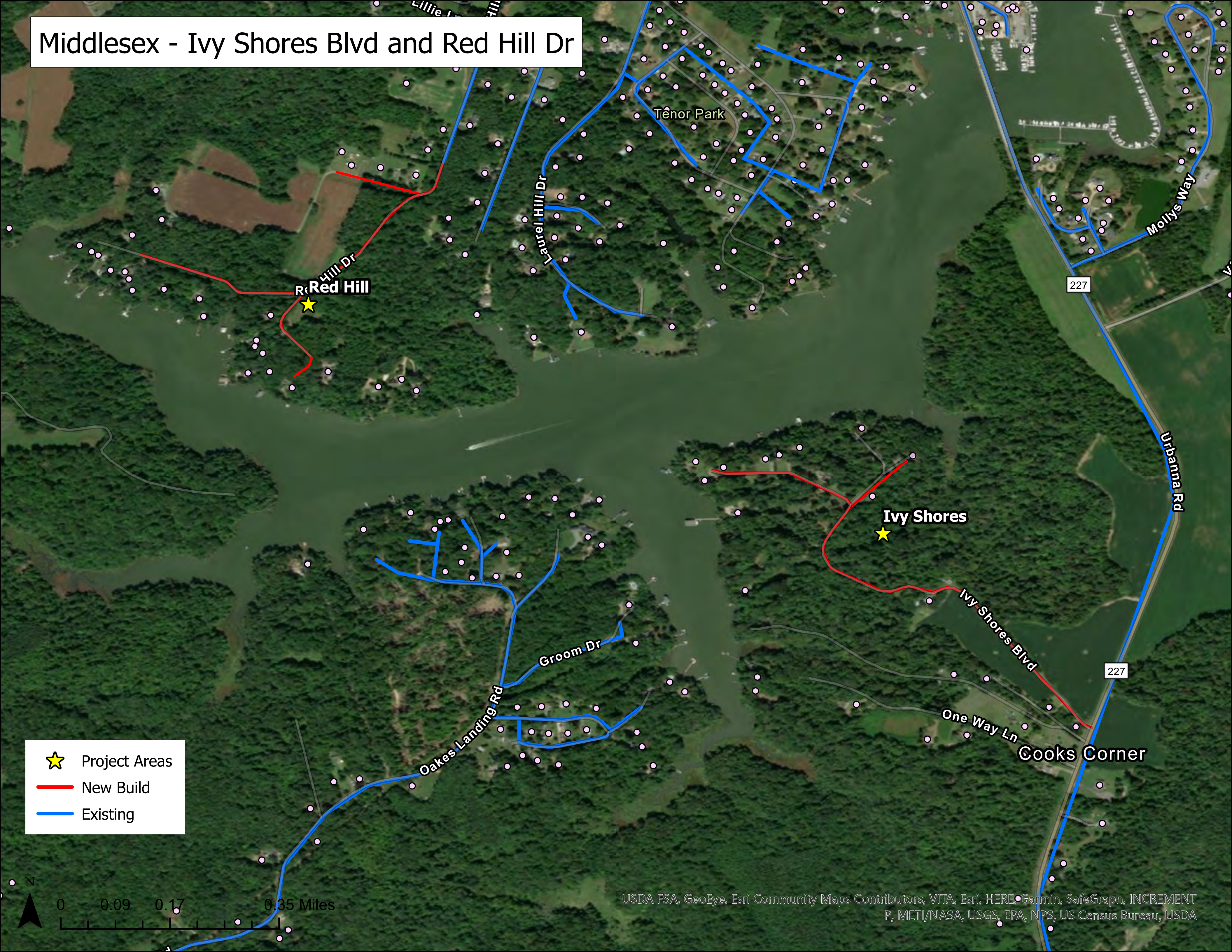
Mathews - Chapel Ln, Roane Point Rd, and Rocky Point


Middlesex County Project Areas
Red Hill
Ivy Shores
Bennett Farm
Kates Neck
Deerchase
Stampers Bay
Third St
Project Areas
New Build
Existing
0
1.75
3.5
7 Miles
N
Nuttsville
Lancaster
Brook Vale
Good Luck
Kilmarnock
Bluff Point Neck
Lancaster
Irvington
White Stone
Windmill Po
Laneview
Jamaica
Renick
Mascot
Glenns
Glenns Rd
Locust Hill
Middlesex
Cobbs Creek
Gwynn
Dutton Rd
Woods Crossroads
Farys Mill Rd
Fleeton
112 ft
89 ft
201
200
17
33
River Rd
VITA, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Esri, NASA, NGA, USGS

Middlesex - Bennett Farm and Kates Neck



Middlesex - Deerchase Rd
Christchurch
General Puller Hwy
Stormont
33
Montague Rd
Montague Rd
Old Courthouse Rd
Stormont Rd
Faraway Rd
Stormont Rd
Stormont Rd
Turks Ferry Rd
Deerchase
Deer Chase Rd
Meggs Bay
Project Areas
New Build
Existing
0 0.21 0.42 0.85 Miles
USDA FSA, GeoEye, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA



Middlesex - Ivy Shores Blvd and Red Hill Dr
Tenor Park
Laurel Hill Dr
Mollys Way
227
Hill Dr
Red Hill
Urbanna Rd
Ivy Shores
Ivy Shores Blvd
Groom Dr
Oakes Landing Rd
One Way Ln
Cooks Corner
Project Areas
New Build
Existing
N
0 0.09 0.17 0.35 Miles
USDA FSA, GeoEye, Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA


Middlesex - Stampers Bay
General Puller Hwy
Conrad Pond
Hartfield
Bath Rd
Stampers Bay Rd
Hunt Club Rd
River Run Dr
Mariners Woods Dr
Twiggs Ferry Rd
Stampers
Lakeview Dr
VA-630
Shoansy Ln
Stampers Bay
Wilton Coves Dr
Sunset Vist Dr
Project Areas
New Build
Existing
0 0.14 0.28 0.55 Miles
N
USDA FSA, GeoEye, Esri Community Maps Contributors, VITA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Middlesex - Third St

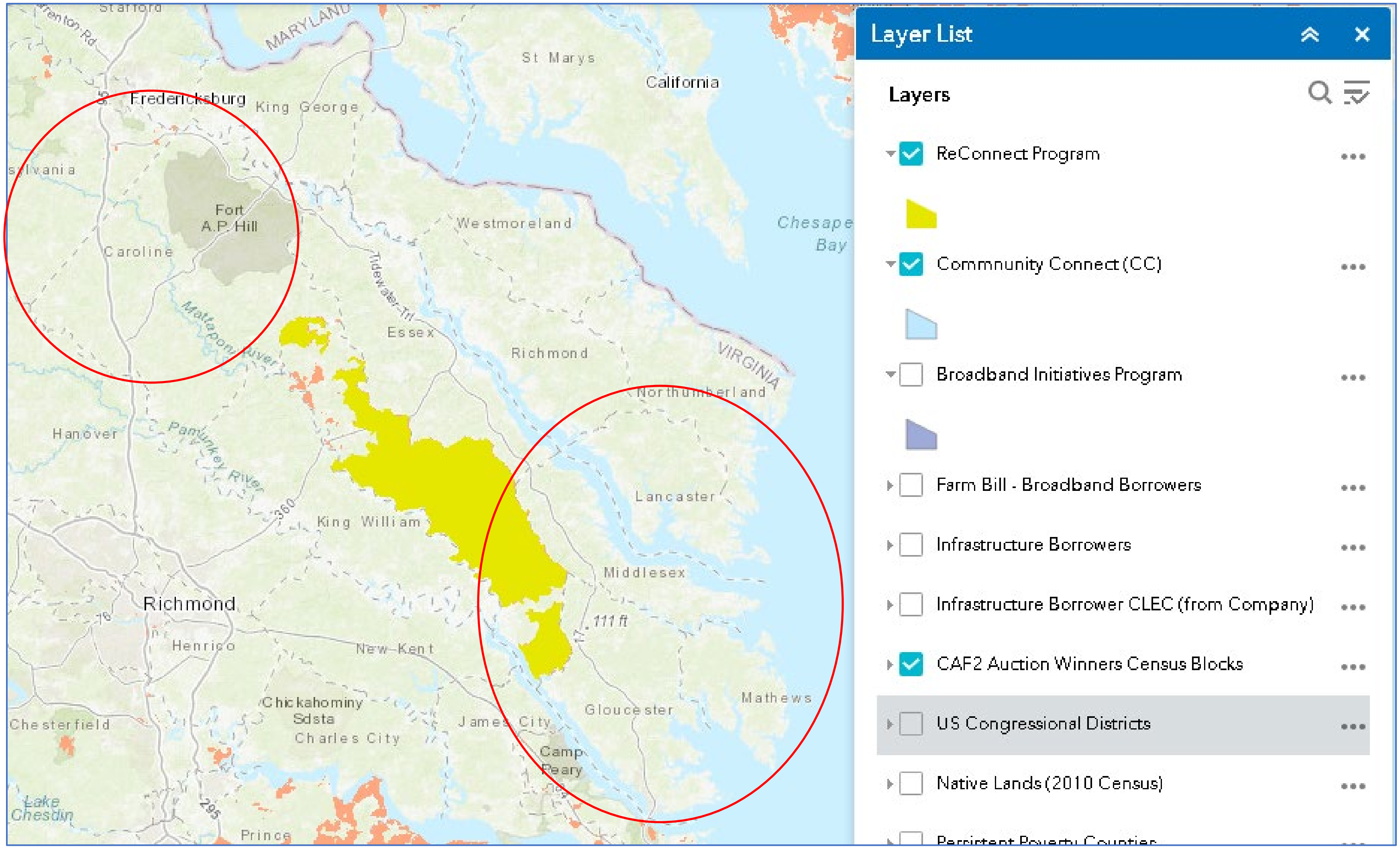
Attachment 2 – Documentation on Federal Funding Area

Option A: Caroline County, Lancaster County, Mathews County, Middlesex County

Option B: Caroline County, Mathews County, Middlesex County

Funded Areas Maps

1. USDA Telecommunications Program Funded Service Areas Map



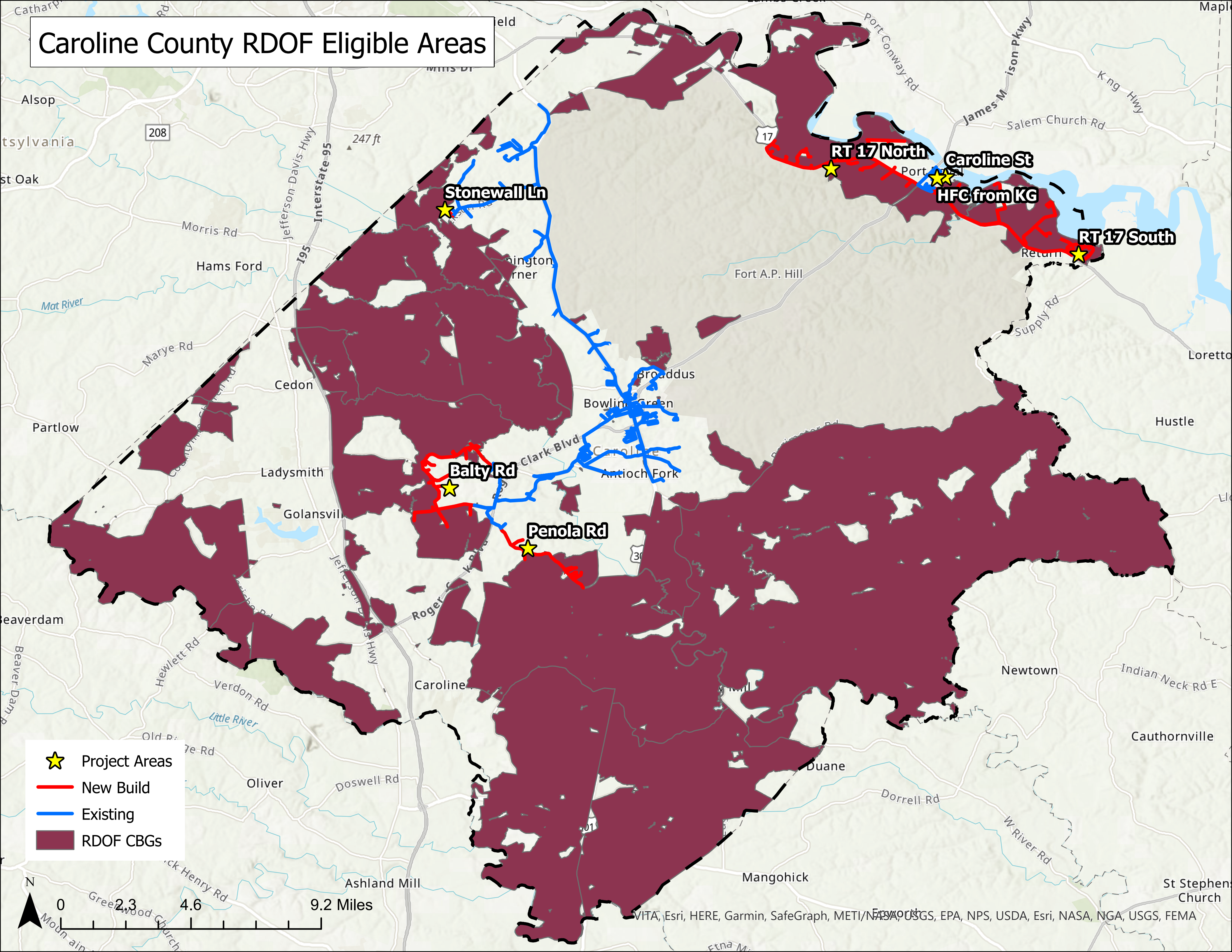
http://ruraldevelopment.maps.arcgis.com/apps/webappviewer/index.html?id=93ba783edf5b407c9641b2f8653e8c1d

2. USAC Connect America Fund Broadband Map

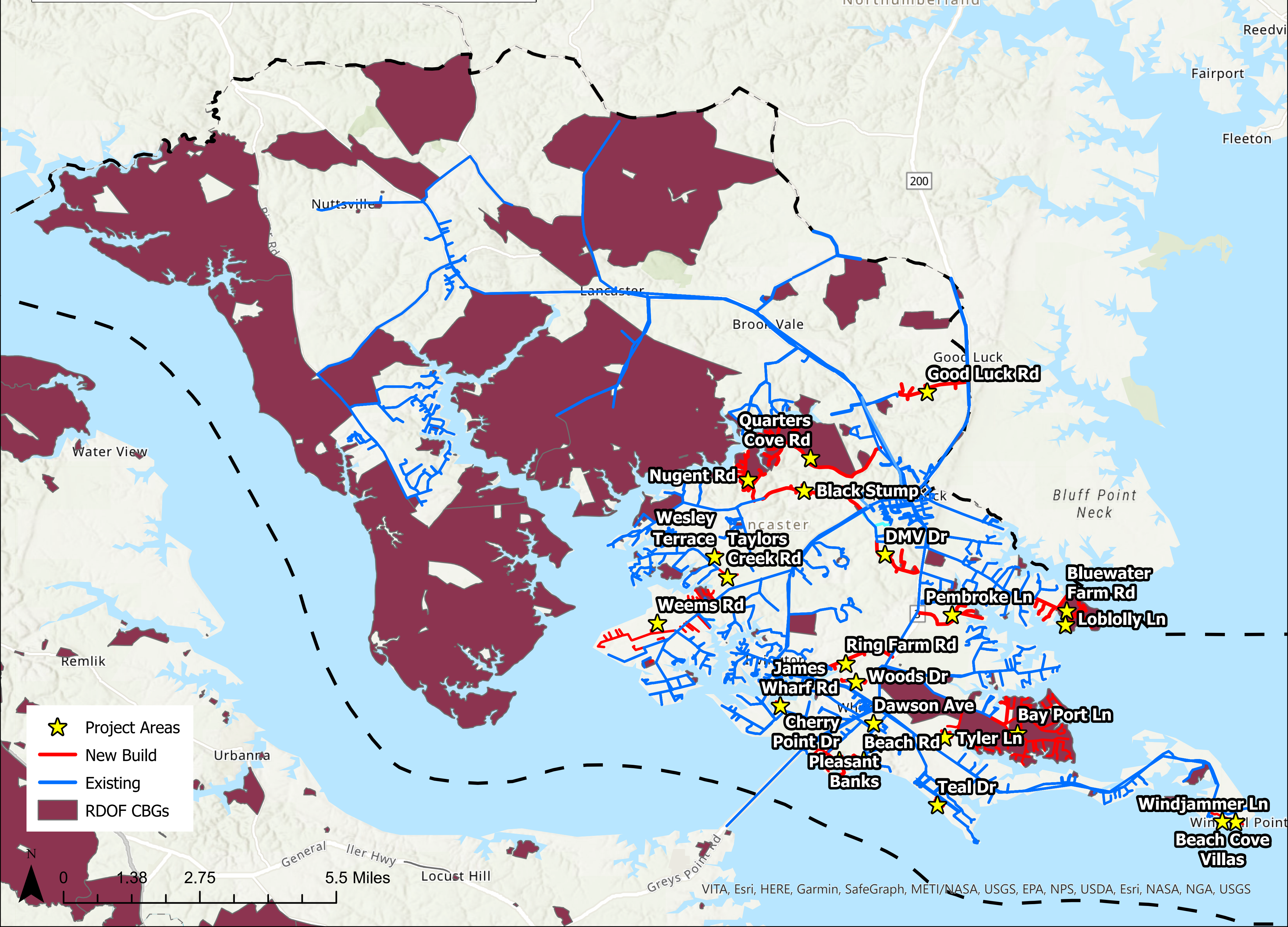
https://data.usac.org/publicreports/caf-map/

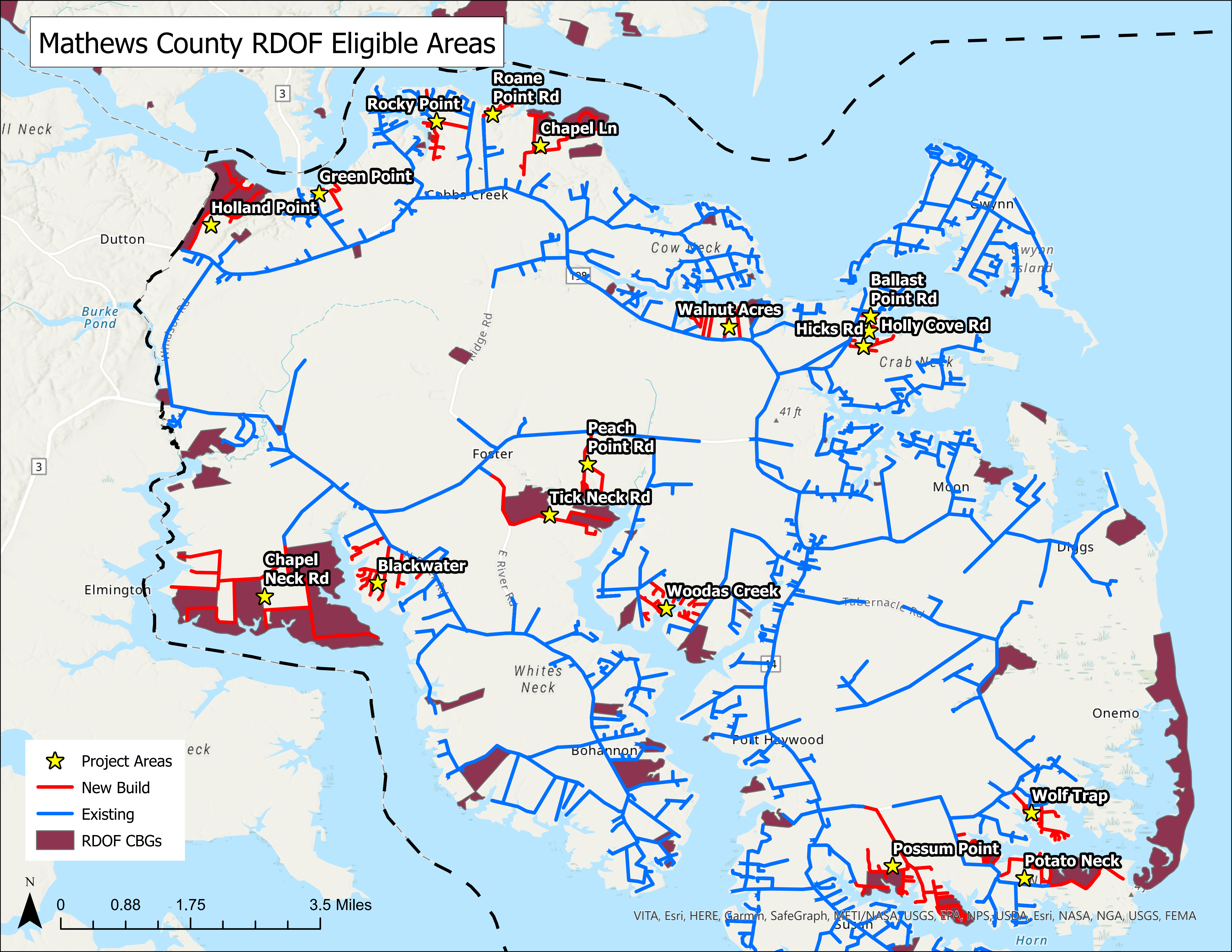
3. RDOF Eligible Areas

Following Pages

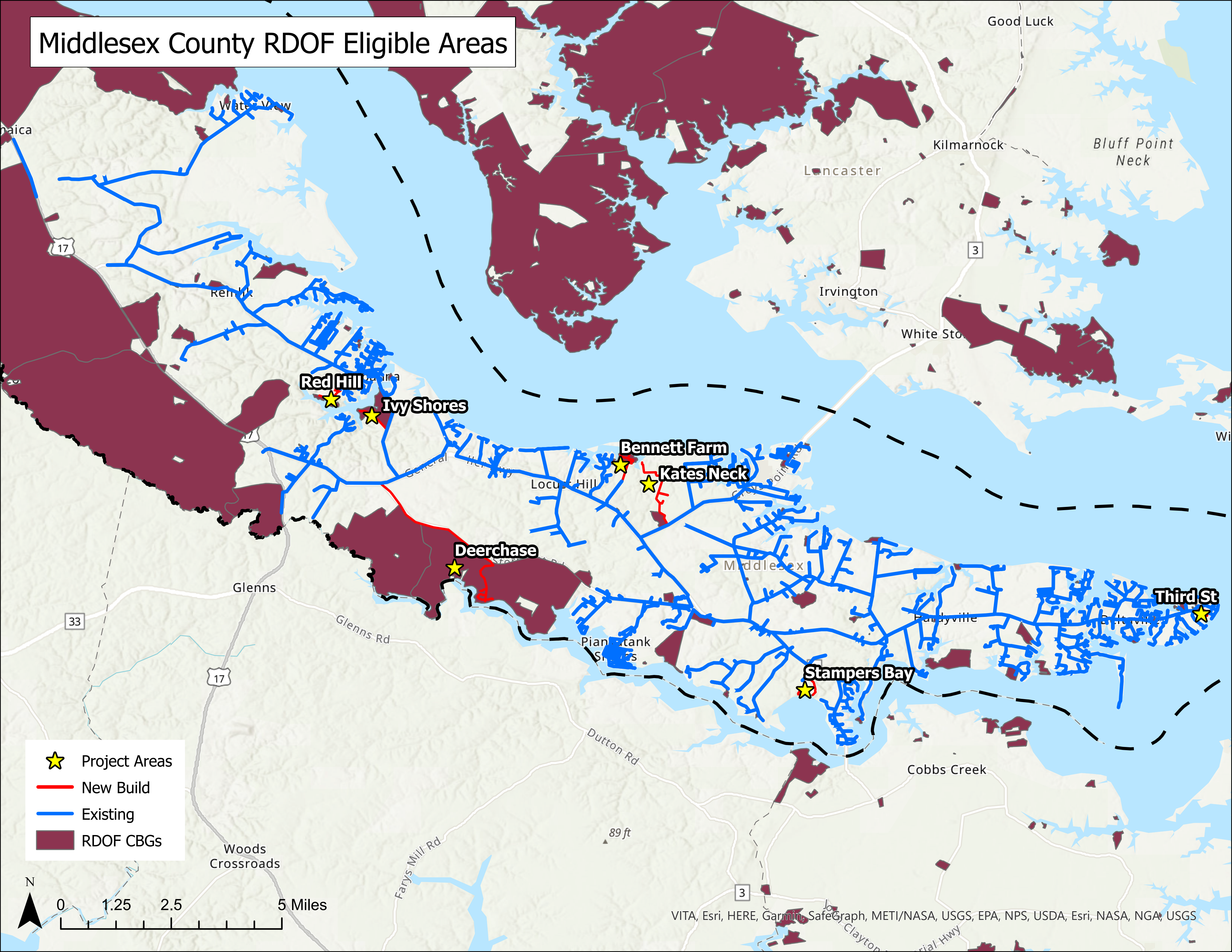

Caroline County RDOF Eligible Areas
Stonewall Ln
RT 17 North
Caroline St
HFC from KG
RT 17 South
Balty Rd
Penola Rd
Project Areas
New Build
Existing
RDOF CBGs
0
2.3
4.6
9.2 Miles
N
VITA, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Esri, NASA, NGA, USGS, FEMA

Lancaster County RDOF Eligible Areas





Mathews County RDOF Eligible Areas
Rocky Point
Roane Point Rd
Chapel Ln
Green Point
Holland Point
Ballast Point Rd
Walnut Acres
Hicks Rd
Holly Cove Rd
Peach Point Rd
Tick Neck Rd
Chapel Neck Rd
Blackwater
Woodas Creek
Wolf Trap
Possum Point
Potato Neck
Dutton
Burke Pond
Cobbs Creek
Cow Neck
Gwynn
Gwynn Island
Crab Neck
41 ft
Foster
Moon
Diggs
Elmington
Tabernacle Rd
Whites Neck
Onemo
Port Haywood
Bohannon
Ridge Rd
E River Rd
Horn
Project Areas
New Build
Existing
RDOF CBGs
N
0
0.88
1.75
3.5 Miles
VITA, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Esri, NASA, NGA, USGS, FEMA



Middlesex County RDOF Eligible Areas
Good Luck
Kilmarnock
Bluff Point Neck
Lancaster
Irvington
3
17
Red Hill
Ivy Shores
Bennett Farm
Kates Neck
Deerchase
Middlesex
Glenns
Glenns Rd
33
17
Third St
Stampers Bay
Cobbs Creek
Dutton Rd
89 ft
Farys Mill Rd
Woods Crossroads
3
Project Areas
New Build
Existing
RDOF CBGs
N
0
1.25
2.5
5 Miles
VITA, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Esri, NASA, NGA, USGS

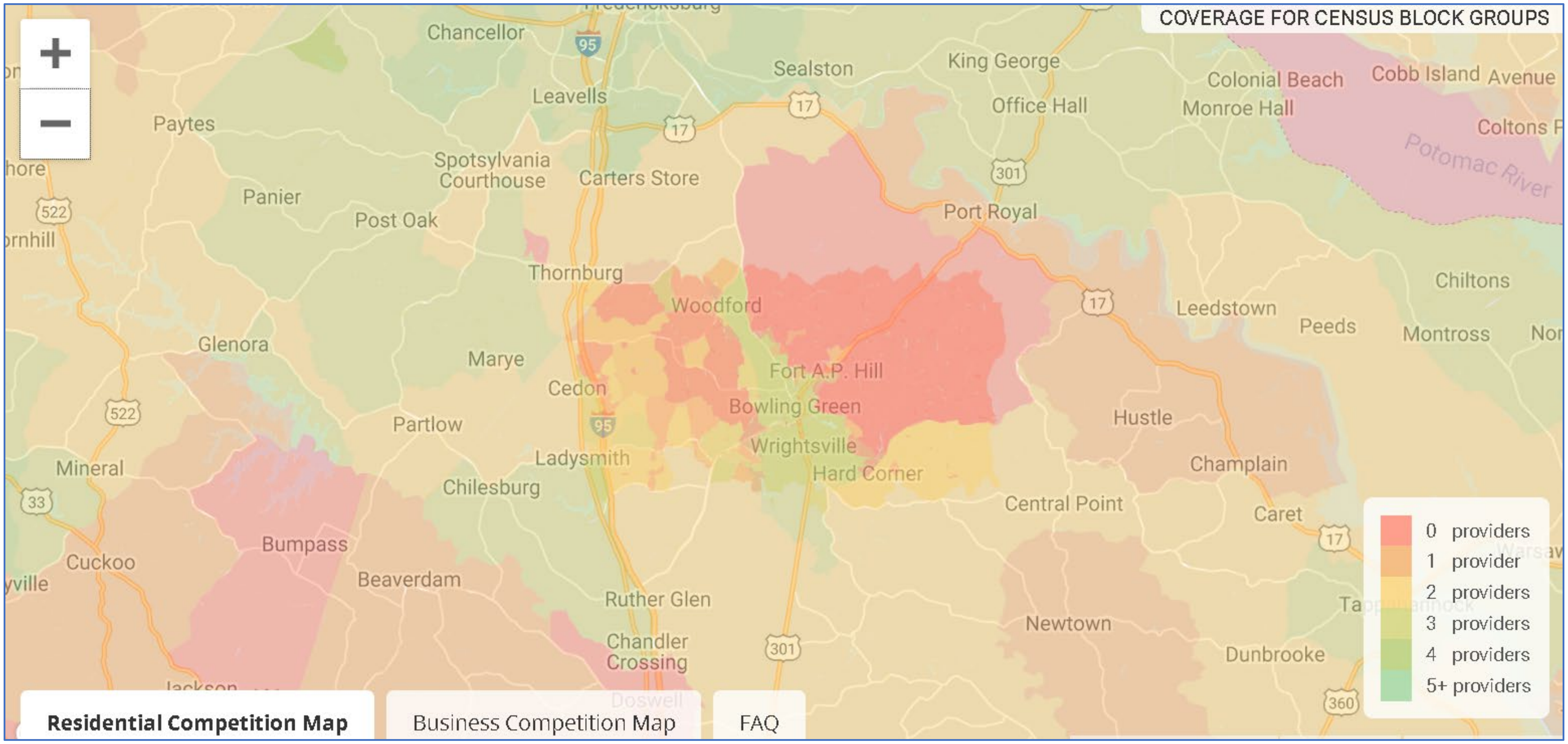
Attachment 3 – Documentation Unserved Area VATI Criteria

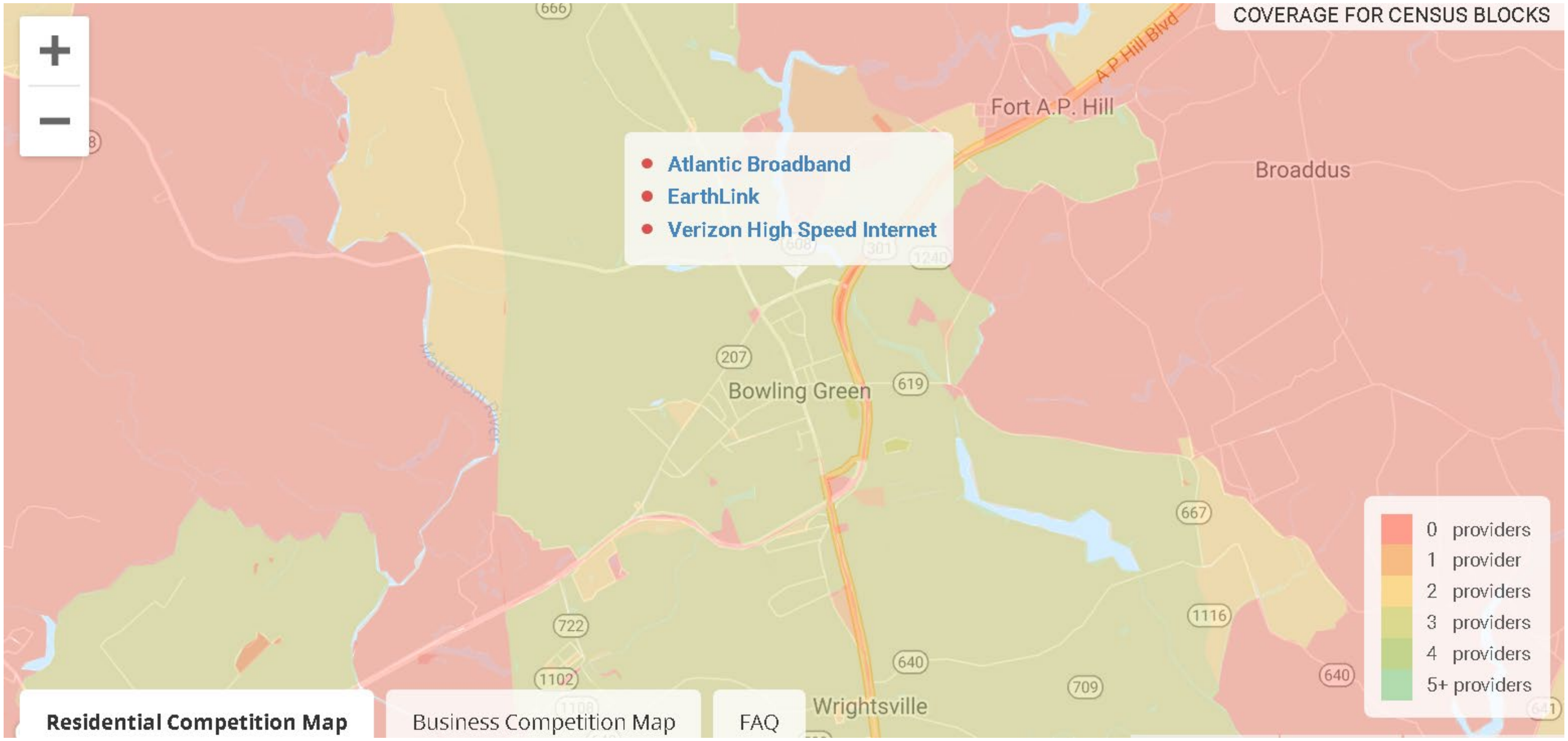
Option A: Caroline County, Lancaster County, Mathews County, Middlesex County

Option B: Caroline County, Mathews County, Middlesex County

Unserved Area Maps

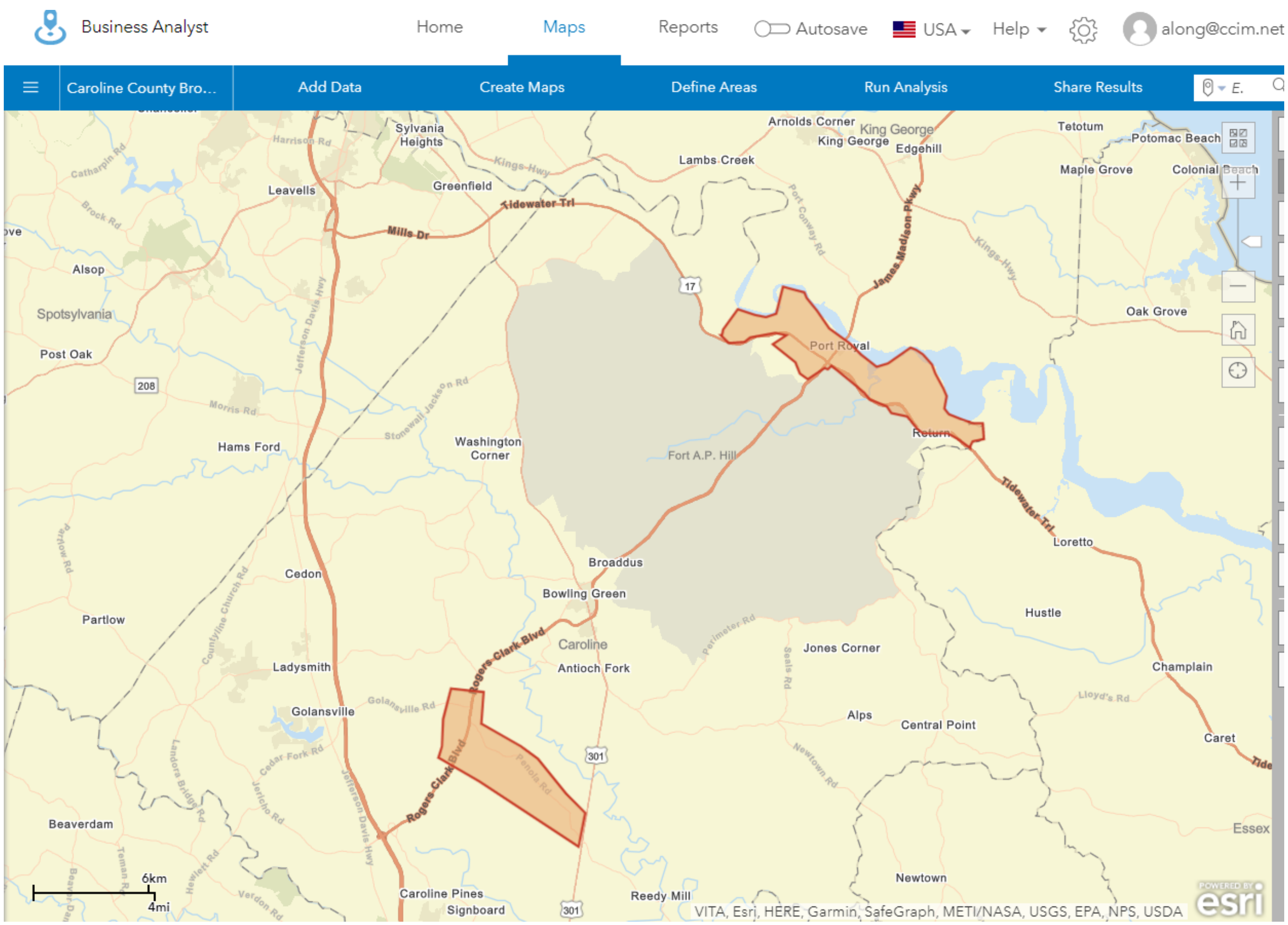
1. Caroline County



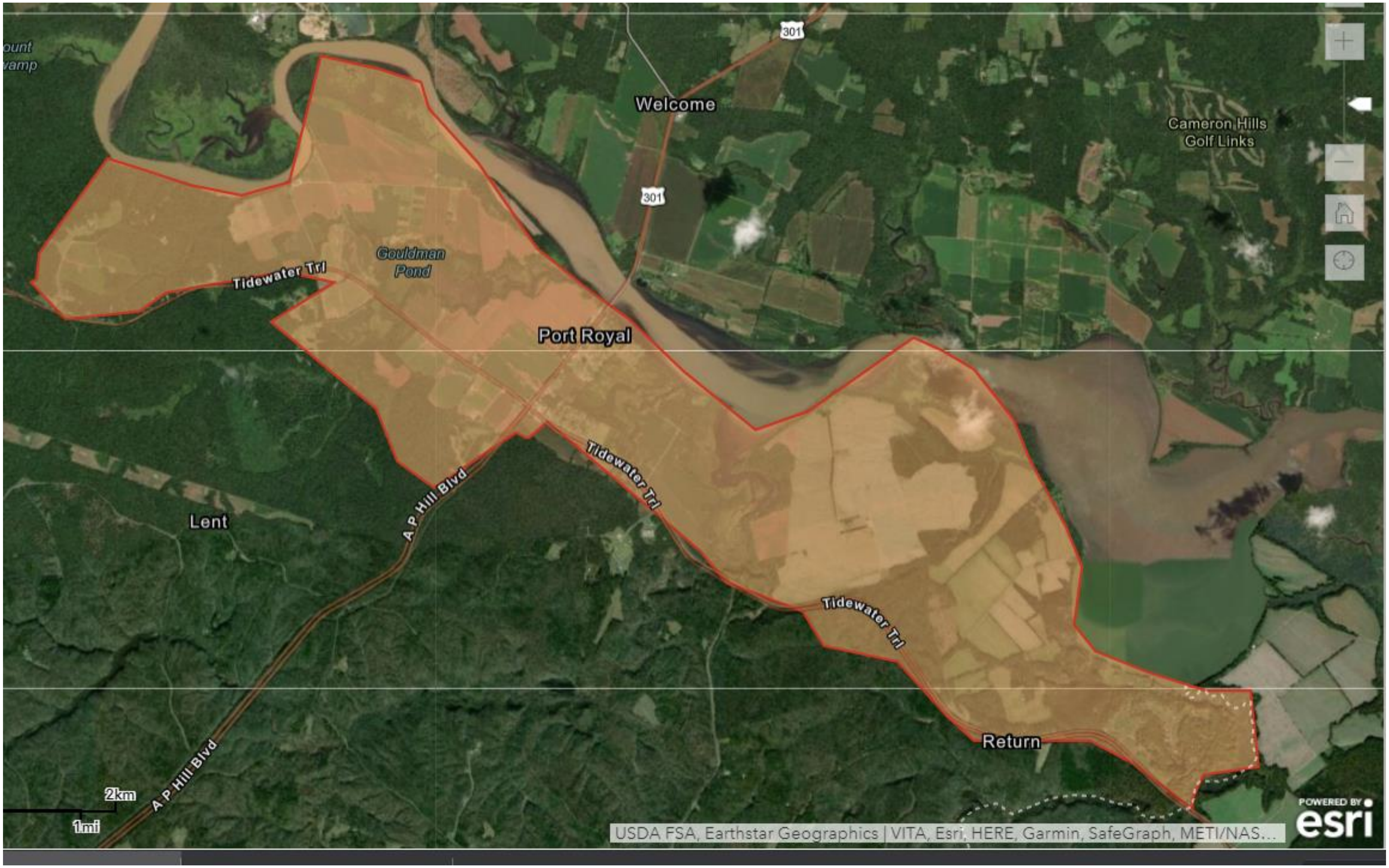

COVERAGE FOR CENSUS BLOCKS
Atlantic Broadband
EarthLink
Verizon High Speed Internet
Fort A.P. Hill
A P Hill Blvd
Broaddus
Bowling Green
Wrightsville
666
207
619
667
722
1102
1116
640
709
0 providers
1 provider
2 providers
3 providers
4 providers
5+ providers
Residential Competition Map
Business Competition Map
FAQ

PROVIDER	STARTING PRICE	SPEED RANGE	TYPE OF INTERNET	COVERAGE AVAILABILITY
Verizon High Speed Internet	$49.99/mo.	15 Mbps	DSL	86% DSL
Atlantic Broadband	$9.99/mo.	15-1000 Mbps	Cable	71% Cable

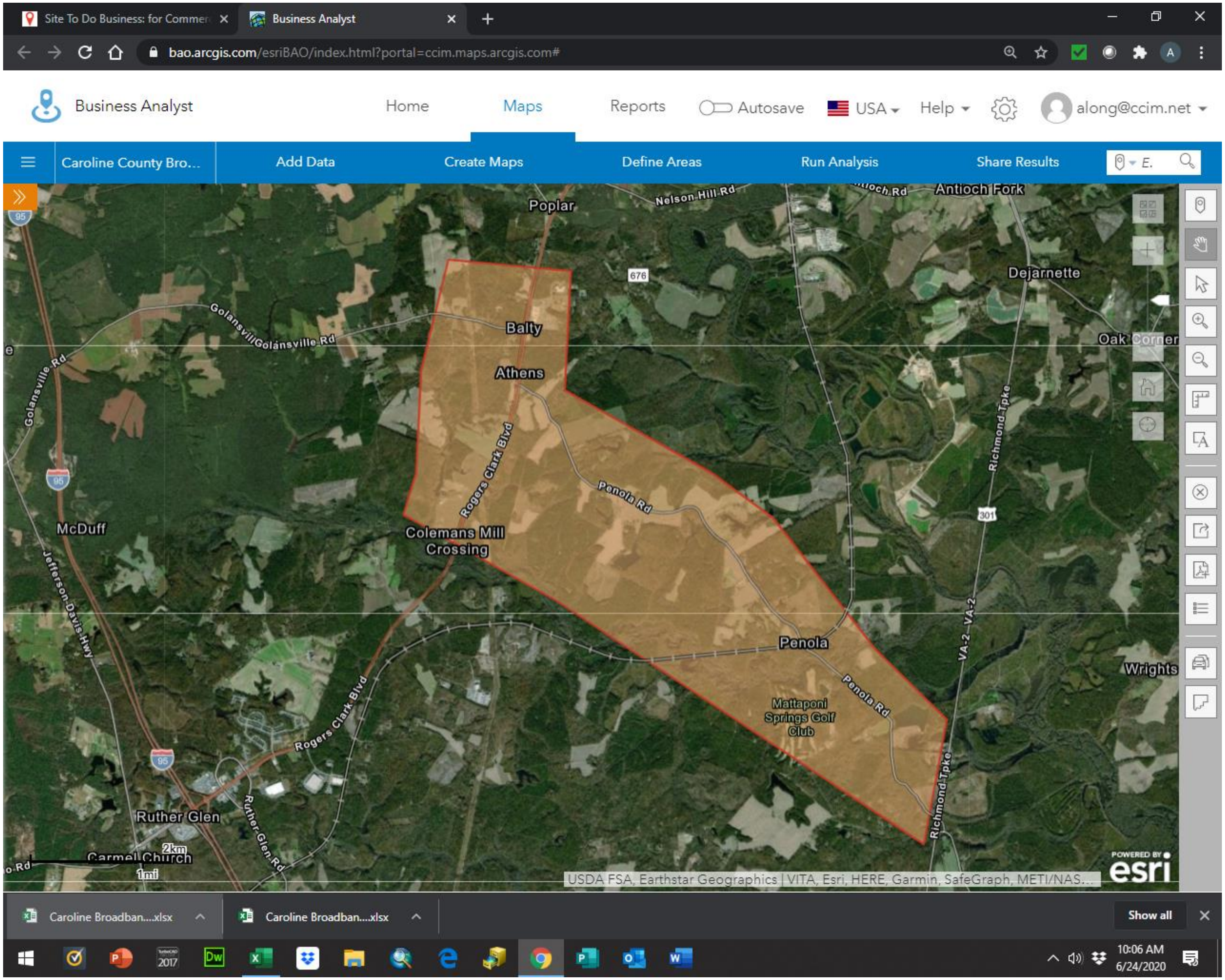
CAROLINE BROADBAND SITES & DATA



Note: the Port Royal area is cut-off from Caroline County and connectivity by Fort AP Hill.



Welcome
301
301
Cameron Hills Golf Links
Gouldman Pond
Tidewater Trl
Port Royal
Tidewater Trl
A P Hill Blvd
Lent
Tidewater Trl
Return
A P Hill Blvd
2km
1mi
USDA FSA, Earthstar Geographics | VITA, Esri, HERE, Garmin, SafeGraph, METI/NAS...
POWERED BY esri


Site To Do Business: for Commer
Business Analyst
bao.arcgis.com/esriBAO/index.html?portal=ccim.maps.arcgis.com#
Business Analyst
Home
Maps
Reports
Autosave
USA
Help
along@ccim.net
Caroline County Bro...
Add Data
Create Maps
Define Areas
Run Analysis
Share Results
Poplar
Nelson Hill Rd
Antioch Fork
Dejarnette
Balty
Athens
Golansville Rd
Oak Corner
Rogers Clark Blvd
Penola Rd
McDuff
Colemans Mill Crossing
Jefferson Davis Hwy
Richmond Tpke
Penola
Mattaponi Springs Golf Club
Wrights
Ruther Glen
Carmel Church
2km
1mi
USDA FSA, Earthstar Geographics | VITA, Esri, HERE, Garmin, SafeGraph, METI/NAS...
esri
Caroline Broadban....xlsx
Caroline Broadban....xlsx
Show all
10:06 AM
6/24/2020

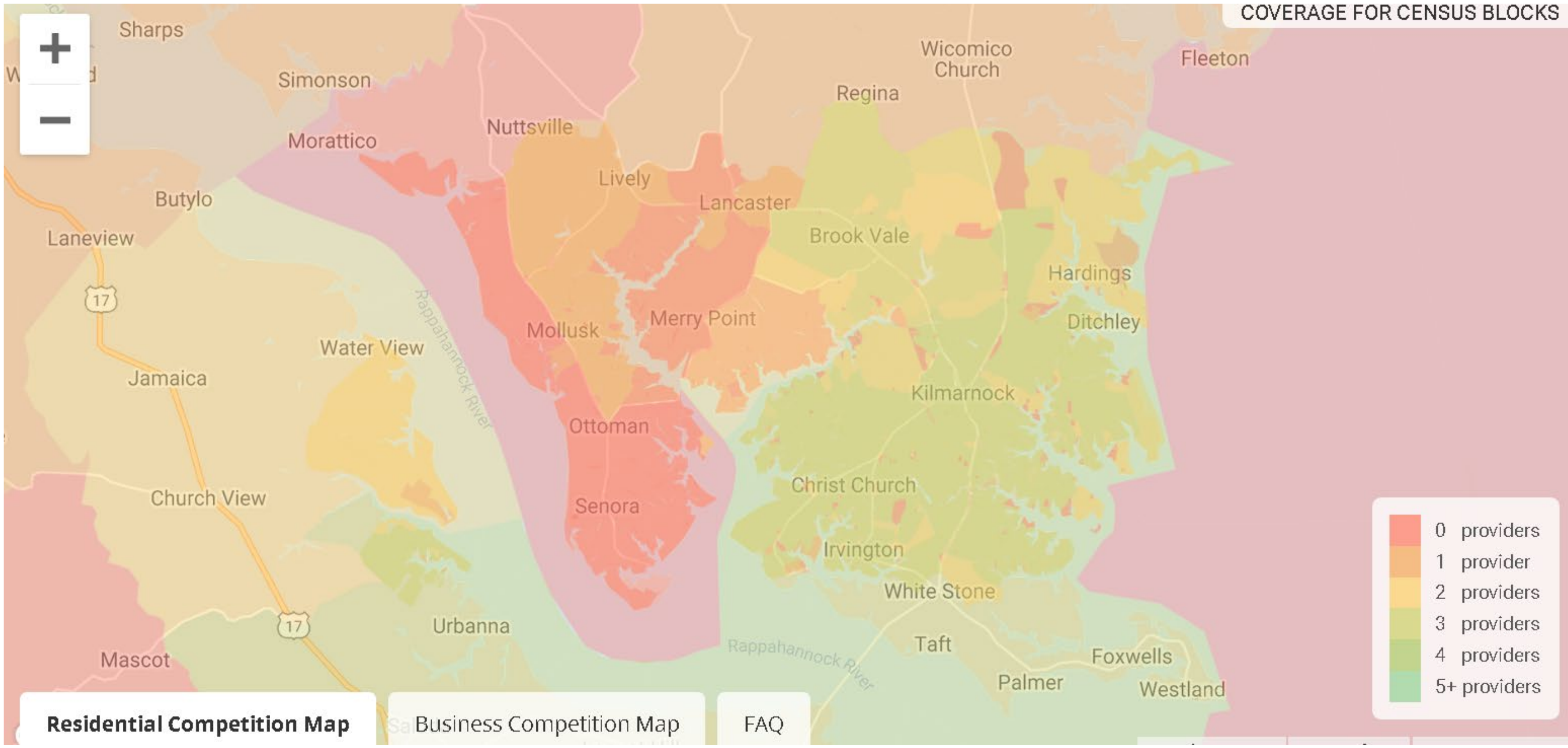
Map and Data Source: ESRI BUSINESS ANALYST; 24 June 2020

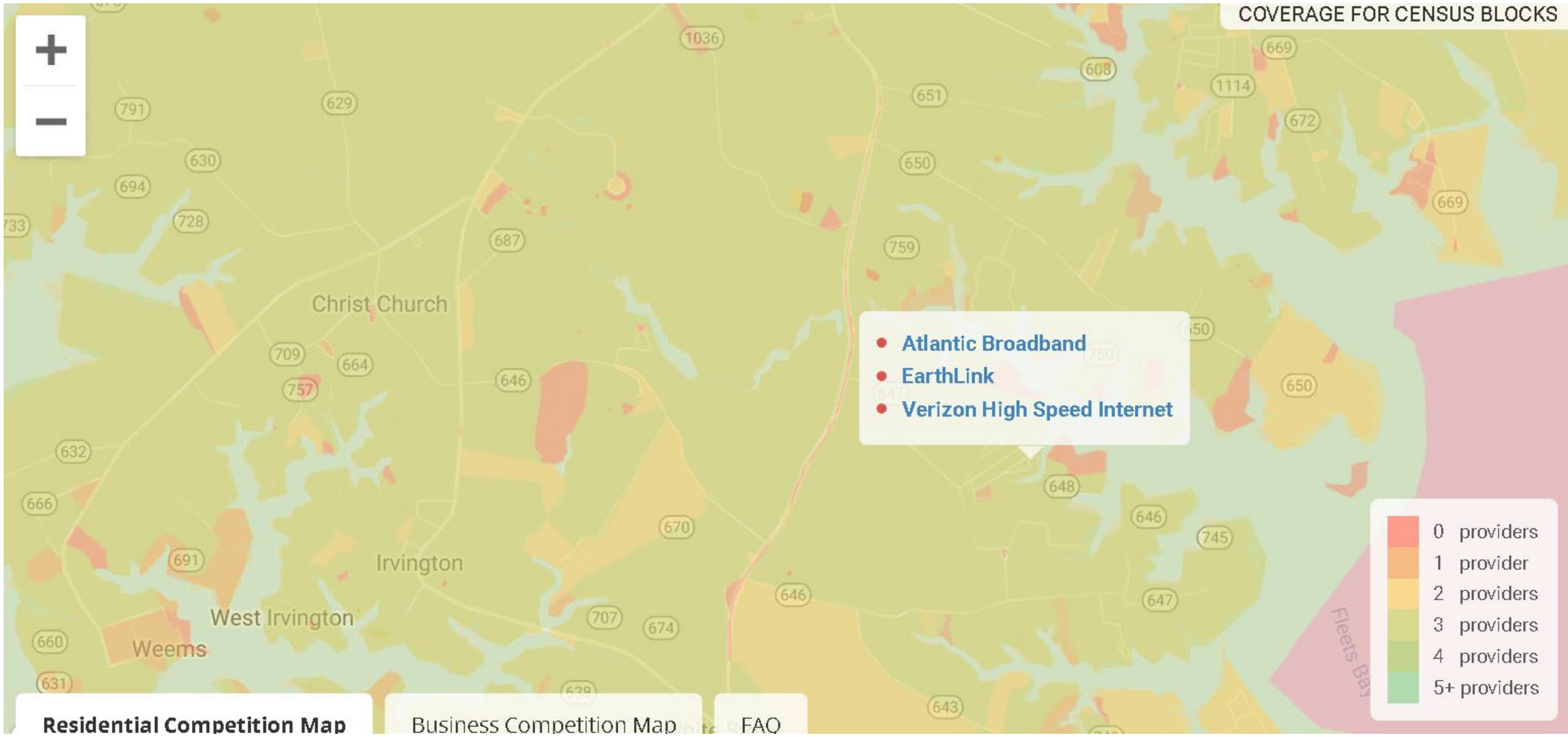
Variable	Port Royal	Penola / Balty	Caroline County, VA
2019 Total Population	718	329	31,458
2024 Total Population	767	336	36,184
2019-2024 Population: Annual Growth Rate	1.33%	0.42%	2.84%
2019 Total Households	307	128	11,486
2019 Average Household Size	2.34	2.57	2.69
2024 Total Households	327	130	13,218
2019 Owner Occupied Housing Units	242	104	9,178
2019 Renter Occupied Housing Units	65	23	2,308
2019 Total Population Age 18+	583	249	24,218
2019 Median Household Income	$73,274	$70,983	$65,806
2019 Average Household Income	$101,947	$83,366	$82,434
2019 Per Capita Income	$42,240	$29,696	$30,273
2019 Median Age	47.1	39.4	40.4
2019 Education: High School Diploma (%)	30.20%	35.53%	31.32%
2019 Education: Bachelor's Degree (%)	12.52%	7.02%	14.40%
2019 Education: Graduate/Professional Degree (%)	3.50%	5.70%	6.27%
2019 Employed Civilian Population Age 16+ (%)	99.01%	97.53%	96.31%
2019 Unemployed Population Age 16+ (%)	0.74%	2.47%	3.69%
2019 Total (SIC01-99) Businesses	20	7	608
2019 Minority Population (%)	36.21%	44.07%	36.66%
2019 Hispanic Population (%)	7.38%	5.47%	5.26%
2019 Diversity Index	57.2	58.1	54.3

Source: ESRI Business Analyst; American Community Survey (ACS) Vintage 2014-2018

Variable	Route 17 / Port Royal	Balty / Pennola Road
2019 Total Population	718	329
2024 Total Population	767	336
2014-2018 ACS Population in Households (%)	100.00%	100.00%
2014-2018 ACS Population <18 in Households (%)	25.78%	22.42%
2014-2018 ACS Population <18 in Households: have a Computer (%)	25.78%	22.42%
2014-2018 ACS Population <18 in Households: have No Computer (%)	0.00%	0.00%
2014-2018 ACS Population 18-64 in Households (%)	53.94%	60.61%
2014-2018 ACS Population 18-64 in Households: have a Computer (%)	52.27%	55.76%
2014-2018 ACS Population 18-64 in Households: have No Computer (%)	1.43%	4.85%
2014-2018 ACS Population 65+ in Households: have a Computer (%)	13.60%	11.52%
2014-2018 ACS Population 65+ in Households: have No Computer (%)	6.92%	5.45%
2014-2018 ACS Households with an Internet Subscription (%)	71.93%	68.84%
2014-2018 ACS Households w/Internet Subscription: Dial-Up Alone (%)	0.00%	0.72%
2014-2018 ACS Households w/Internet Subscription: Broadband (%)	49.12%	29.71%
2014-2018 ACS Households w/Internet Subscription: Satellite Service (%)	22.81%	22.46%
2014-2018 ACS Households w/Internet Subscription: Other Service (%)	0.00%	2.90%
2014-2018 ACS Households with Internet Access/No Subscription (%)	2.92%	6.52%
2014-2018 ACS Households with No Internet Access (%)	25.15%	24.64%

2. Lancaster County

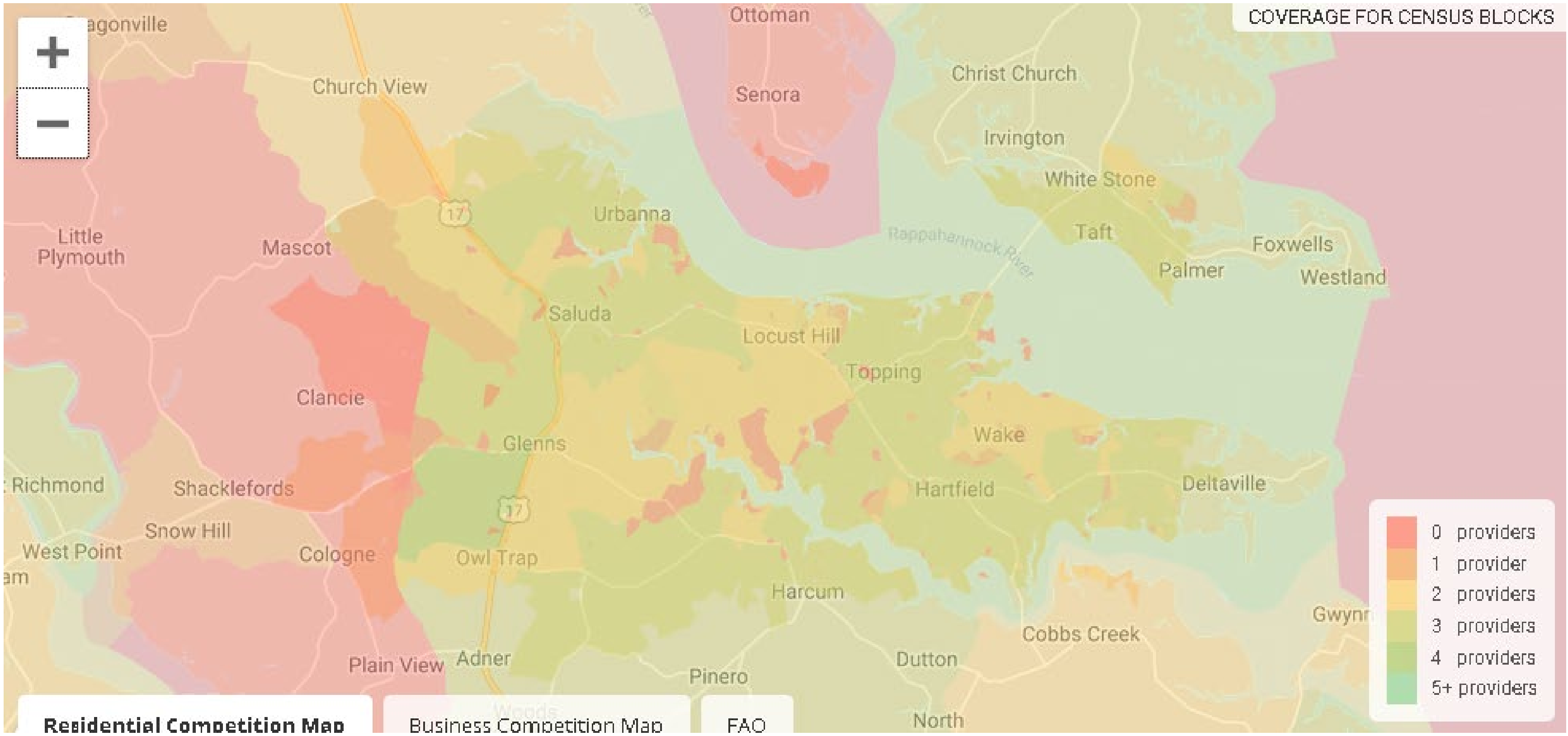


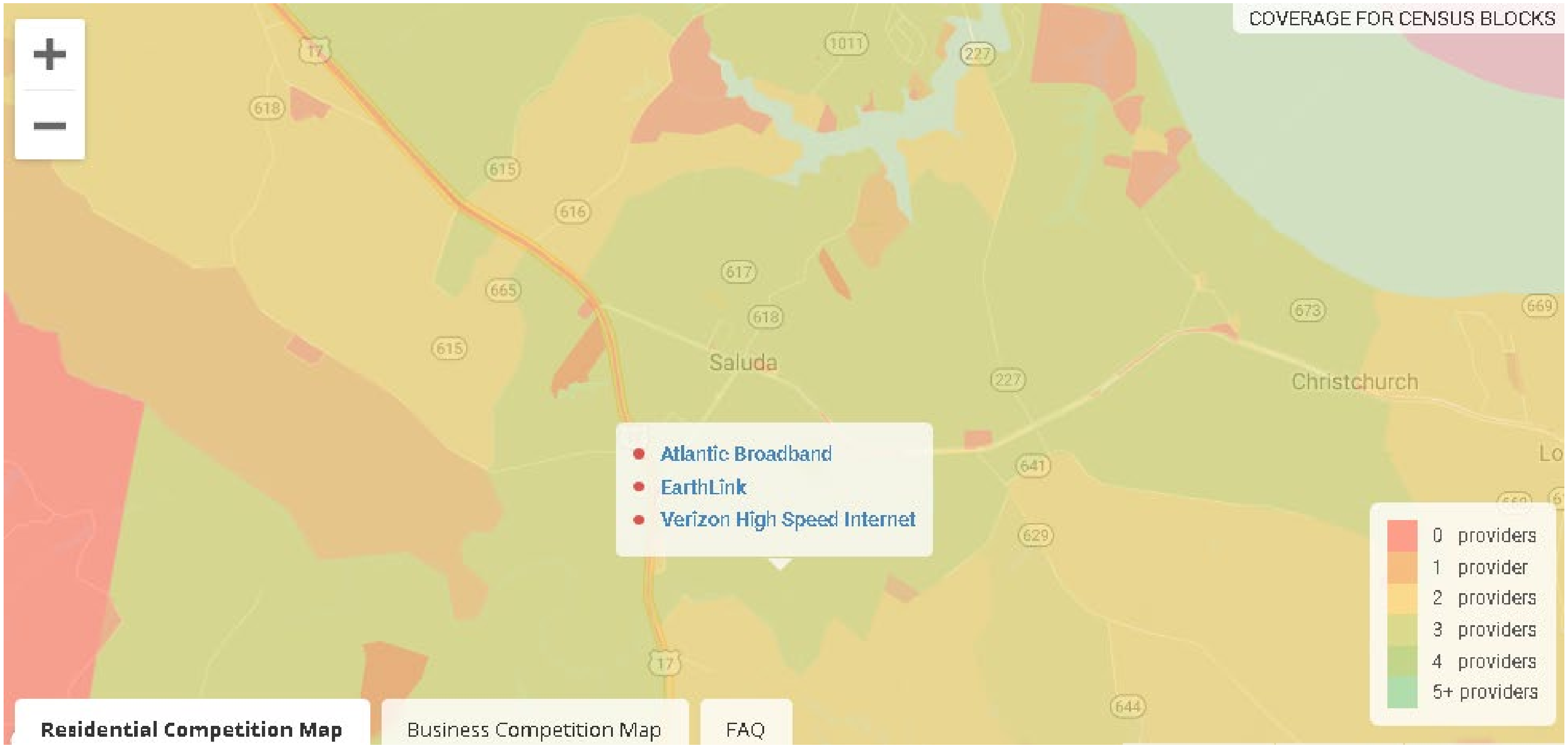

COVERAGE FOR CENSUS BLOCKS
Christ Church
Irvington
West Irvington
Weems
Fleets Bay
Atlantic Broadband
EarthLink
Verizon High Speed Internet
0 providers
1 provider
2 providers
3 providers
4 providers
5+ providers
Residential Competition Map
Business Competition Map
FAQ

Residential Internet Providers in Lancaster, VA

PROVIDER	STARTING PRICE	SPEED RANGE	TYPE OF INTERNET	COVERAGE AVAILABILITY
Atlantic Broadband	$9.99/mo.	15-1000 Mbps	Cable	37% Cable
Verizon High Speed Internet	$49.99/mo.	15 Mbps	DSL	15% DSL

3. Middlesex County

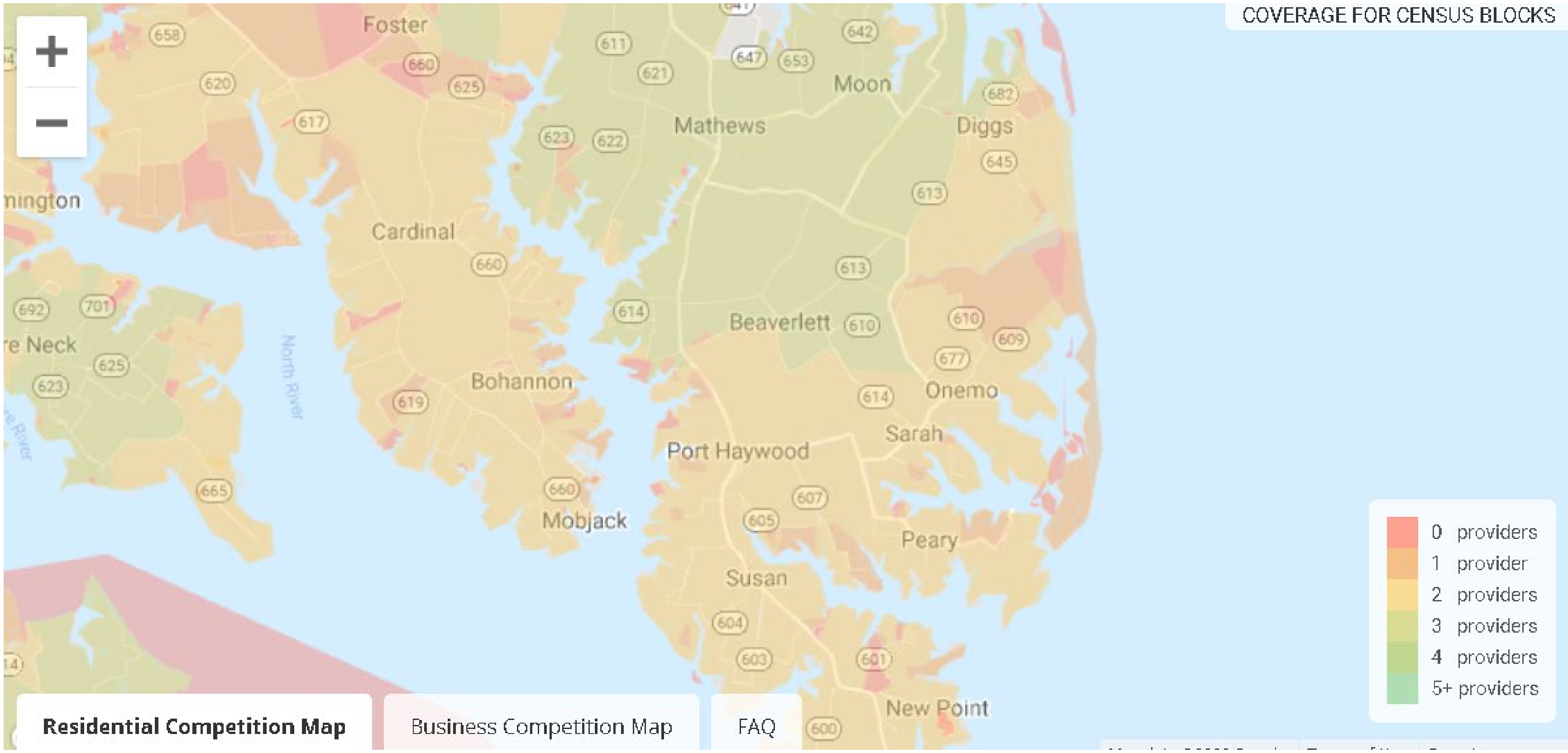


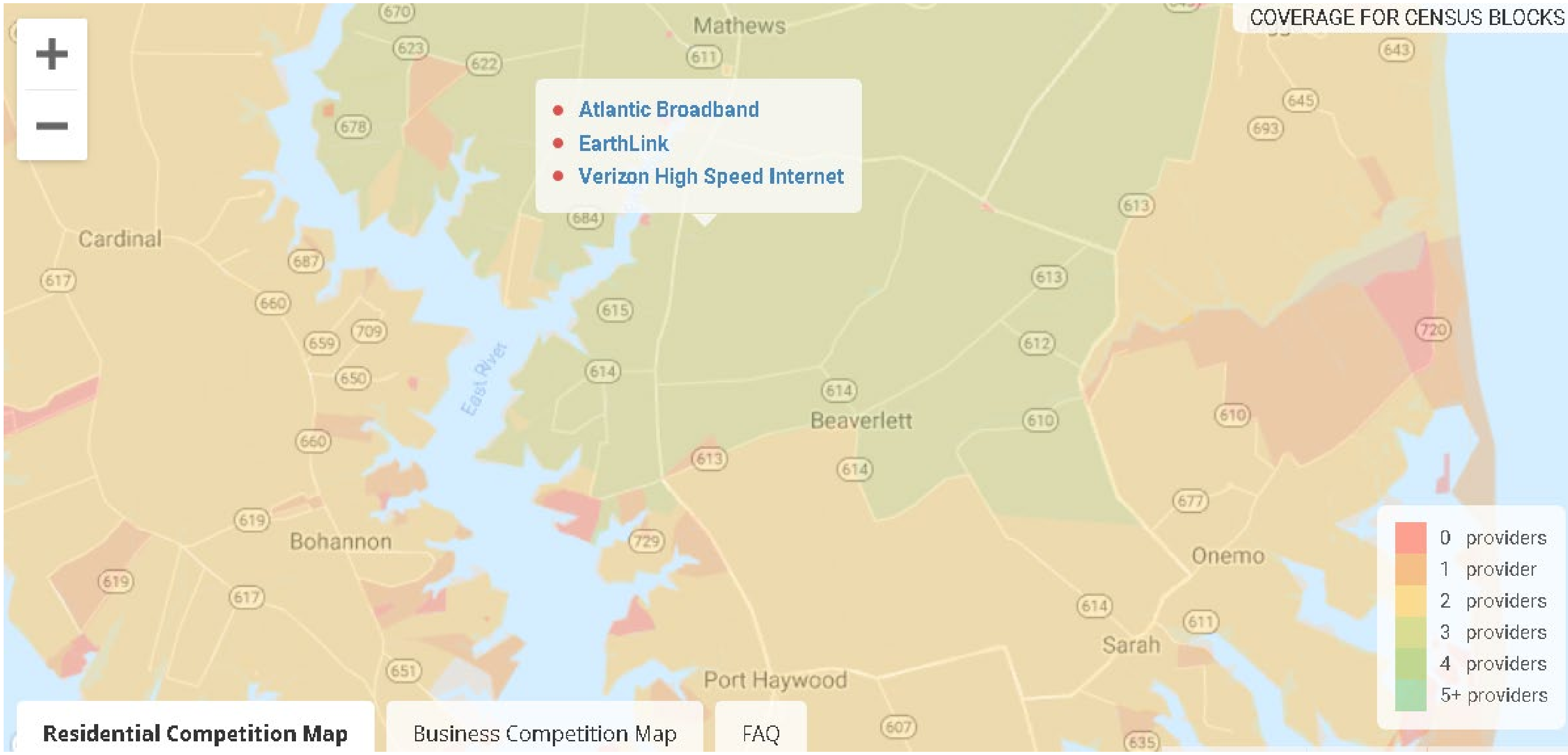

COVERAGE FOR CENSUS BLOCKS
+
−
17
618
615
616
665
615
1011
227
617
618
Saluda
227
673
669
Christchurch
641
629
17
644
Atlantic Broadband
EarthLink
Verizon High Speed Internet
0 providers
1 provider
2 providers
3 providers
4 providers
5+ providers
Residential Competition Map
Business Competition Map
FAQ

Residential Internet Providers in Saluda, VA

PROVIDER	STARTING PRICE	SPEED RANGE	TYPE OF INTERNET	COVERAGE AVAILABILITY
Verizon High Speed Internet	$49.99/mo.	15 Mbps	DSL	86% DSL
Atlantic Broadband	$9.99/mo.	15-1000 Mbps	Cable	42% Cable

4. Mathews County

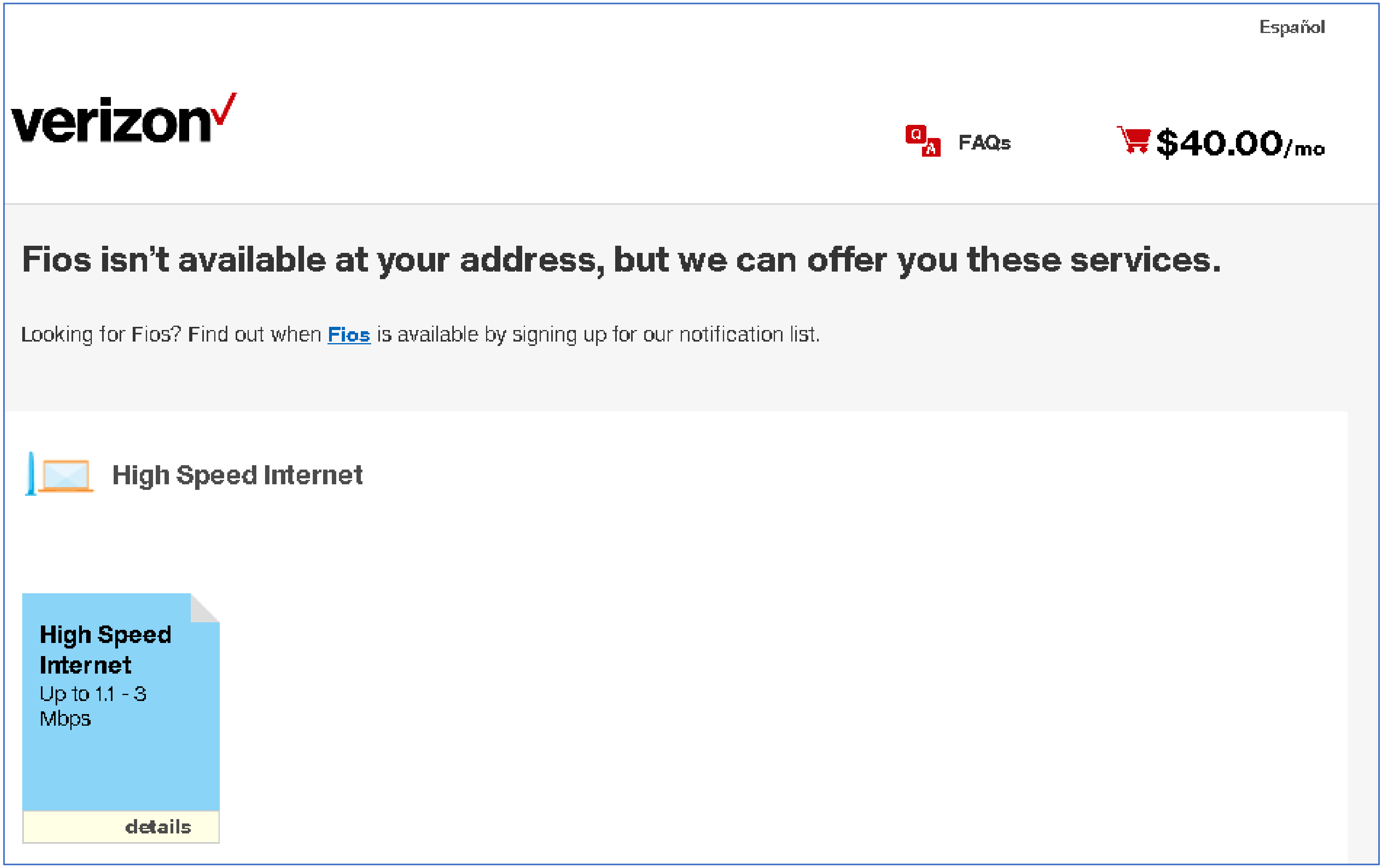



COVERAGE FOR CENSUS BLOCKS
Atlantic Broadband
EarthLink
Verizon High Speed Internet
Mathews
Cardinal
East River
Beaverlett
Bohannon
Onemo
Sarah
Port Haywood
0 providers
1 provider
2 providers
3 providers
4 providers
5+ providers
Residential Competition Map
Business Competition Map
FAQ

Residential Internet Providers in Mathews, VA

PROVIDER	STARTING PRICE	SPEED RANGE	TYPE OF INTERNET	COVERAGE AVAILABILITY
Atlantic Broadband	$9.99/mo.	15-1000 Mbps	Cable	96% Cable
Verizon High Speed Internet	$49.99/mo.	15 Mbps	DSL	95% DSL

5. Verizon high Speed DSL Lancaster White Stone Availability



2021 Virginia Telecommunication Initiative (VATI)
Caroline Passing Form

Type of Passings	Total Number in Project Area	Number with Speeds at 10/1 or below in Project Area
Residential	228	228
Businesses (non-home based)	22	22
Businesses (home-based)	46	46
Community Anchors	0	0
Non-residential	262	262
Total Number of Passings	512	512

***Note**: The Total Number of Passings **MUST** be equal to the Residential, Business (non-home based), Non-residential and Community Anchors sum.*

Definitions

Passing – any structure that can receive service.

Business – An organization or entity that provides goods or services in order to generate profit. Businesses based in residential homes can count if they are a registered business (BPOL, LLC, etc.).

Community Anchor - schools, libraries, medical and health care providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and agencies that provide outreach, access, equipment, and support services to facilitate greater use of broadband service by vulnerable populations, including low-income, unemployed, and the aged.

Non-Residential Passing – places of worship, federal, state, or local facilities or other potential customers that are neither a residence, business or a community anchor as defined above.

2021 Virginia Telecommunication Initiative (VATI)
Lancaster Passing Form

Type of Passings	Total Number in Project Area	Number with Speeds at 10/1 or below in Project Area
Residential	484	484
Businesses (non-home based)	13	13
Businesses (home-based)	25	25
Community Anchors	0	0
Non-residential	0	0
Total Number of Passings	497	497

***Note**: The Total Number of Passings **MUST** be equal to the Residential, Business (non-home based), Non-residential and Community Anchors sum.*

Definitions

Passing – any structure that can receive service.

Business – An organization or entity that provides goods or services in order to generate profit. Businesses based in residential homes can count if they are a registered business (BPOL, LLC, etc.).

Community Anchor - schools, libraries, medical and health care providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and agencies that provide outreach, access, equipment, and support services to facilitate greater use of broadband service by vulnerable populations, including low-income, unemployed, and the aged.

Non-Residential Passing – places of worship, federal, state, or local facilities or other potential customers that are neither a residence, business or a community anchor as defined above.

2021 Virginia Telecommunication Initiative (VATI)
Mathews Passing Form

Type of Passings	Total Number in Project Area	Number with Speeds at 10/1 or below in Project Area
Residential	397	397
Businesses (non-home based)	5	5
Businesses (home-based)	14	14
Community Anchors	0	0
Non-residential	0	0
Total Number of Passings	402	402

***Note**: The Total Number of Passings **MUST** be equal to the Residential, Business (non-home based), Non-residential and Community Anchors sum.*

Definitions

Passing – any structure that can receive service.

Business – An organization or entity that provides goods or services in order to generate profit. Businesses based in residential homes can count if they are a registered business (BPOL, LLC, etc.).

Community Anchor - schools, libraries, medical and health care providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and agencies that provide outreach, access, equipment, and support services to facilitate greater use of broadband service by vulnerable populations, including low-income, unemployed, and the aged.

Non-Residential Passing – places of worship, federal, state, or local facilities or other potential customers that are neither a residence, business or a community anchor as defined above.

2021 Virginia Telecommunication Initiative (VATI)
Middlesex Passing Form

Type of Passings	Total Number in Project Area	Number with Speeds at 10/1 or below in Project Area
Residential	147	147
Businesses (non-home based)	0	0
Businesses (home-based)	17	17
Community Anchors	0	0
Non-residential	0	0
Total Number of Passings	147	147

***Note**: The Total Number of Passings **MUST** be equal to the Residential, Business (non-home based), Non-residential and Community Anchors sum.*

Definitions

Passing – any structure that can receive service.

Business – An organization or entity that provides goods or services in order to generate profit. Businesses based in residential homes can count if they are a registered business (BPOL, LLC, etc.).

Community Anchor - schools, libraries, medical and health care providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and agencies that provide outreach, access, equipment, and support services to facilitate greater use of broadband service by vulnerable populations, including low-income, unemployed, and the aged.

Non-Residential Passing – places of worship, federal, state, or local facilities or other potential customers that are neither a residence, business or a community anchor as defined above.

Atlantic Broadband Project Management Plan

COUNTY	RESPONSIBLE PERSON	ENTITY	Tasks	1-Oct-20	1-Nov-20	1-Dec-20	1-Jan-21	1-Feb-21	1-Mar-21	1-Apr-21	1-May-21	1-Jun-21	1-Jul-21	1-Aug-21	1-Sep-12	1-Oct-21	1-Nov-21	1-Dec-21	1-Jan-22	1-Feb-22	1-Mar-22	1-Apr-22	1-May-22	1-Jun-22	1-Jul-22	1-Aug-22	1-Sep-22
Middlesex	Bill Newborg and Mike Scott	ABB	**Contractor Selection**																								
15.94 Miles	Bill Newborg and Mike Scott	ABB	**OSP Walkout**																								
	Bill Newborg and Mike Scott	ABB	**Design- Permitting**																								
	Bill Newborg and Mike Scott	ABB	**Material Management**																								
	Bill Newborg and Mike Scott	ABB	**Construction Start**																								
	Bill Newborg and Mike Scott	ABB	**EST Activation Date**																								
COUNTY	**RESPONSIBLE PERSON**	**ENTITY**	**Tasks**																								
Mathews	Bill Newborg and Mike Scott	ABB	**Contractor Selection**																								
38.59 Miles	Bill Newborg and Mike Scott	ABB	**OSP Walkout**																								
	Bill Newborg and Mike Scott	ABB	**Design**																								
	Bill Newborg and Mike Scott	ABB	**Material Management**																								
	Bill Newborg and Mike Scott	ABB	**Construction Start**																								
			EST Activation Date																								
COUNTY	**RESPONSIBLE PERSON**	**ENTITY**	**Tasks**																								
Caroline	Bill Newborg and Mike Scott	ABB	**Contractor Selection**																								
49.65 Miles	Bill Newborg and Mike Scott	ABB	**OSP Walkout**																								
	Bill Newborg and Mike Scott	ABB	**Design**																								
	Bill Newborg and Mike Scott	ABB	**Material Management**																								
	Bill Newborg and Mike Scott	ABB	**Construction Start**																								
	Bill Newborg and Mike Scott	ABB	**EST Activation Date**																								
COUNTY	**RESPONSIBLE PERSON**	**ENTITY**	**Tasks**																								
Lancaster	Bill Newborg and Mike Scott	ABB	**Contractor Selection**																								
57.52 Miles	Bill Newborg and Mike Scott	ABB	**OSP Walkout**																								
	Bill Newborg and Mike Scott	ABB	**Design**																								
	Bill Newborg and Mike Scott	ABB	**Material Management**																								
	Bill Newborg and Mike Scott	ABB	**Construction Start**																								
	Bill Newborg and Mike Scott	ABB	**EST Activation Date**																								

MEMORANDUM OF AGREEMENT

This Memorandum of Agreement sets forth the principal terms with respect to the intent of the counties of: Caroline; Lancaster; Mathews; and Middlesex, within the Commonwealth of Virginia (individually and collectively "**Counties**") to partner with Atlantic Broadband (Delmar) LLC ("**ABB**"), to provide turnkey expansion, network management and other network-related services with respect to the proposed fiber network for cable video, high speed data, and other telecommunication services (the "**ABB Network Expansion**") to be designed and built by ABB with the proceeds of a grant jointly applied for by the Counties and ABB subject to the Virginia Telecommunication Initiative ("**VATI**") grant initiative managed by Virginia's Department of Housing and Community Development (the "**DHCD**").

Parties:

- Caroline County
- Lancaster County
- Mathews County
- Middlesex County
- Atlantic Broadband

Proposed Engagement: Following receipt of a VATI grant and compliance by the Counties with all applicable grant and legal requirements, the Counties intend to support ABB in their expansion to unserved areas identified in the VATI application FY2021, and to provide the "**Network Expansion Services"** (as further described below). Such engagement may be structured as a public-private partnership and may be made by the Counties' Broadband Authorities or established advisory group through a Board of Supervisors. If no DHCD grant is awarded to the Counties, the Counties will have no obligation whatsoever to ABB pursuant to this Memorandum of Agreement.

Network Services: The Network Expansion Services shall include:

1. A matching commitment of $1,200 per pass listed in the FY 2021 VATI application, both by ABB and the county where the passes are located;
2. Turnkey design and construction to all proposed areas submitted in the FY2021 VATI grant that are classified unserved by the counties;
3. Providing overall network management services and other network-related services as are necessary or desirable to properly operate and maintain the ABB Network Expansion; and

4. Providing such other network-related services and support as the Counties may reasonably require with respect to the ABB Network Expansion.

Counties Obligations: The Counties' obligations in connection with the Network Services engagement shall include:

1. Providing ABB and its representatives with reasonable access to Counties' information, as permitted by Virginia law, and personnel required to provide all work necessary in the Network Expansion Services, and instructing such personnel to cooperate fully with ABB and its representatives;
2. Timely communication between Counties' personnel and an ABB point-of-contact for questions and requests regarding ABB's Network Expansion and the services to be provided using the ABB Network Expansion.

Financial Contribution: In recognition of the DHCD grant requirements of a matching contribution by the grant recipients, ABB commits to provide a matching contribution with each county based on the number of passes in each county; equal to $1200 per qualified pass. The payment of such contribution amount will be made through the payment of qualifying project expenses by ABB and structured to comply with DHCD requirements.

Expenses: Each party shall bear its own expenses in preparing this FY2021 VATI Grant Application.

Governing Law: The laws of the Commonwealth of Virginia shall govern this Memorandum of Agreement and all disputes between the parties arising with respect to it.

EXECUTED as of August __, 2020.

Caroline County

By: ________________________________
[Name/Title]

Address: ________________________________
____
Attn: ________________________
Email: ________________________

Lancaster County By: ______________________________ [Name/Title] Address: ___________________________ ___________________________ Attn: ______________________ Email: ______________________
Mathews County By: ______________________________ [Name/Title] Address: ___________________________ ___________________________ Attn: ______________________ Email: ______________________
Middlesex County By: ______________________________ [Name/Title] Address: ___________________________ ___________________________ Attn: ______________________ Email: ______________________
Atlantic Broadband By: ___________________________ [Name/Title] Address: ___________________________ Attn: ______________________ Email: ______________________

VATI FUNDING SOURCES TABLE (Option A)

Please fill in the chart below with a description of the project funding source (local, federal, state, private, other), the amount from that source, the percentage of total project funding that source represents, and a description of the current status of the funds (pending, secured, etc.).

Source	Amount	%	Status
REQUESTED VATI	$ 5,187,674	58.11	Pending
ATLANTIC BROADBAND	$ 1,869,600	20.94	APPROVED
CAROLINE COUNTY	$ 614,400	6.88	APPROVED
LANCASTER COUNTY	$ 596,400	6.68	APPROVED
MATHEWS COUNTY	$ 482,400	5.40	APPROVED
MIDDLESEX COUNTY	$ 176,400	1.98	APPROVED
TOTAL	**$ 8,926,874**	**100 %**	

VATI FUNDING SOURCES TABLE (Option B)

Please fill in the chart below with a description of the project funding source (local, federal, state, private, other), the amount from that source, the percentage of total project funding that source represents, and a description of the current status of the funds (pending, secured, etc.).

Source	Amount	%	Status
REQUESTED VATI	$ 3,116,762	55.04	Pending
ATLANTIC BROADBAND	$ 1,273,200	22.48	APPROVED
CAROLINE COUNTY	$ 614,400	10.85	APPROVED
MATHEWS COUNTY	$ 482,400	8.52	APPROVED
MIDDLESEX COUNTY	$ 176,400	3.11	APPROVED
TOTAL	**$ 5,663,162**	**100 %**	

ATLANTIC
broadband
a Cogeco company

August 10, 2020

Tamarah Holmes, Ph.D
Director, Office of Broadband
Program Manager, Virginia Appalachian Regional Commission Program (ARC)
Virginia Department of Housing and Community Development (DHCD)
600 East Main Street, Suite #300
Richmond, Virginia 23219

RE: Virginia Telecommunications Initiative ("VATI") Grant Application

Dear Dr. Holmes:

Should the 2021 Regional Application for portions of the Middle Peninsula and Northern Neck area be awarded grant funding from the "VATI", Atlantic Broadband proposes to design, engineer, construct, operate, maintain and own the respective Hybrid-Fiber Coaxial ("HFC☺ and/or Fiber-To-The-Home ("FTTH") network in the respective proposed service areas.

Should the grant for the Four-County Regional Project be awarded for Plan "A", Atlantic Broadband will contribute up to the maximum of 20.93% of the total construction cost of the project.

Should the grant for the Three-County Regional Project be awarded for Plan "B", Atlantic Broadband will contribute up to the maximum of 22.48% of the total construction cost of the project.

Mr. William T. Newborg, (Director of Grants and Funding), will manage the project with the assistance of Mr. Michael Scott, (Construction Supervisor for Virginia and Maryland), on behalf of Atlantic Broadband.

Please feel free to contact me should you need additional information.

Sincerely,

Danny L. Jobe
Vice President of Operations
Atlantic Broadband

Caroline County, Virginia
Board of Supervisors

Caroline County, VA
All-America City
2009

Jeffrey S. Black
Western Caroline District

Clayton T. Forehand
Madison District

Nancy L. Long
Port Royal District

Jeffery M. Sili
Bowling Green District

Floyd W. Thomas
Mattaponi District

Reginald L. Underwood
Reedy Church District

Charles M. Culley, Jr.
County Administrator

August 10, 2020

Tamarah Holmes, Ph. D.
Director, Office of Broadband
Department of Housing & Community Development
600 East Main Street, Suite 300
Richmond, VA 23219

Dear Dr. Holmes:

At its June 23, 2020 meeting, the Caroline County Board of Supervisors agreed to participate in a multi-jurisdiction application with Lancaster, Mathews and Middlesex counties for a Fiscal Year 2020/2021 Virginia Telecommunication Initiative grant to expand broadband service through a partnership with Atlantic Broadband (ABB). In Caroline County, the proposed project would extend service for 49.65 miles and pass a total of 512 occupied homes and 68 businesses in qualifying unserved areas. Specific information regarding the proposed routes is provided in the grant application. Each home and business along the chosen routes will be offered service rather than resorting to "cherry picking" only the easiest and least costly connections. The total cost of the project is $2,336,805. Caroline County and Atlantic Broadband have agreed to contribute $614,400 each (512 passings at $1,200 per passing) with VATI grant funds requested for the remaining $1,108,005.

We ask for favorable consideration of this grant application. Access to VATI grant funds to help cover the significant costs associated with extending broadband service to sparsely populated rural areas is critical to counties like Caroline. Without financial assistance from the Commonwealth, such projects are simply not feasible and citizens will remain unserved. The Caroline County Board of Supervisors believes the identified project would make excellent use of the VATI grant program and is pleased to demonstrate the County's strong financial backing of the project and grant application.

Thank you for your consideration of this request. Please let us know if any additional information is needed in support of the application.

Sincerely,

Jeffery M. Sili, Chairman
Caroline County Board of Supervisors

"Committed To Service, Dedicated To The People"

212 North Main Street, P. O. Box 447, Bowling Green, Virginia 22427
(804)633-5380 – Telephone (804)633-4970 – Fax
www.co.caroline.va.us

Lancaster County Founded 1651

COUNTY OF LANCASTER

FOUNDED 1651 IN VIRGINIA

LANCASTER COURTHOUSE
8311 MARY BALL ROAD
LANCASTER, VIRGINIA 22503

804-462-5129
804-462-0031 (FAX)
www.lancova.com

Don G. Gill
County Administrator

BOARD OF SUPERVISORS
Jack D. Larson, 1st District
Ernest W. Palin, Jr., 2nd District
Jason D. Bellows, 3rd District
William R. Lee, 4th District
Robert S. Westbrook, 5th District

August 10, 2020

Tamarah Holmes, Ph.D.
Director, Office of Broadband
Department of Housing and Community Development
600 East Main Street, Suite 300
Richmond, Virginia 23219

Re: Board of Supervisors Support for the Broadband Authority's VATI Application

Dear Tamarah Holmes,

On behalf of the Lancaster County Board of Supervisors, I want to extend the Board's enthusiastic support for the Lancaster County Broadband Authority's participation in a four county regional Virginia Telecommunications Initiative (VATI) grant application. The Lancaster County Broadband Authority (LCBA) is collaborating with three other counties (Mathews, Middlesex, and Caroline) and partnering with Atlantic Broadband to design a regional VATI project that will make excellent use of the VATI grant program, providing broadband access to approximately 1,500 currently unserved households in the four counties.

The LCBA has studied the needs of Lancaster County and devised a bold expansion plan that does not include a "cherry picking" approach. A successful application will also contribute greatly to Lancaster County's economic development. Broadband access will be expanded to 505 households and 11 businesses and will benefit 8% of county students.

The provision of high-speed broadband coverage throughout the County is stated as "absolutely essential" in the Lancaster County Comprehensive Plan and the Board has listed it as the number one priority to improving citizens' lives and enhancing economic development within our County. The Board has also approved funding in its FY 21 Capital Improvement Budget for broadband grant matches, including this required 25% grant match of up to $600,000.

The rural digital divide is real. Lancaster County must overcome that divide to provide a better future for its citizens. Lancaster County has the natural resources to offer an unmatched quality of life to its residents, tourists, and businesses, but needs access to the opportunities that will be created by expanded high-speed broadband coverage to enable our County to provide that brighter future for its citizens.

Sincerely,

Don G. Gill

Don G. Gill
County Administrator

August 13, 2020

Tamarah Holmes, Ph.D.
Director
Department of Housing and Community Development
Office of Broadband
600 E Main St #300, Richmond, VA 23219

Dear Dr. Holmes:

Mathews County seeks assistance from the Department of Housing and Community Development to meet the critical need for broadband service in our rural coastal community. Please accept this letter of support for a Virginia Telecommunication Initiative (VATI) grant from Mathews County in partnership with the Counties of Middlesex, Lancaster, and Caroline, and Atlantic Broadband. This project is designed to expand broadband access to 482 passes, including home-based businesses and remote learners, with a hybrid or wired solution from our existing provider.

The Mathews Board of Supervisors recognizes the need for broadband in our community to support education, health care, and our economic base. To this end, the Board voted unanimously to provide a local match up to $485,000 to support this project.

As a community, Mathews understands the importance of broadband in our daily lives at home and at work. The Board of Supervisors appointed the Mathews Broadband Advisory Board in June 2019 to seek solutions for unserved and under-served areas in our county. The pandemic has significantly amplified this need. Our excellent school system cannot educate our children remotely without broadband. Our aging citizens cannot receive tele-health services without broadband. Our shrinking economic base cannot expand without broadband. Quite simply, the lack of broadband creates a crisis in Mathews that we lack the resources to address without support from your agency.

Please let me know if either I, or Board of Supervisors Chair Amy Dubois adubois@mathewscountyva.gov, or Broadband Advisory Board Chair Judy Rowe judyrowemath@gmail.com, can provide any further support for this application. On behalf of the Board of Supervisors and the residents of Mathews County, I appreciate your assistance and your serious consideration of this application.

Sincerely,

DocuSigned by:
Melinda Conner
57A61C33C80C46D...

Melinda Conner
County Administrator

Middlesex County
Board of Supervisors

RESOLUTION

AT A MEETING OF THE BOARD OF SUPERVISORS OF MIDDLESEX COUNTY, VIRGINIA, HELD ON TUESDAY, AUGUST 4, 2020, AT 3:00 P.M., VIA ELECTRONIC MEETING: ON A MOTION MADE BY MR. KIMBROUGH AND SECONDED BY MR. MANSFIELD THE FOLLOWING RESOLUTION WAS ADOPTED BY THE FOLLOWING VOTE:

Wayne H. Jessie, Sr.	aye
John B. Koontz, Jr.	aye
Peter W. Mansfield	aye
Lud H. Kimbrough, III	aye
Reginald A. Williams, Sr.	aye

A RESOLUTION TO COMMIT MATCHING FUNDS TO THE VIRGINIA TELECOMMUNICATIONS INITIATIVE GRANT APPLICATION FOR REGIONAL BROADBAND SERVICE IN MIDDLESEX, MATHEWS, CAROLINE AND LANCASTER (THE FOUR COUNTIES) AND ATLANTIC BROADBAND

WHEREAS, on June 2, 2020, the Middlesex Board of Supervisors authorized the Middlesex Broadband Authority to act on behalf of the County to apply for the Virginia Telecommunications Initiative (VATI) grant funds through a collaborative application with the Four Counties and Atlantic Broadband and

WHEREAS, homes and businesses in all four counties that qualify for grant funds have been identified; and

WHEREAS, Atlantic Broadband has agreed to serve as the Internet Service Provider (ISP) and partner on the grant application; and

WHEREAS, the VATI grant requires a cash match by both the ISP and the applicant; and

WHEREAS, Atlantic Broadband has pledged a match exceeding the 10% cash grant requirement; and

WHEREAS, each County is required to provide a match that covers the expenses for the homes and businesses in their locality: and

NOW, THEREFORE, BE IT RESOLVED by the Middlesex County Board of Supervisors that $180,000 of the appropriated Capital Funds is to be used as a match for the 2021 VATI grant application for regional broadband service in Middlesex, Mathews, Caroline and Lancaster.

BE IT FURTHER RESOLVED that upon completion of preparing the grant application, the application is to be reviewed by the County Attorney before the County Administrator is authorized to sign it.

A Copy Teste:

Matthew L. Walker

Matthew L. Walker, County Administrator

COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

HYLAND F. "BUDDY" FOWLER, JR.
116 NORTH RAILROAD AVENUE
SUITE 13
ASHLAND, VIRGINIA 23005

FIFTY-FIFTH DISTRICT

COMMITTEE ASSIGNMENTS:
GENERAL LAWS
FINANCE
HEALTH, WELFARE AND INSTITUTIONS

August 4, 2020

Tamarah Holmes, Ph. D.
Director, Office of Broadband
Department of Housing & Community Development
600 East Main Street, Suite 300
Richmond, VA 23219

Dear Dr. Holmes:

Caroline County intends to submit a regional FY 2021 Virginia Telecommunications Initiative (VATI) grant application to the Department of Housing & Community Development in partnership with internet service provider Atlantic Broadband. The application will also include Mathews, Middlesex and Lancaster counties.

The service areas for the proposed project have been well chosen. An estimated 512 homes and business in Caroline that currently lack access to broadband will be offered an opportunity to connect. Each home and business along the chosen routes will be offered service rather than resorting to "cherry picking" only the easiest and least costly connections. In addition, both Caroline County and Atlantic Broadband are making a significant financial contribution to the project to demonstrate their commitment to making this a successful grant application.

Access to VATI grant funds to help cover the significant costs associated with extending broadband service to sparsely populated rural areas is critical to counties like Caroline. Without financial assistance from the Commonwealth, such projects are simply not feasible, and citizens will remain unserved. For the reasons outlined above, I believe the project would make excellent use of the VATI grant program and I am pleased to offer my enthusiastic support for the grant application.

Sincerely,

Buddy

Hyland F. (Buddy) Fowler, Jr.
Virginia House of Delegates
55th District

DISTRICT: (804) 305-8867 • RICHMOND: (804) 698-1055 • DELBFOWLER@HOUSE.VIRGINIA.GOV

COMMONWEALTH OF VIRGINIA
HOUSE OF DELEGATES
RICHMOND

M. KEITH HODGES
POST OFFICE BOX 928
URBANNA, VIRGINIA 23175

NINETY-EIGHTH DISTRICT

COMMITTEE ASSIGNMENTS:
COUNTIES, CITIES AND TOWNS
HEALTH, WELFARE AND INSTITUTIONS
COMMUNICATIONS, TECHNOLOGY AND INNOVATION

August 3, 2020

Tamarah Holmes, Ph.D
Director, Office of Broadband
Department of Housing and Community Development
600 East Main Street, Suite 300
Richmond, VA 23219

Dear Dr. Holmes:

In my district, counties are struggling to expand their broadband service area to incorporate rural communities that have been left on the wrong side of the digital divide. In this day and time, the needs for high speed internet are great and well documented. All communities are struggling in the age of the pandemic but those bereft of adequate broadband, face an even greater challenge. With telework becoming the norm, kids returning to school remotely, and doctors opting to meet with at-risk patients online, it is a given that access to broadband is a critical element of modern life. We know that the Virginia Telecommunication Initiative (VATI) is an important factor in closing those gaps and financing worthy projects throughout the Commonwealth. By partnering with our local counties and providers, we can do together what we could never do alone.

With this in mind, I am pleased to offer my enthusiastic support to the application of Middlesex, Mathews, Caroline, and Lancaster counties for a regional VATI project to extend broadband access to meet this critical demand. In keeping with the governor's overarching mission of universal coverage, this project promises to connect hundreds of homes in our area, at a time when it's needed most. I can't think of a better investment of state resources than to expand broadband services to our rural communities.

This regional effort represents the very best of Virginia and demonstrates what we can accomplish when we work as a team. I wholeheartedly support their efforts.

Sincerely yours,

M Keith Hodges

DISTRICT: (804) 277-9801 • RICHMOND: (804) 698-1098 • E-MAIL: DELKHODGES@HOUSE.VIRGINIA.GOV

COMMONWEALTH OF VIRGINIA

HOUSE OF DELEGATES
RICHMOND

MARGARET B. RANSONE
POST OFFICE BOX 358
KINSALE, VIRGINIA 22488

NINETY-NINTH DISTRICT

COMMITTEE ASSIGNMENTS:
COURTS OF JUSTICE
LABOR AND COMMERCE
AGRICULTURE, CHESAPEAKE AND NATURAL RESOURCES

August 12, 2020

Tamarah Holmes, Ph. D
Director, Office of Broadband
Department of Housing and Community Development
600 East Main Street, Suite 300
Richmond, VA 23219

Dear Dr. Holmes,

I am writing in reference to a rural broadband grant application submitted by counties in the 99th District. In view of the fact that access to broadband is an essential part of modern living and eastern Virginia is in dire need of access to broadband, I am proud to support the regional VATI project application for the Counties of Caroline and Lancaster.

Furthermore, I appreciate the time that our local leaders have devoted throughout the years to investigate the deployment of broadband infrastructure. It has taken much patience, diligence, and research by our local officials over the years to create a plan for broadband expansion.

Our regions will not progress if we continue to be overlooked in broadband funding. Made especially clear by the effects of the pandemic, we are at a turning point for healthcare, education, and economic development. Without efficient broadband, I fear that our rural areas will no longer be competitive.

With Atlantic Broadband as their partner in this project, Lancaster and Caroline have joined with Mathews and Middlesex to devise an efficient and effective regional expansion that extends access to hundreds of families throughout several counties. This plan will extend access in service of each county's comprehensive strategy for achieving broadband access within the next decade.

This is a well-planned application to finally establish access to broadband internet that urban and suburban areas have had access to for many years. Our rural families have been overlooked for too long. Without assistance from the VATI funds, our communities will continue to lack the fundamental skills to build a foundation. I wholeheartedly endorse this application for Caroline and Lancaster.

Respectfully,

Margaret

Margaret B. Ransone

DISTRICT: (804) 472-4181 • RICHMOND: (804) 698-1099 • EMAIL: DELMRANSONE@HOUSE.VIRGINIA.GOV

Ninety-Ninth District
Virginia House of Delegates

SENATE OF VIRGINIA

RYAN T. McDOUGLE
4TH SENATORIAL DISTRICT
ALL OF CAROLINE, ESSEX, LANCASTER,
MIDDLESEX, NORTHUMBERLAND, AND
RICHMOND COUNTIES AND PART OF HANOVER,
KING GEORGE, SPOTSYLVANIA, AND
WESTMORELAND COUNTIES

POST OFFICE BOX 187
MECHANICSVILLE, VIRGINIA 23111

COMMITTEE ASSIGNMENTS
JUDICIARY
PRIVILEGES AND ELECTIONS
REHABILITATION AND SOCIAL SERVICES
RULES

July 27, 2020

Tamarah Holmes, Ph.D.
Director, Office of Broadband
Department of Housing and Community Development
600 East Main Street, Suite 300
Richmond, VA 23219

Dear Dr. Holmes:

I would like to express my strong support for Lancaster County's Virginia Department of Housing and Community Development VATI (Virginia Telecommunication Initiative) grant application. Lancaster County is working with a coalition of three other counties, including Middlesex, Caroline, and Mathews Counties. The application is submitted through a partnership with Atlantic Broadband, a private service provider.

Approval of this application would help meet a critical and growing need to expand broadband service in the Northern Neck, Middle Peninsula and Caroline County. Bringing broadband to the community would foster a myriad of benefits, including commercial growth for businesses, educational opportunities for students, and healthcare improvements via access to telemedicine.

I commend the Lancaster Broadband Authority for coordinating this application. Virginia has made progress in the General Assembly over the years to bring broadband to unserved areas. For example, I sponsored legislation three years ago that streamlines the approval process for wireless infrastructure in order to maximize access in unserved areas. Two years ago, House Bill 2691 was passed to allow our Commonwealth's large electric utilities to work with electric cooperatives to bring broadband infrastructure to rural areas. Approval of the VATI grant application would be a significant step forward in the process to reach our goal of universal broadband coverage.

Thank you in advance for your consideration. If you have any questions or concerns, please do not hesitate to call my office.

Sincerely,

Ryan T. McDougle

Ryan T. McDougle

ROBERT J. WITTMAN
1st District, Virginia

HOUSE ARMED SERVICES COMMITTEE
Ranking Member, Seapower and Projection Forces
Tactical Air and Land Forces

NATURAL RESOURCES COMMITTEE
Water, Oceans, and Wildlife

CO-CHAIR, CONGRESSIONAL SHIPBUILDING CAUCUS

CO-CHAIR, CONGRESSIONAL CHESAPEAKE BAY WATERSHED TASK FORCE

CO-CHAIR, CONGRESSIONAL PUBLIC HEALTH CAUCUS

CO-CHAIR, CONGRESSIONAL RURAL BROADBAND CAUCUS

Congress of the United States
House of Representatives
Washington, DC 20515

WASHINGTON OFFICE:
2055 Rayburn House Office Building
Washington, DC 20515
(202) 225-4261

DISTRICT OFFICES:

Stafford Office
95 Dunn Drive Suite 201
Stafford, VA 22556
(540) 659-2734

Mechanicsville Office
6501 Mechanicsville Turnpike Suite 102
Mechanicsville, VA 23111
(804) 730-6595

Middle Peninsula Office
508 Church Lane
P.O. Box 3106
Tappahannock, VA 22560
(804) 443-0668

www.wittman.house.gov

July 30, 2020

Tamarah Holmes, Ph.D.
Director, Office of Broadband
Department of Housing and Community Development
600 East Main Street, Suite 300
Richmond, VA 23219

Dear Director Holmes:

I am writing in support of the Mathews, Middlesex, Caroline, and Lancaster Counties FY 2021 Virginia Department of Housing and Community Development Virginia Telecommunication Initiative (VATI) grant application to expand high-speed broadband availability in the multiple counties in the First Congressional District through a partnership with Atlantic Broadband. Approval of this application would help meet a critical and mounting need to expand high-speed broadband service in the following counties

Rural Virginians know the value of high-speed broadband access. Broadband is vital to their economic progress, educational well-being, and a significant enhancement to telehealth expansion. In the First Congressional District of Virginia, as in other largely rural areas, economic incentives are needed to expand broadband access. The VATI program, has done an exceptional job of meeting that need. Support from VATI encourages private telecommunication providers to enlarge their physical plant and gives local government entities the ability to design the expansion plan that makes most sense for their community. This eases the financial burden associated with construction, extends service, and creates a win-win scenario for the participants and for the Commonwealth of Virginia.

The four counties have collaborated with Atlantic Broadband to design a regional project that will make excellent use of the VATI grant program, providing broadband access to 1,500 currently unserved households. This application is efficiently designed, represents a first-rate use of state resources with a high-rate of non-state leverage, and will be synchronized by a regional entity experienced in managing these kinds of projects. I have also been advised that this application is the first of several phased projects, and that the counties are already planning for more growth and expansion. I'm sure you will be hearing more about this in future VATI rounds. This kind of forward-looking approach is what I hope all Virginia jurisdictions are aspiring to.

I am happy to offer my enthusiastic support for this well-planned regional effort.

Sincerely,

Robert J. Wittman
Member of Congress

August 4, 2020

Tamarah Holmes, Ph. D.
Director, Office of Broadband
Department of Housing & Community Development
600 East Main Street, Suite 300
Richmond, VA 23219

Dear Dr. Holmes,

Caroline County is part of a regional FY 2021 Virginia Telecommunications Initiative (VATI) grant application in partnership with internet service provider Atlantic Broadband. In addition to Caroline, the application includes Mathews, Middlesex and Lancaster counties. Like many largely rural counties throughout the Commonwealth, significant portions of Caroline lack access to broadband. State initiatives such as VATI grants ease the financial burden associated with extending broadband service to sparsely populated areas and are often the make or break factor in determining whether such projects are feasible to rural localities.

The proposed project will offer broadband service to an estimated 512 homes and business in Caroline that currently lack access without resorting to "cherry picking" only the easiest connections. Both Caroline County and Atlantic Broadband have pledged significant matching funds to the project to demonstrate a strong financial commitment to making this a successful grant application.

For these reasons, I believe the project would make excellent use of the VATI grant program and I am pleased to offer my enthusiastic support for the grant application.

Sincerely,
Gary R. Wilson

Gary R. Wilson
Director, Caroline County
Department of Economic Development

23724 Rogers Clark Blvd., Ruther Glen VA 22546 GWilson@co.caroline.va.us 804.633.4074

Caroline County Public Schools

CAROLINE COUNTY SCHOOL BOARD

George L. Spaulding, Jr. Bowling Green | Nancy G. Carson Mattaponi | JoWanda Rollins-Fells, Ph.D. Reedy Church

Shawn M. Kelley Madison | Calvin B. Taylor, Sr. Port Royal | John I. Copeland Western Caroline

Sarah Calveric, Ph.D.
Superintendent

16261 Richmond Turnpike
Bowling Green, VA 22427

Office (804) 633-5088
Fax (804) 633-5563

July 28, 2020

Mr. Culley,

I am pleased to learn that the Caroline County Broadband Advisory Committee is pursuing the VATI Grant in support of broadband expansion. As Superintendent of Schools, I am keenly aware of the impact the current "digital divide" in Caroline has upon economic and residential growth as well as the profound effects on our CCPS students and community. The current health pandemic and subsequent closure of schools and libraries has only exacerbated the known detrimental effects that digital inequality has on children, households, and educator.

In our most recent 20-21 Return to Learn parent survey, results indicated over a third of CCPS families do not have broadband internet in their homes, and almost ten percent had no internet access at all. To reiterate the importance of remedying these gross inequities, Michigan State University produced a report documenting the following repercussions of limited to no broadband access:

- Students who have no home access, slow access, or cell phone only access to the internet have significantly lower overall GPAs.
- Across all subjects, students who rely on a cell phone only for Internet access from home tend to receive lower grades than students who have high-speed access, and even lower than students with no access at all.
- Contrary to the expectation that math and science grades are most likely to be related to the presence or absence of home access, having no access is unrelated to math/science GPAs. Research documented the absence of the internet does however negatively affect overall GPAs and grades in English/language arts and social studies.
- The magnitude of the deficit in grades experienced by students with no internet access from home is similar to the difference in grades between white students and those who are racial or ethnic minorities.

As teachers across the nation, the Commonwealth, and throughout Caroline County struggle with ways to deliver quality education to students without high-speed internet access in their homes, I am bolstered by the knowledge of the broadband committee's efforts to secure new funding streams to address this persistent barrier. The plan proposed in the application would extend broadband access to as many as four hundred PreK-12 students based on CCPS demographic data. At almost ten percent of our enrollment, this represents an important step in addressing the "digital divide" in Caroline.

We are grateful for our Supervisor of Technology's participation on the Advisory Committee and look forward to continuing to work with the Board of Supervisors in finding creative ways to support our students and the Caroline community.

Sarah B. Calveric

Sarah B. Calveric, Ph.D.
Superintendent

BON SECOURS RAPPAHANNOCK GENERAL HOSPITAL
P.O. Box 1449, Kilmarnock, VA 22482 804-435-8000

July 7, 2020

Mr. Don Gill
Lancaster County Administrator
8313 Mary Ball Road
Lancaster, Virginia 22503

As the Administrator of Bon Secours Rappahannock General Hospital in Lancaster County, I am writing to express my strong support for the regional Virginia Telecommunication Initiative (VATI) application that will be submitted in August on behalf of our four-member counties (Lancaster, Middlesex, Mathews and Caroline Counties). These counties have come together to take a regional approach to the expansion of broadband to unserved and underserved residents and businesses of the counties through a partnership with Atlantic Broadband.

Sincerely,

Lisa A. Heishman

Lisa A. Heishman, RN, BSN, MHA
Vice President, Administrator

LH/pvh

LANCASTER *by the* BAY
CHAMBER
IRVINGTON•KILMARNOCK•LIVELY•WHITE STONE

Dear Mr. Gill,

I am writing to express my strong support for the regional Virginia Telecommunications Initiative (VATI) application that will be submitted in August on behalf of four member counties (Lancaster, Middlesex, Mathews and Caroline Counties). We have come together to take a regional approach to the expansion of broadband to unserved and underserved residents and businesses of the counties through a partnership with Atlantic Broadband.

There has never been more evidence for the need of broadband then with the current COVID19 health crisis. Businesses and schools now more than ever before have to rely on internet to stay in business. Our businesses and school systems need a reliable broadband that will be enhanced if there is a collaborative effort. I have seen countless community members sitting in vehicles outside the Lancaster Community Library in cars or in person trying to access the Lancaster Community Libraries internet because their homes either have no internet or inadequate internet. As a member and representative of the business community, I support this initiative as I believe it is necessary to elevate and move our counties and communities forward.

Sincerely,

Anne Paparella

Anne Paparella
Executive Director
Lancaster by the Bay Chamber

Lancaster Community Library
1961-2011 Celebrating 50 Years

16 Town Centre Drive
Kilmarnock, VA 22482
(804)435-1729 X18
www.lancasterlibrary.org

3 August 2020

Mr. Don Gill
Lancaster County Administrator
8311 Mary Ball Road
Lancaster, VA 22503

Dear Mr. Gill,

As Director of the Lancaster Community Library, I enthusiastically support the Lancaster County Broadband Authority's (LCBA) participation in a four county (Lancaster, Caroline, Mathews, Middlesex) regional Virginia Telecommunications Initiative (VATI) application.

The coronavirus pandemic has proven the necessity of access to broadband for all of our citizens. Students learning remotely, telemedicine, job and unemployment applications, and tax filings are just a few examples that prove the need for high speed internet access.

Every day, people use the free WiFi at the Lancaster Community Library, whether in the library while we are open, or in the parking lot when the library is closed. In 2019 there were 88,423 internet sessions at Lancaster Community Library, averaging 7,359 per month. These statistics demonstrate the need for broadband internet access for all of our citizens.

My commendations to the LCBA for their time, effort, and expertise to bring broadband to Lancaster County.

Sincerely,

Alice M. Cooper

Alice M. Cooper
Library Director

Dan Russell, M.Ed., *Superintendent*
Whitney Barrack, *Director of Budget and Finance*
John Mann, *Director of Operations and Transportation*
Jessica Davis, *Director of Instruction*
Kelvin Evans, *Director of Human Resources and Equity*

LANCASTER COUNTY PUBLIC SCHOOLS
Learning Today...
Leading Tomorrow!

July 27, 2020

Mr. Don Gill,

I, Kenith D. Russell, Superintendent of Lancaster County Public Schools, am writing to express my strong support for the regional Virginia Telecommunications Initiative (VATI) application that will be submitted in August on behalf of four member counties (Lancaster, Middlesex, Mathews and Caroline Counties). We have come together to take a regional approach to the expansion of broadband to unserved and underserved residents and businesses of the counties through a partnership with Atlantic Broadband.

The VATI, LCBA and the Board fully understand the need to expand access to broadband to the unserved and underserved residents and businesses throughout our county as well as the region. I recognize that the VATI, the LCBA and the counties are committed to taking action to improve the economics of deploying broadband and improving utilization of internet access to ensure citizens have the ability to leverage connectivity to enhance their lives and to meet and hopefully exceed essential community needs, while preparing Lancaster County and our surrounding partners for the future.

This grant would provide opportunities for our underserved children to access resources at home that will enhance their academic skills. Given the majority of our student population is impoverished, this access will allow the school division to provide more equitable opportunities for our low income student population and enable us to reinforce 21st century skills needed for today's learners to be successful in the workforce.

Again, I fully support the VATI in their request for this grant. I appreciate the opportunity to provide positive input and support a critical need for our entire region. Thank you for your time and consideration of this grant request.

Respectfully,

Kenith D. Russell
Superintendent

Cc:
Cassie Thompson, Chair of Lancaster County Broad Band Authority

P.O. Box 2000 Kilmarnock, VA 22482 Telephone 804-462-5100 ext. 7001 Fax 804-435-3309

Mr. Don Gill
Lancaster County Administrator
8311 Mary Ball Road
Lancaster, VA 22503

Dear Mr. Gill,

The board of the Lancaster County Economic Development Authority (EDA) enthusiastically supports the Lancaster County Broadband Authority's (LCBA) participation in a four county (Lancaster, Caroline, Mathews, Middlesex) Virginia Telecommunications Initiative (VATI) application.

The Lancaster EDA's mission is to foster and stimulate entrepreneurial and employment opportunities within our county. In order to drive that mission and realize the necessary economic and employment growth, the Lancaster EDA has adopted a Strategic Plan where broadband improvement and expansion is a top priority. Expanded and improved broadband services would allow more business to locate in our county, expand online business opportunities and drive overall employment in our rural setting.

The Lancaster County Board of Supervisors, the EDA and the LCBA have made it a priority to expand and implement broadband access throughout the county to the unserved and the underserved population. As a county in rural Virginia we realize the challenges we face without good broadband connectivity. As the last census showed, our county population is decreasing and one of the main reasons is the lack of access and speed of connectivity to the internet. To change this trend and help support broadband development in our county, the EDA funded LCBA in 2019 to support a Virginia Department of Housing and Community Development Telecommunication Planning grant.

A positive response to this application would enable expansion and improvement of broadband in Lancaster County and would greatly support the economic development and employment opportunities in our county. Therefore, the EDA strongly supports this regional effort.

Sincerely,

Roy Carter

Roy Carter
Lancaster EDA Chair

Mr. Don Gill

Lancaster County Administrator

RE: Letter of Support for Broadband Grant

Dear Don,

The purpose of this letter is to express my support for the grants being pursued by the County's Broadband Authority. Herein are my current observations of this market based on my 50 years of real estate development experience in this community. I firmly believe this is one of those hard to find rural markets that has a clear path for transforming its economy. Public investing in broadband here has a clear return on investment (ROI) to funders compared to other less advantaged rural markets.

As ironic as it sounds, it appears the current pandemic could help cure the economic ills of this rural coastal region. Our quality of life is proving to be a value proposition for work-from-homers. Second homes are now full of multi-generational families retreating here, with sales nearly doubling over last year.

We are different from the distinctly rural counties around us. The Tides Inn resort seeded a sophisticated grouping of shops, restaurants, and services. making us the best quality-of-life market in eastern Virginia, As I like to say, we're in the country but not in the sticks.

Being centrally located under the drive-time umbrellas of Hampton Roads, Richmond, and Washington, we are working to brand ourselves as a day tripper's paradise and the best-in-breed rural market for those concerned about escaping the density problems now plaguing urban areas. Both of these initiatives will accelerate other growth opportunities.

In addition to this broadband grant are currently applying for two other grants to fuel our economic growth momentum:

- An EDA grant to build an innovative business assistance center that would deliver concierge services to those considering moving here, as well as a co-work environment for those who need high-speed internet.
- A Trail's grant to build a multi-use fitness and arts trail connecting Kilmarnock, White Stone and Irvington that would nourish existing businesses and encourage new growth.

This is a community that has earned the right to ask for grant assistance because of hard work and private sector investments that are being made. We have many compelling stories to tell. Julien and Terri Patterson are social investing here, building quality-of-life venues. I estimate they have already spent $30M, representing the biggest project to date -- their soon-to-open Compass Entertainment Complex. Knowledgeable experts are saying it is the most advanced family entertainment center in the United States. You won't believe it when you see it!

Add to this the Tides Inn 2.0 Plan, a complete redo of their resort anchored by a world class spa. They are having a strong year, with vacationers seeking smaller, safer resorts.

My company has 300+ shovel-ready acres with municipal water/sewer that was a former golf course that we are working to repurpose for job creation. The proposed connector trail will run through this property, adding an appealing hub/spoke amenity. The Patterson's Compass Entertainment Center adjoins, having been part of this original assemblage.

The missing ingredient is broadband. Regardless of how advantaged we are, without being able to broaden broadband connectivity our efforts will be restricted. My hope is that the grantors will understand their investment here makes sense.

Thanks,

Jimmie

James N Carter, Jr.
Carter Financial Corporation
jimmie@carterfincorp.com
804 761-4543

MATHEWS COUNTY PUBLIC SCHOOLS

www.mathews.k12.va.us

Nancy B. Welch, Ed.S.
Division Superintendent

Lesley R. Hunley, M.Ed., MPA
Assistant Superintendent

August 4, 2020

Tamarah Holmes, Ph.D
Director, Office of Broadband
Department of Housing and Community Development
600 East Main Street, Suite 300
Richmond, VA 23219

Dear Dr. Holmes,

A coalition of four Virginia counties (Mathews, Middlesex, Lancaster, and Gloucester) are seeking resources to provide broadband services to their resident citizens for tele-medical, educational services and local small business.

The coalition has applied for, local government funds, and private sector resources for a regional Virginia Telecommunication Initiative (VATI) project to extend broadband access to a significant portion of the region's currently unserved residents and businesses.

Mathews County is in desperate need for broadband services to support public access to education Pk-12. Due to the COVID-19 Global Pandemic, face-to-face instructional opportunities have been limited since Friday, March 13, 2020. Mathews County Public Schools will reopen to students on Monday, August 31, 2020 in a virtual modality due to continued and growing concerns related to the virus that causes COVID-19. The school division has been successful in obtaining Chromebooks for all students, a limited amount of hotspots and Kajeet units for Smart Bus (Wi-Fi access) rollouts in our community. Although these supports are in place, Mathews County, very simply, does not have a signal available in many areas to implement the hotspots and Smart Bus devices.

During the 2019-2020 school term, Mathews County Public Schools served 1,006 students. Forty-six percent of the student population are considered financially disadvantaged. Continuing access to public education is critical, especially for those who are clearly at a distinct financial disadvantage when compared to their peers. All classes and support services (speech & language, school counseling, ELL, etc.) will be delivered online. Our third party partners who provide professional counseling services and specialized instructions for the hearing impaired have also successfully provided services virtually; however, many families must travel to areas that provide free Wi-Fi to access a suitable connection. In the end, not all students have equitable access to public education services.

Prior to the mandatory school closings, Mathews County Public Schools provided a robust dual enrollment program, workforce development, Advance Placement and other online courses. With the exception of one course, welding, all transferred into the virtual environment with limited disruption. To maintain access to such programs in this day and time, universal coverage is essential. Equity to educational services should be the norm, not the exception.

Mathews County Public Schools fully supports the VATI grant to expand broadband access to public education and support services.

Sincerely,

Nancy B. Welch

Nancy B. Welch, Ed.S.
Division Superintendent

Rappahannock Community College

Glenns Campus
12745 College Drive
Glenns, VA 23149

August 5, 2020

Tamarah Holmes, Ph.D
Director, Office of Broadband
Department of Housing and Community Development
600 East Main Street, Suite 300
Richmond, VA 23219

Dear Dr. Holmes,

Three Virginia counties, Mathews, Lancaster, and Gloucester, served by Rappahannock Community College are seeking resources to provide broadband services to their resident citizens for telemedicine, distance education, and support of local small business.

This coalition has applied for local government funds, and private sector resources for a regional Virginia Telecommunication Initiative (VATI) project to extend broadband access to a significant portion of the region's currently unserved residents and businesses. The counties have partnered with a private sector company to pursue the grant and execute the project.

Before the pandemic, 25% of RCC students took all of their classes online, and another 40% of the student body took at least one course requiring internet access. All students need internet access to fully participate in any course at the College. Last fall 20% of students reported that they had no internet access or only dial-up access to the internet at home.

In the spring of 2020, all RCC courses were moved online using online platforms requiring high speed access. Remote learning continued in Summer 2020 and will be the primary method in Fall 2020. All classes require a remote component. To provide service to students who did not have home access, RCC expanded WIFI power to outside the campus buildings and the Kilmarnock Center into parking lots providing increased access. An average of 8 to 12 students are using each outdoor site daily in their cars. These services include dual enrollment classes for high school students and the Chesapeake Bay Governor's School on all campuses.

Broadband access has become like electricity – one of the fundamental needs in order to prosper. RCC strongly supports the efforts of Mathews, Lancaster, and Gloucester counties and their request for grant funding. I am happy to provide additional information if needed and may be contacted at skennedy@rappahannock.edu.

Sincerely,

Shannon L. Kennedy, Ed.D.
President

PETITION

We the people of Caroline County, Virginia express our deep concern with the lack of technology throughout the county. We believe it will improve our children's development, businesses, and overall growth within the community. The FCC has deemed high-speed Internet as a utility along with power, water & sewer, etc. There is a huge portion of our county that **does not have access** to high-speed Internet. We want to be connected to the world, to grow our businesses, simplify our lives, and offer our children a better opportunity to learn. We want to push a plan into action to create a short term, mid term, and long-term option for high-speed Internet throughout the county. This petition is designed to show the vast need to improve technology and resources throughout Caroline County. *Would you be a part of the movement to receive high-speed Internet in your home and/or business?*

NAME	SIGNATURE	VOTING DISTRICT	DATE
Laura Gordon	Laura Gordon	Mattaponi	2/23/16
Valerie B. Gordon	Valerie B. Gordon	Mattaponi	2/23/16
William H Gordon	William H Gordon	Mattaponi	2/28/16
Crystal Kozell	Crystal Kozell	Reedy Church	3-10-16
Frances Satterwhite	Frances B. Satterwhite	Reedy Church	3-13-16
Trent Satterwhite	Trent Satterwhite	Reedy Church	3/13/16
Wesley Satterwhite	Wesley Satterwhite	Reedy Church	3-13-16
Glenda Stanley	Glenda J. Stanley	Reedy Church	3-19-16
Shawn Whittaker	[illegible]	Mattaponi	3-21-16
Jill Whittaker	Jill Whittaker	Mattaponi	3-21-16
Judy Lilly	Judy Lilly	Mattaponi	3-21-16
Jack Lilly	Jack Lilly	Mattaponi	3-21-16
John Wheeler	John Wheeler	Mattaponi	3-21-16
Nancy Carson	Nancy Carson	Mattaponi	3-21-16
Robert Johnson	Robert Johnson	Mattaponi	3-21-16
Cindy Johnson	Cindy Johnson	Mattaponi	3-21-16
Allison Beitzel	[illegible]	Mattaponi	3-21-16
[illegible]	Troy Dossett	Mattaponi	3-21-16
Darlene Facer	[illegible]	Mattaponi	03/21/16
Ashley Morgan	Ashley Morgan	Mattaponi	3/21/16
"Traci" Wright	Tracy C. Wright	Mattaponi	3/21/16
Randy Wright	Randy Wright	Mattaponi	3/21/16
[illegible]	Barbara Guy	Mattaponi	3-21-2016
Deborah Culbertson	Deborah Culbertson	Mattaponi	3-21-2016
[illegible]	[illegible]	Mattaponi	3-21-16
Mark Culbertson	Mark Culbertson	Mattaponi	3-21-16
Lacie Culbertson	Lacie Culbertson	Mattaponi	3-21-16
Carolyn Cook	Carolyn Cook	Mattaponi	3-21-16
Charles W. Cook	Charles W. Cook	Mattaponi	3-21-16
Brittany Tipton	Brittany Tipton	Madison	3-21-16
JOHN FACER	John R. Facer	MATTAPONI	3-21-16
NANCY FACER	Nancy C. Facer	MATTAPONI	3-21-16
James Cecil	[illegible]	Mattaponi	3-21-16
Sarah Gordon	[illegible]	Mattaponi	3-21-16
ELMER WHEELER	[illegible]	Mattaponi	3/21/16
Bonnie Wheeler	Bonnie Wheeler	Mattaponi	3/21/16
Bennie Wheeler	Bennie Wheeler	Mattaponi	3/21/16
E. Blair Gordon	Blair Gordon	Mattaponi	3/21/16

No monetary commitment is required.

PETITION

We the people of Caroline County, Virginia express our deep concern with the lack of technology throughout the county. We believe it will improve our children's development, businesses, and overall growth within the community. The FCC has deemed high-speed Internet as a utility along with power, water & sewer, etc. There is a huge portion of our county that **does not have access** to high-speed Internet. We want to be connected to the world, to grow our businesses, simplify our lives, and offer our children a better opportunity to learn. We want to push a plan into action to create a short term, mid term, and long-term option for high-speed Internet throughout the county. This petition is designed to show the vast need to improve technology and resources throughout Caroline County. *Would you be a part of the movement to receive high-speed Internet in your home and/or business?*

NAME	SIGNATURE	VOTING DISTRICT	DATE
Luke Golden	[illegible]	Mattaponi	3/2/2016

No monetary commitment is required.

PETITION

We the people of Caroline County, Virginia express our deep concern with the lack of technology throughout the county. We believe it will improve our children's development, businesses, and overall growth within the community. The FCC has deemed high-speed Internet as a utility along with power, water & sewer, etc. There is a huge portion of our county that **does not have access** to high-speed Internet. We want to be connected to the world, to grow our businesses, simplify our lives, and offer our children a better opportunity to learn. We want to push a plan into action to create a short term, mid term, and long-term option for high-speed Internet throughout the county. This petition is designed to show the vast need to improve technology and resources throughout Caroline County. *Would you be a part of the movement to receive high-speed Internet in your home and/or business?*

NAME	SIGNATURE	VOTING DISTRICT	DATE
Kitty Gordon	Kitty Gordon	Mattaponi	3-21-2016
Linda Coleman	[illegible]	Mattaponi	3-21-2016
MARK ColemAN	Mark Coleman	MATTAponi	3-21-2016
Porter Coleman	[illegible]	Mattaponi	3-21-2016

No monetary commitment is required.

PETITION

We the people of Caroline County, Virginia express our deep concern with the lack of technology throughout the county. We believe it will improve our children's development, businesses, and overall growth within the community. The FCC has deemed high-speed Internet as a utility along with power, water & sewer, etc. There is a huge portion of our county that **does not have access** to high-speed Internet. We want to be connected to the world, to grow our businesses, simplify our lives, and offer our children a better opportunity to learn. We want to push a plan into action to create a short term, mid term, and long-term option for high-speed Internet throughout the county. This petition is designed to show the vast need to improve technology and resources throughout Caroline County. *Would you be a part of the movement to receive high-speed Internet in your home and/or business?*

Print NAME	SIGNATURE	VOTING DISTRICT	DATE
Rency Chenault	Percy Chenault	Bowling Green	3-14-16
Arlone Ballew	Arlone Barlow	Reedy Church	3-14-16
Allen Eubanks	Charles A. Eubanks	Reedy Church	3-17-16
Loren Bozell	Loren Bozell	Reedy Church	3-17-16
F.M. Barlow Jr	FM Barlow	Reedy Church	3-14-16
Grace Southworth	Grace Southworth	Reedy Church	3.18.16
Kevin Barlow	Kevin Barlow	Reedy Church	3-18-16
Keith Barlow	Keith Barlow	Reedy Church	3-18-16
Debra Aikens	Debra Aikens	Bowling Green	3-18-16
Paul Akers	Paul Akers	Bowling Green	3-18-16
Ernie Brown	Ernie Brown	Reedy Church	3-18-16
Linwood Moore	Linwood Moore	Reedy Church	3-18-16
Nathan [illegible]	[illegible]	Madison	3-18-16
John Harper	John Harper	Reedy Church	3-18-16
Nina Southworth	Nina Southworth	Mattaponi	3-20-16
Amy Whitaker	Amy Whitaker	Mattaponi	3-20-16
Sandra Anderson	Sandra Anderson	Bowling Green	3-20-16
Richard Taylor	Rich Taylor	Reedy Church	3-20-16
Marie Duvall	Marie Duvall	Port Royal	3-20-16
Mike Lenthes	[illegible]	Reedy Ch	3-20-16
Jeannie Ball	Jeannie Ball	Mattaponi	3-20-16
Donnie Ball	Donnie Ball	Mattaponi	3-20-16
Kevin Moen	Kevin Moen	Bowling Green	3-20-16
Taryn Barlow	Taryn L Barlow	Reedy Church	3-20-16
Jason Barlow	[illegible]	Reedy Church	3-20-16
April Hicks	[illegible]	Reedy Church	3-20-16
Mitchell Colemen	M A Coleman	Mattaponi	3-20-16
Jacqueline Coleman	Jackie Coleman	Mattaponi	3-20-16
Dennis Whitaker	[illegible]	Mattaponi	3-20-16
Glenda Hertless	Glenda Hertless	Reedy Church	3-20-16
Connie Arnold	Connie Arnold	Reedy Church	3-20-16
Larry L Boone	Larry L Boone	Bowling Green	3-20-16
William B. Andrews Jr	[illegible]	Bowling Green	3-20-16
Larry Parks	LRP	Mattaponi	3-20-16
Lee Cooper	[illegible]	Chilesburg	3-20-16
Janice Cooper	[illegible]	Chilesburg	3/20/16
Wendy Wallscott	[illegible]	Reedy Church	3/20/16
Anthony Barlow	Anthony Barlow	Reedy Church	3/20/16

No monetary commitment is required.

Caroline Cost Derivation

Product	Total	VATI	Non-VATI	Source of Estimate	Date
OSP Construction Labor	$ 1,731,645	$ 821,066	$ 910,579	ABB Project Evaluation	1/2/2017
OSP Cabling	$ 298,876	$ 141,713	$ 157,163	ABB Project Evaluation	1/2/2017
Fiber Optics (49.65 Miles)	$ 185,356	$ 87,887	$ 97,469	ABB Project Evaluation	1/2/2017
OSP Hardware	$ 53,173	$ 25,212	$ 27,961	ABB Project Evaluation	1/2/2017
OSP Electronics	$ 61,720	$ 29,265	$ 32,455	ABB Project Evaluation	1/2/2017
OSP Passives	$ 5,885	$ 2,790	$ 3,095	ABB Project Evaluation	1/2/2017
OSP Field Engineering	$ 150	$ 71	$ 79	ABB Project Evaluation	1/2/2017
Headend Construction Labor	$ 89,370	$ 42,375	$ 46,995	ABB Project Evaluation	1/2/2017
Headend Electronics	$ 207,148	$ 98,220	$ 108,928	ABB Project Evaluation	1/2/2017
Headend Field Engineering	$ 50	$ 24	$ 26	ABB Project Evaluation	1/2/2017
Total	$ 2,633,373	$ 1,248,623	$ 1,384,750		

Lancaster Cost Derivation

Product	Total	VATI	Non-VATI	Source of Estimate	Date
OSP Construction Labor	$ 1,831,416	$ 1,019,551	$ 811,865	ABB Project Evaluation	1/2/2017
OSP Cabling	$ 254,348	$ 141,596	$ 112,752	ABB Project Evaluation	1/2/2017
Fiber Optics (57.52 Miles)	$ 93,786	$ 52,211	$ 41,575	ABB Project Evaluation	1/2/2017
OSP Hardware	$ 125,643	$ 69,946	$ 55,697	ABB Project Evaluation	1/2/2017
OSP Electronics	$ 329,899	$ 183,655	$ 146,244	ABB Project Evaluation	1/2/2017
OSP Passives	$ 32,615	$ 18,157	$ 14,458	ABB Project Evaluation	1/2/2017
OSP Field Engineering	$ 4,550	$ 2,533	$ 2,017	ABB Project Evaluation	1/2/2017
OSP Maps	$ 1,377	$ 767	$ 610	ABB Project Evaluation	1/2/2017
In House Labor	$ 17,100	$ 9,520	$ 7,580	ABB Project Evaluation	1/2/2017
Headend Construction Labor	$ 102,960	$ 57,318	$ 45,642	ABB Project Evaluation	1/2/2017
Headend Electronics	$ 469,968	$ 261,632	$ 208,336	ABB Project Evaluation	1/2/2017
Headend Field Engineering	$ 50	$ 28	$ 22	ABB Project Evaluation	1/2/2017
Total	$ 3,263,712	$ 1,816,914	$ 1,446,798		

Mathews Cost Derivation

Product	Total	VATI	Non-VATI	Source of Estimate	Date
OSP Construction Labor	**$ 1,201,617**	**$ 619,337**	**$ 582,280**	**ABB Project Evaluation**	**1/2/2017**
OSP Cabling	**$ 398,995**	**$ 205,650**	**$ 193,345**	**ABB Project Evaluation**	**1/2/2017**
Fiber Optics (38.59 Miles)	**$ 13,618**	**$ 7,019**	**$ 6,599**	**ABB Project Evaluation**	**1/2/2017**
OSP Hardware	**$ 52,300**	**$ 26,956**	**$ 25,344**	**ABB Project Evaluation**	**1/2/2017**
OSP Electronics	**$ 264,778**	**$ 136,472**	**$ 128,306**	**ABB Project Evaluation**	**1/2/2017**
OSP Passives	**$ 58,943**	**$ 30,380**	**$ 28,563**	**ABB Project Evaluation**	**1/2/2017**
OSP Field Engineering	**$ 750**	**$ 387**	**$ 363**	**ABB Project Evaluation**	**1/2/2017**
Headend Construction Labor	**$ 69,462**	**$ 35,802**	**$ 33,660**	**ABB Project Evaluation**	**1/2/2017**
Headend Electronics	**$ 115,200**	**$ 59,376**	**$ 55,824**	**ABB Project Evaluation**	**1/2/2017**
Headend Field Engineering	**$ 50**	**$ 26**	**$ 24**	**ABB Project Evaluation**	**1/2/2017**
Total	**$ 2,175,713**	**$ 1,121,405**	**$ 1,054,308**		

Middlesex Cost Derivation

Product	Total	VATI	Non-VATI	Source of Estimate	Date
OSP Construction Labor	$ 449,083	$ 238,769	$ 210,314	ABB Project Evaluation	1/2/2017
OSP Cabling	$ 150,448	$ 79,990	$ 70,458	ABB Project Evaluation	1/2/2017
Fiber Optics (15.94 Miles)	$ 3,915	$ 2,082	$ 1,833	ABB Project Evaluation	1/2/2017
OSP Hardware	$ 17,060	$ 9,070	$ 7,990	ABB Project Evaluation	1/2/2017
OSP Electronics	$ 113,268	$ 60,223	$ 53,045	ABB Project Evaluation	1/2/2017
OSP Passives	$ 19,310	$ 10,267	$ 9,043	ABB Project Evaluation	1/2/2017
OSP Field Engineering	$ 250	$ 133	$ 117	ABB Project Evaluation	1/2/2017
Headend Construction Labor	$ 28,692	$ 15,255	$ 13,437	ABB Project Evaluation	1/2/2017
Headend Electronics	$ 72,000	$ 38,281	$ 33,719	ABB Project Evaluation	1/2/2017
Headend Field Engineering	$ 50	$ 27	$ 23	ABB Project Evaluation	1/2/2017
Total	$ 854,076	$ 454,097	$ 399,979		

FINAL Plan A - 2021 Four County VATI Application - Combined BOM 8/13/2020

Project Area	Total of Homes & Businesses Passed	Homes Passed	Business Passed	Vacant Lots Passed	Home School Passed	Home Business Passed	COST	Footage	Approximate Mileage	ABB Contribution	New Fiber Mileage
Region 3 - LANCASTER FTTH Cumulative BOM with all the additional Areas added by Mark and Margie. Revised down by Margie as of 7-18-2020.	497	484	13	38	73	25	$2,690,734.00	303,698	57.52	$596,400.00	27.94
MIDDLESEX Combined RFOG-FTTH-HFC Cumulative BOM **includes Deltaville area added 7-16-2020**	147	147	0	0	26	17	$753,334.00	81,607	15.46	$176,400.00	2.96
MATHEWS Combined RFOG-FTTH-HFC Cumulative BOM with areas added by Thomas and + Holland Point Road + Morgan Branch and Atkins Lane. Excludes Mapp #8 as we did not receive it. **We are Deleting Chapel Neck and Daniel**	402	397	5	0	0	14	$1,991,001.00	213,688	40.47	$482,400.00	7.31
CAROLINE Combined FTTH and HFC Cummulative BOM to include Ladysmith Road - Balty Road (to Golansville), Penola Road (does not cross RR), Route 17 North and Route 17 South including areas added by Port Royal Supervisor AND Fiber Overlash from KG to PR (7.35 Miles). **I have added the additional Homes provided by David 7-16-2020.**	512	490	22	262	101	46	$2,336,805.00	262,173	49.65	$614,400.00	24.17
SUB - TOTALS	**1,558**	**1518**	**40**	**300**	**200**	**102**	**$7,771,874.00**	**861,166**	**163.10**	**$1,869,600.00**	**62.38**
Cumulative 4 County BOM for HeadEnd - Transport - Mapping - Design Needs							**$1,155,000.00**				
Estimated TOTAL	**1,558**	**1,518**	**40**	**300**	**200**	**102**	**$8,926,874.00**	**861,166**	**163.10**	**$1,869,600.00**	**62.38**

Grand Total Passings =	**1,558**	
Total Homes Passed =	**1,518**	
Total Businesses Passed =	**40**	
AVG Home/Business Passed Per Mile of Construction =	**9.55**	
AVG Cost per home/business passed =	**$5,729.70**	
AVG Cost per home/business passed obligation for ABB =	**$1,200.00**	**20.94%**
AVG Cost per home/business passed obligation for Combined Four Counties =	**$1,200.00**	**20.94%**
AVG Cost per home/business passed obligtion for VATI =	**$3,329.70**	
EXPECTED FUNDING REQUEST TO VATI =	**$5,187,674.00**	**58.11%**

FINAL Plan B - 2021 Three County County VATI Application - Combined BOM - 8/13/2020

Project Area	Total of Homes & Businesses Passed	Homes Passed	Business Passed	Vacant Lots Passed	Home School Passed	Home Business Passed	COST	Footage	Approximate Mileage	ABB Contribution	New Fiber Mileage
MIDDLESEX Combined RFOG-FTTH-HFC Cumulative BOM **includes Deltaville area added 7-16-2020**	147	147	0	0	26	17	$753,334.00	81,607	15.46	$176,400.00	2.96
MATHEWS Combined RFOG-FTTH-HFC Cumulative BOM with areas added by Thomas and + Holland Point Road + Morgan Branch and Atkins Lane. Excludes Mapp #8 as we did not receive it. **We are Deleting Chapel Neck and Daniel.**	402	397	5	0	0	14	$1,991,001.00	213,688	40.47	$482,400.00	7.31
CAROLINE Combined FTTH and HFC Cummulative BOM to include Ladysmith Road - Balty Road (to Golansville), Penola Road (does not cross RR), Route 17 North and Route 17 South including areas added by Port Royal Supervisor AND Fiber Overlash from KG to PR (7.35 Miles). **I have added the additional Homes provided by David 7-16-2020.**	512	490	22	262	101	46	$2,336,805.00	262,173	49.65	$614,400.00	24.17
SUB - TOTALS	**1,061**	**1034**	**27**	**262**	**127**	**77**	**$5,081,140.00**	**557,468**	**105.58**	**$1,273,200.00**	**34.44**
Cumulative 3 County BOM for HeadEnd - Transport - Mapping Design Needs							**$582,022.00**				
Estimated TOTAL	**1,061**	**1,034**	**27**	**262**	**127**	**77**	**$5,663,162.00**	**557,468**	**105.58**	**$1,273,200.00**	**34.44**

Grand Total Passings =	**1,061**	
Total Homes Passed =	**1,034**	
Total Businesses Passed =	**27**	
AVG Home/Business Passed Per Mile of Construction =	**10.05**	
AVG Cost per home/business passed =	**$5,337.57**	
AVG Cost per home/business passed obligation for ABB =	**$1,200.00**	**22.48%**
AVG Cost per home/business passed obligation for Combined Three Counties =	**$1,200.00**	**22.48%**
AVG Cost per home/business passed obligtion for VATI =	**$2,937.57**	
EXPECTED FUNDING REQUEST TO VATI =	**$3,116,762.00**	**55.04%**

PROJECT EVALUATION SUMMARY

Revised 01/02/17

Company/System: Atlantic Broadband Delmar

Name of Project: Caroline All VATI

SURVEY DATA

Home count (Year-Round)	New	512	Other Equivalent Units (List Name/Units):	Name		Name	0
	Existing	0	(Hotels, Motels, Seasonals, Etc.)		0		0
					0		0
Total Homes including equivalent units		512					

PROJECT DESCRIPTION

VATI 2021 for Caroline aerial to underground to capture 512 passings

PROJECT MILEAGE - AERIAL, UNDERGROUND & FIBER

FIBER OPTIC NODES 0

NEW PLANT					NEW FIBER PLANT			
Aerial	49474 ft.	=	9.37	Miles	13987 ft.	=	2.65	Miles
Underground	92731 ft.	=	17.56	Miles	70934 ft.	=	13.43	Miles
REBUILD / UPGRADE PLANT					**OVERLASHED FIBER PLANT**			
Aerial	0 ft.	=		Miles	42689 ft.	=	8.09	Miles
Underground	0 ft.	=		Miles	0 ft.	=		Miles
TOTAL PROJECT	142205 ft.	=	26.93	Miles	**TOTAL FIBER** 127610 ft.	=	24.17	Miles

Total aerial miles	9.4	miles
Total underground miles	17.6	miles
Homes per node	0	homes
Miles of plant per node	0	miles
Ratio of fiber in the plant	89.7%	
Ratio of aerial plant to total	34.8%	
Ratio of underground plant to total ...	65.2%	

CONSTRUCTION COST

	Total Eval Cost
A. Construction Labor	$1,731,645
B. Cable	$298,876
C. Fiber Optics	$185,356
D. Hardware	$53,173
E. Electronics	$61,720
F. Passives	$5,885
G. Subscriber Drop	$0
H. Other Costs (list)	
field engineering	$150
Maps	$0
In House Labor	$0
Aid to Construction	$0
Total Project Cost	$2,336,805

Virginia/ Maryland 1.9.2017

CONSTRUCTION LABOR

	Quantity		Price		Eval Total
Rt 17 North and South	1	ea. @	$1,122,346.00	/ ea	$1,122,346.00
Penola Rd	1	ea. @	$244,291.00	/ ea.	$244,291.00
Ladysmith Rd	1	ft. @	$365,008.00	/ ft.	$365,008.00
Totals					$1,731,645.00

CABLE BILL OF MATERIALS

	Quantity			Total	Price		Eval Total
Rt 17 North and South	1	ft	ft	1	298876.00	/ft	298,876.00
					Sub Totals		298,876.00
	2.0%						
	2.0%						
					0.0%		$0.00
					0.0%		0.00
							$298,876.00

FIBER

BILL OF MATERIALS

Item	Quantity			Total	Price		Eval Total
Rt 17 North and South	1	ea	ea	1	$63,117.00	/ea	$63,117.00
Penola Rd	1	ea	ea	1	$41,431.00	/ea	$41,431.00
Ladysmith Rd	1	ea	ea	1	$80,808.00	/ea	$80,808.00
					Sub Totals		$185,356.00

Waste Percentage - Fiber 2.0%

0.0%	$0.00
0.0%	$0.00
	$185,356.00

ELECTRONIC EQUIPMENT

Item	Quantity	Price		Eval Total
Penola Rd	1	$2,451.0000	each	$2,451.00
Rt 17 North and South	1	$59,269.0000	each	$59,269.00
				$61,720.00
			0.0%	$0.00
			0.0%	$0.00
				$61,720.00

HARDWARE

Item	Quantity	Price			Eval Total
Rt 17 North and South	1 ea	$18,702.0000	per	each	$18,702.00
Penola Rd	1 ea	$8,425.0000	per	each	$8,425.00
Ladysmith Rd	1 ea	$26,046.0000	per	each	$26,046.00

Sub Total		$53,173.00
Tax Percentage	0.0%	$0.00
Shipping Percentage	0.0%	$0.00
TOTAL COST OF HARDWARE		$53,173.00

PASSIVES

Item	Quantity	Price		Eval Total
Rt 17 North and South	1	$5,885.00	each	$5,885.00
				$5,885.00
			0.0%	$0.0
			0.0%	$0.00
				$5,885.00

PROJECT EVALUATION SUMMARY

Revised 01/02/17

Company/System: Atlantic Broadband Delmar

Name of Project: Caroline County Headend equipment

SURVEY DATA

				Name		Name	
Home count (Year-Round)	New	512	Other Equivalent Units (List Name/Units):				0
	Existing	0	(Hotels, Motels, Seasonals, Etc.)		0		0
					0		0
Total Homes including equivalent units		512					

PROJECT DESCRIPTION

Associated headend gear to build out footprint in Caroline County for VATI

PROJECT MILEAGE - AERIAL, UNDERGROUND & FIBER

FIBER OPTIC NODES 0

NEW PLANT				NEW FIBER PLANT			
Aerial	0 ft.	=	Miles	0 ft.	=	Miles	
Underground	0 ft.	=	Miles	0 ft.	=	Miles	
REBUILD / UPGRADE PLANT				**OVERLASHED FIBER PLANT**			
Aerial	0 ft.	=	Miles	0 ft.	=	Miles	
Underground	0 ft.	=	Miles	0 ft.	=	Miles	
TOTAL PROJECT				**TOTAL FIBER**			
	0 ft.	=	Miles	0 ft.	=	Miles	

Total aerial miles	0.0	miles
Total underground miles	0.0	miles
Homes per node	0	homes
Miles of plant per node	0	miles
Ratio of fiber in the plant		
Ratio of aerial plant to total		
Ratio of underground plant to total ..		

CONSTRUCTION COST

	Total Eval Cost
A. Construction Labor	$89,370
B. Cable	$0
C. Fiber Optics	$0
D. Hardware	$0
E. Electronics	$207,148
F. Passives	$0
G. Subscriber Drop	$0
H. Other Costs (list)	
field engineering	$50
Maps	
In House Labor	
Aid to Construction	$0
Total Project Cost	$296,568

Virginia/ Maryland 1.9.2017 **BILL OF MATERIALS** **CONSTRUCTION LABOR**

	Bid Item #	Quantity		Price		Eval Total
Mapping and Design		49.65	ea @	$1,800.00	/ea	$89,370.00
Totals						$89,370.00

ELECTRONIC EQUIPMENT

BILL OF MATERIALS

Item	Quick Books #	Model #	Manufacture	Quantity	Price		Eval Total
Pump Laser/ EDFA combo				3	$26,708.67	each	$80,126.01
patch pannel 96 ct				1	$11,822.00	each	$11,822.00
GS7000 node headend equipment				8	$14,400.00	each	$115,200.00

Sub Total		$207,148.01
Tax Percentage	0.0%	$0.00
Shipping Percentage	0.0%	$0.00
TOTAL COST OF ELECTRONICS		$207,148.01

PROJECT EVALUATION SUMMARY

Revised 01/02/17

Company/System: Atlantic Broadband Delmar

Name of Project: Lancaster All VATI

SURVEY DATA

					Name		Name	
Home count (Year-Round)	New	496		Other Equivalent Units (List Name/Units):				0
	Existing	0		(Hotels, Motels, Seasonals, Etc.)		0		0
						0		0
Total Homes including equivalent units		496						

PROJECT DESCRIPTION

VATI 2021 for Lancaster aerial to underground to capture 496 passings

PROJECT MILEAGE - AERIAL, UNDERGROUND & FIBER

FIBER OPTIC NODES 0

NEW PLANT					NEW FIBER PLANT				
Aerial	60685 ft.	=	11.49	Miles		15457 ft.	=	2.93	Miles
Underground	157117 ft.	=	29.76	Miles		51609 ft.	=	9.77	Miles
REBUILD / UPGRADE PLANT					**OVERLASHED FIBER PLANT**				
Aerial	0 ft.	=		Miles		80474 ft.	=	15.24	Miles
Underground	0 ft.	=		Miles		0 ft.	=		Miles
TOTAL PROJECT					**TOTAL FIBER**				
	217802 ft.	=	41.25	Miles		147540 ft.	=	27.94	Miles

Total aerial miles	11.5	miles
Total underground miles	29.8	miles
Homes per node	0	homes
Miles of plant per node	0	miles
Ratio of fiber in the plant	67.7%	
Ratio of aerial plant to total	27.9%	
Ratio of underground plant to total ...	72.1%	

CONSTRUCTION COST

	Total Eval Cost
A. Construction Labor	$1,831,416
B. Cable	$254,348
C. Fiber Optics	$93,786
D. Hardware	$125,643
E. Electronics	$329,899
F. Passives	$32,615
G. Subscriber Drop	$0
H. Other Costs (list)	
field engineering	$4,550
Maps	$1,377
In House Labor	$17,100
Aid to Construction	$0
Total Project Cost	$2,690,734

Virginia/ Maryland 1.9.2017

CONSTRUCTION LABOR

	Quantity		Price		Eval Total
DMV Dr	1	ea. @	$67,174.00	/ea.	$67,174.00
Dawson Ave	1	ea. @	$13,098.00	/ ea	$13,098.00
Cherry Point Dr	1	ea. @	$70,353.00	/ ea.	$70,353.00
Black Stump Rd	1	ft. @	$80,443.00	/ ft.	$80,443.00
Beach Rd	1	ft. @	$25,223.00	/ ft.	$25,223.00
Beach Cove Villas	1	ft @	$16,740.00	/ ft.	$16,740.00
Loblolly Ln	1	ft @	$10,920.00	/ ft.	$10,920.00
Little Bay	1	ft @	$363,581.00	/ ft.	$363,581.00
Kenner Dr	1	ft. @	$3,284.00	/ ft.	$3,284.00
James Wharf Rd	1	ft. @	$18,854.00	/ ft.	$18,854.00
Nugent Rd	1	ea. @	$241,578.00	/ea	$241,578.00
Pleasant Banks Ln	1	ft. @	$14,146.00	/ ft.	$14,146.00
Quarters Cove	1	ft. @	$219,050.00	/ ft.	$219,050.00
Ring Farm Rd	1	ft. @	$54,222.00	/ ft.	$54,222.00
Taylors Creek	1	ft @	$15,905.00	/ ft.	$15,905.00
Teal Dr	1	ft @	$13,342.00	/ ft.	$13,342.00
Townley Farm/ Pembroke	1	ft @	$63,205.00	/ ft.	$63,205.00
Tyler Ln	1	ft @	$24,071.00	/ ft.	$24,071.00
Weems Rd	1	ft @	$262,058.00	/ ft.	$262,058.00
Wesley Terrace	1	ft @	$13,326.00	/ ft.	$13,326.00
Windjammer Ln	1	ft @	$15,220.00	/ ft.	$15,220.00
Woods Dr	1	ft @	$9,406.00	/ ft.	$9,406.00
Goodluck Rd	1	ea @	$92,542.00	/ ea	$92,542.00
Baywater	1	ft @	$13,124.00	/ ft.	$13,124.00
Bluewater Farm	1	ft @	$110,551.00	/ ft.	$110,551.00
Totals					$1,831,416.00

CABLE

				Total	Price		Eval Total
		ft	ft		0.00	/m	
DMV Dr	1	ft	ft	1	35626.00	/m	35,626.00
Dawson Ave	1	ft	ft	1	2850.00	/m	2,850.00
Cherry Point Dr	1	ft	ft	1	20971.00	/m	20,971.00
Black Stump Rd	1	ft	ft	1	10692.00	/m	10,692.00
Beach Rd	1	ft	ft	1	3540.00	/ft	3,540.00
Beach Cove Villas	1	ft	ft	1	5814.00	/ft	5,814.00
Loblolly Ln	1	ft	ft	1	2049.00	/ft	2,049.00
Little Bay	1	ft	ft	1	78536.00	/ft	78,536.00
Kenner Dr	1	ft	ft	1	663.00	/ft	663.00
James Wharf Rd	1	ft	ft	1	3762.00	/ft	3,762.00
Pleasant Banks Ln	1	ft	ft	1	3316.00	/ft	3,316.00
Ring Farm Rd	1	ft	ft	1	2422.00	/ft	2,422.00
Taylors Creek	1	ft	ft	1	4558.00	/ft	4,558.00
Teal Dr	1	ft	ft	1	2533.00	/ft	2,533.00
Tyler Ln	1	ft	ft	1	1835.00	/ea	1,835.00
Weems Rd	1	ft	ft	1	20654.00	/ea	20,654.00
Wesley Terrace	1	ft	ft	1	2530.00	/ea	2,530.00
Windjammer Ln	1	ft	ft	1	2770.00	/ea	2,770.00
Woods Dr	1	ft	ft	1	1788.00	/ea	1,788.00
Goodluck Rd	1	ft	ft	1	31034.00	/ea	31,034.00
Bluewater Farm	1	ft	ft	1	16405.00	/ea	16,405.00

	Sub Totals	254,348.00
2.0%		
2.0%		
	0.0%	$0.00
	0.0%	0.00
		$254,348.00

FIBER

BILL OF MATERIALS

Item	Part number	Manufacture	Quantity	Total	Price		Eval Total
DMV Dr			1	1	$859.00	/ea	$859.00
Cherry Point Dr			1	1	$964.00	/ea	$964.00
Black Stump Rd			1	1	$5,200.00	/ea	$5,200.00
Little Bay			1	1	$1,982.00	/ea	$1,982.00
Nugent Rd			1	1	$22,485.00	/ea	$22,485.00
Quarters Cove			1	1	$32,356.00	/ea	$32,356.00
Ring Farm Rd			1	1	$14,322.00	/ea	$14,322.00
Taylors Creek			1	1	$2,965.00	/ea	$2,965.00
Townley Farm/ Pembroke			1	1	$10,019.00	/ea	$10,019.00
Tyler Ln			1	1	$1,545.00	/ea	$1,545.00
Baywater			1	1	$1,089.00	/ea	$1,089.00
					Sub Totals		$93,786.00

Waste Percentage - Fiber	2.0%		
		0.0%	$0.00
		0.0%	$0.00
			$93,786.00

ELECTRONIC EQUIPMENT

BILL OF MATERIALS

Item	Manufacture	Quantity	Price		Eval Total
DMV Dr		1	$14,300.00	each	$14,300.00
Dawson Ave		1	$2,864.0000	each	$2,864.00
Cherry Point Dr		1	$13,267.0000	each	$13,267.00
Black Stump Rd		1	$24,235.0000	each	$24,235.00
Beach Rd		1	$17,419.0000	each	$17,419.00
Beach Cove Villas		1	$1,641.0000	each	$1,641.00
Loblolly Ln		1	$1,269.0000	each	$1,269.00
Little Bay		1	$131,140.0000	each	$131,140.00
Kenner Dr		1	$576.0000	each	$576.00
James Wharf Rd		1	$3,210.00	each	$3,210.00
Pleasant Banks Ln		1	$1,615.00	each	$1,615.00
Quarters Cove		1	$55,154.00	each	$55,154.00
Taylors Creek		1	$9,102.00	each	$9,102.00
Teal Dr		1	$1,269.00	each	$1,269.00
Townley Farm/ Pembroke		1	$28,493.00	each	$28,493.00
Tyler Ln		1	$6,400.00	each	$6,400.00
Weems Rd		1	$3,120.00	each	$3,120.00
Wesley Terrace		1	$1,269.00	each	$1,269.00
Windjammer Ln		1	$319.00	each	$319.00
Woods Dr		1	$922.00	each	$922.00
Goodluck Rd		1	$6,601.00	each	$6,601.00
Baywater		1	$2,387.00	each	$2,387.00
Bluewater Farm		1	$3,327.00	each	$3,327.00

Sub Total		$329,899.00
Tax Percentage	0.0%	$0.00
Shipping Percentage	0.0%	$0.00
TOTAL COST OF ELECTRONICS		$329,899.00

HARDWARE

Item	Quantity	Price			Eval Total
DMV Dr	1 ea	$3,245.0000	per	each	$3,245.00
Dawson Ave	1 ea	$1,603.0000	per	each	$1,603.00
Cherry Point Dr	1 ea	$4,116.0000	per	each	$4,116.00
Black Stump Rd	1 ea	$5,506.0000	per	each	$5,506.00
Beach Rd	1 ea	$5,380.0000	per	each	$5,380.00
Beach Cove Villas	1 ea	$2,857.0000	per	each	$2,857.00
Loblolly Ln	1 ea	$598.0000	per	each	$598.00
Little Bay	1 ea	$18,772.0000	per	each	$18,772.00
Kenner Dr	1 ea	$240.0000	per	each	$240.00
James Wharf Rd	1 ea	$773.0000	per	each	$773.00
Nugent Rd	1 ea	$18,790.0000	per	each	$18,790.00
Pleasant Banks Ln	1 ea	$716.0000	per	each	$716.00
Quarters Cove	1 ea	$17,961.0000	per	each	$17,961.00
Ring Farm Rd	1 ea	$3,213.0000	per	each	$3,213.00
Taylors Creek	1 ea	$1,924.0000	per	each	$1,924.00
Teal Dr	1 ea	$488.0000	per	each	$488.00
Townley Farm/ Pembroke	1 ea	$10,237.0000	per	each	$10,237.00
Tyler Ln	1 ea	$2,675.0000	per	each	$2,675.00
Weems Rd	1 ea	$11,680.0000	per	each	$11,680.00
Wesley Terrace	1 ea	$488.0000	per	each	$488.00
Windjammer Ln	1 ea	$1,561.0000	per	each	$1,561.00
Woods Dr	1 ea	$454.0000	per	each	$454.00
Goodluck Rd	1 ea	$1,763.0000	per	each	$1,763.00
Baywater	1 ea	$2,777.0000	per	each	$2,777.00
Bluewater Farm	1 ea	$7,826.0000	per	each	$7,826.00

Sub Total		$125,643.00
Tax Percentage	0.0%	$0.00
Shipping Percentage	0.0%	$0.00
TOTAL COST OF HARDWARE		$125,643.00

PASSIVES

Item	Quantity	Price		Eval Total
DMV Dr	1	$2,826.00	each	$2,826.00
Dawson Ave	1	$398.00	each	$398.00
Cherry Point Dr	1	$2,196.00	each	$2,196.00
Black Stump Rd	1	$1,823.00	each	$1,823.00
Beach Rd	1	$460.00	each	$460.00
Beach Cove Villas	1	$195.00	each	$195.00
Loblolly Ln	1	$331.00	each	$331.00
Little Bay	1	$12,600.0000	each	$12,600.00
Kenner Dr	1	$130.0000	each	$130.00
James Wharf Rd	1	$664.0000	each	$664.00
Pleasant Banks Ln	1	$636.0000	each	$636.00
Taylors Creek	1	$1,385.0000	each	$1,385.00
Teal Dr	1	$598.0000	each	$598.00
Townley Farm/ Pembroke	1	$34.0000	each	$34.00
Weems Rd	1	$998.0000	each	$998.00
Wesley Terrace	1	$634.0000	each	$634.00
Windjammer Ln	1	$309.0000	each	$309.00
Woods Dr	1	$435.0000	each	$435.00
Goodluck Rd	1	$2,017.0000	each	$2,017.00
Bluewater Farm	1	$811.0000	each	$811.00

		$32,615.00
	0.0%	$0.0
	0.0%	$0.00
		$32,615.00

PROJECT EVALUATION SUMMARY

Revised 01/02/17

Company/System: Atlantic Broadband Delmar

Name of Project: Lancaster Headend VATI

SURVEY DATA

				Name		Name	
Home count (Year-Round)	New	496	Other Equivalent Units (List Name/Units):				0
	Existing	0	(Hotels, Motels, Seasonals, Etc.)		0		0
					0		0
Total Homes including equivalent units		496					

PROJECT DESCRIPTION

Associated Headend gear for Lancaster VATI

PROJECT MILEAGE - AERIAL, UNDERGROUND & FIBER

FIBER OPTIC NODES 0

NEW PLANT				NEW FIBER PLANT			
Aerial	0 ft.	=	Miles	0 ft.	=		Miles
Underground	0 ft.	=	Miles	0 ft.	=		Miles

REBUILD / UPGRADE PLANT				OVERLASHED FIBER PLANT			
Aerial	0 ft.	=	Miles	0 ft.	=		Miles
Underground	0 ft.	=	Miles	0 ft.	=		Miles

	TOTAL PROJECT			TOTAL FIBER		
	0 ft.	=	Miles	0 ft.	=	Miles

Total aerial miles	0.0	miles
Total underground miles	0.0	miles
Homes per node	0	homes
Miles of plant per node	0	miles
Ratio of fiber in the plant		
Ratio of aerial plant to total		
Ratio of underground plant to total ...		

CONSTRUCTION COST

	Total Eval Cost
A. Construction Labor	$102,960
B. Cable	$0
C. Fiber Optics	$0
D. Hardware	$0
E. Electronics	$469,968
F. Passives	$0
G. Subscriber Drop	$0
H. Other Costs (list)	
field engineering	$50
Maps	
In House Labor	
Aid to Construction	$0
Total Project Cost	$572,978

Virginia/ Maryland 1.9.2017 **BILL OF MATERIALS** **CONSTRUCTION LABOR**

	Bid Item #	Quantity	Price		Eval Total
Mapping and Design		57.2 hr @	$1,800.00	/hr	$102,960.00
Totals					$102,960.00

ELECTRONIC EQUIPMENT

BILL OF MATERIALS

Item	Quick Books #	Model #	Manufacture	Quantity	Price		Eval Total
VHUB				3	$37,656.00	each	$112,968.00
VHUB Pump Lasers				3	$23,000.00	each	$69,000.00
GS7000 Headend node equipment				20	$14,400.00	each	$288,000.00

Sub Total		$469,968.00
Tax Percentage	0.0%	$0.00
Shipping Percentage	0.0%	$0.00
TOTAL COST OF ELECTRONICS		$469,968.00

PROJECT EVALUATION SUMMARY

Revised 01/02/17

Company/System:	Atlantic Broadband	Delmar
Name of Project:	Mathews VATI All	

SURVEY DATA

				Name		Name	
Home count (Year-Round)	New	402	Other Equivalent Units (List Name/Units):				0
	Existing	0	(Hotels, Motels, Seasonals, Etc.)		0		0
					0		0
Total Homes including equivalent units		402					

PROJECT DESCRIPTION

VATI 2021 for Mathews aerial to underground to capture 402 passings

PROJECT MILEAGE - AERIAL, UNDERGROUND & FIBER

FIBER OPTIC NODES 0

NEW PLANT					NEW FIBER PLANT				
Aerial	60093	ft.	=	11.38 Miles	4227	ft.	=	0.80	Miles
Underground	153595	ft.	=	29.09 Miles	0	ft.	=		Miles
REBUILD / UPGRADE PLANT					**OVERLASHED FIBER PLANT**				
Aerial	0	ft.	=	Miles	34384	ft.	=	6.51	Miles
Underground	0	ft.	=	Miles	0	ft.	=		Miles
TOTAL PROJECT					**TOTAL FIBER**				
	213688	ft.	=	40.47 Miles	38611	ft.	=	7.31	Miles

Total aerial miles	11.4	miles
Total underground miles	29.1	miles
Homes per node	0	homes
Miles of plant per node	0	miles
Ratio of fiber in the plant	18.1%	
Ratio of aerial plant to total	28.1%	
Ratio of underground plant to total ...	71.9%	

CONSTRUCTION COST

	Total Eval Cost
A. Construction Labor	$1,201,617
B. Cable	$398,995
C. Fiber Optics	$13,618
D. Hardware	$52,300
E. Electronics	$264,778
F. Passives	$58,943
G. Subscriber Drop	$0
H. Other Costs (list)	
field engineering	$750
Maps	
In House Labor	
Aid to Construction	$0
Total Project Cost	$1,991,001

Virginia/ Maryland 1.9.2017

CONSTRUCTION LABOR

	Quantity		Price		Eval Total
Mathews Map 7	1	ea. @	$63,311.00	/ea.	$63,311.00
Mathews Map 6	1	ea. @	$21,561.00	/ ea.	$21,561.00
Mathews Map 5	1	ft. @	$39,041.00	/ ft.	$39,041.00
Mathews Map 4	1	ft. @	$152,097.00	/ ft.	$152,097.00
Mathews Map 3	1	ft @	$67,910.00	/ ft.	$67,910.00
Mathews Map 2	1	ft @	$108,941.00	/ ft.	$108,941.00
Mathews Map 1	1	ft @	$35,244.00	/ ft.	$35,244.00
Holland Point Rd	1	ft. @	$112,263.00	/ ft.	$112,263.00
Chapel Ln	1	ft. @	$125,631.00	/ ft.	$125,631.00
Tick Neck	1	ea. @	$189,003.00	/ea	$189,003.00
Roanne Point	1	ft. @	$24,802.00	/ ft.	$24,802.00
Peach Point	1	ft. @	$58,787.00	/ ft.	$58,787.00
Morgan Branch and Atkins Lr	1	ft. @	$29,119.00	/ ft.	$29,119.00
Mathews Map 10	1	ft @	$121,861.00	/ ft.	$121,861.00
Mathews Map 9	1	ft @	$52,046.00	/ ft.	$52,046.00
Totals					$1,201,617.00

CABLE

BILL OF MATERIALS

	Quantity			Total	Price		Eval Total
Mathews Map 7	1	ft	ft	1	24874.00	/ft	24,874.00
Mathews Map 6	1	ft	ft	1	6042.00	/ft	6,042.00
Mathews Map 5	1	ft	ft	1	17883.00	/ft	17,883.00
Mathews Map 4	1	ft	ft	1	73572.00	/ft	73,572.00
Mathews Map 3	1	ft	ft	1	22056.00	/ft	22,056.00
Mathews Map 2	1	ft	ft	1	35160.00	/ft	35,160.00
Mathews Map 1	1	ft	ft	1	14676.00	/ft	14,676.00
Holland Point Rd	1	ft	ft	1	31379.00	/ft	31,379.00
Chapel Ln	1	ft	ft	1	46171.00	/ea	46,171.00
Tick Neck	1	ft	ft	1	60344.00	/ea	60,344.00
Roanne Point	1	ft	ft	1	8825.00	/ea	8,825.00
Peach Point	1	ft	ft	1	13885.00	/ea	13,885.00
Morgan Branch and Atkins	1	ft	ft	1	8825.00	/ea	8,825.00
Mathews Map 10	1	ft	ft	1	15327.00	/ea	15,327.00
Mathews Map 9	1	ft	ft	1	19976.00	/ea	19,976.00

	Sub Totals	398,995.00
2.0%		
2.0%		
	0.0%	$0.00
	0.0%	0.00
		$398,995.00

FIBER

BILL OF MATERIALS

Item	Quantity			Total	Price		Eval Total
Mathews Map 7	1	ea	ea	1	$637.00	/ea	$637.00
Mathews Map 4	1	ea	ea	1	$1,555.00	/ea	$1,555.00
Mathews Map 3	1	ea	ea	1	$885.00	/ea	$885.00
Mathews Map 2	1	ea	ea	1	$1,315.00	/ea	$1,315.00
Holland Point Rd	1	ea	ea	1	$3,124.00	/ea	$3,124.00
Chapel Ln	1	ea	ea	1	$1,592.00	/ea	$1,592.00
Tick Neck	1	ea	ea	1	$1,687.00	/ea	$1,687.00
Peach Point	1	ea	ea	1	$1,982.00	/ea	$1,982.00
Mathews Map 10	1	ea	ea	1	$838.00	/ea	$838.00
					Sub Totals		$13,615.00

Waste Percentage - Fiber 2.0%

0.0%	$0.00
0.0%	$0.00
	$13,615.00

ELECTRONIC EQUIPMENT

BILL OF MATERIALS

Item	Manufacture	Quantity	Price		Eval Total
Mathews Map 7		1	$23,651.0000	each	$23,651.00
Mathews Map 6		1	$2,537.0000	each	$2,537.00
Mathews Map 5		1	$13,517.0000	each	$13,517.00
Mathews Map 4		1	$48,185.0000	each	$48,185.00
Mathews Map 3		1	$17,190.0000	each	$17,190.00
Mathews Map 2		1	$39,242.0000	each	$39,242.00
Mathews Map 1		1	$12,345.0000	each	$12,345.00
Holland Point Rd		1	$17,170.0000	each	$17,170.00
Chapel Ln		1	$8,623.00	each	$8,623.00
Tick Neck		1	$17,498.00	each	$17,498.00
Roanne Point		1	$5,506.00	each	$5,506.00
Peach Point		1	$14,915.00	each	$14,915.00
Morgan Branch and Atkins Ln		1	$5,506.00	each	$5,506.00
Mathews Map 10		1	$25,376.00	each	$25,376.00
Mathews Map 9		1	$13,517.00	each	$13,517.00

Sub Total		$264,778.00
Tax Percentage	0.0%	$0.00
Shipping Percentage	0.0%	$0.00
TOTAL COST OF ELECTRONICS		$264,778.00

HARDWARE

Item	Quantity	Price			Eval Total
Mathews Map 7	1 ea	$1,810.0000	per	each	$1,810.00
Mathews Map 6	1 ea	$1,170.0000	per	each	$1,170.00
Mathews Map 5	1 ea	$2,226.0000	per	each	$2,226.00
Mathews Map 4	1 ea	$6,251.0000	per	each	$6,251.00
Mathews Map 3	1 ea	$3,454.0000	per	each	$3,454.00
Mathews Map 2	1 ea	$6,423.0000	per	each	$6,423.00
Mathews Map 1	1 ea	$2,569.0000	per	each	$2,569.00
Holland Point Rd	1 ea	$5,551.0000	per	each	$5,551.00
Chapel Ln	1 ea	$5,406.0000	per	each	$5,406.00
Tick Neck	1 ea	$4,566.0000	per	each	$4,566.00
Roanne Point	1 ea	$1,958.0000	per	each	$1,958.00
Peach Point	1 ea	$3,622.0000	per	each	$3,622.00
Morgan Branch and Atkins Ln	1 ea	$1,957.0000	per	each	$1,957.00
Mathews Map 10	1 ea	$3,112.0000	per	each	$3,112.00
Mathews Map 9	1 ea	$2,225.0000	per	each	$2,225.00

Sub Total		$52,300.00
Tax Percentage	0.0%	$0.00
Shipping Percentage	0.0%	$0.00
TOTAL COST OF HARDWARE		$52,300.00

PASSIVES

Item	Quantity	Price		Eval Total
Mathews Map 7	1	$2,548.00	each	$2,548.00
Mathews Map 6	1	$1,587.00	each	$1,587.00
Mathews Map 5	1	$3,169.00	each	$3,169.00
Mathews Map 4	1	$5,075.00	each	$5,075.00
Mathews Map 3	1	$4,839.00	each	$4,839.00
Mathews Map 2	1	$7,529.00	each	$7,529.00
Mathews Map 1	1	$3,652.0000	each	$3,652.00
Holland Point Rd	1	$4,923.0000	each	$4,923.00
Chapel Ln	1	$5,710.0000	each	$5,710.00
Tick Neck	1	$5,872.0000	each	$5,710.00
Roanne Point	1	$2,898.0000	each	$2,898.00
Peach Point	1	$1,916.0000	each	$1,916.00
Morgan Branch and Atkins Ln	1	$2,898.0000	each	$2,898.00
Mathews Map 10	1	$3,310.0000	each	$3,310.00
Mathews Map 9	1	$3,179.0000	each	$3,179.00
				$58,943.00
			0.0%	$0.0
			0.0%	$0.00
				$58,943.00

PROJECT EVALUATION SUMMARY

Revised 01/02/17

Company/System: Atlantic Broadband Delmar

Name of Project: Mathews Headend VATI

SURVEY DATA

				Name		Name	
Home count (Year-Round)	New	402	Other Equivalent Units (List Name/Units):				0
	Existing	0	(Hotels, Motels, Seasonals, Etc.)		0		0
					0		0
Total Homes including equivalent units		402					

PROJECT DESCRIPTION

Associated Headend gear to build out the footprint in Mathews for VATI

PROJECT MILEAGE - AERIAL, UNDERGROUND & FIBER

FIBER OPTIC NODES 0

NEW PLANT					NEW FIBER PLANT				
Aerial	0 ft.	=		Miles	0 ft.	=		Miles	
Underground	0 ft.	=		Miles	0 ft.	=		Miles	
REBUILD / UPGRADE PLANT					OVERLASHED FIBER PLANT				
Aerial	0 ft.	=		Miles	0 ft.	=		Miles	
Underground	0 ft.	=		Miles	0 ft.	=		Miles	
TOTAL PROJECT					TOTAL FIBER				
	0 ft.	=		Miles	0 ft.	=		Miles	

Total aerial miles	0.0	miles
Total underground miles	0.0	miles
Homes per node	0	homes
Miles of plant per node	0	miles
Ratio of fiber in the plant		
Ratio of aerial plant to total		
Ratio of underground plant to total ..		

CONSTRUCTION COST

	Total Eval Cost
A. Construction Labor	$69,462
B. Cable	$0
C. Fiber Optics	$0
D. Hardware	$0
E. Electronics	$115,200
F. Passives	$0
G. Subscriber Drop	$0
H. Other Costs (list)	
field engineering	$50
Maps	
In House Labor	
Aid to Construction	$0
Total Project Cost	$184,712

Virginia/ Maryland 1.9.2017 **BILL OF MATERIALS** **CONSTRUCTION LABOR**

	Bid Item #	Quantity		Price		Eval Total
Mapping and Design		38.59	hr @	$1,800.00	/hr	$69,462.00
Totals						$69,462.00

ELECTRONIC EQUIPMENT

BILL OF MATERIALS

Item	Quick Books #	Model #	Manufacture	Quantity	Price		Eval Total
GS7000 Node Headend equipment				8	$14,400.00	each	$115,200.00

Sub Total		$115,200.00
Tax Percentage	0.0%	$0.00
Shipping Percentage	0.0%	$0.00
TOTAL COST OF ELECTRONICS		$115,200.00

PROJECT EVALUATION SUMMARY

Revised 01/02/17

Company/System: Atlantic Broadband Delmar

Name of Project: Middlesex All VATI

SURVEY DATA

				Name		Name	
Home count (Year-Round)	New	147	Other Equivalent Units (List Name/Units):				0
	Existing	0	(Hotels, Motels, Seasonals, Etc.)		0		0
					0		0
Total Homes including equivalent units		147					

PROJECT DESCRIPTION

VATI 2021 for Middlesex aerial to underground to capture 147 passings

PROJECT MILEAGE - AERIAL, UNDERGROUND & FIBER

FIBER OPTIC NODES 0

NEW PLANT				
Aerial	15428 ft.	=	2.92	Miles
Underground	66179 ft.	=	12.53	Miles

REBUILD / UPGRADE PLANT				
Aerial	0 ft.	=		Miles
Underground	0 ft.	=		Miles

TOTAL PROJECT			
81607 ft.	=	15.46	Miles

NEW FIBER PLANT			
7590 ft.	=	1.44	Miles
0 ft.	=		Miles

OVERLASHED FIBER PLANT			
8026 ft.	=	1.52	Miles
0 ft.	=		Miles

TOTAL FIBER			
15616 ft.	=	2.96	Miles

Total aerial miles	2.9	miles
Total underground miles	12.5	miles
Homes per node	0	homes
Miles of plant per node	0	miles
Ratio of fiber in the plant	19.1%	
Ratio of aerial plant to total	18.9%	
Ratio of underground plant to total ...	81.1%	

CONSTRUCTION COST

	Total Eval Cost
A. Construction Labor	$449,083
B. Cable	$150,448
C. Fiber Optics	$3,915
D. Hardware	$17,060
E. Electronics	$113,268
F. Passives	$19,310
G. Subscriber Drop	$0
H. Other Costs (list)	
field engineering	$250
Maps	$0
In House Labor	$0
Aid to Construction	$0
Total Project Cost	$753,334

Virginia/ Maryland 1.9.2017

CONSTRUCTION LABOR

	Quantity		Price		Eval Total
Bennett Farm Rd	1	ea. @	$72,173.00	/ ea	$72,173.00
Deer Chase Rd	1	ea. @	$159,718.00	/ ea.	$159,718.00
Kates Neck Rd	1	ft. @	$134,107.00	/ ft.	$134,107.00
Red Hill/ Ivy Shores	1	ft. @	$54,535.00	/ ft.	$54,535.00
Stampers Bay	1	ft @	$28,550.00	/ ft.	$28,550.00
Totals					$449,083.00

CABLE

BILL OF MATERIALS

	Quantity			Total	Price		Eval Total
Bennett Farm Rd	1	ft	ft	1	22638.00	/ft	22,638.00
Deer Chase Rd	1	ft	ft	1	74982.00	/ft	74,982.00
Kates Neck Rd	1	ft	ft	1	15937.00	/ft	15,937.00
Red Hill/ Ivy Shores	1	ft	ft	1	22289.00	/ft	22,289.00
Stampers Bay	1	ft	ft	1	14602.00	/ft	14,602.00
					Sub Totals		150,448.00

2.0%
2.0%

0.0%	$0.00
0.0%	0.00
	$150,448.00

FIBER

BILL OF MATERIALS

Item	Quantity			Total	Price		Eval Total
Bennett Farm Rd	1	ea	ea	1	$885.00	/ea	$885.00
Deer Chase Rd	1	ea	ea	1	$1,555.00	/ea	$1,555.00
Kates Neck Rd	1	ea	ea	1	$838.00	/ea	$838.00
Red Hill/ Ivy Shores	1	ea	ea	1	$637.00	/ea	$637.00
					Sub Totals		$3,915.00

Waste Percentage - Fiber 2.0%

0.0%	$0.00
0.0%	$0.00
	$3,915.00

ELECTRONIC EQUIPMENT

BILL OF MATERIALS

Item	Manufacture	Quantity	Price		Eval Total
Bennett Farm Rd		1	$17,190.0000	each	$17,190.00
Deer Chase Rd		1	$50,952.0000	each	$50,952.00
Kates Neck Rd		1	$25,376.0000	each	$25,376.00
Red Hill/ Ivy Shores		1	$7,405.0000	each	$7,405.00
Stampers Bay		1	$12,345.0000	each	$12,345.00

Sub Total		$113,268.00
Tax Percentage	0.0%	$0.00
Shipping Percentage	0.0%	$0.00
TOTAL COST OF ELECTRONICS		$113,268.00

HARDWARE

Item	Quantity	Price			Eval Total
Bennett Farm Rd	1 ea	$18,702.0000	per	each	$3,452.00
Deer Chase Rd	1 ea	$8,425.0000	per	each	$6,250.00
Kates Neck Rd	1 ea	$26,046.0000	per	each	$3,112.00
Red Hill/ Ivy Shores	1 ea	$0.0000	per	each	$1,810.00
Stampers Bay	1 ea	$0.0000	per	each	$2,436.00
		Sub Total			$17,060.00

Tax Percentage	0.0%	$0.00
Shipping Percentage	0.0%	$0.00
TOTAL COST OF HARDWARE		$17,060.00

PASSIVES

Item	Quantity	Price		Eval Total
Bennett Farm Rd	1	$4,839.00	each	$4,839.00
Deer Chase Rd	1	$5,048.00	each	$5,048.00
Kates Neck Rd	1	$3,310.00	each	$3,310.00
Red Hill/ Ivy Shores	1	$2,442.00	each	$2,442.00
Stampers Bay	1	$3,671.00	each	$3,671.00
				$19,310.00
			0.0%	$0.0
			0.0%	$0.00
				$19,310.00

PROJECT EVALUATION SUMMARY

Revised 01/02/17

Company/System: Atlantic Broadband Delmar

Name of Project: Middlesex Headend VATI

SURVEY DATA

					Name		Name	
Home count (Year-Round)	New	147	Other Equivalent Units (List Name/Units):					0
	Existing	0	(Hotels, Motels, Seasonals, Etc.)			0		0
						0		0
Total Homes including equivalent units		147						

PROJECT DESCRIPTION

Associated headend gear to build out the footprint for Middlesex VATI

PROJECT MILEAGE - AERIAL, UNDERGROUND & FIBER

FIBER OPTIC NODES 0

NEW PLANT				NEW FIBER PLANT			
Aerial	0 ft.	=	Miles		0 ft.	=	Miles
Underground	0 ft.	=	Miles		0 ft.	=	Miles
REBUILD / UPGRADE PLANT				**OVERLASHED FIBER PLANT**			
Aerial	0 ft.	=	Miles		0 ft.	=	Miles
Underground	0 ft.	=	Miles		0 ft.	=	Miles
TOTAL PROJECT				**TOTAL FIBER**			
	0 ft.	=	Miles		0 ft.	=	Miles

Total aerial miles	0.0	miles
Total underground miles	0.0	miles
Homes per node	0	homes
Miles of plant per node	0	miles
Ratio of fiber in the plant		
Ratio of aerial plant to total		
Ratio of underground plant to total ...		

CONSTRUCTION COST

	Total Eval Cost
A. Construction Labor	$28,692
B. Cable	$0
C. Fiber Optics	$0
D. Hardware	$0
E. Electronics	$72,000
F. Passives	$0
G. Subscriber Drop	$0
H. Other Costs (list)	
field engineering	$50
Maps	
In House Labor	
Aid to Construction	$0
Total Project Cost	$100,742

Virginia/ Maryland 1.9.2017 **BILL OF MATERIALS** **CONSTRUCTION LABOR**

	Bid Item #	Quantity		Price		Eval Total
Mapping and Design		15.94	hr @	$1,800.00	/hr	$28,692.00
Totals						$28,692.00

ELECTRONIC EQUIPMENT

BILL OF MATERIALS

Item	Quick Books #	Model #	Manufacture	Quantity	Price		Eval Total
GS7000 Node headend equipment				5	$14,400.00	each	$72,000.00
			Sub Total				$72,000.00
			Tax Percentage			0.0%	$0.00
			Shipping Percentage			0.0%	$0.00
			TOTAL COST OF ELECTRONICS				$72,000.00

Interconnected VoIP State Totals - Based on Actuals

Connecticut

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
10960	9729	1231

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
10960	9729	1231

Services Sold:

Total Last Mile	with Internet	without Internet
10960	10960	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
10960		10960		

Delaware

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
1452	1354	98

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
1452	1354	98

Services Sold:

Total Last Mile	with Internet	without Internet
1452	1452	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
1452		1452		

Florida

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
17428	15669	1759

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
17428	15669	1759

Services Sold:

Total Last Mile	with Internet	without Internet
17428	17428	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
17428		17428		

Maine

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
2720	2496	224

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
2720	2496	224

Services Sold:

Total Last Mile	with Internet	without Internet
2720	2720	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
2720		2720		

Maryland

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
21030	19024	2006

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
21030	19024	2006

Services Sold:

Total Last Mile	with Internet	without Internet
21030	21030	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
21030		21030		

New Hampshire

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
15903	14878	1025

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
15903	14878	1025

Services Sold:

Total Last Mile	with Internet	without Internet
15903	15903	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
15903		15903		

New York

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
755	679	76

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
755	679	76

Services Sold:

Total Last Mile	with Internet	without Internet
755	755	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
755		755		

Pennsylvania

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
49392	45331	4061

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
49392	45331	4061

Services Sold:

Total Last Mile	with Internet	without Internet
49392	49392	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
49392		49392		

South Carolina

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
8334	7089	1245

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
8334	7089	1245

Services Sold:

Total Last Mile	with Internet	without Internet
8334	8334	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
8334		8334		

Virginia

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
5535	4693	842

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
5535	4693	842

Services Sold:

Total Last Mile	with Internet	without Internet
5535	5535	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
5535		5535		

West Virginia

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
3811	3526	285

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
3811	3526	285

Services Sold:

Total Last Mile	with Internet	without Internet
3811	3811	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
3811		3811		

Interconnected VoIP State Totals - Based on Actuals

Connecticut

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
10012	8687	1325

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
10012	8687	1325

Services Sold:

Total Last Mile	with Internet	without Internet
10012	10012	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
10012		10012		

Delaware

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
1463	1363	100

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
1463	1363	100

Services Sold:

Total Last Mile	with Internet	without Internet
1463	1463	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
1463		1463		

Florida

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
17124	15385	1739

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
17124	15385	1739

Services Sold:

Total Last Mile	with Internet	without Internet
17124	17124	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
17124		17124		

Maine

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
2757	2522	235

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
2757	2522	235

Services Sold:

Total Last Mile	with Internet	without Internet
2757	2757	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
2757		2757		

Maryland

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
20905	18830	2075

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
20905	18830	2075

Services Sold:

Total Last Mile	with Internet	without Internet
20905	20905	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
20905		20905		

New Hampshire

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
15904	14829	1075

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
15904	14829	1075

Services Sold:

Total Last Mile	with Internet	without Internet
15904	15904	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
15904		15904		

New York

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
761	679	82

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
761	679	82

Services Sold:

Total Last Mile	with Internet	without Internet
761	761	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
761		761		

Pennsylvania

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
49190	45046	4144

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
49190	45046	4144

Services Sold:

Total Last Mile	with Internet	without Internet
49190	49190	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
49190		49190		

South Carolina

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
8214	6963	1251

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
8214	6963	1251

Services Sold:

Total Last Mile	with Internet	without Internet
8214	8214	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
8214		8214		

Virginia

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
5795	4933	862

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
5795	4933	862

Services Sold:

Total Last Mile	with Internet	without Internet
5795	5795	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
5795		5795		

West Virginia

Grand Totals, by End User Type...

Total	Consumer	Business/Gov
3858	3571	287

Over The Top Subscriptions (service to end users provided without also supplying last mile)...

Total OTT	Consumer	Business/Gov
0		

All Other Subscriptions (service to end users provided over last mile facilities supplied by the provider)...

End User Type:

Total Last Mile	Consumer	Business/Gov
3858	3571	287

Services Sold:

Total Last Mile	with Internet	without Internet
3858	3858	

Last Mile Medium:

Total Last Mile	Fiber	Coax	FW and Satellite	Copper
3858		3858		

ATLANTIC
broadband
a Cogeco company

August 10, 2020

Tamarah Holmes, Ph.D
Director, Office of Broadband
Program Manager, Virginia Appalachian Regional Commission Program (ARC)
Virginia Department of Housing and Community Development (DHCD)
600 East Main Street, Suite #300
Richmond, Virginia 23219

Dear Dr. Holmes:

Please let this letter serve as the informal agreement for Atlantic Broadband to participate as the co-applicant in the FY21 Virginia Telecommunication Initiative (VATI) grant application with Mathews County, Lancaster County, Middlesex County and Caroline County.

We are submitting a Primary Plan “A”. The funding is intended to extend service to a total of 1,557 Residences and Businesses within 48 Project areas in the Four County Region of Mathews County, Lancaster County, Middlesex County and Caroline County. Each project will make service available to every existing location within the project area and will be scalable to serve future needs.

Atlantic Broadband's investment in the Plan “A” Regional project will be $1,868,400. In addition, the cumulative matching contribution from the Four Counties will be $1,868,400. This equates to almost 42% of the overall cost of the project.

In anticipation of potential budgetary concerns from the state, we are submitting within the application a Secondary Plan “B”. The funding is intended to extend service to a total of 1,061 Residences and Home Businesses within 23 Project areas in the Three County Region of Mathews County, Middlesex County and Caroline County. Each project will make service available to every existing location within the project area and will be scalable to serve future needs.

Atlantic Broadband's investment in the Plan “B” Regional project will be $1,273,200. In addition, the cumulative matching contribution from the Four Counties will be $1,273,200. This equates to almost 45% of the overall cost of the project.

We look forward to working with you on this initiative to expand broadband services in the Middle Peninsula and Northern Neck Region.

Sincerely,

Danny L. Jobe
Vice President of Operations
Atlantic Broadband

ATLANTIC
broadband
a Cogeco company

August 10, 2020

Tamarah Holmes, Ph.D
Director, Office of Broadband
Program Manager, Virginia Appalachian Regional Commission Program (ARC)
Virginia Department of Housing and Community Development (DHCD)
600 East Main Street, Suite #300
Richmond, Virginia 23219

Dear Dr. Holmes:

Atlantic Broadband hereby certifies that Atlantic Broadband has never applied for nor received funding from the Federal Communications Commission's Connect America Fund for broadband expansion in the Commonwealth of Virginia.

Please feel free to contact me should you need additional information.

Sincerely,

Danny L. Jobe
Vice President of Operations
Atlantic Broadband

A world of your very own

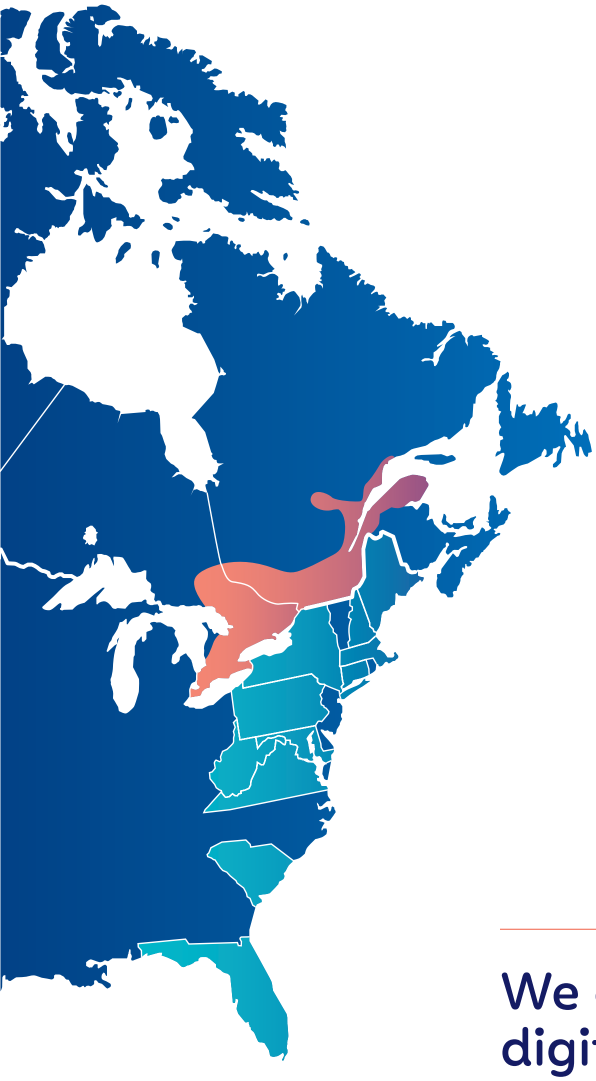
2019
ANNUAL REPORT

cogeco
COMMUNICATIONS

Profile

Cogeco Communications Inc. is a communications corporation. It is the 8th largest cable operator in North America, operating in Canada under the Cogeco Connexion name in Québec and Ontario, and along the East Coast of the United States under the Atlantic Broadband brand (in 11 states from Maine to Florida). The Corporation provides residential and business customers with Internet, video and telephony services through its two-way broadband fibre networks. Cogeco Communications Inc.'s subordinate voting shares are listed on the Toronto Stock Exchange (TSX: CCA).

Cogeco Communications is...



COGECO CONNEXION
ATLANTIC BROADBAND

3,800 employees bringing state-of-the-art communications and media services, with a commitment to providing customers with unparalleled service.

committed to continued growth and success based on solid financial management and an acquisition strategy that is at once bold and rigorous.

very well positioned for the future, with a commitment to innovation and to being at the forefront of the rapidly changing communications landscape.

committed to contributing to the social, economic and cultural development of the communities it serves through focused initiatives that reflect the particular needs of these communities.

We connect our customers to the digital world and create outstanding communication experiences

Table of contents

2019
Financial Performance

+8.6%

REVENUE
(in thousands of Canadian dollars)

2019	2,331,820
2018[2]	2,147,404

+10%

ADJUSTED EBITDA[1] AND ADJUSTED EBITDA MARGIN[1]
(in thousands of Canadian dollars, except percentages)

2019	47.5%	1,107,940
2018[2]	46.9%	1,006,818

+20%

PROFIT FOR THE YEAR
(in thousands of Canadian dollars)

2019	432,288
2018[2]	360,197

+39.9%

CASH FLOW FROM OPERATING ACTIVITIES
(in thousands of Canadian dollars)

2019	868,711
2018[2]	620,748

–5.1%

ACQUISITIONS OF PROPERTY, PLANT AND EQUIPMENT AND CAPITAL INTENSITY[1]
(in thousands of Canadian dollars, except percentages)

2019	18.6%	434,545
2018[2]	21.3%	457,808

+50.4%

FREE CASH FLOW[1]
(in thousands of Canadian dollars)

2019	454,059
2018[2]	301,850

1 The indicated terms do not have standardized definitions prescribed by International Financial Reporting Standards ("IFRS") and, therefore, may not be comparable to similar measures presented by other companies. For more details, please consult the "Non-IFRS financial measures" section of the Management's Discussion and Analysis ("MD&A").

2 Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections of the MD&A.

Financial Highlights

YEARS ENDED AUGUST 31 (in thousands of Canadian dollars, except percentages and per share data)	**2019 $**	2018[1] $	Change %	Change in constant currency[2] %	Foreign exchange impact[2] $
OPERATIONS					
Revenue	**2,331,820**	2,147,404	8.6	6.8	37,433
Adjusted EBITDA	**1,107,940**	1,006,818	10.0	8.5	15,797
Adjusted EBITDA margin	**47.5%**	46.9%			
Integration, restructuring and acquisition costs[3]	**11,150**	20,328	(45.1)		
Profit for the year from continuing operations	**356,908**	384,578	(7.2)		
Profit (loss) for the year from discontinued operations	**75,380**	(24,381)	—		
Profit for the year	**432,288**	360,197	20.0		
Profit for the year attributable to owners of the Corporation	**415,353**	350,833	18.4		
CASH FLOW					
Cash flow from operating activities	**868,711**	620,748	39.9		
Acquisitions of property, plant and equipment[4]	**434,545**	457,808	(5.1)	(7.1)	9,342
Free cash flow	**454,059**	301,850	50.4	50.0	1,330
CAPITAL INTENSITY	**18.6%**	21.3%			
FINANCIAL CONDITION					
Cash and cash equivalents	**556,504**	84,725	—		
Total assets	**6,951,079**	7,180,043	(3.2)		
Indebtedness[5]	**3,454,923**	3,914,711	(11.7)		
Equity attributable to owners of the Corporation	**2,199,789**	1,997,169	10.1		
PER SHARE DATA[6]					
Earnings (loss) per share					
Basic					
From continuing operations	**6.89**	7.61	(9.5)		
From discontinued operations	**1.53**	(0.49)	—		
From continuing and discontinued operations	**8.41**	7.12	18.1		
Diluted					
From continuing operations	**6.83**	7.55	(9.5)		
From discontinued operations	**1.51**	(0.49)	—		
From continuing and discontinued operations	**8.35**	7.06	18.3		
Dividends	**2.10**	1.90	10.5		

1 Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections of the MD&A.

2 Key performance indicators presented on a constant currency basis are obtained by translating financial results of the current period denominated in US dollars at the foreign exchange rate of the prior year. For the year ended August 31, 2018, the average foreign exchange rate used for translation was 1.2773 USD/CDN.

3 For the year ended August 31, 2019, integration, restructuring and acquisition costs were mostly due to restructuring costs incurred in the Canadian broadband services segment related to an operational optimization program during the first half of fiscal 2019. In addition, acquisition and integration costs were incurred by the American broadband services segment related to the FiberLight acquisition. For the year ended August 31, 2018, integration, restructuring and acquisition costs were related to the MetroCast acquisition completed on January 4, 2018.

4 For the year ended August 31, 2019, acquisitions of property, plant and equipment in constant currency amounted to $425.2 million.

5 Indebtedness is defined as the aggregate of bank indebtedness, balance due on business combinations and principal on long-term debt.

6 Per multiple and subordinate voting share.

LOUIS AUDET

Message from the Executive Chairman

Fiscal 2019 was another landmark year at Cogeco Communications Inc., ("Cogeco Communications" or the "Corporation") and for me personally, as I completed my first year as Executive Chair of the Board of Directors. Under the leadership of its new President and Chief Executive Officer, Philippe Jetté, Cogeco Communications boldly asserted its willingness to focus on its primary business through the sale of Cogeco Peer 1. In Canada, we continued to explore a diligent entry into the wireless market and announced our intention to invest more than $1 billion over the next four years in the operation and expansion of our hybrid fibre coaxial cable network, partly to support underserved and unserved communities. In our US market, we expanded our presence in Florida, a strategic growth market, after completing the acquisition of Florida's FiberLight LLC while continuing to expand and enhance product and service offerings in our 11-state footprint.

At Cogeco Communications, our fundamental goal is to help connect people, businesses and institutions to the world via our advanced broadband networks and services. We serve more than 1,200 communities across Canada and the US, invest over $434.5 million in capital annually in our Canadian and US markets, provide more than 3,800 stable and well-paid jobs, high-quality customer services with fast Internet connections, and have strong relationships with municipalities in our network footprint.

The Corporation delivered value to shareholders by striving to create exceptional customer experiences, building on our geographical reach in Canada and in the US, expanding into new market segments and mobilizing highly engaged teams. Our organic financial performance was good despite increased market pressure. As Cogeco Communications continues to build on its foundation to pursue transformational digital change, we remain mindful of the trust and support our shareholders, customers and employees have invested in us. In return, we have consistently delivered strong results for shareholders. Over the past 5 years, dividends paid per share have increased by 10.7% on a compounded annual basis, and the Corporation's market capitalization has approximately doubled over the last 6 years.

Cogeco has a longstanding commitment to high social responsibility standards, building on our track record of active engagement with our communities. In 2019, we proudly contributed over $7.8 million in cash and in-kind donations and sponsorships to several organizations in our communities and territories. At the close of the fiscal year, we were honoured to sign, at the G7 in Biarritz, France, the Organisation for Economic Co-operation and Development's ("OECD") Business for Inclusive Growth pledge. Cogeco Communications volunteered along with 33 other multinational organizations from around the world to seek effective ways to share more fairly the fruits of economic development.

With this annual report, we are proud to share with you Cogeco Communications' new visual brand platform, which is centered on you, our shareholder, our customer, our employee, our fellow citizen. It is a reflection of who Cogeco Communications is today: a modern, innovative, dynamic, accessible Corporation, that has always been close to its customers and communities.

I would like to congratulate Philippe Jetté on a remarkable first year in his new position. Through his visionary leadership, Cogeco Communications closed the fiscal year solidly, continuing on its growth curve. I would also like to thank the members of Cogeco Communications' Board of Directors who showed great openness and support, and shared their wisdom with me and the Corporation's executive leadership team throughout the year. I am always proud to see our organization's corporate governance recognized, year after year, amongst the top tier of family-controlled dual-class companies listed on a Canadian stock exchange in the Globe and Mail's annual Board Games publication.

My fellow shareholders, I look forward to overseeing Cogeco Communications through another year of exciting innovation and growth. All together, employees, senior leadership and members of the Board of Directors, we will continue to focus on creating value, maintaining a leadership position in our markets and providing excellent experiences for our customers and employees alike.

LOUIS AUDET
Executive Chairman of the Board

Message from the President & CEO

In many ways, fiscal 2019 marked a new beginning for the Corporation as we initiated significant change and transformation. With an updated leadership team in place at the start of the fiscal year and under the constant guidance of our Board of Directors, we refined our strategic vision and mission, supported by core strategic priorities.

Consolidated revenue increased by 8.6% in fiscal 2019 to reach $2.33 billion, while adjusted EBITDA reached $1.11 billion, up by 10.0%. Profit for the year reached $432.3 million and the Corporation generated free cash flow of $454.1 million. Dividends paid to our shareholders increased by 10.5% to $2.10 per share.

We took on a number of transformational projects in fiscal 2019. The sale of Cogeco Peer 1 in the spring allowed us to refocus Cogeco Communications' resources on our Canadian and American broadband services businesses and has provided us with greater flexibility to pursue organic investment and acquisition opportunities. This was evidenced by our commitment to invest more than $1 billion in our Québec and Ontario networks over the next four years where we are working closely with municipalities and towns to extend and enhance our network so that we can deliver high-speed connectivity to as many residents, businesses and institutions as possible.

In fiscal 2019, we also continued exploring various business models and proactively proposed a new hybrid mobile network operator model to policy makers as part of government consultations in Canada that would allow us to launch a profitable wireless service. We opted not to participate in the auction process for licenses that took place in 2019 given that the structure of the auction, based on large geographic areas, would have made the acquisition of such spectrum uneconomical for the Corporation.

At an organizational level, we further developed our shared services teams internally, allowing our subsidiaries more time to focus on core activities such as sales, marketing and customer support, ultimately allowing us to deliver an exceptional customer experience.

Cogeco. A world of your very own.

At Cogeco Communications, our mission is to connect our customers to the digital world and create outstanding communication experiences. In fiscal 2019, we internalized a promise to ensure our customers' needs remain at the heart of all our actions and we approached our strategy and priorities with a renewed sense of commitment to them.

Our new tagline – Cogeco. A world of your very own. – was launched in early fiscal year 2020. It is centered on the customer, people, the human touch. It reinforces the notions that are at the heart of our mission: accessibility and proximity with our customers and communities. These are amongst our key differentiators in a crowded market. It also speaks to how our products and services can be personalised to match the needs of our customers.

PHILIPPE JETTÉ

INITIATIVES

Canadian broadband services

In fiscal 2019, at Cogeco Connexion, we focused on leveraging our superior Internet speeds and video services by continuing to expand our Gigabit offerings to reach approximately 60% coverage of our footprint. In addition, our evolution towards Internet protocol television ("IPTV"), which will provide highly customizable video content, wireless enabled equipment and more, is underway with pre-launch preparations. We continued concentrating on growing our business customer base in our footprint in Canada, expanding the availability of 360Mbps and Gigabit service to more locations.

As our teams focused on achieving best-in-class operating efficiencies considerable effort was devoted to the stabilization of the new advanced customer management system at the end of fiscal year 2018 and the start of fiscal year 2019. Since then, teams have been leveraging the system's capabilities to offer excellent customer experiences and accelerate our digital transformation.

Recognizing that our employees are at the heart of our success, we constantly invest in developing our employees by improving our training, development programs and tools in order to ensure they are highly engaged in delivering on our customer promises. In fiscal 2019, we deployed a modern and engaging collaboration and communication platform to optimize people performance and productivity while putting in place renewed health and safety programs to provide a safe working environment.

American broadband services

Atlantic Broadband continues to work to deliver an exceptional customer experience throughout the customer lifespan with a focus on new self-serve options. In fiscal 2019, we introduced a range of customer care enhancements throughout the year to improve efficiency and productivity for the Corporation, while producing an enhanced experience for customers.

Cogeco Communications' executive leadership **team**

From left to right: **PATRICE OUIMET,** Senior Vice President and Chief Financial Officer • **CHRISTIAN JOLIVET,** Senior Vice President, Corporate Affairs and Chief Legal Officer and Secretary • **FRANK VAN DER POST,** President, Atlantic Broadband • **MARIE-HÉLÈNE LABRIE,** Senior Vice President and Chief Public Affairs and Communications Officer • **PHILIPPE JETTÉ,** President and Chief Executive Officer • **LUC NOISEUX,** Senior Vice President and Chief Technology and Strategy Officer • **DIANE NYISZTOR,** Senior Vice President and Chief Human Resources Officer • **KEN SMITHARD,** President, Cogeco Connexion.

Message from the President & CEO (continued)

Through this, we made employee engagement a key priority through a number of recognition, communication and training activities that help create team members who are invested in the Corporation and the communities they serve.

In fiscal 2019, we continued to focus on delivering market-leading Internet service speed offerings and advanced video services with an emphasis on performance and reliability. We extended our market advantage in the high-speed Internet segment by increasing top download and upload speeds for our modem-based Internet products for both residential and business customers and by expanding our deployment of Gigabit Internet to over 90% of our footprint. We also introduced major video enhancements through our TiVo® platform, providing greater ease-of-use for customers and through the expansion of voice control of our TiVo® Experience 4 platform and the launch of Amazon Alexa functionality, the launch of a new mobile app for multi-screen viewing and the migration to IP Video On Demand ("VOD").

We also generated strong customer growth at Atlantic Broadband and in the recently acquired MetroCast markets in both the residential and business segments. Programs were targeted to retain high-value residential customers and an aggressive effort was undertaken to move more business customers into long-term contracts. In addition, strong acquisition initiatives were deployed to drive new connection activity among non-customers in competitive markets.

Core Strategic Priorities

Deliver an exceptional customer experience through continuous innovation of our service offering.

Grow our footprint and obtain our fair share of market in current segments.

Optimize our cost structure and operational effectiveness by exploiting group synergies facilitated through a highly collaborative culture.

Leverage our leadership and digital technologies in client relationship management.

Continue building a strong brand.

Deliver an exceptional employee experience.

Corporate Social Responsibility

We have strengthened our corporate social responsibility ("CSR") program aimed at operating responsibly and sustainably and being a good corporate citizen. To support the achievement of our CSR goals, we have developed key performance indicators for environmental, social and governance ("ESG") objectives. During fiscal 2019, key initiatives of the CSR program were rolled-out to our business units, namely Atlantic Broadband and Cogeco Connexion.

Amongst our CSR highlights reported in 2019, we have reduced our GHG emissions on a per revenue basis by 40% over the past five years and have diverted 163,095 kilos of electronic waste from landfills. Cogeco Communications partnered with Computers for Success Canada by donating used electronic devices, in support of the program's intent to deliver improved access to technology for Canadians at risk of digital exclusion. We also participated in the Connected for Success program, through which we offer affordable Internet to more than 475 low income families in Québec and Ontario. Once again, Cogeco Communications was named to Corporate Knights' 2019 Best 50 Corporate Citizens in Canada.

Fiscal 2020 outlook

Building on our fiscal 2019 results, we are well positioned for continued growth and success. On a constant currency basis, the Corporation expects fiscal 2020 revenue to grow between 2% and 4%, adjusted EBITDA between 2.5% and 4.5%, acquisitions of property, plant and equipment should reach between $460 million and $480 million and free cash flow is expected to grow between 5% and 11%.

Concluding remarks

As we look forward to taking on the challenges and opportunities that a new fiscal year will bring, I am honoured to have the support of a talented team of over 3,800 employees, who embody Cogeco Communications' values of innovation, commitment to customer service, teamwork, trust, and respect. I would like to thank Louis Audet and the members of the Board of Directors for the guidance and wisdom they shared throughout my first year as President and Chief Executive Officer. I would also like to take this opportunity to recognize the collaboration, encouragement and loyalty I have received from Cogeco Communications' executive leadership team. Working together as one team, we can achieve our business goals to continue being a leader in the communications industry while ensuring we recognize and respond to the needs of our customers, the communities we serve and our colleagues.

PHILIPPE JETTÉ
President and Chief Executive Officer

MANAGEMENT'S DISCUSSION AND ANALYSIS ("MD&A")

MD&A

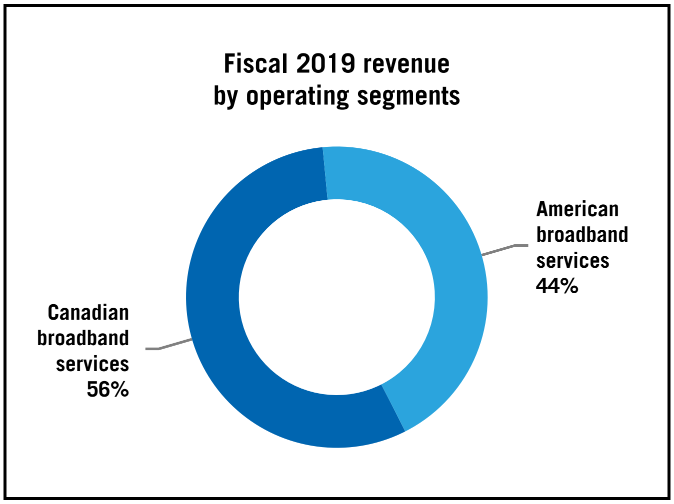
1. FORWARD-LOOKING STATEMENTS

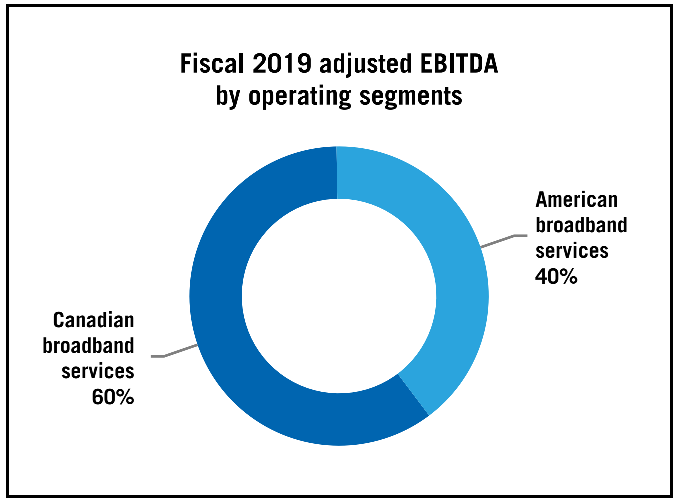
Certain statements contained in this Management's Discussion and Analysis ("MD&A") may constitute forward-looking information within the meaning of securities laws. Forward-looking information may relate to Cogeco Communications Inc.'s ("Cogeco Communications" or the "Corporation") future outlook and anticipated events, business, operations, financial performance, financial condition or results and, in some cases, can be identified by terminology such as "may"; "will"; "should"; "expect"; "plan"; "anticipate"; "believe"; "intend"; "estimate"; "predict"; "potential"; "continue"; "foresee", "ensure" or other similar expressions concerning matters that are not historical facts. Particularly, statements regarding the Corporation's financial guidelines, future operating results and economic performance, objectives and strategies are forward-looking statements. These statements are based on certain factors and assumptions including expected growth, results of operations, performance and business prospects and opportunities, which Cogeco Communications believes are reasonable as of the current date. Refer in particular to the "Corporate Objectives and Strategies" and "Fiscal 2020 Financial Guidelines" sections of the present MD&A for a discussion of certain key economic, market and operational assumptions we have made in preparing forward-looking statements. While Management considers these assumptions to be reasonable based on information currently available to the Corporation, they may prove to be incorrect. Forward-looking information is also subject to certain factors, including risks and uncertainties that could cause actual results to differ materially from what Cogeco Communications currently expects. These factors include risks such as competitive risks, business risks, regulatory risks, technology risks, financial risks, economic conditions, human-caused and natural threats to our network, infrastructure and systems, community acceptance risks, ethical behavior risks, ownership risks and litigation risks, many of which are beyond the Corporation's control. For more exhaustive information on these risks and uncertainties, the reader should refer to the "Uncertainties and Main Risk Factors" section of the present MD&A. These factors are not intended to represent a complete list of the factors that could affect Cogeco Communications and future events and results may vary significantly from what Management currently foresees. The reader should not place undue importance on forward-looking information contained in this MD&A which represent Cogeco Communications' expectations as of the date of this MD&A (or as of the date they are otherwise stated to be made) and are subject to change after such date. While Management may elect to do so, the Corporation is under no obligation (and expressly disclaims any such obligation) and does not undertake to update or alter this information at any particular time, whether as a result of new information, future events or otherwise, except as required by law.

All amounts are stated in Canadian dollars unless otherwise indicated. This report should be read in conjunction with the Corporation's consolidated financial statements and the notes thereto prepared in accordance with the International Financial Reporting Standards ("IFRS") for the year ended August 31, 2019.

2. OVERVIEW OF THE BUSINESS

Cogeco Communications is a communications corporation. It is the 8th largest cable operator in North America. In fiscal 2019, the Corporation reported its operating results in two operating segments: Canadian broadband services and American broadband services. The reporting structure reflects how the Corporation manages its business activities to make decisions about resources to be allocated to the segments and to assess their performance. For the year ended August 31, 2019, the proportion of each segment as a percentage of the Corporation's consolidated revenue and adjusted EBITDA[1] excluding inter-segment eliminations, intercompany transactions and head office activities were as follows:





For further details on the Corporation's segmented operating results, please refer to the "Segmented operating results" section.

2.1 CANADIAN AND AMERICAN BROADBAND SERVICES

DESCRIPTION OF SERVICES

The Canadian and American broadband services segments provide a wide range of Internet, video and telephony services primarily to residential customers as well as business services across its coverage areas.

The Canadian broadband services activities are carried out by Cogeco Connexion in the provinces of Québec and Ontario and the American broadband services activities are carried out by Atlantic Broadband in 11 states: Connecticut, Delaware, Florida, Maine, Maryland, New Hampshire, New York, Pennsylvania, South Carolina, Virginia and West Virginia.

The following four services represent our core suite of offerings:

Internet services: We offer a range of Internet packages with top download speeds of up to 1 Gbps in Canada and the United States. Simple and complete security suite and email solutions are available to our Internet customers with automatic updates to protect their devices. As an added benefit, Internet customers can connect wirelessly to the Internet at no extra cost from designated WiFi Internet hotspots in our Canadian and American footprints.

Video services: We offer our customers a full array of digital video services and programming offerings. Our customers have access to various digital tier packages, discretionary services, pay-per-view ("PPV") channels, video on demand ("VOD") services, high definition television ("HD"), TiVo advanced video services and Ultra HD/4K television.

Telephony services: Telephony services use internet protocol ("IP") to transport digitized voice signals over the same private network that brings video and Internet services to customers. Residential customers can subscribe to different packages. All residential telephony service customers have access to direct international calling and can subscribe to various international long distance plans, voicemail and other popular custom calling features.

Business services: We offer to our business customers, depending on the area, a wide range of Internet packages, video services, telephony services, managed cloud services and other advanced network connectivity services, such as session initiation protocol ("SIP"), primary rate interface ("PRI") trunk solutions, hosted private branch exchange ("HPBX") solutions and business and software efficiency services.

Furthermore, we actively bundle our services into "double play" and "triple play" offerings at competitive prices to encourage cross-selling within our customer base and to attract new customers.

(1) The indicated terms do not have standardized definitions prescribed by IFRS and, therefore, may not be comparable to similar measures presented by other companies. For more details, please consult the "Non-IFRS financial measures" section of the MD&A.

NETWORKS AND INFRASTRUCTURE

Cogeco Connexion and Atlantic Broadband provide residential Internet, video and telephony services and business services through advanced fibre optic and two-way broadband distribution networks. Cogeco Connexion and Atlantic Broadband deliver these services through their own long distance fibre optic systems, advanced hybrid fibre-coaxial ("HFC") broadband distribution networks, point-to-point fibre networks and fibre-to-the-home ("FTTH") network technologies.

Cogeco Connexion's distribution network covers a large territory from the Western Ontario to the Eastern Québec. Atlantic Broadband's distribution network covers the East Coast of the United States, from the southern part of Maine to southern Virginia, as well as portions of South Carolina and a large footprint in Southeast Florida. The broad reach of Cogeco Connexion and Atlantic Broadband's core transport network is designed to easily interconnect, at very high speed, its many local distribution systems to video content providers, other public telephony networks, software application providers and the world-wide Internet.

For residential services, Cogeco Connexion and Atlantic Broadband are deploying optical fibres to nodes serving small clusters of homes passed, with multiple fibres per node in most cases to rapidly extend the capacity of the system with smaller clusters when necessary. This "just in time" process, known as "node splitting", leads to further improvement in quality and reliability while increasing the "just in time" capacity of two-way services such as Internet, VOD and telephony and optimizing the efficiency of capital investments. The HFC distribution infrastructure is designed with radio frequency ("RF") capacity of up to 1 GHz of bandwidth capacity, depending on the market served and customer needs.

In each market, the signals are carried on our hybrid coax/fibre network for delivery to our customers. Cogeco Connexion and Atlantic Broadband believe that the active use of fibre optic technology in combination with coaxial cable plays a major role in expanding capacity and improving the performance of the systems. Fibre optic strands are capable of carrying hundreds of video, data and voice channels over extended distances without signal amplification. Cogeco Connexion and Atlantic Broadband will continue to deploy fibre optic cable as warranted to further reduce amplifier cascades, which improves system reliability and reduces system maintenance cost. This hybrid combination of fibre optic and coaxial cable is the most efficient choice when it comes to delivering high quality networks with judicious capital investments.

Cogeco Connexion and Atlantic Broadband use CableLabs' DOCSIS technology to deliver Internet and business services over HFC networks. DOCSIS has numerous advanced features to ensure a continuous transmission and high quality of service delivery. In addition, this technology provides a flexible and expandable platform to further increase IP transmission speeds and to provide other products such as symmetrical services, which are particularly well suited for commercial customer applications. Cogeco Connexion offers Internet speeds of 120 Mbps in virtually all of its footprint and up to 1 Gbps in approximately 60% of its footprint. Atlantic Broadband has upgraded to 1 Gbps Internet speeds to more than 90% of its footprint of serviceable homes and business. Cogeco Connexion and Atlantic Broadband intend to continue deploying 1 Gbps in the coming years through several technologies depending on the location, with DOCSIS 3.1 being the most cost effective.

Finally, Cogeco Connexion and Atlantic Broadband are deploying FTTH technology in all new residential developments which meet specific criteria of size, proximity to the existing plant and service penetration rate. Cogeco Connexion and Atlantic Broadband use a FTTH technology called radio frequency over glass ("RFoG"). The primary benefit of RFoG is its compatibility backward and forward with existing cable modem termination system ("CMTS") investments and back-office systems.

The following table shows the percentage of Cogeco Connexions' and Atlantic Broadband's homes passed where digital video, VOD, Internet and telephony services were available at August 31, 2019:

	% of homes passed where service is available	
Service	**Cogeco Connexion**	**Atlantic Broadband**
Digital video	99%	100%
VOD	98%	99%
Internet	98%	100%
Telephony	97%	100%

2.2 BUSINESS DEVELOPMENTS

On August 15, 2019, the CRTC issued its costing decision setting final rates for aggregated wholesale Internet services for resellers, significantly lowering the interim rates it had previously fixed in 2016 and applying the new rates on a retroactive basis. On September 13, 2019, Cogeco Communications, along with other telecommunications service providers, jointly filed an application for leave to appeal the CRTC order to the Federal Court of Appeal ("FCA") and to suspend its effect pending the Court decision to hear the matter. The FCA granted the interim stay on September 27, 2019, with the result, for the time being, of not having to implement the new rates nor to make the retroactive payments estimated at $25 million for the Corporation as of August 31, 2019, based on the CRTC's final aggregated wholesale service rates being disputed in court. Due to FCA granting of the interim stay and the significant uncertainty surrounding both the outcome and the amount, the Corporation has therefore not recorded the impact of the new reduced rates in the 2019 financial statements.

On April 30, 2019, the Corporation completed the sale of its subsidiary Cogeco Peer 1 Inc., its Business information and communications technology ("Business ICT") services subsidiary, to affiliates of Digital Colony for a net cash consideration of $720 million which resulted in a gain on disposal of $84.4 million. Operating and financial results as well as cash flows from Cogeco Peer 1 from both the current and comparable periods are therefore presented as discontinued operations.

On December 6, 2018, Cogeco Communications confirmed that it has elected to not participate in the auction process for licenses in the 600 MHz spectrum band that took place in 2019. The structure of the auction based on large geographic areas made the acquisition of such spectrum uneconomical. This decision is consistent with the Corporation's continued commitment to pursue opportunities to enter the wireless market in a disciplined and thoughtful manner. Following the acquisition of spectrum licenses in fiscal 2018, Cogeco Communications is committed to continue exploring various business models in order to launch a profitable wireless service.

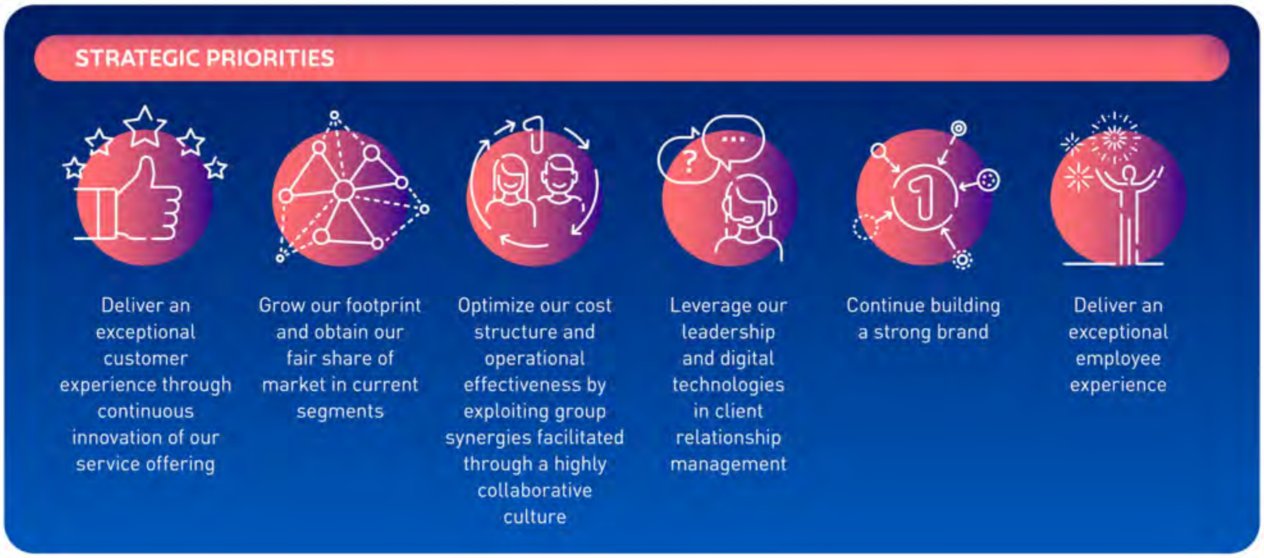
On December 4, 2018, the Corporation extended its $800 million Term Revolving Facility maturity date by an additional year until January 24, 2024.

On October 3, 2018, the Corporation's subsidiary, Atlantic Broadband, completed the acquisition of the south Florida fibre network previously owned by FiberLight, LLC (the "FiberLight acquisition") which provides high-performance metro and long-haul fibre transport services. The closing of this deal marks the addition of 350 route miles to Atlantic Broadband’s existing south Florida footprint.

2.3 CORPORATE OBJECTIVES AND STRATEGIES

Cogeco Communications' mission is to connect its customers to the digital world and create outstanding communication experiences. This mission is enabled by our core fundamental values of respect, trust, commitment to customer service, teamwork and innovation.

Our vision is to deliver value to our shareholders by: 1) creating an exceptional customer experience, 2) augmenting our geographical reach in Canada and the United States, 3) expanding into new market segments and 4) mobilizing highly engaged teams. The Corporation has defined six key strategic priorities that embody the roadmap to achieving our mission and vision. These strategic priorities are as follows:



Each Business Unit of the Corporation has in turn elaborated a strategic plan that is aligned to the key strategic priorities defined above. The key areas of focus of those strategic plans are as follows:

Canadian broadband services	American broadband services
Delivering organic growth by introducing value added services for residential customers and by growing our business customer base	Deliver exceptional customer experience while fostering team member engagement
Optimizing the return on investments by delivering our services more efficiently and improving loyalty through a differentiated customer experience strategy	Leveraging Internet superiority and advanced video platform to promote growth and customer satisfaction
Exploring a potential wireless service in a profitable manner and within our financial means	Focusing on growth in the business market and continuing Florida expansion efforts while actively pursuing acquisition opportunities
Enabling business transformation through modern people management practices that will provide meaningful and engaging employee experiences	Drive unit growth and customer satisfaction through product marketing and brand positioning

In addition to the above, the Corporation seeks to integrate practices which improve the environmental and social impacts of its operations, while ensuring the Corporation's continued development. This is why we have strengthened our corporate social responsibility ("CSR") program aimed at operating responsibly and sustainably while being a model of good corporate citizen. The Corporation is committed to listening to its stakeholders, customers and employees and setting concrete CSR commitments accordingly, disclosing CSR information transparently and maintaining the highest ethical standards.

ANTICIPATED RESULTS OF THE CORPORATION'S STRATEGIES

The following sections contain forward-looking statements concerning the business outlook for our Canadian and American broadband services segments. These sections also describe certain key economic, market and operational assumptions we have made in preparing such forward-looking statements and other forward-looking statements contained in this MD&A. For a description of risk factors that could cause actual results or events to differ materially from our expectations expressed in this Annual Report, please refer in particular to the "Uncertainties and main risk factors" section of this report.

The successful implementation of the strategies described below should result in increased revenue and adjusted EBITDA which combined, should lead to heightened profitability that will be measured based on the criteria described in greater details in the "Fiscal 2020 financial guidelines" section. Please refer to the "Key performance indicators and performance highlights" section for further details on the fiscal 2019 results and achievements.

CANADIAN BROADBAND SERVICES SEGMENT

DELIVERING ORGANIC GROWTH BY INTRODUCING VALUE ADDED SERVICES FOR RESIDENTIAL CUSTOMERS AND BY GROWING OUR BUSINESS CUSTOMER BASE

We focus on leveraging our superior Internet speeds and video services by improving our offerings and constantly investing in technology.

We continue concentrating on growing our business customer base in our footprint in Canada. We remain focused on increasing our market share of addressable business customers by strategically investing in network expansion programs, by launching enhanced products and by improving the effectiveness of our sales and marketing initiatives in conjunction with a stronger focus on digital strategies.

We strive to build a powerful brand identity inspired by our ability to innovate and deliver strong customer experiences and further strengthen our leadership in communities we serve. As the business continues to transform, it is important that we continue to highlight across all our customer communications and brand campaigns that Cogeco Communications' investments allow us to give our clients access to the innovative services they want with the exceptional customer experience they deserve from a local and trusted provider. This message is at the centre of all our branding communications.

Progress in fiscal 2019

We continued to expand our Internet Gigabit offerings to reach approximately 60% coverage of our footprint in 2019 and the latest WiFi extenders technology was launched in March which is now available for homes and businesses in many communities.

In August, we completed a new update for the user interface experience for the entire TiVo customer base. This update displays an appealing and customizable interface, delivering personalized content from all video sources. It allowed us to modernize the look (more visual, less text) and also to recognize that users have evolved in terms of interaction with devices. This change enables better usability and time to content and personalizes the TV experience.

Our evolution toward Internet protocol television ("IPTV") is underway and is currently in pre-launch preparation. IPTV will provide highly customizable video content, wireless enabled equipment, voice activated controls and access to the Google Play store for a complete video offering.

In order to improve our Business services, we continued to develop products, packages and service experiences that are tailored to small and medium business needs. We enhanced our ultra-high speed Internet offering for small and medium size businesses by expanding the availability of 360 Gbps and Gigabit services to more locations in Ontario and Québec to meet the data intense needs of our customers. Furthermore, we launched enhancements to our business HPBX and SIP trunking services which include platform redundancy, an updated customer portal, and the launch of several customer-requested features. We also launched a comprehensive managed business WiFi solution, an all-in monthly price solution delivering high reliability of WiFi while eliminating cost and complexity of deployment and management.

Focus in fiscal 2020

For the residential market, we will continue to invest in our network in order to increase bandwidth to 1 gigabit Internet speeds according to market demand. We will also introduce a new solution that will optimize the in-home experience which will allow us to support the customer self-install of WiFi extenders.

We will also enhance our residential video services by investing in additional capabilities including IPTV integrated with voice activated control, media-optimized cloud-based services and new capabilities for its over-the-top ("OTT") applications. To complement our residential IPTV initiative, we will work on solutions designed to meet the unique needs of our customers across key segments.

The MediaFirst IPTV platform is expected to be launched at the beginning of calendar year 2020 and will then become the new standard video experience offering to new customers. Customers currently enjoying our existing video services, including the advanced TiVo solution, will continue to be offered their current services in the future as MediaFirst will coexist with these video platforms.

For the business segment, we will introduce key enhancements in each of our product portfolios. We will continue our rollout of 360 Gbps and Gigabit Internet. HBPX and SIP Trunking will be offered OTT and will also receive feature enhancements. Fibre-based private networking services will be enhanced with software-defined wide area network ("SD-WAN") technologies to meet the needs of a broader group of customers. We will expand our video services and will launch a video service over IP for business customers. In addition, we will expand our Managed WiFi services to meet the needs of multi-business/dwelling units and further enhance our customer management portal.

OPTIMIZING THE RETURN ON INVESTMENTS BY DELIVERING OUR SERVICES MORE EFFICIENTLY AND IMPROVING LOYALTY THROUGH A DIFFERENTIATED CUSTOMER EXPERIENCE STRATEGY

We focus on achieving the best in-class operating efficiencies by optimizing our cost structure in order to improve our ability to manage our capital utilization to support future growth.

Progress in fiscal 2019

In fiscal 2019, we focused on the stabilization of our new customer management system and have started to leverage its capabilities to further improve the quality of the customer experience and enhance our local marketing strategies through targeted offers that meet customer profiles and segments.

We also continued our transformation journey towards more digitization by introducing a new self-install option for our phone service, further enhancing our cogeco.ca website, as well as providing new self-serve functionality accessible through my account (appointment management, channel changes).

Moreover, in our business segment we continued to transition to digital, automated marketing strategies and tactics. Focused on our customers' experience, we developed personalized offers to improve acquisition rates and customer retention.

Focus in fiscal 2020

Our focus will continue to be on continuous improvement of our residential and business customer experience to strengthen loyalty, engagement and brand advocacy.

Our multi-year digitization program is well under way and, in fiscal 2020, we are planning to introduce advanced and cost effective contact centre technology as well as marketing automation. These tools will create more efficient business processes while enhancing our ability to customize our marketing approach and personalize our customer experience.

EXPLORING A POTENTIAL WIRELESS SERVICE IN A PROFITABLE MANNER AND WITHIN OUR FINANCIAL MEANS

We believe that offering wireless services to complement our current service offering to customers within our traditional footprint would grow our share of our customers' telecommunications spending.

Our objective is to offer profitable wireless services by investing prudently in alignment with our strategic priorities and within our financial means.

We believe that the model most likely to be achievable while satisfying our profitability requirements will be a hybrid model consisting of segments relying on the mobile virtual network operator model, as well as some segments where we would be a facilities-based operator.

Progress in fiscal 2019

Innovation Science and Economic Development Canada ("ISED") initiated in November 2018 a consultation on the creation of smaller spectrum license service areas. Cogeco Communications led a consortium of industry associations in developing a joint proposal deemed a more suitable alternative than those initially proposed in the consultation. ISED issued its decision in July 2019 creating 654 Tier-5 service areas incorporating most elements of the joint proposal. Tier-5 service areas, if used by ISED in future spectrum licence auctions, will allow Cogeco Communications to be more focused and efficient to the extent it participates in future spectrum auctions.

In February 2019, the Canadian Radio-television and Telecommunications Commission ("CRTC") launched a review of mobile wireless services and the CTRC expressed a "preliminary view that it would be appropriate to mandate that the national wireless carriers provide wholesale mobile virtual network ("MVNO") access as an outcome of this proceeding" (Telecom Notice of Consultation CRTC 2019-57). Cogeco has submitted its Hybrid Mobile Network Operator ("HMNO") model to the CRTC as a means for the Government to achieve its policy objectives of increasing competition in the mobile wireless market while safeguarding investments in telecommunication networks. The CRTC public hearings on this matter are planned for January 2020.

Focus in fiscal 2020

We will continue to explore all the options available to us in order to potentially launch a Canadian wireless service which satisfies our profitability and capital allocation objectives.

ENABLING BUSINESS TRANSFORMATION THROUGH MODERN PEOPLE MANAGEMENT PRACTICES THAT WILL PROVIDE MEANINGFUL AND ENGAGING EMPLOYEE EXPERIENCES

At Cogeco Connexion, our employees are the fibre of our success. We constantly invest in developing our employees by improving our training, development programs and tools in order to ensure they are highly engaged in delivering on our customer promises. We recognize that creating an engaging employee experience will lead to a superior experience for our customers and have a significant impact on the communities we serve.

Progress in fiscal 2019

In our pursuit of enhancing our employee experience, we continued to identify areas of focus in order to make Cogeco Connexion one of the best places to work. We focused on proactive change management and communication initiatives to support the business transformation through a sustainable transition plan of the workforce while developing a culture of agility. We deployed a modern and engaging collaboration and communication platform to optimize people performance and productivity. We put in place health and safety programs to reduce absenteeism, increase productivity and provide a safe working environment. We also started the renovation of our Burlington head office by redesigning the cafeteria into a collaborative workplace while changing the food offerings to promote a culture of health and wellness.

We continued to be an influential partner to the communities we serve with our 37 community television stations across Ontario and Québec offering close to 9,000 hours of programming produced by local artisans with the assistance of more than 1,200 volunteers who, along with our full time staff, think, create and support our community television for our local customers.

Finally, our brand ambassadors have participated in more than 250 events across our markets this past year to support many different types of organizations, bringing great visibility to our residential and commercial segments. We also continued to be a partner of choice in fundraising and our involvement has raised more than $7 million in various activities for non-profit organizations.

Focus in fiscal 2020

We will pursue the digital transformation of our systems to offer an engaging and agile work environment. With the deployment of our new Human Capital Management tool, we will finalize the transformation of our human resources business model. New centres of excellence will focus on specific training and development initiatives to evolve our workforce and management skill set in order to embrace the digital environment. We will continue the renovation of the Burlington office by redesigning the contact centre. The Montréal headquarters will also be completely modernized and transformed to offer an engaging employee experience. Lastly, there will be an important focus on health, safety and wellness through prevention initiatives, training and proper governance.

AMERICAN BROADBAND SERVICES SEGMENT

DELIVERING EXCEPTIONAL CUSTOMER EXPERIENCE WHILE FOSTERING TEAM MEMBER ENGAGEMENT

Atlantic Broadband will continue to work to deliver an exceptional customer experience across the entire customer lifespan with a focus on new self-care options. At the same time, the prioritization of customer experience is closely linked to team member engagement and satisfaction. Fully engaged and highly-trained team members that are invested in Atlantic Broadband and the communities they serve will be strong ambassadors dedicated to ensuring the highest levels of customer satisfaction.

Progress in fiscal 2019

We introduced a range of customer care enhancements during the fiscal year to improve efficiency and productivity for Atlantic Broadband, while producing an enhanced experience for customers.

A new online shopping cart was launched in September 2019 through a service gateway. This allows customers to select new services, modify existing services, place their order and schedule an installation appointment without the need for agent assistance. The Gateway has been integrated with the online account management portal which also allows customers to view account information, make bill payments, report an outage, trouble-shoot equipment and more, without the need for a phone call or agent assistance. Single sign-on ("SSO") coming in 2020 will also simplify the experience for customers. Meanwhile, the implementation of a new workforce management platform will improve customer communication as well as operational efficiency and productivity. For example, the tool allows to deliver automated appointment messages via the customer's preferred communication channel, including SMS/Text, to remind them of upcoming service calls, to confirm appointments and be notified regarding possible delays, as well as for future communications during the entire span of the customer journey. The automated workflow tool also allows for the scheduling of installation and service work in-real time based on work traffic, street-level geography, technician skills and availability. It also gives the dispatch team the ability to track jobs and technician status in real-time via detailed maps. These workflow initiatives will improve on-time scheduling performance, while the notification tools will reduce missed customer appointments.

We introduced improved outage messaging, including an online tool which provides customers with up-to-date information on service interruption or outages organized by zip code. Social media platforms also provided customers with important outage information related to storms or preventive maintenance.

We made employee engagement a key priority in fiscal 2019 through periodic all-associates meetings, launching a new quarterly all-employee communication highlighting customer service achievements and service heroes, listening sessions, employee development and training, and regular communication through internal channels.

Focus in fiscal 2020

We will continue to leverage the workforce management program to manage workflow, including MetroCast locations and transitioning them from paper work orders to electronic tablets. Virtual support tools will also be introduced in 2020 to enhance phone support while reducing trouble calls. A new Interactive Voice Response ("IVR") system will be fully deployed in 2020. The IVR utilizes speech recognition so that customers can more easily reach the appropriate Atlantic Broadband team (support, sales, etc.), as well as self-care options, without the need for manual transfers. We will also evaluate a new application to expedite business quotes and sales process and enhance the billing and invoice management.

In addition, we will reimagine our customer communications strategy to align with key moments in the customer journey, with messaging that goes beyond the typical focus on sales to speak directly and relationally to customers as individuals in order to add value, elevate the customer experience, and help deepen the customer bond.

Through these and other efforts, we are committed to exceeding customer expectations not only as a matter of sound, ethical business practice, but also to delineate the Atlantic Broadband experience from other providers as a competitive marker. This means first contact resolution, personalized service, and helpful, empathetic, caring interactions that delight the customer, positively upending his or her expectations, thereby leading to deeper loyalty, a propensity for repeat business and willingness to recommend Atlantic Broadband to others.

Building on the success of its first corporate social responsibility ("CSR") day in fiscal 2019, our commitment to our local communities will also be demonstrated through CSR initiatives designed to engage team members and the wider community in activities that will support sustainability, respect for the environment and social responsibility. Internal communications will be further enhanced in fiscal 2020 through the launch of a new team intranet that will aggregate important content for team members in an easy-to-use portal.

LEVERAGING INTERNET SUPERIORITY AND ADVANCED VIDEO PLATFORM TO PROMOTE GROWTH AND CUSTOMER SATISFACTION

Continuing to deliver market-leading Internet service speed offerings and advanced video services with a focus on performance and reliability to promote growth and customer satisfaction, represents a key area of focus for us.

Progress in fiscal 2019

We extended our market advantage in the High Speed Internet ("HSI") segment in fiscal 2019 through four key initiatives: 1) increasing top download and upload speeds for our modem-based Internet products for both residential and business customers; 2) expanding our deployment of Gigabit Internet; 3) enhancing customers' WiFi experience; and 4) improving Internet performance and reliability. We also introduced major video enhancements through our TiVo platform.

We continued to provide added value to our Internet customers by increasing speeds. In addition to Gigabit deployments, we increased the speed profile of our "Premier" residential Internet to 250 Mbps and introduced the new 400 Mbps "Extreme" speed profile. Meanwhile, speeds for the business class "Pro Power" and "Pro Edge" products increased to 200 Mbps and 500 Mbps, respectively. Fiscal 2019 launches in Pennsylvania, Maryland, Delaware, Virginia, New York and West Virginia pushed the Gigabit Internet service to more than 90% of serviceable homes and businesses by August.

Previously launched in 2017, Atlantic Broadband rolled out enhanced WiFi services for residential and business customers in New Hampshire, Maine, Eastern Pennsylvania, Southern Maryland and Virginia service areas that were acquired from MetroCast last year. Unlike traditional WiFi networks which rely on a single access-point, our E-WiFi service utilizes multiple access points in a wireless configuration and intelligent routing algorithms to provide wall-to-wall coverage.

Through our partnership with TiVo, we significantly enhanced our video offering, providing greater ease-of-use for customers and a key differentiator in competitive markets through four key initiatives: 1) the expansion of our TiVo Experience 4 platform; 2) the launch of Amazon Alexa functionality with the TiVo platform in March 2019; 3) the launch of a new mobile app for multi-screen viewing; and 4) the migration to IP VOD. The new TiVo Experience 4 platform combined with IP-based VOD incorporates a redesigned on-screen user interface, personalized and tailored programming recommendations for customers, content that is searchable across multiple sources (live TV, DVR recordings, VOD and OTT applications) and it also allows customers to access content on multiple screens across TVs, smartphones, tablets and more, both in-home and on-the-go.

We have continued to invest capital in network improvements to bring fibre closer to customers' premises, to free bandwidth, to reduce contention during peak usage times, and to ensure that WiFi performance is optimized. The process of consolidating multiple headends began in fiscal 2018, continued in 2019, including reducing satellite earth stations and paving the way for DOCSIS 3.1 Gigabit Internet deployments and IP-based video. Ongoing plant maintenance continued to improve system performance and reliability, as well as to ready the network for future system interconnections.

Focus in fiscal 2020

The steps taken to ready the network for Gigabit Internet all have led to a more efficient use of available spectrum, while enhancing performance of the legacy products, even as it creates the technological environment for additional DOCSIS 3.1 product deployments in fiscal 2020 and provides the foundation for an IP linear transition in the future.

We will continue to drive unit growth through our TiVo-powered video platform. Attractively-priced TiVo bundle options coupled with awareness driven by increased marketing spend will help drive primary services units growth across all product lines while reducing churn and contributing to long-term customer value. We will also launch a new TV Online App that will allow Atlantic Broadband DVR users to watch live TV, DVR recordings, On Demand shows on any device in the home, and to download the content for later offline viewing.

We will continue with the consolidation of multiple older headend components back to master headends while modernizing older headends. This will include the move of the legacy Florida headend in Miami Beach to a new, state-of-the-art data centre more favorably located to reduce the risk posed by coastal storms.

We will also migrate to a minimum of 200Gb backbone in all key markets to accommodate residential bandwidth growth, as well as carrier and commercial products that require scalability and high throughput rates. We will continue backbone hardening, with attention to redundancy and diversity for seamless traffic rerouting. There will also be a continued conversion to 100Gb, 200Gb and 400Gb Dense Wavelength Division Multiplexing ("DWDM") channels to increase scalability and to reduce reliance on leased circuits. We will also continue our plans to perform targeted migrations from MPEG2 to MPEG4 transcoding and delivery, which utilizes the spectrum more efficiently, thereby freeing up bandwidth for growth as well as future product enhancements such as delivery of video via IP.

FOCUSING ON GROWTH IN THE BUSINESS MARKET AND CONTINUING FLORIDA EXPANSION EFFORTS WHILE ACTIVELY PURSUING ACQUISITION OPPORTUNITIES

Business customers will continue to serve as a growth accelerator as product offerings evolve to meet the demands of larger scale business customers. We will also seek additional growth in the small and medium-sized business ("SMB") market where opportunities exist to increase revenue per customer by moving customers into higher-speed tiers or upgrading these customers into value added products.

The successful pursuit of additional bulk opportunities in the Florida market remains a priority and the significant opportunities provided by the expansion of the service footprint in addition to the continued leveraging of the FiberLight network. Furthermore, in alignment with our external growth strategy, we will continue to seek acquisition opportunities of broadband businesses in order to create long-term value for our shareholders.

Progress in fiscal 2019

Fibre-based connectivity experience continued growth in fiscal 2019, with average speeds increasing from 50 Mbps to 100 Mbps. The carrier channel, which provides last mile connectivity to national and international customers, is also experiencing rapid growth. In fiscal 2019, Atlantic Broadband also worked to rapidly deploy Hosted Voice in former MetroCast markets, with launches in New Hampshire, Maine and Southern Maryland in March, with Virginia and Eastern Pennsylvania launches following in April. In addition, we implemented speed increases across all regions when integrating the MetroCast systems in order to move customers up market and increase the average revenue per user.

We have been successful in signing numerous bulk residential properties including large developments like Century Village in West Palm Beach, which was officially activated in July 2019 and for which we now provide video services to 14,000 residents in nearly 8,000 homes.

On December 30, 2017, we signed a definitive agreement to purchase the entire South Florida fibre network from FiberLight, LLC, an industry leader in providing high-performance fibre-optic network solutions. With the completion of the agreement on October 1, 2018, we added approximately 350 route miles to our existing South Florida footprint, more than doubling the existing fibre footprint in the region. The network now extends from South Miami to North Palm Beach. The acquisition puts us in closer proximity to serve commercial buildings and it also provides additional opportunities to service other bulk properties within the area.

Focus in fiscal 2020

Steady business services growth is expected across all markets with a continued emphasis on business opportunities. This growth will be propelled by new Hosted Voice launches, continued edge out opportunities in newly activated franchise areas in Virginia, as well as opportunities resulting from the fiscal 2019 acquisition of the FiberLight network. The addition of the FiberLight network in Florida will continue to support further expansion into the business and wholesale segments. Initiatives include on-net building sales, lighting up additional buildings with fibre, multi-point Ethernet networks and data-centre to data-centre services ranging from 10 Gbps to 100 Gbps.

New WiFi offerings into medium and large businesses are planned, with a particular focus on the hospitality vertical as well as a plan to explore the leveraging of a SD-WAN to offer managed network services. New offerings in the business product roadmap include the launch of 4G/LTE Backup for Internet customers, cloud-based WiFi for business clients and hotels, and a Hosted Voice product targeted to the SMB market (Hosted Voice Light).

We will continue our Florida expansion initiative by working to secure bulk opportunities in the market and continuing to grow revenues secured from the 2019 activation of Century Village. With a focus on attentive customer care for these high value customers, we plan to open a new 3,000 square feet, full-service customer care center at Pine Trail Square Plaza in West Palm Beach to serve Century Village and the surrounding community. Meanwhile, growth plans for the FiberLight investment include an expanded sales team, added sales channels, shift of product focus to include Hosted Voice, full lit fibre service and dark fibre leases.

DRIVE UNIT GROWTH AND CUSTOMER SATISFACTION THROUGH PRODUCT MARKETING AND BRAND POSITIONING

We believe that product marketing and brand positioning are critical to drive continued unit growth and enhanced revenues per subscriber. We intend to introduce a differentiated, disruptive and consistent brand to market that will position us to win.

Progress in fiscal 2019

We generated strong customer growth in legacy and former MetroCast markets in both the residential and business segments while mitigating the impact of overbuild activity in some of our markets. Programs were targeted to retain high-value residential customers by enhancing product features and moving them into longer term agreements, an aggressive effort was also undertaken to move unsecured business clients into long-term contracts. In addition to retention efforts, strong acquisition offers were deployed to drive new connect activity among the non-customer universe in competitive markets. Lastly, seasonal customers, which are heavily represented in competitive markets, were incentivized through promotional offers with longer-term agreements to temporarily suspend their services, rather than disconnect them, during the off-season to facilitate an easy return.

Focus in fiscal 2020

We will continue to promote packaging and pricing options for customers to drive unit growth and enhanced revenue per customer. We will leverage relationships with premium programmers to enhance promotional offers, to offset campaign costs, and to take advantage of premium programmer advertising spend that occurs around their program schedule cycles.

We will increase marketing spend in fiscal 2020 to ensure ample funding for Atlantic Broadband's omni-channel marketing approach, particularly in overbuild markets, to build awareness among residential and business prospects and customers of Atlantic Broadband products and services, promotional offers, and competitive differentiators across traditional, digital and social platforms. Because our markets across 11 states are diverse, market-specific initiatives will be further developed to optimize campaigns and elevate response rates. Further, customer segmentation efforts will be pursued, including the use of customer personas and customer journey mapping, for more efficient targeting and personalized messaging, not only at the point of sales, but throughout the customer lifespan.

We will elevate the awareness of Atlantic Broadband as a provider of advanced residential and business services, while unifying our messaging through common themes and creative elements. This investment will position Atlantic Broadband as a company that has the capabilities of the largest companies to connect customers to the things that matter most to them, but also the appeal of a local company dedicated to, and especially responsive to, the customers and communities it serves.

2.4 KEY PERFORMANCE INDICATORS AND PERFORMANCE HIGHLIGHTS

The following key performance indicators are closely monitored to ensure that business strategies and objectives are closely aligned with shareholder value creation. The key performance indicators are not measurements in accordance with IFRS and should not be considered an alternative to other measures of performance in accordance with IFRS. The Corporation's method of calculating key performance indicators may differ from other companies and, accordingly, these key performance indicators may not be comparable to similar measures presented by other companies. The Corporation measures its performance, with regard to these objectives by monitoring revenue, adjusted EBITDA(1), free cash flow(1) and capital intensity(1) on a constant currency basis(1).

	Actual	Revised projections (2)	Actual		Achievement of the projections
	Fiscal 2018 (1)	Fiscal 2019 (constant currency) (3)	**Fiscal 2019 (constant currency)** (3)		Fiscal 2019
(in millions of dollars, except percentages)	$		**$**	**%**	
Financial guidelines					
Revenue	2,147	Increase of 6% to 8%	**2,294**	**6.8**	**Achieved**
Adjusted EBITDA	1,007	Increase of 8% to 10%	**1,092**	**8.5**	**Achieved**
Acquisitions of property, plant and equipment	458	$450 to $470	**425**	**(7.1)**	**Surpassed**
Capital intensity	21.3%	20% to 21%	**18.5%**	**—**	**Surpassed**
Free cash flow	302	Increase of 38% to 45%	**453**	**50.0**	**Surpassed**

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(2) Following the announcement of the agreement on February 27, 2019 to sell Cogeco Peer 1, fiscal 2019 financial guidelines were revised.

(3) Actual results are presented in constant currency based on fiscal 2018 average foreign exchange rates of 1.2773 USD/CDN.

For further details on the Corporation's operating results, please refer to the "Operating and financial results", the "Segmented operating and financial results" and the "Cash flow analysis" sections.

REVENUE

Fiscal 2019 revenue in constant currency increased by 6.8%, achieving the Corporation's revised projections resulting from higher revenue in the American broadband services segment due to the MetroCast cable systems acquisition (the "MetroCast acquisition") and FiberLight acquisition combined with strong organic growth, partly offset by a slight decrease of revenue in the Canadian broadband services segment from lower than expected primary service units resulting from issues following the implementation of a new customer management system.

ADJUSTED EBITDA

Fiscal 2019 adjusted EBITDA in constant currency increased by 8.5%, achieving the Corporation's revised projections mainly due to growth in revenue exceeding growth in operating expenses.

CAPITAL INTENSITY AND ACQUISITIONS OF PROPERTY, PLANT AND EQUIPMENT

For fiscal 2019, the Corporation invested $425.2 million in constant currency ($434.5 million in reported dollars) in acquisitions of property, plant and equipment, thus spending less than anticipated and surpassing the Corporation's revised projections as a result of lower than expected capital expenditures in the Canadian and American broadband services segments due to the timing of certain initiatives and a greater focus on capital expenditures optimization. For fiscal 2019, the Corporation reached a capital intensity of 18.5%, thus surpassing the Corporation's revised projections.

FREE CASH FLOW

Fiscal 2019 free cash flow in constant currency increased by 50.0%, surpassing the Corporation's revised projections mainly as a result of lower than expected capital expenditures.

(1) The indicated terms do not have standardized definitions prescribed by IFRS and, therefore, may not be comparable to similar measures presented by other companies. For more details, please consult the "Non-IFRS financial measures" section of the MD&A.

2.5 THREE-YEAR ANNUAL FINANCIAL HIGHLIGHTS

Years ended August 31,	2019	2018 (1)	2017 (2)
(in thousands of dollars, except percentages and per share data)	$	$	$
Operations			
Revenue	**2,331,820**	2,147,404	2,226,851
Adjusted EBITDA	**1,107,940**	1,006,818	1,004,970
Adjusted EBITDA margin	**47.5%**	46.9%	45.1%
Integration, restructuring and acquisition costs	**11,150**	20,328	3,191
Profit for the year from continuing operations	**356,908**	384,578	N/A
Profit (loss) for the year from discontinued operations	**75,380**	(24,381)	N/A
Profit for the year	**432,288**	360,197	299,225
Profit for the year from continuing operations attributable to owners of the Corporation	**339,973**	375,214	N/A
Profit for the year attributable to owners of the Corporation	**415,353**	350,833	299,225
Cash flow			
Cash flow from operating activities	**868,711**	620,748	956,657
Acquisitions of property, plant and equipment	**434,545**	457,808	428,057
Free cash flow	**454,059**	301,850	373,735
Capital intensity	**18.6%**	21.3%	19.2%
Financial condition			
Cash and cash equivalents	**556,504**	84,725	211,185
Short-term investments	**—**	—	54,000
Total assets	**6,951,079**	7,180,043	5,348,380
Indebtedness(3)	**3,454,923**	3,914,711	2,598,058
Long-term financial liabilities(4)	**3,453,776**	3,803,929	2,480,914
Equity attributable to owners of the Corporation	**2,199,789**	1,997,169	1,599,267
Per Share Data(5)			
Earnings (loss) per share			
Basic			
From continuing operations	**6.89**	7.61	N/A
From discontinued operations	**1.53**	(0.49)	N/A
From continuing and discontinued operations	**8.41**	7.12	6.08
Diluted			
From continuing operations	**6.83**	7.55	N/A
From discontinued operations	**1.51**	(0.49)	N/A
From continuing and discontinued operations	**8.35**	7.06	6.03
Dividends	**2.10**	1.90	1.72

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(2) Fiscal 2017 was not restated to comply with IFRS 15 and does not reflect a change in accounting policy and includes the results of Cogeco Peer 1.

(3) Indebtedness is defined as the aggregate of bank indebtedness, balance due on business combinations and principal on long-term debt.

(4) Long-term financial liabilities include long-term debt, derivative financial instruments, contract liabilities and other liabilities and pension plan liabilities and accrued employee benefits.

(5) Per multiple and subordinate voting shares.

3. OPERATING AND FINANCIAL RESULTS

3.1 OPERATING RESULTS

Years ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Revenue	2,331,820	2,147,404	8.6	6.8	37,433
Operating expenses	1,203,980	1,121,625	7.3	5.4	21,636
Management fees – Cogeco Inc.	19,900	18,961	5.0	5.0	—
Adjusted EBITDA	1,107,940	1,006,818	10.0	8.5	15,797
Adjusted EBITDA margin	47.5%	46.9%			

(1) Fiscal 2019 average foreign exchange rate used for translation was 1.3255 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of fiscal 2018 which was 1.2773 USD/CDN.

REVENUE

Years ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Canadian broadband services	1,294,967	1,299,906	(0.4)	(0.4)	—
American broadband services	1,036,853	847,372	22.4	17.9	37,433
Inter-segment eliminations and other	—	126	(100.0)	(100.0)	—
	2,331,820	2,147,404	8.6	6.8	37,433

(1) Fiscal 2019 average foreign exchange rate used for translation was 1.3255 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of fiscal 2018 which was 1.2773 USD/CDN.

Fiscal 2019 revenue increased by 8.6% (6.8% in constant currency) resulting from:

- a growth in the American broadband services segment mainly due to the impact of the MetroCast acquisition which was included in revenue for only an eight-month period in the prior year combined with strong organic growth and the acquisition of the south Florida fibre network previously owned by FiberLight, LLC (the "FiberLight acquisition"); partly offset by
- a decrease in the Canadian broadband services segment mainly as a result of:
  - a decline in primary service units in the fourth quarter of fiscal 2018 and the first quarter of 2019 from lower service activations primarily due to issues resulting from the implementation of a new customer management system; partly offset by
  - rate increases; and
  - higher net pricing from consumer sales.

For further details on the Corporation's revenue, please refer to the "Segmented operating and financial results" section.

OPERATING EXPENSES

Years ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Canadian broadband services	606,286	618,886	(2.0)	(2.2)	1,102
American broadband services	571,208	478,172	19.5	15.2	20,522
Inter-segment eliminations and other	26,486	24,567	7.8	7.8	12
	1,203,980	1,121,625	7.3	5.4	21,636

(1) Fiscal 2019 average foreign exchange rate used for translation was 1.3255 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of fiscal 2018 which was 1.2773 USD/CDN.

Fiscal 2019 operating expenses increased by 7.3% (5.4% in constant currency) mainly from:

- growth in the American broadband services segment mainly due to the impact of the MetroCast acquisition which was included in operating expenses for only an eight-month period in the prior year combined with higher programming costs, additional headcount to support growth, higher marketing initiatives to drive primary service units growth and the FiberLight acquisition; and
- additional costs in Inter-segment eliminations and other resulting from the timing of corporate projects and initiatives; partly offset by
- lower operating expenses in the Canadian broadband services segment mainly attributable to lower programming costs resulting from a lower level of primary service units and lower compensation expenses resulting from an operational optimization program implemented in the first half of fiscal 2019, partly offset by higher marketing initiatives, additional headcount costs in the first quarter of fiscal 2019 to support the stabilization phase of the new customer management system as well as retroactive costs related to higher rates than expected established by the Copyright Board of Canada.

For further details on the Corporation's operating expenses, please refer to the "Segmented operating and financial results" section.

MANAGEMENT FEES

Fiscal 2019 management fees paid to Cogeco Inc. reached $19.9 million compared to $19.0 million for fiscal 2018. For further details on the Corporation's management fees, please refer to the "Related party transactions" section.

ADJUSTED EBITDA

Years ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Canadian broadband services	688,681	681,020	1.1	1.3	(1,102)
American broadband services	465,645	369,200	26.1	21.5	16,911
Inter-segment eliminations and other	(46,386)	(43,402)	6.9	6.8	(12)
	1,107,940	1,006,818	10.0	8.5	15,797

(1) Fiscal 2019 average foreign exchange rate used for translation was 1.3255 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of fiscal 2018 which was 1.2773 USD/CDN.

Fiscal 2019 adjusted EBITDA increased by 10.0% (8.5% in constant currency) as a result of:

- an increase in the American broadband services segment mainly as a result of strong organic growth combined with the impact of the MetroCast and FiberLight acquisitions; and
- an increase in the Canadian broadband services segment resulting mainly from a decline in operating expenses.

For further details on the Corporation's adjusted EBITDA, please refer to the "Segmented operating and financial results" section.

3.2 INTEGRATION, RESTRUCTURING AND ACQUISITION COSTS

Fiscal 2019 integration, restructuring and acquisition costs amounted to $11.2 million mostly due to restructuring costs incurred in the Canadian broadband services segment in relation to an operational optimization program during the first half of fiscal 2019. The workforce reduction strategy, which included a voluntary departure program focused on support functions, aimed at creating a leaner, more efficient and agile organization pursuant to its digital transformation. In addition, acquisition and integration costs were incurred by the American broadband services segment related to the FiberLight acquisition in the first quarter of fiscal 2019.

Fiscal 2018 integration, restructuring and acquisition costs amounted to $20.3 million and were related to the MetroCast acquisition completed on January 4, 2018.

3.3 DEPRECIATION AND AMORTIZATION

Years ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages)	$	$	%
Depreciation of property, plant and equipment	423,432	387,726	9.2
Amortization of intangible assets	57,293	45,928	24.7
	480,725	433,654	10.9

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

Fiscal 2019 depreciation and amortization expense increased by 10.9% resulting mainly from the impact of the MetroCast acquisition combined with additional depreciation from the acquisitions of property, plant and equipment during the fiscal year and the appreciation of the US dollar against the Canadian dollar compared to the prior year.

3.4 FINANCIAL EXPENSE

Years ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages)	$	$	%
Interest on long-term debt	176,798	179,680	(1.6)
Net foreign exchange gains	(2,744)	(2,134)	28.6
Amortization of deferred transaction costs	1,836	1,884	(2.5)
Capitalized borrowing costs	(690)	(2,074)	(66.7)
Other	302	8,100	(96.3)
	175,502	185,456	(5.4)

(1) Fiscal 2018 was restated to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Discontinued operations" section.

Fiscal 2019 financial expense decreased by 5.4% mainly due to:

- the reimbursement at maturity of the Senior Secured Notes Series B on October 1, 2018;
- the reimbursements of $65 million and US$35 million under the Canadian Revolving Facility during the second quarter of fiscal 2019 and of US$328 million during the third quarter of fiscal 2019 following the sale of Cogeco Peer 1; and
- early reimbursement of the US$400 million Senior Unsecured Notes during the third quarter of fiscal 2018 which resulted in a $6.2 million redemption premium and the write-off of the unamortized deferred transaction costs of $2.5 million; partly offset by
- higher interest cost on the First Lien Credit Facilities resulting from the full year impact of the financing of the MetroCast acquisition; and
- the appreciation of the US dollar against the Canadian dollar compared to the prior year.

3.5 INCOME TAXES

Years ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages)	$	$	%
Current	53,361	68,288	(21.9)
Deferred	30,294	(85,486)	—
	83,655	(17,198)	—

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

Years ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages)	$	$	%
Profit before income taxes	440,563	367,380	19.9
Combined Canadian income tax rate	26.50%	26.50%	—
Income taxes at combined Canadian income tax rate	116,749	97,356	19.9
Difference in operations' statutory income tax rates	1,466	(3)	—
Impact on deferred taxes as a result of changes in substantively enacted tax rates	15	(94,175)	—
Impact on income taxes arising from non-deductible expenses and non-taxable profit	(565)	1,670	—
Tax impacts related to foreign operations	(28,633)	(22,099)	29.6
Other	(5,377)	53	—
	83,655	(17,198)	—

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

Fiscal 2019 income taxes expense amounted to $83.7 million compared to a recovery of $17.2 million for the prior year mainly attributable to:

- the effect of the federal rate reduction in the second quarter of fiscal 2018 in the United States;
- the increase in profit before income taxes which is mostly related to the impact of the MetroCast acquisition completed in the second quarter of fiscal 2018, and
- the appreciation of the US dollar against the Canadian dollar compared to the prior year.

On March 19, 2019, the Department of Finance Canada confirmed the acceleration of tax depreciation on most capital investments for property, plant and equipment acquired after November 20, 2018, which phases out during the period from 2023 to 2028. The federal accelerated tax depreciation had a favorable impact on the current income tax expense of the Corporation in fiscal 2019. On March 21, 2019, the Québec Department of Finance confirmed that it would harmonize with the Federal legislation.

On December 22, 2017, the U.S. federal government enacted the Tax Cuts and Jobs Act (the "Act"). The tax reform reduced the general federal corporate tax rate from 35% to 21% starting after 2017 which reduced net deferred tax liabilities by approximately $94 million (US$74 million) in the second quarter of fiscal 2018. In addition, the Act calls for other changes such as interest deductibility limitations, full deduction of acquisitions of tangible assets, net operating losses limitations as well as base erosion anti-avoidance, which together with tax rate reductions, had an overall favorable impact on the income tax expense.

3.6 PROFIT FOR THE YEAR

Years ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages and earnings per share)	$	$	%
Profit for the year from continuing operations	356,908	384,578	(7.2)
Profit for the year	432,288	360,197	20.0
Profit for the year from continuing operations attributable to owners of the Corporation	339,973	375,214	(9.4)
Profit for the year attributable to owners of the Corporation	415,353	350,833	18.4
Profit for the year from continuing operations attributable to non-controlling interest(2)	16,935	9,364	80.9
Basic earnings per share from continuing operations	6.89	7.61	(9.5)
Basic earnings per share	8.41	7.12	18.1

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(2) The non-controlling interest represents a participation of 21% in Atlantic Broadband's results by Caisse de dépôt et placement du Québec ("CDPQ"), effective since the MetroCast acquisition on January 4, 2018.

Fiscal 2019 profit for the year from continuing operations and profit for the year from continuing operations attributable to owners of the Corporation decreased by 7.2% and 9.4%, respectively, as a result of:

- last year's $94 million income tax reduction following the United States tax reform; and
- the increase in depreciation and amortization mostly related to the impact of the MetroCast acquisition; partly offset by
- higher adjusted EBITDA mainly as a result of the impact of the MetroCast acquisition;
- the decrease in financial expense; and
- the decrease in integration, restructuring and acquisition costs.

Fiscal 2019 profit for the year and profit for the year attributable to owners of the Corporation increased by 20.0% and 18.4%, respectively, mainly due to a profit for the year from discontinued operations of $75.4 million resulting from the sale of Cogeco Peer 1 in the third quarter of fiscal 2019 compared to a loss for the year from discontinued operations of $24.4 million for the prior year in addition to the elements mentioned above.

4. RELATED PARTY TRANSACTIONS

Cogeco Communications is a subsidiary of Cogeco Inc. ("Cogeco"), which holds 31.8% of the Corporation's equity shares, representing 82.3% of the Corporation's voting shares.

Cogeco provides executive, administrative, financial and strategic planning services and additional services to the Corporation under a Management Services Agreement (the "Agreement"). On May 1, 2019, the Corporation and Cogeco agreed to amend the Agreement in order to replace the methodology used to establish the management fees payable by the Corporation to Cogeco, which was based on a percentage of the consolidated revenue of the Corporation, with a new methodology based on the costs incurred by Cogeco plus a reasonable mark-up. This cost-plus methodology was adopted to avoid future variations of the management fee percentage due to the frequent changes of the Corporation's consolidated revenue pursuant to business acquisitions and divestitures. Prior to this change, management fees represented 0.75% of the consolidated revenue from continuing and discontinued operations of the Corporation (0.85% for the period prior to the MetroCast acquisition on January 4, 2018). Provision is made for future adjustment upon the request of either Cogeco or the Corporation from time to time during the term of the Agreement. For the year ended August 31, 2019, management fees paid to Cogeco reached \$19.9 million compared to \$19.0 million for fiscal 2018.

No direct remuneration is payable to Cogeco's executive officers by the Corporation. However, during fiscal years 2019 and 2018, the Corporation granted stock options and performance share units ("PSUs") to these executive officers, as executive officers of Cogeco Communications, as shown in the following table:

Years ended August 31,	2019	2018
Stock options	97,725	126,425
PSUs	14,625	19,025

The following table shows the amounts that the Corporation charged Cogeco with regards to the Corporation's stock options, incentive share units ("ISUs") and PSUs to these executive officers, as well as deferred share units ("DSUs") issued to Board directors of Cogeco:

Years ended August 31,	2019	2018
(in thousands of dollars)	$	$
Stock options	1,046	915
ISUs	61	1
PSUs	981	990
DSUs	631	—

There were no other material related party transactions during the periods covered.

5. CASH FLOW ANALYSIS

Years ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages)	$	$	%
Cash flow from operating activities	868,711	620,748	39.9
Cash flow from investing activities	(471,078)	(2,191,666)	(78.5)
Cash flow from financing activities	(659,222)	1,426,136	—
Effect of exchange rate changes on cash and cash equivalents denominated in a foreign currency	(439)	1,989	—
Net change in cash and cash equivalents from continuing operations	(262,028)	(142,793)	83.5
Net change in cash and cash equivalent from discontinued operations(2)	733,807	16,333	—
Cash and cash equivalents, beginning of the year	84,725	211,185	(59.9)
Cash and cash equivalents, end of the year	556,504	84,725	—

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(2) For further details on the Corporation's cash flow attributable to discontinued operations, please consult the "Discontinued operations" section.

5.1 OPERATING ACTIVITIES

Fiscal 2019 cash flow from operating activities increased by 39.9% compared to the prior year mainly from:

- higher adjusted EBITDA;
- the decreases in income taxes paid and in financial expense paid; and
- the decrease in integration, restructuring and acquisitions costs.

5.2 INVESTING ACTIVITIES

Fiscal 2019 investing activities decreased by 78.5% compared to the prior year mainly due to the MetroCast acquisition of $1.76 billion in the second quarter of fiscal 2018.

BUSINESS COMBINATION IN FISCAL 2019

On October 3, 2018, the Corporation's subsidiary, Atlantic Broadband, completed the acquisition of the south Florida fibre network previously owned by FiberLight, LLC. The transaction, combined with the dark fibers acquired from FiberLight in the second quarter of fiscal 2018, added 350 route miles to Atlantic Broadband's existing south Florida footprint.

The acquisition was accounted for using the purchase method and was subject to post closing adjustments. The final allocation of the purchase price of this acquisition is as follows:

	Final August 31, 2019 $	Preliminary November 30, 2018 $
Purchase price		
Consideration paid at closing	**38,876**	38,876
Balance due on business combinations	**5,005**	5,005
	43,881	43,881
Net assets acquired		
Trade and other receivables	**1,308**	1,743
Prepaid expenses and other	**335**	335
Property, plant and equipment	**28,785**	45,769
Intangible assets	**3,978**	—
Goodwill	**11,093**	—
Trade and other payables assumed	**(644)**	(644)
Contract liabilities and other liabilities assumed	**(974)**	(3,322)
	43,881	43,881

ACQUISITIONS OF PROPERTY, PLANT AND EQUIPMENT

The acquisitions of property, plant and equipment as well as the capital intensity per operating segment are as follows:

Years ended August 31,	2019	2018 (1)	Change	Change in constant currency (2)
(in thousands of dollars, except percentages)	$	$	%	%
Canadian broadband services	**241,940**	245,228	(1.3)	(2.6)
Capital intensity	**18.7%**	18.9%		
American broadband services	**192,605**	212,580	(9.4)	(12.4)
Capital intensity	**18.6%**	25.1%		
Consolidated	**434,545**	457,808	(5.1)	(7.1)
Capital intensity	**18.6%**	21.3%		

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy. For further details, please consult the "Accounting policies" section.

(2) Fiscal 2019 actuals are translated at the average foreign exchange rate of fiscal 2018 which was 1.2773 USD/CDN.

Fiscal 2019 acquisitions of property, plant and equipment decreased by 5.1% (7.1% in constant currency) mainly due to lower capital expenditures in the Canadian and American broadband services segments.

Fiscal 2019 capital intensity reached 18.6% compared to 21.3% for the prior year mainly as a result of revenue growth combined with lower capital expenditures.

For further details on the Corporation's acquisitions of property, plant and equipment, please refer to the "Segmented operating and financial results" section.

5.3 FREE CASH FLOW AND FINANCING ACTIVITIES

FREE CASH FLOW

Fiscal 2019 free cash flow increased by 50.4% (50.0% in constant currency) compared to the prior year mainly due to the following:

- higher adjusted EBITDA;
- the decrease in acquisitions of property, plant and equipment;
- the decreases in current income taxes expense and in financial expense; and
- the decrease in integration, restructuring and acquisition costs.

FINANCING ACTIVITIES

Fiscal 2019 changes in cash flows from financing activities are mainly explained as follows:

Years ended August 31,	**2019**	2018	Explanations
(in thousands of dollars)	**$**	$	
Increase (decrease) in bank indebtedness	**(5,949)**	2,148	Related to the timing of payments made to suppliers.
Net increase (decrease) under the revolving facilities	**(443,955)**	384,568	Repayments of the revolving facilities in fiscal 2019 as a result of the sale of Cogeco Peer 1 combined with generated free cash flow. US$307 million revolving loan was drawn under the Term Revolving Facility following the early reimbursement of the US$400 million Senior Unsecured Notes in the third quarter of fiscal 2018 and drawing of US$40.4 million on the US$150 million Senior Secured Revolving Credit Facility to finance the MetroCast acquisition.
Issuance of long-term debt, net of discounts and transaction costs	**—**	2,082,408	Issuance of a US$1.7 billion Senior Secured Term Loan B to finance the MetroCast acquisition and refinance Atlantic Broadband's long-term debt in the second quarter of fiscal 2018.
Repayment of long-term debt	**(77,639)**	(1,329,044)	Reimbursement of the $55 million Senior Secured Notes Series B maturing in October 2018. Repayment of long-term debt in fiscal 2018 mainly related to the Atlantic Broadband refinancing and the early redemption of the US$400 million Senior Unsecured Notes.
Repayment of balance due on business combinations	**(655)**	(118)	Not significant.
Increase in deferred transaction costs	**(2,210)**	(3,168)	Not significant.
	(530,408)	1,136,794	

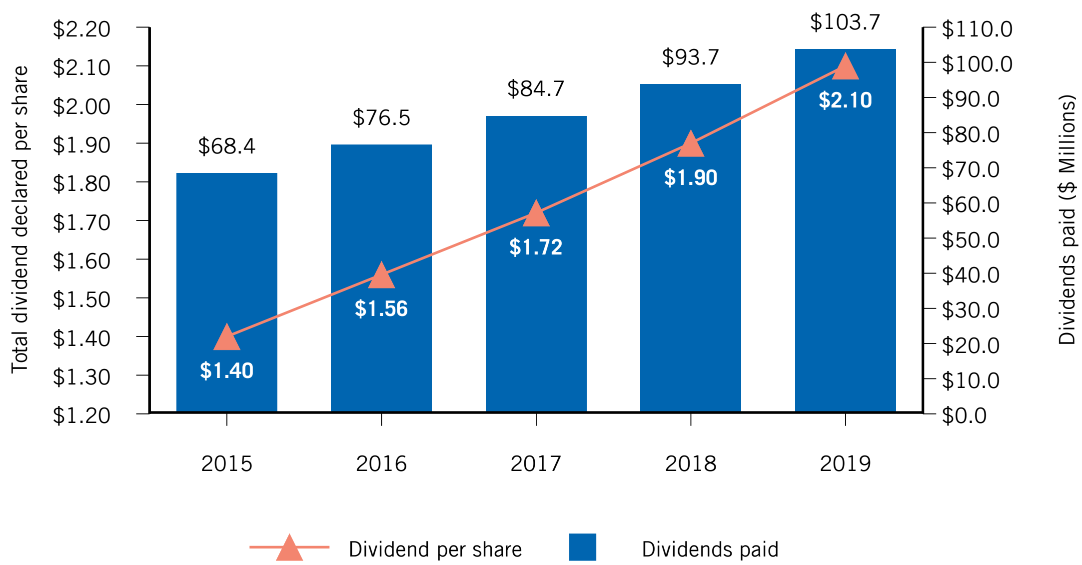
DIVIDENDS

During fiscal 2019, quarterly eligible dividends of $0.525 per share, totaling $2.10 per share, were paid to the holders of multiple and subordinate voting shares, for a total paid of $103.7 million. In fiscal 2018, quarterly eligible dividends of $0.475 per share, totaling $1.90 per share, were paid to the holders of multiple and subordinate voting shares, for a total paid of $93.7 million. During the last five years, dividends paid per share increased by 10.7% on a compounded annual basis.

The dividends declaration dates and payments for multiple and subordinate voting shares are as follows:

Declaration date	Record date	Payment date	Dividend per share (in dollars)
October 31, 2018	**November 14, 2018**	**November 28, 2018**	**0.525**
January 10, 2019	**January 24, 2019**	**February 7, 2019**	**0.525**
April 9, 2019	**April 23, 2019**	**May 7, 2019**	**0.525**
July 10, 2019	**July 24, 2019**	**August 7, 2019**	**0.525**
November 2, 2017	November 16, 2017	November 30, 2017	0.475
January 10, 2018	January 24, 2018	February 7, 2018	0.475
April 12, 2018	April 26, 2018	May 10, 2018	0.475
July 11, 2018	July 25, 2018	August 8, 2018	0.475

Total dividends and dividends per share over the last five years are as follow:



NORMAL COURSE ISSUER BID

Following the completion of the sale of Cogeco Peer 1 on April 30, 2019, the Toronto Stock Exchange has accepted Cogeco Communications' notice of intention for a normal course issuer bid in respect to its subordinate voting shares. Purchases pursuant to the normal course issuer bid will be made between May 3, 2019 to May 2, 2020 and enable the Corporation to acquire up to 1,869,000 subordinate voting shares.

During fiscal 2019, Cogeco Communications purchased and cancelled 327,200 subordinate voting shares with an average stated value of $9.1 million for a total consideration of $32.4 million.

The normal course issuer bid purchases were as follows:

					2019
Quarters ended	**Nov. 30**	**Feb. 28**	**May 31**	**Aug. 31**	**Total**
(in thousands of dollars, except number of shares and average purchase price per share)	**$**	**$**	**$**	**$**	**$**
Subordinate voting shares purchased and cancelled	—	—	**157,400**	**169,800**	**327,200**
Average purchase price per share	—	—	**91.87**	**105.55**	**98.97**
Purchase costs	—	—	**14,460**	**17,922**	**32,382**

6. SEGMENTED OPERATING AND FINANCIAL RESULTS

The Corporation reports its operating results in two operating segments: Canadian broadband services and American broadband services. The reporting structure reflects how the Corporation manages its business activities to make decisions about resources to be allocated to the segment and to assess its performance.

6.1 CANADIAN BROADBAND SERVICES

OPERATING AND FINANCIAL RESULTS

Years ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Revenue	**1,294,967**	1,299,906	(0.4)	(0.4)	—
Operating expenses	**606,286**	618,886	(2.0)	(2.2)	1,102
Adjusted EBITDA	**688,681**	681,020	1.1	1.3	(1,102)
Adjusted EBITDA margin	**53.2%**	52.4%			
Acquisitions of property, plant and equipment	**241,940**	245,228	(1.3)	(2.6)	3,010
Capital intensity	**18.7%**	18.9%			

(1) Fiscal 2019 average foreign exchange rate used for translation was 1.3255 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy. For further details, please consult the "Accounting policies" section.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of fiscal 2018 which was 1.2773 USD/CDN.

REVENUE

Fiscal 2019 revenue decreased by 0.4% (0.4% in constant currency) mainly as a result of:

- a decline in primary service units in the fourth quarter of fiscal 2018 and the first quarter of 2019 from lower service activations primarily due to issues resulting from the implementation of a new customer management system; partly offset by
- rate increases; and
- higher net pricing from consumer sales.

OPERATING EXPENSES

Fiscal 2019 operating expenses decreased by 2.0% (2.2% in constant currency) mainly attributable to:

- lower programming costs resulting from a lower level of primary service units; and
- lower compensation expenses resulting from an operational optimization program implemented in the first half of fiscal 2019; partly offset by
- higher marketing initiatives; and
- retroactive costs of $3.2 million incurred in the first quarter of fiscal 2019 related to higher rates than expected established by the Copyright Board of Canada for the retransmission of distant Canadian and American television signals in Canada for the period of 2014 to 2018.

ADJUSTED EBITDA

Fiscal 2019 adjusted EBITDA increased by 1.1% (1.3% in constant currency) resulting mainly from a decline in operating expenses.

CAPITAL INTENSITY AND ACQUISITIONS OF PROPERTY, PLANT AND EQUIPMENT

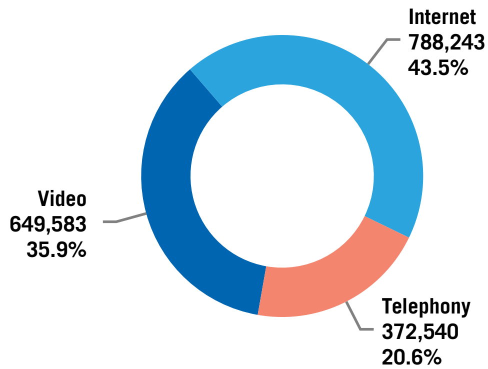
Fiscal 2019 acquisitions of property, plant and equipment decreased by 1.3% (2.6% in constant currency) resulting from:

- lower costs related to the new customer management system which was implemented in the third quarter of fiscal 2018; and
- lower purchases of customer premise equipment due to the timing of certain initiatives; partly offset by
- additional investments to improve and expand the network infrastructure; and
- costs related to the new IPTV platform.

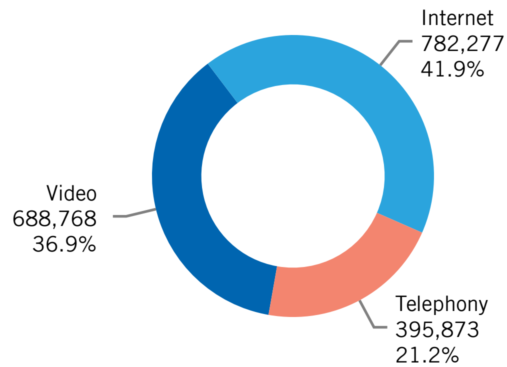
Fiscal 2019 capital intensity reached 18.7% compared to 18.9% for fiscal 2018 mainly as a result of a higher decrease in capital expenditures.

CUSTOMER STATISTICS

Customer counts at August 31, 2019



Customer counts at August 31, 2018



		Net additions (losses) Years ended		% of penetration(2)	
	August 31, 2019	**August 31, 2019**	August 31, 2018 (1)	**August 31, 2019**	August 31, 2018
Primary service units	**1,810,366**	**(56,552)**	(55,849)		
Internet service customers	**788,243**	**5,966**	14,173	**44.7**	44.7
Video service customers	**649,583**	**(39,185)**	(37,035)	**36.8**	39.3
Telephony service customers	**372,540**	**(23,333)**	(32,987)	**21.1**	22.6

(1) Excludes adjustments related to the migration to the new customer management system implemented during the third quarter of fiscal 2018.

(2) As a percentage of homes passed.

During the third quarter of fiscal 2018, the Canadian broadband services segment implemented a new customer management system, replacing 22 legacy systems. While the customer management system was still in the stabilization phase, contact center congestion resulted in lower services activations during most of the fourth quarter of fiscal 2018 and the first quarter of 2019. Contact center and marketing operations had returned to normal at the end of the first quarter of 2019.

Variations of each services are also explained as follows:

INTERNET

Fiscal 2019 Internet service customers net additions stood at 5,966 compared to 14,173 for the prior year mainly due to:

- the ongoing interest in high speed offerings;
- the sustained interest in bundle offers; and
- the increased demand from Internet resellers; partly offset by
- competitive offers in the industry; and
- contact center congestion during the stabilization period of the new customer management system.

VIDEO

Fiscal 2019 video service customers net losses stood at 39,185 compared to 37,035 for the prior year as a result of:

- highly competitive offers in the industry;
- a changing video consumption environment; and
- contact center congestion during the stabilization period of the new customer management system; partly offset by
- customers' ongoing interest in digital advanced video services; and
- customers' interest in video services bundled with fast Internet offerings.

TELEPHONY

Fiscal 2019 telephony service customers net losses amounted to 23,333 compared to 32,987 for the prior year mainly due to:

- technical issues with telephony activations following the implementation of the new customer management system which were resolved at the end of the first quarter;
- increasing wireless penetration in North America and various unlimited offers launched by wireless operators causing some customers to cancel their landline telephony services for wireless telephony services only; partly offset by
- growth in the business sector; and
- more telephony bundles due to additional promotional activity in the second half of fiscal 2019.

DISTRIBUTION OF CUSTOMERS

At August 31, 2019, 69% of the Canadian broadband services segment's customers enjoyed "double play" or "triple play" bundled services.

6.2 AMERICAN BROADBAND SERVICES

OPERATING AND FINANCIAL RESULTS

Years ended August 31,	**2019** (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	**$**	$	%	%	$
Revenue	**1,036,853**	847,372	22.4	17.9	37,433
Operating expenses	**571,208**	478,172	19.5	15.2	20,522
Adjusted EBITDA	**465,645**	369,200	26.1	21.5	16,911
Adjusted EBITDA margin	**44.9%**	43.6%			
Acquisitions of property, plant and equipment	**192,605**	212,580	(9.4)	(12.4)	6,332
Capital intensity	**18.6%**	25.1%			

(1) Fiscal 2019 average foreign exchange rate used for translation was 1.3255 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy. For further details, please consult the "Accounting policies" section.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of fiscal 2018 which was 1.2773 USD/CDN.

REVENUE

Fiscal 2019 revenue increased by 22.4% (17.9% in constant currency). In local currency, revenue amounted to US$782.3 million compared to US$662.3 million for fiscal 2018. The increase resulted mainly from:

- the impact of the MetroCast acquisition completed on January 4, 2018 which was included in revenue for only an eight-month period in the prior year;
- rate increases;
- continued growth in Internet service customers; and
- the FiberLight acquisition completed in the first quarter of fiscal 2019; partly offset by
- a decrease in video service customers.

Excluding the MetroCast and FiberLight acquisitions, revenue in constant currency increased by 5.2% for fiscal 2019.

OPERATING EXPENSES

Fiscal 2019 operating expenses increased by 19.5% (15.2% in constant currency) mainly as a result of:

- the impact of the MetroCast acquisition which was included in operating expenses for only an eight-month period in the prior year;
- programming rate increases;
- the FiberLight acquisition completed in the first quarter of fiscal 2019;
- higher compensation expenses due to higher headcount to support growth; and
- higher marketing initiatives to drive primary service units growth; partly offset by
- the prior year's non-recurring costs of $3.1 million (US$2.5 million) related to hurricane Irma.

ADJUSTED EBITDA

Fiscal 2019 adjusted EBITDA increased by 26.1% (21.5% in constant currency). In local currency, adjusted EBITDA amounted to US$351.3 million compared to US$288.4 million for fiscal 2018. The increase was mainly due to the impact of the MetroCast and FiberLight acquisitions combined with strong organic growth.

Excluding the MetroCast and FiberLight acquisitions and the prior year's non-recurring costs of $3.1 million ($US2.5 million) related to hurricane Irma, adjusted EBITDA in constant currency increased by 5.7% for fiscal 2019.

CAPITAL INTENSITY AND ACQUISITIONS OF PROPERTY, PLANT AND EQUIPMENT

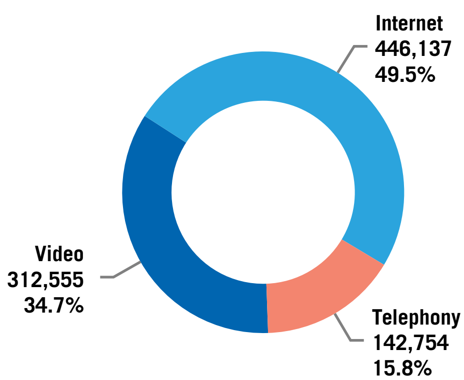
Fiscal 2019 acquisitions of property, plant and equipment decreased by 9.4% (12.4% in constant currency) mainly due to:

- the acquisition of several dark fibres throughout south Florida from FiberLight, LLC for a consideration of $21.2 million (US$16.8 million) during the second quarter of fiscal 2018; partly offset by
- additional capital expenditures related to the impact of the MetroCast acquisition; and
- additional capital expenditures related to the expansion in Florida.

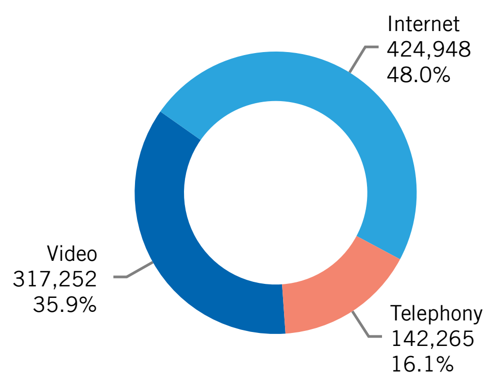
Fiscal 2019 capital intensity reached 18.6% compared to 25.1% for fiscal 2018 mainly as a result of lower capital expenditures combined with revenue growth.

CUSTOMER STATISTICS

Customer counts at August 31, 2019



Customer counts at August 31, 2018



		Net additions (losses) Years ended		% of penetration[2][3]	
	August 31, 2019	**August 31, 2019**	August 31, 2018 [1]	**August 31, 2019**	August 31, 2018 [3]
Primary service units	**901,446**	**16,981**	20,251		
Internet service customers	**446,137**	**21,189**	21,417	**50.8**	49.7
Video service customers	**312,555**	**(4,697)**	(6,760)	**35.6**	37.1
Telephony service customers	**142,754**	**489**	5,594	**16.2**	16.6

(1) Excludes 251,379 primary services units (130,404 Internet services, 87,873 video services and 33,102 telephony services) from the MetroCast acquisition completed in the second quarter of fiscal 2018.

(2) As a percentage of homes passed.

(3) In the first quarter of fiscal 2019, the number of homes passed in the American broadband services segment have been adjusted upwards in order to reflect the number of non-served multi-dwelling unit passings within the footprint and consequently, the penetration as a percentage of homes passed for fiscal 2018 have also been adjusted.

INTERNET

Fiscal 2019 Internet service customers net additions stood at 21,189 compared to 21,417 for the prior year as a result of:

- additional connects related to the Florida expansion initiatives and in the MetroCast footprint;
- our customers' ongoing interest in high speed offerings; and
- growth in both the residential and business sectors.

VIDEO

Fiscal 2019 video service customers net losses stood at 4,697 compared to 6,760 for the prior year mainly from:

- competitive offers in the industry; and
- a changing video consumption environment; partly offset by
- our customers' ongoing interest in TiVo's digital advanced video services; and
- the activation of bulk properties in Florida during the fourth quarter of fiscal 2019.

TELEPHONY

Fiscal 2019 telephony service customers net additions stood at 489 compared to 5,594 for the prior year mainly as a result of the growth in the business sector, partly offset by a decline in the residential sector.

DISTRIBUTION OF CUSTOMERS

At August 31, 2019, 52% of the American broadband services segment's customers enjoyed "double play" or "triple play" bundled services.

7. FINANCIAL POSITION

7.1 WORKING CAPITAL

As part of the usual conduct of its business, Cogeco Communications generally maintains a working capital deficiency due to a low level of trade and other receivables since a large proportion of the Corporation's customers pay before their services are rendered, while trade and other payables are usually paid after products are delivered or services are rendered, enabling the Corporation to use the resulting cash and cash equivalents to reduce Indebtedness. However, the Corporation had a working capital surplus at August 31, 2019 due to cash and cash equivalents from the sale of Cogeco Peer 1.

The variations are as follows:

	August 31, 2019	August 31, 2018 [1]	Change	Explanations
(in thousands of dollars)	**$**	$	$	
Current assets				
Cash and cash equivalents	**556,504**	84,725	471,779	Please refer to the "Cash flow analysis" section.
Trade and other receivables	**75,652**	97,294	(21,642)	Related to the sale of Cogeco Peer 1 on April 30, 2019, partly offset by revenue growth combined with the appreciation of the US dollar against the Canadian dollar.
Income taxes receivable	**17,706**	24,976	(7,270)	Mostly related to lower income tax installments made during fiscal 2019 in the Canadian broadband services segment.
Prepaid expenses and other	**22,740**	29,473	(6,733)	Related to the sale of Cogeco Peer 1.
Derivative financial instrument	**—**	1,330	(1,330)	Not significant.
	672,602	237,798	434,804	
Current liabilities				
Bank indebtedness	**—**	5,949	(5,949)	Timing of payments made to suppliers.
Trade and other payables	**260,481**	302,806	(42,325)	Timing of payments made to suppliers combined with the sale of Cogeco Peer 1, partly offset by the appreciation of the US dollar against the Canadian dollar.
Provisions	**36,553**	25,887	10,666	Mostly related to the increase of network fees under negotiation in the Canadian broadband services segment.
Income tax liabilities	**16,693**	16,133	560	Not significant.
Contract liabilities and other liabilities	**43,395**	59,656	(16,261)	Related to the sale of Cogeco Peer 1, partly offset by the appreciation of the US dollar against the Canadian dollar.
Balance due on business combinations	**4,520**	—	4,520	Related to the FiberLight acquisition completed on October 3, 2018.
Current portion of long-term debt	**22,601**	77,188	(54,587)	Mostly related to the reimbursement of the $55 million Senior Secured Notes Series B maturing in October 2018, partly offset by the appreciation of the US dollar against the Canadian dollar.
	384,243	487,619	(103,376)	
Working capital surplus (deficiency)	**288,359**	(249,821)	538,180	

(1) Fiscal 2018 was restated to comply with IFRS 15. For further details, please consult the "Accounting policies" section.

7.2 OTHER SIGNIFICANT CHANGES

(in thousands of dollars)	August 31, 2019 $	August 31, 2018 (1) $	Change $	Explanations
Non-current assets				
Property, plant and equipment	**2,007,610**	2,323,678	(316,068)	Related to the sale of Cogeco Peer 1, partly offset by the FiberLight acquisition in the first quarter of fiscal 2019 and the appreciation of the US dollar against the Canadian dollar.
Intangible assets	**2,850,844**	2,927,388	(76,544)	Related to the sale of of Cogeco Peer 1, partly offset by the appreciation of the US dollar against the Canadian dollar.
Goodwill	**1,373,439**	1,608,446	(235,007)	Related to the sale of Cogeco Peer 1, partly offset by the appreciation of the US dollar against the Canadian dollar and the FiberLight acquisition.
Derivative financial instruments	**—**	33,797	(33,797)	Lower fair value of the interest rate swap agreements related to the US$1.7 billion Senior Secured Term Loan B issued for the MetroCast acquisition due to a lower interest rate.
Non-current liabilities				
Long-term debt	**3,382,258**	3,781,020	(398,762)	Mostly related to the reimbursement of the US$328 million Canadian Revolving Facility during the third quarter of fiscal 2019 using the proceeds of the sale of Cogeco Peer 1, partly offset by the appreciation of the US dollar against the Canadian dollar.
Derivative financial instruments	**46,044**	—	46,044	Lower fair value of the interest rate swap agreements related to the US$1.7 billion Senior Secured Term Loan B issued for the MetroCast acquisition due to a lower interest rate.
Shareholders' equity				
Equity attributable to non-controlling interest(2)	**359,689**	336,442	23,247	Mostly related to the increase in profit for the year from continuing operations attributable to non-controlling interest combined with the appreciation of the US dollar against the Canadian dollar.

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy. For further details, please consult the "Accounting policies" section.

(2) The non-controlling interest represents a participation of 21% in Atlantic Broadband by CDPQ, effective since the MetroCast acquisition on January 4, 2018.

8. CAPITAL RESOURCES AND LIQUIDITY

8.1 CAPITAL STRUCTURE

The table below summarizes debt-related financial ratios over the last two fiscal years and the fiscal 2020 guidelines:

Years ended August 31,	2020 Guidelines (1)	2019	2018
Average cost of indebtedness(2)	4.4%	**4.4%**	4.4%
Fixed rate indebtedness(3)	78%	**78%**	72%
Average term: long-term debt (in years)	3.9	**4.9**	5.7
Net indebtedness(4) / adjusted EBITDA(5)	2.3	**2.6**	3.8
Adjusted EBITDA / financial expense(5)	N/A (6)	**6.3**	5.4

(1) Based on mid-range guidelines.

(2) Excludes amortization of deferred transaction costs and commitment fees but includes the impact of interest rate swaps. Potential variations in the US LIBOR rates in fiscal 2020 have not been considered.

(3) Taking into consideration the interest rate swaps in effect at the end of each fiscal year.

(4) Net indebtedness is defined as the aggregate of bank indebtedness, balance due on business combinations and principal on long-term debt, less cash and cash equivalents.

(5) Adjusted EBITDA and financial expense for fiscal year 2018 include only eight months of MetroCast operations.

(6) Specific guidance on interest coverage cannot be provided given that financial expense guidance is not provided.

In fiscal 2019, the financial leverage ratio relating to net indebtedness over adjusted EBITDA has declined as a result of the sale of Cogeco Peer 1 on April 30, 2019 for a net cash consideration of $720 million and to a lesser extent growing adjusted EBITDA and a reduction in net indebtedness from generated free cash flow. In fiscal 2020, prior to the adoption of IFRS 16 *Leases*, the financial leverage ratio relating to net indebtedness over adjusted EBITDA should continue to decline as a result of growing adjusted EBITDA and a projected reduction in net indebtedness from generated free cash flow.

8.2 OUTSTANDING SHARE DATA

A description of Cogeco Communications' share data at September 30, 2019 is presented in the table below. Additional details are provided in note 20 of the consolidated financial statements.

(in thousands of dollars, except number of shares/options)	Number of shares/options	Amount $
Common shares		
Multiple voting shares	**15,691,100**	**98,346**
Subordinate voting shares	**33,656,868**	**938,013**
Options to purchase subordinate voting shares		
Outstanding options	**714,014**	
Exercisable options	**262,774**	

8.3 FINANCING

On December 4, 2018, the Corporation extended its $800 million Term Revolving Facility maturity date by an additional year until January 24, 2024.

At August 31, 2019, the Corporation had used $0.6 million of its $800 million Term Revolving Facility for a remaining availability of $799.4 million. In addition, two subsidiaries related to Atlantic Broadband benefit from a Senior Secured Revolving Facility of $199.4 million (US$150 million), of which $3.2 million (US$2.4 million) was used at August 31, 2019 for a remaining availability of $196.2 million (US$147.6 million).

8.4 CREDIT RATINGS

The table below shows Cogeco Communications' and Atlantic Broadband's credit ratings:

At August 31, 2019	S&P	DBRS	Moody's
Cogeco Communications			
Senior Secured Notes and Debentures	**BBB-**	**BBB (low)**	**NR**
Atlantic Broadband			
First Liens Credit Facilities	**BB-**	**NR**	**B1**

NR : Not rated

Our ability to access debt capital markets and bank credit markets and the cost and amount of funding available partly depends on the quality of our credit ratings. Obligations rated in the "BBB" category are considered investment grade and their cost of funding is typically lower relative to the "BB/B" rating category. In addition, obligations with "BBB" ratings generally have greater access to funding than those with "BB/B" ratings.

8.5 FINANCIAL MANAGEMENT

Interest rate risk

The Corporation is exposed to interest rate risks on its floating interest rate instruments. Interest rate fluctuations will have an effect on the repayment of these instruments. At August 31, 2019, all of the Corporation's long-term debt was at fixed rate, except for the amounts drawn under the First Lien Credit Facilities, which are subject to floating interest rates.

To reduce the risk on the floating interest rate instruments, the Corporations' US subsidiary entered into interest rate swap agreements. The following table shows the interest rate swaps outstanding at August 31, 2019:

Type of hedge	Notional amount	Receive interest rate	Pay interest rate	Maturity	Hedged item
Cash flow	US$1.1 billion	US Libor base rate	2.017% - 2.262%	January 2021 - November 2024	Senior Secured Term Loan B

The sensitivity of the Corporation's annual financial expense to an increase of 1% in the interest rate applicable to the unhedged portion of these facilities would represent an increase of approximately $7.7 million based on the outstanding debt at August 31, 2019.

Foreign exchange risk

The Corporation is exposed to foreign exchange risk with respect to the interest associated with its long-term debt denominated in US dollars. The impact of a 10% increase in the exchange rate of the US dollar into Canadian dollars would increase financial expense by approximately $12.0 million based on the outstanding debt at August 31, 2019.

Furthermore, the Corporation's net investments in foreign operations are exposed to market risk attributable to fluctuations in foreign currency exchange rates, notably changes in the value of the Canadian dollar versus the US dollar. The risk related to the US dollar aggregate investments is mitigated since a portion was borrowed in US dollars.

The following table shows the aggregate investments in foreign operations attributable to owners of the Corporation and the notional amount of debt borrowed to hedge these investments at August 31, 2019:

Type of hedge	Notional amount of debt	Aggregate investments	Hedged item
Net investments	US$390 million	US$1,000 million	Net investments in foreign operations in US dollar

The exchange rate used to translate the US dollar currency into Canadian dollars for the consolidated statement of financial position accounts at August 31, 2019 was $1.3295 ($1.3055 in 2018) per US dollar. A 10% decrease in the exchange rate of the US dollar into Canadian dollars would decrease other comprehensive income by approximately $81.1 million.

Market risk

The Corporation uses derivative instruments to manage the exposure to the risk of changes in the price of its subordinate voting shares under the DSU plan. As such, the Corporation uses equity swap agreements on its subordinate voting shares to economically hedge the cash flow exposure. A 5% variation in the market price of its subordinate voting shares at August 31, 2019 would result in a variation, net of the hedge, of approximately $0.1 million in operating expenses for 2019.

8.6 FOREIGN CURRENCY

For the year ended August 31, 2019, the average rates prevailing used to convert the operating results of the American broadband services segment and the discontinued operations were as follows:

Years ended August 31,	2019	2018	Change	Change
	$	$	$	%
US dollar vs Canadian dollar	1.3255	1.2773	0.05	3.8
British Pound vs Canadian dollar (1)	1.7212	1.7220	—	—

(1) The rate for fiscal 2019 is for the eight-month period ended April 30, 2019.

The following table highlights in Canadian dollars, the impact of a $0.05 variation of the Canadian dollar against the US dollar on Cogeco Communications' segmented and consolidated operating results for the year ended August 31, 2019:

	Canadian broadband services	American broadband services	Consolidated (1)
Year ended August 31, 2019	Exchange rate impact	Exchange rate impact	Exchange rate impact
(in thousands of dollars)	$	$	$
Revenue	—	37,433	37,433
Operating expenses	1,102	20,522	21,636
Management fees - Cogeco Inc.			—
Adjusted EBITDA	(1,102)	16,911	15,797
Acquisitions of property, plant and equipment	3,010	6,332	9,342
Free cash flow			1,330

(1) The consolidated results do not correspond to the addition of the operating segment's results as inter-segment eliminations and other are not presented.

8.7 COMMITMENTS, CONTINGENCIES AND GUARANTEES

A) COMMITMENTS

Cogeco Communications' contractual obligations at August 31, 2019 are shown in the table below:

Years ended August 31,	2020	2021	2022	2023	2024	Thereafter	Total
(In thousands of Canadian dollars)	$	$	$	$	$	$	$
Operating lease agreements (1)	22,728	22,105	20,851	21,087	20,012	53,412	160,195
Acquisitions of property, plant and equipment and intangible assets (2)	15,201	14,625	22,355	18,613	21,272	—	92,066
Other long-term contracts (3)	25,603	15,174	6,178	5,899	5,666	20,113	78,633
	63,532	51,904	49,384	45,599	46,950	73,525	330,894

(1) Include operating lease agreements for rent of premises and support structures.

(2) Include minimum spend commitments under acquisitions of customer premise equipment and software licenses.

(3) Include long-term commitments with suppliers to provide services including minimum spend commitments.

B) CONTINGENCIES

On August 15, 2019, the CRTC issued its costing decision setting final rates for aggregated wholesale Internet services for resellers, significantly lowering the interim rates it had previously fixed in 2016 and applying the new rates on a retroactive basis. On September 13, 2019, Cogeco Communications, along with other telecommunications service providers, jointly filed an application for leave to appeal the CRTC order to the Federal Court of Appeal ("FCA") and to suspend its effect pending the Court decision to hear the matter. The FCA granted the interim stay on September 27, 2019, with the result, for the time being, of not having to implement the new rates nor to make the retroactive payments estimated at $25 million for the Corporation as of August 31, 2019, based on the CRTC's final aggregated wholesale service rates being disputed in court. Due to FCA granting of the interim stay and the significant uncertainty surrounding both the outcome and the amount, the Corporation has therefore not recorded the impact of the new reduced rates in the 2019 financial statements.

The Corporation and its subsidiaries are involved in matters involving litigations or potential claims from customers and suppliers arising out of the ordinary course and conduct of its business. Although such matters cannot be predicted with certainty, management does not consider the Corporation's exposure to litigations to be significant to these consolidated financial statements. At August 31, 2019 and 2018, no liability has been recorded with respect to these litigations and potential claims, except for those disclosed in Note 17 of the Consolidated financial statements.

C) GUARANTEES

In the normal course of business, the Corporation provides indemnification in conjunction with certain transactions. While many of the agreements specify a maximum potential exposure, some do not specify a maximum amount. The overall maximum amount of an indemnification obligation will depend on future events and conditions and therefore cannot be reasonably estimated. As a result, we cannot determine how they could affect our future liquidity, capital resources or credit risk profile. At August 31, 2019 and 2018, no liability has been recorded with respect to these indemnifications, except for those disclosed in Note 17 of the Consolidated financial statements.

BUSINESS COMBINATIONS AND ASSET DISPOSALS

In connection with the acquisition or sale of a business or assets, in addition to possible indemnifications relating to failure to perform covenants and breach of representations and warranties, the Corporation has agreed to indemnify the seller or the purchaser against claims related to events that occurred prior to the date of acquisition or sale.

LONG-TERM DEBT

Under the terms of the Senior Secured Notes, the Corporation has agreed to indemnify the lenders against changes in regulations relative to withholding taxes and costs incurred due to changes in laws.

SALE OF SERVICES

As part of transactions involving the sale of services, the Corporation and its subsidiaries may be required to make payments to counterparties as a result of breaches of representations and warranties made into the service agreements.

PURCHASE AND DEVELOPMENT OF ASSETS

As part of transactions involving the purchase and development of assets, the Corporation and its subsidiaries may be required to pay counterparties for costs and losses incurred as a result of breaches of representations and warranties contained in the purchase agreements.

9. DISCONTINUED OPERATIONS

On April 30, 2019, Cogeco Communications completed the sale of its subsidiary Cogeco Peer 1 Inc., its Business ICT services subsidiary, to affiliates of Digital Colony for a net cash consideration of $720 million.

In accordance with IFRS 5, *Non-current Assets Held for Sale and Discontinued Operations*, the Corporation reclassified the current and prior year results and cash flows of Cogeco Peer 1 as discontinued operations separate from the Corporation's continuing operations.

As a result of the sale, the Corporation recognized the following gain on disposal for fiscal 2019:

(in thousands of dollars)	**$**
Gross proceeds, net of cash disposed	**720,314**
Working capital adjustments	**691**
Transaction costs	**(10,903)**
Net proceeds from sale, net of cash disposed	**710,102**
Net assets disposed	**(625,738)**
Gain on disposal of a subsidiary	**84,364**

The following table presents the carrying value of the net assets disposed of:

(in thousands of dollars)	**$**
Trade and other receivables	**19,988**
Income taxes receivable	**1,126**
Prepaid expenses and other	**8,532**
Property, plant and equipment	**361,774**
Intangible assets	**49,618**
Other assets	**9,594**
Goodwill	**272,591**
Deferred tax assets	**2,061**
Trade and other payables	**(22,416)**
Provisions	**(34)**
Contract liabilities and other liabilities	**(25,104)**
Deferred tax liabilities	**(22,183)**
Foreign currency translation adjustment	**(29,809)**
	625,738

The profit or loss of the discontinued operations was as follows:

Years ended August 31,	**2019** (1)	2018	Change
(in thousands of dollars, except percentages)	**$**	$	%
Revenue	**174,990**	275,952	(36.6)
Operating expenses	**132,390**	197,545	(33.0)
Adjusted EBITDA	**42,600**	78,407	(45.7)
Depreciation and amortization	**43,999**	95,891	(54.1)
Financial expense	**(1,304)**	(2,902)	(55.1)
Gain on disposal of a subsidiary	**(84,364)**	—	—
Profit (loss) before income taxes	**84,269**	(14,582)	—
Income taxes	**8,889**	9,799	(9.3)
Profit (loss) for the year from discontinued operations	**75,380**	(24,381)	—

(1) Fiscal 2019 amounts reflect the eight-month period ended April 30, 2019.

REVENUE

Fiscal 2019 revenue decreased by 36.6% primarily due to an eight-month period of revenue in fiscal 2019 compared to a twelve-month period in fiscal 2018 combined with continued pricing pressures on the hosting and network connectivity services.

OPERATING EXPENSES

Fiscal 2019 operating expenses decreased by 33.0% mainly due to:

- an eight-month period of operating expenses in fiscal 2019 compared to a twelve-month period in fiscal 2018;
- lower compensation expenses; and
- lower costs related to service delivery and cloud licensing; partly offset by
- costs related to the closure of a data centre.

ADJUSTED EBITDA

Fiscal 2019 adjusted EBITDA decreased by 45.7% as a result of an eight-month period of operating results in fiscal 2019 compared to twelve-month period in fiscal 2018 combined with a decline in revenue.

CASH FLOW

The cash flows of the discontinued operations were as follows:

Years ended August 31,	2019 (1)	2018	Change
(in thousands of dollars, except percentages)	$	$	%
Cash flow from operating activities	**41,962**	65,720	(36.2)
Cash flow from investing activities	**691,729**	(49,492)	—
Effect of exchange rate changes on cash and cash equivalents denominated in foreign currencies	**116**	105	10.5
Net change in cash and cash equivalents from discontinued operations	**733,807**	16,333	—

(1) Fiscal 2019 amounts reflect the eight-month period ended April 30, 2019.

10. QUARTERLY OPERATING RESULTS

10.1 QUARTERLY FINANCIAL HIGHLIGHTS

	Fiscal 2019				Fiscal 2018 (1) (2)			
Three months ended	Nov. 30(2)	Feb. 28	May 31	Aug. 31	Nov. 30	Feb. 28	May 31	Aug. 31
(in thousands of dollars, except percentages and per share data)	$	$	$	$	$	$	$	$
Operations								
Revenue	576,673	584,129	587,345	583,673	484,286	529,855	567,079	566,184
Adjusted EBITDA	267,851	280,552	283,927	275,610	227,004	248,470	267,933	263,411
Adjusted EBITDA margin	46.4%	48.0%	48.3%	47.2%	46.9%	46.9%	47.2%	46.5%
Integration, restructuring and acquisition costs	5,713	3,722	1,003	712	392	15,999	2,260	1,677
Profit for the period from continuing operations	78,806	86,128	99,571	92,403	78,271	159,912	70,525	75,870
Profit (loss) for the period from discontinued operations	(3,622)	(5,369)	82,451	1,920	(1,885)	(16,079)	(5,365)	(1,052)
Profit for the period	75,184	80,759	182,022	94,323	76,386	143,833	65,160	74,818
Profit for the period from continuing operations attributable to owners of the Corporation	73,792	81,718	96,613	87,850	78,271	157,000	67,190	72,753
Profit for the period attributable to owners of the Corporation	70,170	76,349	179,064	89,770	76,386	140,921	61,825	71,701
Cash flow								
Cash flow from operating activities	98,996	199,462	265,551	304,702	(483)	198,720	167,073	255,438
Acquisitions of property, plant and equipment	100,557	92,773	96,116	145,099	84,451	112,378	98,660	162,319
Free cash flow	107,503	125,307	136,999	84,250	92,907	58,796	102,408	47,739
Capital intensity	17.4%	15.9%	16.4%	24.9%	17.4%	21.2%	17.4%	28.7%
Earnings (loss) per share(3)(4)								
Basic								
From continuing operations	1.50	1.65	1.96	1.78	1.59	3.19	1.36	1.48
From discontinued operations	(0.07)	(0.11)	1.67	0.04	(0.04)	(0.33)	(0.11)	(0.02)
From continuing and discontinued operations	1.42	1.55	3.62	1.82	1.55	2.86	1.25	1.45
Diluted								
From continuing operations	1.49	1.64	1.94	1.77	1.57	3.16	1.35	1.47
From discontinued operations	(0.07)	(0.11)	1.65	0.04	(0.04)	(0.33)	(0.11)	(0.02)
From continuing and discontinued operations	1.41	1.53	3.59	1.80	1.53	2.83	1.24	1.44
Dividends per share	0.525	0.525	0.525	0.525	0.475	0.475	0.475	0.475

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy. For further details, please consult the "Accounting policies" section.

(2) Results were restated to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Discontinued operations" section.

(3) The addition of quarterly information may not correspond to the annual total due to rounding.

(4) Per multiple and subordinate voting share.

10.2 SEASONAL VARIATIONS

Cogeco Communications' operating results are not generally subject to material seasonal fluctuations except as follows. In the Canadian and American broadband services segments, the number of Internet and video services customers are generally lower in the second half of the fiscal year as a result of a decrease in economic activity due to the beginning of the vacation period, the end of the television season, and students leaving their campuses at the end of the school year. Cogeco Communications offers its services in several towns with education institutions. In the American broadband services segment, certain areas are also subject to seasonal fluctuations due to the winter and summer seasons.

10.3 FOURTH-QUARTER OPERATING AND FINANCIAL RESULTS

CONSOLIDATED

OPERATING AND FINANCIAL RESULTS

Three months ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Revenue	**583,673**	566,184	3.1	2.7	2,427
Operating expenses	**302,833**	297,977	1.6	1.1	1,441
Management fees – Cogeco Inc.	**5,230**	4,796	9.0	9.0	—
Adjusted EBITDA	**275,610**	263,411	4.6	4.3	986
Adjusted EBITDA margin	**47.2%**	46.5%			

(1) For the three-month period ended August 31, 2019, the average foreign exchange rate used for translation was 1.3222 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of the comparable period of fiscal 2018 which was 1.3100 USD/CDN.

REVENUE

Three months ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Canadian broadband services	**319,935**	319,741	0.1	0.1	—
American broadband services	**263,738**	246,443	7.0	6.0	2,427
	583,673	566,184	3.1	2.7	2,427

(1) For the three-month period ended August 31, 2019, the average foreign exchange rate used for translation was 1.3222 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of the comparable period of fiscal 2018 which was 1.3100 USD/CDN.

Fiscal 2019 fourth-quarter revenue increased by 3.1% (2.7% in constant currency) resulting from:

- growth in the American broadband services segment mainly due to strong organic growth and the FiberLight acquisition.
- stable revenue in the Canadian broadband services segment mainly as a result of:
  - rate increases; partly offset by
  - decreases in video and telephony services customers compared to the same period of the prior year primarily due to issues resulting from the implementation of a new customer management system in the second half of fiscal 2018.

OPERATING EXPENSES

Three months ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Canadian broadband services	**147,815**	153,560	(3.7)	(3.8)	73
American broadband services	**148,215**	136,506	8.6	7.6	1,370
Inter-segment eliminations and other	**6,803**	7,911	(14.0)	(14.0)	(2)
	302,833	297,977	1.6	1.1	1,441

(1) For the three-month period ended August 31, 2019, the average foreign exchange rate used for translation was 1.3222 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of the comparable period of fiscal 2018 which was 1.3100 USD/CDN.

Fiscal 2019 fourth-quarter operating expenses increased by 1.6% (1.1% in constant currency) mainly from:

- additional costs in the American broadband services segment mainly due to higher programming costs, additional headcount to support growth, higher marketing initiatives to drive primary service units growth and the FiberLight acquisition; partly offset by
- lower operating expenses in the Canadian broadband services segment mainly attributable to lower programming costs resulting from a lower level of primary service units and lower compensation expenses resulting from an operational optimization program implemented in the first half of fiscal 2019, partly offset by higher marketing initiatives and
- lower costs in Inter-segment eliminations and other resulting from the timing of certain initiatives.

MANAGEMENT FEES

Fiscal 2019 fourth-quarter management fees paid to Cogeco Inc. reached $5.2 million compared to $4.8 million for the same period of fiscal 2018.

ADJUSTED EBITDA

Three months ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Canadian broadband services	172,120	166,181	3.6	3.6	(73)
American broadband services	115,523	109,937	5.1	4.1	1,057
Inter-segment eliminations and other	(12,033)	(12,707)	(5.3)	(5.3)	2
	275,610	263,411	4.6	4.3	986

(1) For the three-month period ended August 31, 2019, the average foreign exchange rate used for translation was 1.3222 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of the comparable period of fiscal 2018 which was 1.3100 USD/CDN.

Fiscal 2019 fourth-quarter adjusted EBITDA increased by 4.6% (4.3% in constant currency) as a result of:

- an increase in the American broadband services segment mainly as a result of strong organic growth combined with the impact of the FiberLight acquisition; and
- an increase in the Canadian broadband services segment resulting mainly from a decline in operating expenses.

INTEGRATION, RESTRUCTURING AND ACQUISITION COSTS

Fiscal 2019 fourth-quarter integration, restructuring and acquisition costs amounted to $0.7 million mostly due to acquisition and integration costs in the American broadband services segment.

Fiscal 2018 fourth-quarter integration, restructuring and acquisition costs amounted to $1.7 million due to the MetroCast acquisition completed on January 4, 2018.

DEPRECIATION AND AMORTIZATION

Three months ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages)	$	$	%
Depreciation of property, plant and equipment	106,698	106,899	(0.2)
Amortization of intangible assets	14,858	13,172	12.8
	121,556	120,071	1.2

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

Fiscal 2019 fourth-quarter depreciation and amortization expense increased by 1.2% mostly as a result of the impact of the appreciation of the US dollar against the Canadian dollar compared to the same period of the prior year.

FINANCIAL EXPENSE

Three months ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages)	$	$	%
Interest on long-term debt	41,307	46,127	(10.4)
Net foreign exchange losses (gains)	(403)	482	—
Amortization of deferred transaction costs	464	441	5.2
Capitalized borrowing costs	(168)	(162)	3.7
Other	(763)	821	—
	40,437	47,709	(15.2)

(1) Fiscal 2018 was restated to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Discontinued operations" section.

Fiscal 2019 fourth-quarter financial expense decreased by 15.2% mainly due to:

- the reimbursements of $65 million and US$35 million under the Canadian Revolving Facility during the second quarter of fiscal 2019 and of US$328 million during the third quarter of fiscal 2019 following the sale of Cogeco Peer 1; and
- lower debt outstanding and interest rates on the First Lien Credit Facilities; party offset by
- the appreciation of the US dollar against the Canadian dollar compared to same period of the prior year.

INCOME TAXES

Three months ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages)	$	$	%
Current	11,603	9,301	24.8
Deferred	8,899	8,783	1.3
	20,502	18,084	13.4

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

Three months ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages)	$	$	%
Profit before income taxes	112,905	93,954	20.2
Combined Canadian income tax rate	26.50%	26.50%	—
Income taxes at combined Canadian income tax rate	29,920	24,898	20.2
Difference in operations' statutory income tax rates	1,404	73	—
Impact on deferred taxes as a result of changes in substantively enacted tax rates	15	—	—
Impact on income taxes arising from non-deductible expenses and non-taxable profit	220	(397)	—
Tax impacts related to foreign operations	(7,517)	(6,825)	10.1
Other	(3,540)	335	—
	20,502	18,084	13.4

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

Fiscal 2019 fourth-quarter income taxes expense increased by 13.4% compared to the same period of the prior year mainly attributable to:

- the increase in profit before income taxes; and
- the appreciation of the US dollar against the Canadian dollar compared to the same period of the prior year.

PROFIT FOR THE PERIOD

Three months ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages and earnings per share)	$	$	%
Profit for the period from continuing operations	**92,403**	75,870	21.8
Profit for the period	**94,323**	74,818	26.1
Profit for the period from continuing operations attributable to owners of the Corporation	**87,850**	72,753	20.8
Profit for the period attributable to owners of the Corporation	**89,770**	71,701	25.2
Profit for the period from continuing operations attributable to non-controlling interest(2)	**4,553**	3,117	46.1
Basic earnings per share from continuing operations	**1.78**	1.48	20.3
Basic earnings per share	**1.82**	1.45	25.5

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(2) The non-controlling interest represents a participation of 21% in Atlantic Broadband's results by Caisse de dépot et placement du Québec ("CDPQ"), effective since the MetroCast acquisition on January 4, 2018.

Fiscal 2019 fourth-quarter profit for the period from continuing operations and profit for the period from continuing operations attributable to owners of the Corporation increased by 21.8% and 20.8%, respectively, as a result of:

- higher adjusted EBITDA; and
- the decrease in financial expense.

Fiscal 2019 fourth-quarter profit for the period and profit for the period attributable to owners of the Corporation increased by 26.1% and 25.2%, respectively, mainly due to a profit for the period from discontinued operations of $1.9 million due to working capital adjustments during the fourth quarter related to the sale of Cogeco Peer 1 compared to a loss for the period from discontinued operations of $1.1 million for the comparable period of the prior year in addition to the elements mentioned above.

CANADIAN BROADBAND SERVICES

OPERATING AND FINANCIAL RESULTS

Three months ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Revenue	**319,935**	319,741	0.1	0.1	—
Operating expenses	**147,815**	153,560	(3.7)	(3.8)	73
Adjusted EBITDA	**172,120**	166,181	3.6	3.6	(73)
Adjusted EBITDA margin	**53.8%**	52.0%			
Acquisitions of property, plant and equipment	**79,132**	89,405	(11.5)	(11.7)	225
Capital intensity	**24.7%**	28.0%			

(1) For the three-month period ended August 31, 2019, the average foreign exchange rate used for translation was 1.3222 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy. For further details, please consult the "Accounting policies" section.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of the comparable period of fiscal 2018 which was 1.3100 USD/CDN.

REVENUE

Fiscal 2019 fourth-quarter revenue remained essentially the same at $319.9 million compared to $319.7 million for the same period of the prior year mainly as a result of:

- rate increases; partly offset by
- decreases in video and telephony services customers compared to the same period of the prior year primarily due to issues resulting from the implementation of a new customer management system in the second half of fiscal 2018.

OPERATING EXPENSES

Fiscal 2019 fourth-quarter operating expenses decreased by 3.7% (3.8% in constant currency) mainly attributable to:

- lower programming costs resulting from a lower level of primary service units;
- lower compensation expenses resulting from an operational optimization program implemented in the first half of fiscal 2019; and
- costs incurred in fiscal 2018 driven by an increase in headcount to support the stabilization phase of the new customer management system; partly offset by
- higher marketing initiatives.

ADJUSTED EBITDA

Fiscal 2019 fourth-quarter adjusted EBITDA increased by 3.6% (3.6% in constant currency) resulting mainly from a decline in operating expenses.

ACQUISITIONS OF PROPERTY, PLANT AND EQUIPMENT

Fiscal 2019 fourth-quarter acquisitions of property, plant and equipment decreased by 11.5% (11.7% in constant currency) resulting from:

- lower purchases of customer premise equipment due to the timing of certain initiatives; and
- lower costs related to the new customer management system which was implemented in the third quarter of fiscal 2018; partly offset by
- additional investments to improve and expand the network infrastructure; and
- costs related to the new IPTV platform.

Fiscal 2019 fourth-quarter capital intensity reached 24.7% compared to 28.0% for the same period of the prior year mainly as a result of lower capital expenditures.

CUSTOMER STATISTICS

		Net additions (losses) Three months ended August 31,	
	August 31, 2019	**2019**	2018 (1)
Primary service units	**1,810,366**	**(2,846)**	(35,818)
Internet service customers	**788,243**	**2,540**	(2,965)
Video service customers	**649,583**	**(8,164)**	(15,953)
Telephony service customers	**372,540**	**2,778**	(16,900)

(1) Exclude adjustments related to the migration to the new customer management system implemented during the third quarter of fiscal 2018.

During the third quarter of fiscal 2018, the Canadian broadband services segment implemented a new customer management system, replacing 22 legacy systems. While the customer management system was still in the stabilization phase, contact center congestion resulted in lower services activations during most of the fourth quarter of fiscal 2018. Contact center and marketing operations had returned to normal at the end of the first quarter of 2019.

Variations of each services are also explained as follows:

INTERNET

Fiscal 2019 fourth-quarter Internet service customers net additions stood at 2,540 compared to net losses of 2,965 for the same period of the prior year mainly due to:

- the ongoing interest in high speed offerings;
- the sustained interest in bundle offers; and
- the increased demand from Internet resellers; partly offset by
- competitive offers in the industry.

VIDEO

Fiscal 2019 fourth-quarter video service customers net losses stood at 8,164 compared to 15,953 for the same period of the prior year as a result of:

- highly competitive offers in the industry; and
- a changing video consumption environment; partly offset by
- customers' ongoing interest in digital advanced video services; and
- customers' interest in video services bundled with fast Internet offerings.

TELEPHONY

Fiscal 2019 fourth-quarter telephony service customers net additions amounted to 2,778 compared to net losses 16,900 for the same period of the prior year mainly due to:

- more telephony bundles due to additional promotional activity in the second half of fiscal 2019; and
- growth in the business sector; partly offset by
- increasing wireless penetration in North America and various unlimited offers launched by wireless operators causing some customers to cancel their landline telephony services for wireless telephony services only.

AMERICAN BROADBAND SERVICES

OPERATING AND FINANCIAL RESULTS

Three months ended August 31,	2019 (1)	2018 (2)	Change	Change in constant currency (3)	Foreign exchange impact (3)
(in thousands of dollars, except percentages)	$	$	%	%	$
Revenue	**263,738**	246,443	7.0	6.0	2,427
Operating expenses	**148,215**	136,506	8.6	7.6	1,370
Adjusted EBITDA	**115,523**	109,937	5.1	4.1	1,057
Adjusted EBITDA margin	**43.8%**	44.6%			
Acquisitions of property, plant and equipment	**65,967**	72,914	(9.5)	(10.5)	704
Capital intensity	**25.0%**	29.6%			

(1) For the three-month period ended August 31, 2019, the average foreign exchange rate used for translation was 1.3222 USD/CDN.

(2) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy. For further details, please consult the "Accounting policies" section.

(3) Fiscal 2019 actuals are translated at the average foreign exchange rate of the comparable period of fiscal 2018 which was 1.3100 USD/CDN.

REVENUE

Fiscal 2019 fourth-quarter revenue increased by 7.0% (6.0% in constant currency). In local currency, revenue amounted to US$199.5 million compared to US$188.1 million for the same period of fiscal 2018. The increase resulted mainly from:

- rate increases;
- activation of bulk properties in Florida during the fourth quarter of fiscal 2019;
- continued growth in Internet service customers; and
- the FiberLight acquisition completed in the first quarter of fiscal 2019; partly offset by
- a decrease in video service customers.

OPERATING EXPENSES

Fiscal 2019 fourth-quarter operating expenses increased by 8.6% (7.6% in constant currency) mainly as a result of:

- programming rate increases;
- the FiberLight acquisition completed in the first quarter of fiscal 2019;
- higher compensation expenses due to higher headcount to support growth; and
- higher marketing initiatives to drive primary service units growth.

ADJUSTED EBITDA

Fiscal 2019 fourth-quarter adjusted EBITDA increased by 5.1% (4.1% in constant currency). In local currency, adjusted EBITDA amounted to US$87.4 million compared to US$83.9 million for the same period of fiscal 2018. The increase was mainly due to organic growth combined with the impact of the FiberLight acquisition.

ACQUISITIONS OF PROPERTY, PLANT AND EQUIPMENT

Fiscal 2019 fourth-quarter acquisitions of property, plant and equipment decreased by 9.5% (10.5% in constant currency) mainly due to:

- lower purchases of customer premise equipment due to the timing of certain initiatives; and
- lower capital expenditures due to the timing of certain initiatives; partly offset by
- additional capital expenditures related to the expansion in Florida.

Fiscal 2019 fourth-quarter capital intensity reached 25.0% compared to 29.6% for the same period of the prior year as a result of revenue growth combined with lower capital expenditures.

CUSTOMER STATISTICS

		Net additions (losses) Three months ended August 31,	
	August 31, 2019	**2019**	2018
Primary service units	**901,446**	**7,431**	2,797
Internet service customers	**446,137**	**2,441**	4,693
Video service customers	**312,555**	**5,294**	(3,046)
Telephony service customers	**142,754**	**(304)**	1,150

INTERNET

Fiscal 2019 fourth-quarter Internet service customers net additions stood at 2,441 compared to 4,693 for the same period of the prior year as a result of:

- additional connects related to the Florida expansion initiatives and in the MetroCast footprint;
- our customers' ongoing interest in high speed offerings; and
- growth in both the residential and business sectors.

VIDEO

Fiscal 2019 fourth-quarter video service customers net additions stood at 5,294 compared to net losses of 3,046 for the same period of the prior year mainly from:

- the activation of bulk properties in Florida during the fourth quarter of fiscal 2019; and
- our customers' ongoing interest in TiVo's digital advanced video services; partly offset by
- competitive offers in the industry; and
- a changing video consumption environment.

TELEPHONY

Fiscal 2019 fourth-quarter telephony service customers net losses stood at 304 compared to net additions of 1,150 for the same period of the prior year mainly as a result of a decline in the residential sector, partly offset by growth in the business sector.

CASH FLOW ANALYSIS

Three months ended August 31,	2019	2018 (1)	Change
(in thousands of dollars, except percentages)	$	$	%
Cash flow from operating activities	304,702	255,438	19.3
Cash flow from investing activities	(144,332)	(194,474)	(25.8)
Cash flow from financing activities	(50,198)	(52,127)	(3.7)
Effect of exchange rate changes on cash and cash equivalents denominated in a foreign currency	(1,405)	(63)	—
Net change in cash and cash equivalents from continuing operations	108,767	8,774	—
Net change in cash and cash equivalent from discontinued operations(2)	—	13,133	(100.0)
Cash and cash equivalents, beginning of the period	447,737	62,818	—
Cash and cash equivalents, end of the period	556,504	84,725	—

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

(2) For further details on the Corporation's cash flow attributable to discontinued operations, please consult the "Discontinued operations" section.

OPERATING ACTIVITIES

Fiscal 2019 fourth-quarter cash flow from operating activities increased by 19.3% compared to the same period of the prior year mainly from:

- higher adjusted EBITDA;
- the decreases in income taxes paid and financial expense paid; and
- the increase in changes in non-cash operating activities primarily due to changes in working capital.

INVESTING ACTIVITIES

Fiscal 2019 fourth-quarter investing activities decreased by 25.8% compared to the same period of the prior year mainly due to the acquisition of spectrum licenses in the Canadian broadband services segment in the comparable period of the prior year combined with a decrease in acquisitions of property, plant and equipment.

ACQUISITIONS OF PROPERTY, PLANT AND EQUIPMENT

The acquisitions of property, plant and equipment as well as the capital intensity per operating segment are as follows:

Three months ended August 31,	2019	2018 (1)	Change	Change in constant currency (2)
(in thousands of dollars, except percentages)	$	$	%	%
Canadian broadband services	79,132	89,405	(11.5)	(11.7)
Capital intensity	24.7%	28.0%		
American broadband services	65,967	72,914	(9.5)	(10.5)
Capital intensity	25.0%	29.6%		
Consolidated	145,099	162,319	(10.6)	(11.2)
Capital intensity	24.9%	28.7%		

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy. For further details, please consult the "Accounting policies" section.

(2) Fiscal 2019 actuals are translated at the average foreign exchange rate of the comparable period of fiscal 2018 which was 1.3100 USD/CDN.

Fiscal 2019 fourth-quarter acquisitions of property, plant and equipment decreased by 10.6% (11.2% in constant currency) mainly due to lower capital expenditures in the Canadian and American broadband services segments.

Fiscal 2019 fourth-quarter capital intensity reached 24.9% compared to 28.7% for the same period of the prior year mainly as a result of lower capital capital expenditures combined with higher revenue.

FREE CASH FLOW

Fiscal 2019 fourth-quarter free cash flow increased by 76.5% (76.9% in constant currency) compared to the same period of the prior year, mainly due to the following:

- higher adjusted EBITDA;
- the decrease in acquisitions of property, plant and equipment; and
- the decrease in financial expense.

FINANCING ACTIVITIES

Fiscal 2019 fourth-quarter change in cash flows arising from financing activities is mainly explained as follows:

Three months ended August 31,	**2019**	2018	Explanations
(in thousands of dollars)	**$**	$	
Decrease in bank indebtedness	**(4,821)**	(9,913)	Related to the timing of payments made to suppliers.
Net decrease under the revolving facilities	**—**	(13,342)	Repayments of the revolving facilities in the fourth quarter of fiscal 2018.
Repayment of long-term debt	**(5,650)**	(5,548)	Not significant.
Increase in deferred transaction costs	**(1,778)**	—	Not significant.
	(12,249)	(28,803)	

DIVIDENDS

During the fourth quarter of fiscal 2019, a quarterly eligible dividend of $0.525 per share was paid to the holders of subordinate and multiple voting shares, totalling $25.9 million, compared to an eligible quarterly dividend paid of $0.475 per share, or $23.4 million in the fourth quarter of fiscal 2018.

NORMAL COURSE ISSUER BID

During the fourth quarter of fiscal 2019, Cogeco Communications purchased and cancelled 169,800 subordinate voting shares with average stated value of $4.7 million for a total consideration of $17.9 million.

11. FISCAL 2020 FINANCIAL GUIDELINES

Cogeco Communications maintains its fiscal 2020 preliminary financial guidelines as issued on July 10, 2019.

The Corporation presents its financial guidelines on a constant currency basis and believes this presentation enables an improved understanding of the Corporation's underlying financial performance, undistorted by the effects of changes in a foreign currency rate. Measures on a constant currency basis are considered non-IFRS measures and do not have any standardized meaning prescribed by IFRS and therefore, may not be comparable to similar measures presented by other companies. Moreover, the financial guidelines exclude possible acquisitions and do not take into consideration the recent CRTC costing decision setting final rates for aggregated wholesale Internet services for resellers, since these new rates are being disputed in court. For further details, please consult the "Business developments" subsection.

On a constant currency and consolidated basis, Cogeco Communications expects fiscal 2020 revenue to grow between 2% and 4% mainly as a result of organic growth in the American broadband services segment for both the residential and business sectors, the continued expansion in Florida and annual rate increases. In the Canadian broadband services segment, revenue growth should stem primarily from growth in the business sector and Internet customer additions.

On a constant currency and consolidated basis, fiscal 2020 adjusted EBITDA should grow between 2.5% and 4.5% mainly as a result of revenue growth exceeding operating expenses in both the American and Canadian broadband services segments.

The capital intensity ratio should increase as a result of capital expenditures growth exceeding revenue increase. In the American broadband services segment, higher capital expenditures are expected due to the continued Florida network expansion and additional investments in our network infrastructure in the areas we serve, partly offset by lower capital expenditures due to the completion of equipment replacements in the MetroCast regions in fiscal 2019. In the Canadian broadband services segment, stable capital expenditures are expected as a result of lower customer premise equipment costs, offset by investments to expand our network footprint across Ontario and Québec combined with investments in digitalization projects.

Free cash flow on a constant currency and consolidated basis should increase between 5% and 11% mainly due to the growth of adjusted EBITDA, partly offset by higher capital expenditures.

The following table outlines fiscal 2020 financial guidelines ranges on a consolidated basis:

	Projections (prior to the adoption of IFRS 16) (1)	Actual
	Fiscal 2020 (2)	Fiscal 2019
(in millions of dollars, except percentages)	$	$
Financial guidelines		
Revenue	Increase of 2% to 4%	2,332
Adjusted EBITDA	Increase of 2.5% to 4.5%	1,108
Acquisitions of property, plant and equipment	$460 to $480	435
Capital intensity	19% to 20%	18.6%
Free cash flow(3)	Increase of 5% to 11%	454

(1) Fiscal 2020 financial guidelines presented as percentages reflect increases over projections for fiscal 2019 prior to the adoption of IFRS 16, *Leases*. However, management does not expect the adoption of IFRS 16 will have a significant impact on its results of operations, and therefore financial guidelines should not be impacted.

(2) Fiscal 2020 financial guidelines are based on a USD/CDN exchange rate of 1.3255 USD/CDN.

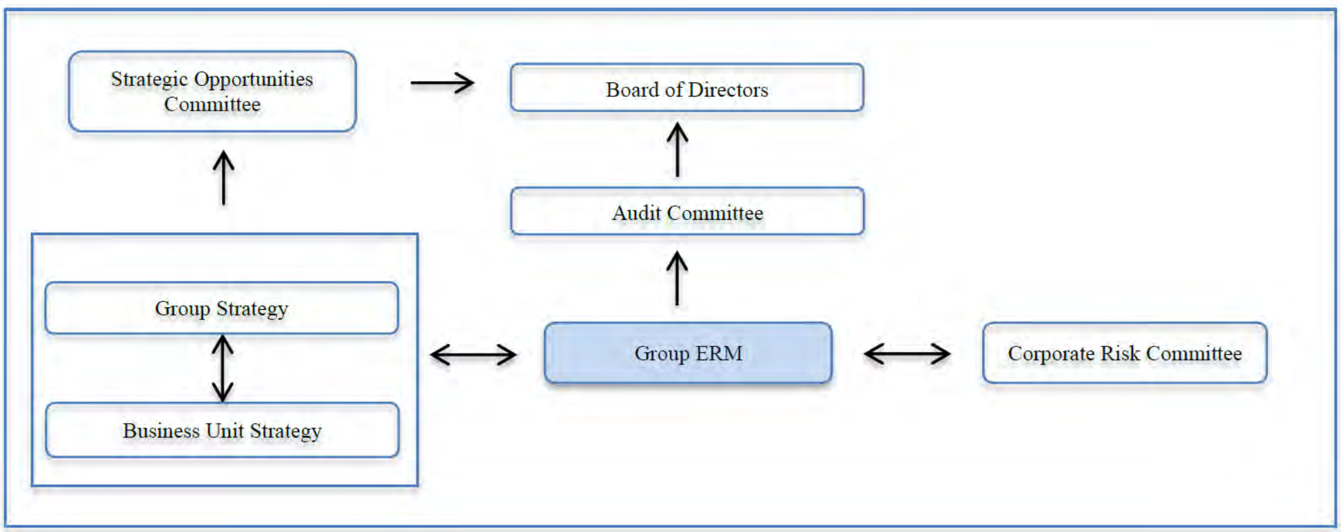
(3) The assumed current income tax effective rate is approximatively 12%

12. UNCERTAINTIES AND MAIN RISK FACTORS

This section outlines the principal risks and uncertainties which Cogeco Communications and its subsidiaries currently believe to be material. It does not purport to cover all contingencies, or to describe all possible factors that might have an influence on the Corporation or its activities at any point in time. Furthermore, the risks and uncertainties outlined in this section may or may not materialize in the end, may evolve differently than expected or may have different consequences than those that are currently anticipated. If any of the following risks, or any other risks and uncertainties that the Corporation and its subsidiaries have not yet identified or that they currently consider not to be material, actually occur or become material risks, the Corporation and its subsidiaries' businesses, guidance, prospects, financial condition, results of operations and cash flows and consequently the price of the subordinate voting shares could be materially and adversely affected.

ENTERPRISE RISK MANAGEMENT

The Corporation has a formal integrated enterprise-wide risk management ("ERM") program structured and governed based on the widely adopted *Committee of Sponsoring Organisations of the Treadway Commission* ("COSO") ERM integrated framework. The ERM approach is supported by a Risk Governance Ecosystem as illustrated below.



The Risk Governance Ecosystem solicits input from corporate functions as well as business units and feeds the strategic planning process.

Annual Consolidated Risk Assessment	On an annual basis, principal business risks that could impact the Corporation are identified during an Executive Risk Workshop. Risks considered are not only strategic, operational, financial and compliance in nature but also environmental, social and governance ("ESG") related. In addition, during this workshop, the Risk Appetite Framework, guiding strategic decision making, is reviewed and updated, as needed. Critical output from this workshop is used in the preparation of the corporate strategy and presented to the Board of Directors as part of the strategic planning process.
Business Unit Risk Assessment	As part of the strategic planning process, business units identify the principal risks specific to their business unit as well as mitigation plans.
Risk Oversight	On an annual basis, the Board, with the Audit Committee, reviews the principal business risks facing the Corporation and its subsidiaries as well as the mitigation measures implemented to manage these risks. On a quarterly basis: - the Corporate Risk Committee, comprised of the CEO and his direct reports, governs risk management. - the Audit Committee oversees the ERM activities and the operational and financial risks associated with significant programs or projects of the Corporation.
Other Risk Related Activities	A risk universe and trends universe (e.g. industry, technology, regulatory, social, economic, political) is maintained by the ERM function and updated through exchanges with members of the business units covering risks and key trends that could impact our risk assessment and strategic planning.

12.1 COMPETITIVE RISKS

The industries in which we operate are very competitive, and we expect competition to increase and intensify from a number of sources in the future. Some of our competitors have longer operating histories, significantly greater financial, technical, marketing and other resources, greater brand recognition, a larger base of customers while some are digital native organizations with lower cost structures due to the absence of legacy systems to maintain. In addition, some competitors are pursuing an overbuild strategy, i.e building a network in areas where a competitor network already exists, in certain markets to grow their footprint. Our competitors may be able to adapt more quickly to new or emerging technologies, changes in customer expectations, and may also be able to develop services comparable or superior to those offered by us at more competitive prices. Aggressive pricing and market offers of our competitors could result in pricing pressures and increased customer acquisition and retention costs and could put pressure and adversely affect our businesses and results of operations. Our ability to compete successfully within one or more of our market segments may thus decline in the future due to increased competition from current competitors or from new entrants taking bold actions to establish, sustain or increase their position in the market. Our businesses and results of operations could be materially adversely affected to the extent that we are unable to retain our existing customers and grow our customer base while maintaining our adjusted EBITDA margins and desired capital intensity.

***We face intensifying competition in our Canadian broadband services segment from several large integrated communications service providers and Internet resellers*.**

In Canada, there are several terrestrial, wireless and satellite transmission technologies available to deliver a wide range of communications services to residential homes and to commercial establishments with varying degrees of flexibility and efficiencies, which compete with our Internet, video and telephony services. BCE Inc. ("Bell"), the largest competitor, offers through its various operating entities similar competitive voice, Internet and video services to residential as well as to business customers in the provinces of Québec and Ontario through a combination of wireline and satellite platforms throughout our network footprint. TELUS Communications Company ("Telus") offers through its various operating entities similar competitive voice, Internet and video services to residential as well as to business customers in Eastern Québec.

Bell and Telus are replacing older telephone systems with new fibre-to-the-home ("FTTH") networks to deploy IP television services in their service areas. The fibre optic technologies they are using are capable of carrying two-way video, Internet and telephony services, each of which is comparable to the services Cogeco Connexion offers.

We also compete within our network footprint in Canada with several other telecommunications service providers. Shaw Direct, the direct-to-home satellite service of Shaw Communications Inc. ("Shaw") competes for video customers throughout our footprint.

Bell, Telus, Rogers, Vidéotron and Shaw are actively marketing their wireless telecommunications services within our network footprint, increasing competition between wireless technology and wireline broadband access in our territories.

Cogeco Connexion also faces competition from several resellers who have subscribed to the wholesale third party Internet access ("TPIA") service mandated by the Canadian Radio-Television and Telecommunications Commission ("CRTC") in order to provide Internet, telephony and to a lesser extent, video services to their customers. Resellers' market share is growing, especially in Québec and Ontario, the two regions in Canada where the resellers have been more active and are marketing their services. The recently CRTC mandated revised wholesale rates, if enforced, will provide TPIAs with a cost structure which could lead to increased competition either from established TPIA providers or new entrants. Cogeco Connexion also faces competition from satellite-based access Internet services.

Certain Canadian municipalities also plan to build and operate their own broadband networks through public/private partnership arrangements in competition with the Corporation in some of its serving areas.

Some of the large integrated communications service providers we compete with in Canada also own broadcast content assets.

Some of the large integrated communications service providers we compete with in Canada such as Bell, also own broadcast content assets. This vertical integration could result in content being withheld from us or being made available to us at inflated prices or unattractive terms. Potential anti-competitive practices in dealings between programming content owners and distributors are discussed in the "Regulatory Risks" section below.

Intensifying competition in the American Broadband services segment.

Our main competitors in the United States for video services are direct broadcast satellite ("DBS") providers, DirecTV, Inc. (owned by AT&T) and Dish Network. We also face increasing competition for our video services from phone companies with fibre networks, such as AT&T U-verse, Verizon FiOs and Frontier Communications Corporation, as well as other cable companies, such as Comcast. We are also facing intensified competition from overbuild strategies in our Florida, Connecticut and New Hampshire markets.

Our competitors for Internet services primarily offer direct subscriber line ("DSL"), and, to a lower extent fiber-to-the-node ("FTTN") and FTTH. We also face little competition from wireless Internet service providers. AT&T is also promoting its DirecTV service with its wireless products.

Our telephony services face competition from the incumbent local exchange carriers ("ILEC"), as well as other providers such as wireless and VoIP providers. Our business services face competition from a variety of service providers, in addition to cloud, hosting and various applications.

We face competition in both the Canadian and American Broadband services segments from over-the-top ("OTT") content providers.

Cogeco Connexion and Atlantic Broadband also face competition from OTT video content providers. The majority of households use OTT services such as Netflix as they complement wired video services. The OTT trend is expected to continue and we could be materially adversely affected if, as a result, a significant number of video customers disconnected their services or reduced their video spending and we may not be able to make up for the loss of revenue associated with this migration.

Some of our main video competitors, such as Bell in Canada or AT&T/DirecTV and Dish Network in the United States, have entered the OTT sphere with their own OTT services. Additionally, several programming networks distributed by the Corporation offer direct-to-consumer products, such as Sportsnet in Canada or HBO Now, CBS All Access and Showtime Anytime in the United States. The Corporation enables the delivery of certain OTT services on its set top boxes, but does not own any OTT platform.

An increased number of consumers are switching from landline telephony to wireless and IP based phone services.

An increased number of fixed phone customers are replacing fixed lines with wireless and IP based phone services. This trend is largely the result of the increasing wireless penetration rate in North America and the various unlimited offers launched by wireless operators. We do not currently offer wireless services and, therefore, further erosion of fixed phone customers could have a material adverse effect on our business, financial condition, prospects and results of operations.

Wireline to wireless home broadband substitution will likely increase.

An increasing number of wireline Internet customers are expected to replace wireline broadband Internet access with wireless Internet access with the launch by Canadian wireless operators, of faster speeds and unlimited data packages at attractive price points. We do not currently offer wireless services and, therefore, further erosion of traditional Internet customers moving away from wireline Internet access towards wireless broadband access could have a material adverse effect on our business, financial condition, prospects and results of operations.

We do not currently offer "four play" bundles that include wireless communications.

Although we provide "double play" and "triple play" bundled services in Canada and the United States, with various combinations of Internet, video and landline telephony services being offered at bundled prices, we do not offer "four play" bundled services which include wireless communications.

We remain interested in offering wireless services to complement our service offerings to customers within our current footprint and grow our share of our customers' telecommunications spending. We are aiming to enter the wireless space on a limited basis on the condition that it is a profitable business and intend to invest prudently in line with our priorities and within our financial means. We believe that the model that is most likely achievable, while satisfying our profitability requirements is a hybrid model that would consist of segments relying on the mobile virtual network ("MVNO") model where we would use an incumbent’s networks to offer wireless services as well as some areas where we may be a facilities-based operator. We have started devoting relatively small amounts of capital towards accumulating spectrum to cover part of our territory, which we may use in such a hybrid MVNO model or offer out in a partnership arrangement. However, we may not be able to secure on a timely basis the appropriate arrangements required to launch a wireless operation. Also, launching a wireless operation may result in downward pressure on adjusted EBITDA margins and free cash flow.

12.2 BUSINESS RISKS

STRATEGIC PLAN AND BUSINESS STRATEGIES

Our ability to successfully implement our business strategies described above in section "Corporate objectives and strategies" of this report in a timely and coordinated manner and to realize their anticipated benefits could be adversely affected by a number of factors beyond our control, including operating difficulties, increased ongoing operating expenses, regulatory developments, general economic conditions, increased competition, technological changes and the other factors described in this "Uncertainties and Main Risk Factors" section. Failure to successfully implement and execute our strategic plan and business strategies in a timely and coordinated manner could have a material adverse effect on our reputation, business, financial condition, prospects and results of operations and on our ability to meet our obligations, including our ability to service our Indebtedness.

PROGRAMMING COSTS

The financial performance of our businesses depends in large part on our ability to sustain adjusted EBITDA margins by tightly controlling operating expenses. One of the largest drivers of such operating expenses is the programming license fees we pay to television programming service suppliers. The programming license fees of certain television programming services have increased significantly in Canada and in the United States in recent years, particularly for sports programming. Future increases in programming license fees could have a material adverse effect on our business and results of operations.

In Canada, the market for video content services is characterized by high levels of supplier concentration and vertical integration. Our largest programming supplier is Bell, with approximately 38% of our overall programming costs. Bell is vertically integrated and is also our largest competitor. While we have generally been able to obtain satisfactory distribution agreements with programming service suppliers in Canada to date, we may not be able to maintain our current arrangements, or conclude new arrangements that are economically viable, therefore the number of video channels may change from year to year.

Certain affiliation agreements with some of our major programming suppliers have expired and the terms and conditions for their renewal have not yet been fully concluded. We may be subject in upcoming Canadian programming services renewals to regulatory dispute resolution proceedings which could either help us obtain reasonable affiliation terms or compel us to pay increased programming license fees or otherwise subject us to adverse competitive conditions.

While the programming costs in the United States showed some signs of stabilization in the last year, our ability to access content at reasonable rates, terms and conditions could be negatively impacted by the changing content landscape resulting from the increasing number of company mergers such as AT&T and Time Warner, Disney and 21st Century Fox, in 2018 and the pending Viacom and CBS merger expected in late 2019 early 2020. This ongoing consolidation activity could enable combined companies to leverage popular content and negotiate better terms with us in the future or require that we carry their less popular services, thus further increasing our costs. In addition to the increase in programming costs, most of our programming agreements require us to meet certain penetration thresholds, which limit our ability to offer smaller tiers and packages. Some of these same programmers are simultaneously launching their own direct-to-consumer products to effectively compete with programming distributors.

We are also subject in the United States to increasing financial and other demands by broadcasters to obtain the required consent for the transmission of local broadcast programming to our customers. We obtain most local broadcast programming through retransmission consent agreements. Most agreements require payment of a flat fee per customer for retransmission of the broadcaster's primary signal. In most cases these agreements also involve the exchange of other types of considerations, such as limited grants of advertising time and the carriage of multicast signals. The landscape continues to evolve with the pending purchase by Sinclair Broadcasting Group's, the largest affiliate broadcaster, of select regional sports networks further enhancing its leverage over programming distributors. We expect to continue to be subject to significant increases in fees by broadcasters in exchange for their required consent for the retransmission of local broadcast programming to customers.

The inability to acquire and provide content to our customers that meets their expectations in terms of quality, format, variety of programming choices, packages and platforms at competitive rates which customers can afford to pay, could have a material adverse effect on our businesses as well as on our adjusted EBITDA margins should we fail to pass on the incremental increase in costs of programming to our customers.

CUSTOMER EXPERIENCE

The Corporation strives to maintain respectful and transparent relationships with its customers by providing a superior customer service experience and through honest marketing of its products. The loyalty of our customers and their retention depend on our ability to provide a service experience that meets or exceeds their expectations. The Corporation firmly believes that customer service represents a key differentiator and has enacted various programs and actions at its different business units to constantly improve the customer service experience and build upon this reputational capital. In fiscal 2018, Cogeco Connexion launched a new customer management system which involved the data conversion and migration of approximately one million Québec and Ontario residential and business customers. Some difficulties were encountered during the transition to this new system which impacted the customer service experience. The failure to sustain and expand customer relationships through quality customer service could have a material adverse effect on our businesses, financial condition and results of operations.

MEETING CUSTOMER EXPECTATIONS

Consumers continue to shift their media consumption towards digital and online media, mobile devices and on-demand content requiring industry players to increase their efforts in digital content and capabilities in order to compete. Consumers are also responding more and more to personalized content and marketing. In addition, rising OTT fragmentation is triggering a consumer call for aggregation of OTT offerings on a common platform. The Corporation has various on-going initiatives in place to evolve its products and service offerings, in the digital space, in line with customer expectations. Failure to anticipate and respond in a timely manner to changing customer expectations, changes in consumer behavior, technology trends and new market conditions may result in an outdated product/services portfolio, thus impairing our ability to retain current customers and attract new ones. The inability to adapt and evolve our service offerings to respond to changing customer expectations in an increasingly digitized world, new market conditions or disruptive technologies could have a material adverse effect on our businesses, financial condition and results of operations.

MARKETING AND SALES

The evolution of technology has enabled more targeted marketing approaches, initiatives and campaigns, thus changing the dynamics of the competitive environment. The Corporation is evolving its marketing and sales approach to align with customer preferences powered by machine learning and artificial intelligence and automated marketing platform based on a highly segmented outreach. The failure to achieve sales growth targets as a result of inadequate marketing and/or sales strategies, a deficient execution of said strategies or operating difficulties could have a material adverse effect on our business, financial condition and results of operations.

RELIANCE ON THIRD PARTIES

We depend on long-term agreements with a supplier in Canada and a supplier in the United States, for the provision of our telephony services to our residential and business customers.

We currently offer video services to our customers in our Canadian and American footprint through a combination of equipment from various suppliers.

All these suppliers may experience business difficulties, restructure their operations, consolidate with other suppliers, discontinue products or sell their operations to other suppliers, which could affect the future development of our products and services. The inability to meet product or service delivery objectives or having to incur increased costs as a result of a failure in supply from third-party suppliers or change in suppliers could have a material adverse effect on our business, financial condition and results of operations.

MERGERS/ACQUISITIONS, DIVESTITURES AND REORGANIZATIONS

Cogeco Communications has grown through acquisitions and will continue to seek attractive acquisition opportunities in the future. Achieving the expected benefits of acquisitions depends in part on successfully consolidating functions, integrating operations, procedures and personnel in a timely and efficient manner and realizing revenue, synergies and other growth opportunities from combining acquired businesses with those of Cogeco Communications. There is no assurance that the integration of acquisitions will be successful and will deliver the anticipated benefits and results. The integration process after an acquisition may lead to greater than expected operating expenses, financial leverage, capital costs, customer losses, business disruption of our other businesses and management's diversion of time and resources. We may also be required to make capital expenditures or other investments, which may affect our ability to implement our business strategies to the extent we are unable to secure additional financing on acceptable terms or generate sufficient funds internally to cover these requirements. In addition, an acquired business could have liabilities that we fail or are unable to uncover and for which the Corporation may be responsible. Depending on the circumstances, pursuing acquisitions may also require that we raise additional capital, through debt or equity, and establish relationships with new financing partners, or use cash that would otherwise have been available to support our existing business operations. Any failure by Cogeco Communications to successfully integrate or address the risks associated with acquisitions or to take advantage of future strategic opportunities could materially adversely affect our financial position, financial performance, cash flows, business or reputation.

FOREIGN OPERATIONS

Our American Broadband services activities are carried out by Atlantic Broadband in 11 states along the East Coast from Maine to Florida and represent 44.5% of the consolidated revenue of the Corporation. There are significant complexities and risks involved with carrying foreign operations, such as differences in political, legal, regulatory and taxation regimes or fluctuations in relative currency values against the Canadian dollar, all of which could have a material adverse effect on our operating and financial results.

TALENT MANAGEMENT AND SUCCESSION PLANNING

The fast pace of technological advancements and the digitization within the industry and the workplace have created a shortage of digital skills as industry players compete for the same resources. In addition, employees expectations are evolving requiring comprehensive employee experiences to attract and retain talent. Our success is substantially dependent on our capacity to attract new talent and our ability to retain existing talent and foster continued performance of our employees and executive officers. Many of these employees and executive officers are uniquely qualified in their areas of expertise, making it difficult to replace their services. Retaining key employees and executive officers is especially important to our business in order to keep pace with technological change and to avoid losing critical knowledge in the context of the organization's continued expansion. The loss of the services of any key executives and/or employees in critical roles or inadequate processes designed to attract, develop, motivate and retain productive and engaged employees could impact our ability to deliver on organizational goals and have a material adverse effect on our growth, business and profitability. The Corporation is actively engaged in fully participating in its employees' professional development and well-being by offering competitive working conditions and through a variety of programs that promote continuous education, a healthy and safe work environment as well as diversity.

LABOUR RELATIONS

Collective bargaining agreements are in place with some of our employees that are renewed from time to time in the normal course of business. The Corporation has been successful to date in negotiating satisfactory collective agreements with unions without significant labour disruption. While the Corporation's labour relations have been satisfactory in the past, we can neither predict the outcome of current or future negotiations relating to labour disputes, union representation or renewal of collective bargaining agreements, nor be able to avoid future work stoppages, strikes or other forms of labour protests pending the outcome of any current or future negotiations. A prolonged work stoppage, strike or other form of labour protest could have a material adverse effect on our businesses, operations and reputation. Even if we do not experience strikes or other forms of labour protests, the outcome of labour negotiations could adversely affect our businesses and results of operations. In addition, our ability to make short-term adjustments to control compensation and benefits costs is limited by the terms of our collective bargaining agreements.

12.3 REGULATORY RISKS

REGULATORY RISKS - CANADIAN AND AMERICAN BROADBAND SERVICES

Our Canadian and American broadband operations are subject to extensive regulation and policies.

Our Canadian and American broadband operations are subject to extensive and evolving laws, regulations and policies at the federal, provincial, state and local levels. Cogeco Connexion is primarily regulated respectively under the *Broadcasting Act* and the *Telecommunications Act* and regulations thereunder while Atlantic Broadband is regulated mainly by the *Communications Act*. In addition, they are both subject to other laws relating to copyright and intellectual property, data protection, privacy of personal information, spam, e-commerce, direct marketing and digital advertising which have become more prevalent in recent years. Changes to existing laws and regulations, the adoption of new laws and regulations as well as periodic reviews of copyright royalties payable in relation to the use by the Corporation of protected content could have negative financial, operational or competitive consequences on our business, financial condition, prospects and results of operations by increasing our costs, limiting our revenues and/or imposing additional restrictions on our operations.

Regulations and policies are evolving rapidly.

Several recent proceedings and decisions of the CRTC in Canada and the Federal Communications Commission ("FCC") in the United States could have a material adverse effect on our business and results of operations.

Canada

On December 19, 2018, the Copyright Board of Canada issued the rates payable for period 2014-2018 for the retransmission of distant Canadian and US television over-the-air signals in Canada. The 2018 rate established at $1.17 per subscriber per month represented a significant increase over the previous rate and was applied retroactively to 2014. This rate is the interim rate applicable going forward until rates for period 2019-2023 are either settled through negotiations or certified by the Copyright Board. In June 2018, the retransmission collective societies have filed their proposed rates for 2019-2023 asking for increases that range from $8.00 per subscriber per month in 2019 to $9.50 in 2023. The industry has duly opposed these rates. Any such further increase to the royalties payable under the statutory retransmission regime established under the *Copyright Act* could have a material impact on the financial condition and results of operations of the Corporation.

On February 28, 2019, the CRTC initiated a public consultation to review mobile wireless services in Canada. In this proceeding, the CRTC will consider three areas for review: (i) competition in the retail wireless market, (ii) the current wholesale mobile wireless service regulatory framework, with a focus on wholesale MVNO access, and (iii) the future of mobile wireless services in Canada, with a focus on reducing barriers to infrastructure deployment. The CRTC is concerned that the mobile wireless market continues to demonstrate a high degree of market concentration. To protect the interest of users and further the policy objectives of the Telecommunications Act, the CRTC has determined as a preliminary view in this Notice of Consultation, that it would be appropriate to mandate the national wireless carriers in Canada (Bell Mobility, Rogers Communications and Telus Communications) to provide wholesale MVNO access as an outcome of the proceeding. The CRTC received initial submissions on May 15, 2019 which will be followed by a public hearing scheduled to begin on January 13, 2020. A decision is expected sometime in mid-2020.

On May 15, 2019, the Parliament's Standing Committee on Canadian Heritage released its report on the review of the *Copyright Act*, following its study of remuneration models for artists and creative industries and after conducting hearings with witnesses from various sectors of activities, stakeholders and legal experts. The report contains a set of recommended amendments to the *Copyright Act*. It is difficult to predict if these recommendations will be adopted over time or the extent to which any changes might adversely affect us.

On June 3, 2019, the CRTC released an application guide for the Broadband Fund which will make available up to $750 million over the first five years to support projects aiming to build or upgrade infrastructure for fixed and wireless broadband Internet access services. It also released at the same time the first call for applications for funding projects in 1) eligible satellite-dependent communities located in Northern Canada, or 2) eligible geographic areas in the North West Territories, Nunavut or Yukon. Following an analysis of the published maps outlining the eligible communities and areas for the first call for applications, the Corporation concluded that these communities and areas were not targeted by our network expansion strategy. The next call for applications is expected to be launched in the fall 2019. Other governmental subsidies are expected to be made available in the next fiscal year through federal or provincial programs such as the Universal Broadband fund (ISED) and the Québec Haut Débit program. It is difficult to predict how much funds the Corporation will be able to secure from these programs and the impact it may have on its business and affairs.

On June 5, 2019, Innovation, Science and Economic Development Canada ("ISED") released its decision regarding Millimetre wave ("mmWave") spectrum to support 5G, which appears as a generally favorable decision as it frees up considerable mmWave spectrum for future 5G deployment. On July, 23, 2019, ISED announced that it would move ahead with the creation of smaller license Tier 5 license areas for spectrum in order to support more efficient use of spectrum resources and encourage network rollout in rural and remote areas. In addition, ISED also decided to move to a consumption-based license fee model for fixed point to point systems which will reduce significantly the license fees to be paid for operating these systems in future. ISED is currently reviewing the allocation rules of the 3500 MHZ spectrum with an auction expected to be held in 2020.

On June 18, 2019, the Federal Court of Appeal ("FCA") granted to Québecor the right to appeal a decision issued by the CRTC compelling TVA Group Inc. to continue providing its programming service, TVA Sports, to Bell TV customers until they can reach an agreement concerning the carriage and distribution terms of TVA Sports or until the CRTC renders a decision on matters not resolved by agreement. This order is commonly referred to as a "standstill" order and is made to enforce the "standstill" rule in the *Discretionary Services Regulations*. Québecor is arguing that the CRTC does not have the jurisdiction pursuant to the *Broadcasting Act* to interfere in commercial relations and force a party to maintain the distribution of a television signal during a dispute and that the standstill rule conflicts with the *Copyright Act*. Should the court confirm Québecor's position, this decision would have negative consequences for the Corporation as it would eliminate negotiation safeguards to ensure that broadcasting distribution undertakings ("BDUs") or Canadian programming service licensees are not threatened with the withdrawal of popular programming services or forced to accept unreasonable terms and conditions while disputes are pending before the CRTC. The Corporation has filed leave to intervene before the Federal Court of Appeal on September 26, 2019 and will seek to have the court declare that the "standstill" rule is within the jurisdiction of the CRTC and does not conflict with the Copyright Act. Other motions for intervention have been filed by the Attorney General of Canada and Telus. In the absence of such negotiation safeguards, contained in *Discretionary Services Regulations* and in the *Wholesale Code* adopted in 2016 to govern the commercial arrangements between BDUs and programming services and in conditions of license of licensees, there is a risk that vertically integrated competitors may abuse their market power and impose anticompetitive terms for the distribution of their programming services or attempt to withhold content from us.

On June 26, 2019, the Review Panel appointed in 2018 by the Federal Government to review and modernize the *Broadcasting Act, the Radiocommunication Act* and the *Telecommunications Act (the "Acts")*, released its preliminary report, after having held working sessions and meetings with industry stakeholders throughout the year. The report entitled "What We Heard" summarizes the input received from Canadians representing a wide range of views from diverse groups of interested parties. The report contains neither recommendations nor conclusions on any issue in its mandate. The panel is expected to report to the Government with its recommendations by January 31, 2020. It is difficult to predict how the *Acts* will be amended, and if so, when these changes will be implemented or how they will be construed by the relevant courts or the extent to which any changes might adversely affect us.

On August 15, 2019, the CRTC issued its costing decision setting final rates for aggregated wholesale Internet services for resellers, significantly lowering the interim rates it had previously fixed in 2016 and applying the new rates on a retroactive basis. On September 13, 2019, Cogeco Communications, along with other telecommunications service providers, jointly filed an application for leave to appeal the CRTC order to the FCA and to suspend its effect pending the Court decision to hear the matter. The FCA granted the interim stay on September 27, 2019, with the result, for the time being, of not having to implement the new rates nor to make the retroactive payments estimated at $25 million for the Corporation as of August 31, 2019, based on the CRTC's final aggregated wholesale service rates being disputed in court. Due to FCA granting of the interim stay and the significant uncertainty surrounding both the outcome and the amount, the Corporation has therefore not recorded the impact of the new reduced rates in the 2019 financial statements. The outcome of these proceedings and the resulting wholesale rates applicable to Internet resellers could have a material adverse effect on our business, financial condition and results of operations.

United States

The FCC has taken since 2017 a less interventionist approach to regulatory requirements. Such approach, however, could negatively impact the Corporation in certain areas, such as carriage rights for broadcast stations and programming networks. Additionally, the recent increase in the consolidation of broadcast station ownership, as well as the consolidation of vertically-integrated communications service providers with distribution and programming ownership interests could negatively impact our ability to obtain carriage rights on reasonable, non-discriminatory terms and conditions.

Following the issuance by the FCC of its *2018 Restoring Internet Freedom Order* removing many regulatory requirements from broadband service providers by reclassifying broadband service from a telecommunications service to an information service, several federal and state legislators have introduced legislation to reinstate some regulatory requirements, which would increase oversight and regulation of the industry. Some have even advocated for the creation of public broadband Internet service providers. Any such legislation could reduce our revenues and restrict the way we offer products and services, as well as increase competition from publicly-funded service providers.

The STELA Reauthorization Act of 2014 ("STELARA"), which amended certain provisions of the Communications Act governing the retransmission of distant broadcast signals, is set to expire at the end of 2019. STELARA included certain provisions that protect programming distributors, like Atlantic Broadband, from unfair treatment by broadcast stations, including: 1) prohibiting broadcast stations and programming distributors from entering into exclusive retransmission consent agreements, 2) requiring broadcast stations and programming distributors to negotiate retransmission agreements in good faith, 3) prohibiting joint retransmission consent negotiations by same-market broadcast stations, and 4) prohibiting broadcast stations from limiting the ability of programming distributors to carry out-of-market significantly viewed stations. Broadcasters are urging Congress to allow STELARA to expire, which would remove the foregoing protections. In the past, Congress has used STELARA as a means to pass other related provisions governing the retransmission of broadcast signals. If Congress allows STELARA to expire or renews STELARA with more onerous provisions, Atlantic Broadband's ability to secure the right to retransmit broadcast stations could be negatively impacted, and its costs could increase significantly.

Certain federal and state governments have passed or proposed legislation to award funding for new broadband infrastructure. If such legislation does not limit funding to unserved areas, competitors could receive funding to expand their broadband networks within or near Atlantic Broadband's service areas.

The FCC recently launched a proceeding to reallocate C-Band spectrum for 5G services and other users. The C-Band consists of 500 MHz of spectrum. Atlantic Broadband and other MVPDs currently use this spectrum for the receipt of programming signals. If the final regulations allow other users to utilize the same spectrum, filters would be necessary to prevent 5G interference, which could result in poor quality resolution. If current users are required to find alternative means of receiving signals, Atlantic Broadband could incur significant costs.

Congress introduced on July 25, 2019 a bipartisan bill titled the Modern Television Act of 2019. This bill would repeal retransmission consent and compulsory copyright licenses, as well as several other outdated statutory provisions. This would allow free-market contract negotiations for the carriage of broadcast signals and corresponding copyright licenses, which could give the broadcast stations considerable leverage in contract negotiations. This bill is broad sweeping and could affect Atlantic Broadband in multiple areas, depending on how the bill progresses through Congress.

We must obtain access to support structures and municipal right of ways for our broadband operations.

We require access to the support structures of provincial and municipal electric utilities and telephone companies and to municipal rights of way to deploy our broadband network. Where access to municipal rights of ways in our Canadian footprint cannot be secured, we may apply to the CRTC to obtain a right of access under the *Telecommunications Act*. Access to the support structures of telephone companies which we compete with is provided on a tariff basis approved by the CRTC. In the case of provincial and municipal electric utilities, access to those support structures is subject to provincial and municipal requirements, and the terms for access to these structures may need to be obtained through provincial and municipal authorities. We have entered into comprehensive support structure access agreements with all of the major electric companies and all of the major telecommunications companies in our network footprint.

In the United States, the *Communications Act* requires telephone companies and other utilities (other than those owned by municipalities or cooperatives) to provide cable systems with non-discriminatory access to any pole or right-of-way controlled by the utility. The rates that utilities may charge, together with certain terms and conditions for such access are regulated by the FCC, or, alternatively, by states that certify to the FCC that they regulate pole attachments. Five states in which Atlantic Broadband has cable systems have certified that they regulate pole attachments. Make ready work, which is the strengthening of the poles and/or relocation of other facilities on the poles to accommodate additional attachments, often takes several months to years to complete, which delays the company's network expansion. The FCC recently adopted regulations, which allow those seeking new attachment rights, in certain cases, to move existing cables and accessories to accommodate the new attachments, which could result in service interruptions and damage to the company's network. There is always the possibility that the FCC or a State could adopt additional regulations governing pole attachments, including permitting the increase of pole attachment rates paid by cable operators.

Additionally, depending on whether the state regulates itself or delegates authority to municipalities to regulate, Atlantic Broadband is required to obtain a franchise from states or local municipalities in order to use the public rights-of-way and provide cable or telecommunications services. Such franchises may involve the payment of franchise fees, the provision of public, educational and governmental access channels, the provision of institutional networks and free services to municipal buildings, schools and libraries. In August 2019, the FCC issued its Final Notice and Third Report and Order in the Implementation of Section 621(a)(1) of the Cable Communications Policy Act of 1984 ("Order"), in which it restricted municipalities from regulating non-cable related services, such as high-speed data, and required that certain costs be included within franchise fees paid by operators to franchising authorities. Federal law caps franchise fees at 5% of the gross revenues derived by operators from the provision of cable service within the franchise area. If this Order is challenged or if legislation is introduced to give state and local governments more regulatory authority, it could increase our costs and delay access to the rights-of-way.

If we have to support increasing costs in securing access to support structures needed for our broadband network or are unable to secure such agreements, we may not be able to implement our business strategies and our businesses, financial condition, results of operations, reputation and prospects could be materially adversely affected.

12.4 TECHNOLOGY RISKS

NETWORK FAILURE

The Corporation manages network failure risks through a Business Continuity Planning program as well as through a Disaster Recovery Policy and related procedures. Operational risk assessments are also conducted on an annual basis minimally to consider anticipated and unanticipated events (including climate-related incidents) in order to protect the viability of all critical business processes.

In Canada, Cogeco Connexion has a backup system for retransmission through another headend or a mobile headend if one of our headends fails. In the United States, Atlantic Broadband also has emergency backup or replacement sites, including several interconnects with adjacent cable operators to be able to use their signals as a backup.

A failure in our headends could prevent us from delivering some of our services through a portion of our network until we have implemented backup solutions or resolved the failure and result in significant customer dissatisfaction, loss of revenue and potential litigation, depending on the severity of the outage condition.

MAINTENANCE OF OUR NETWORK, INFRASTRUCTURE AND IT SYSTEMS

We continuously maintain, upgrade or replace our network, infrastructure and IT systems in order to optimize our networks and systems, increase the speed of our Internet service and improve and provide new or enhanced services that meet the needs and expectations of our customers. If we are unable to do so because of capital or other constraints, this may materially adversely affect our ability to compete and negatively impact business and financial performance.

DEPENDENCE ON TECHNOLOGY SYSTEMS

Our daily operations are highly dependent on information technology systems and software, including those provided by certain third party suppliers. Our business is dependent on our payroll, customer billing, service provisioning, financial, accounting and other data processing systems. We rely on these systems to process, on a daily basis, a large number of transactions. An inability to maintain and enhance our existing information technology systems or obtain new systems to support additional customer growth or new products and services could have a material adverse effect on our ability to acquire new customers, retain existing customers, produce accurate and timely billing, generate revenue growth and manage operating expenses, or comply with regulatory requirements, all of which could materially adversely affect our operational results and financial position. During the third quarter of fiscal 2018, Cogeco Connexion implemented a new customer management system, which replaced 22 legacy systems in Québec and Ontario. Some difficulties were encountered during the transition to this new system, such as billing errors, service provisioning issues and congestion in our contact centers, which negatively impacted the customer service experience and revenue and generated costs overruns. Any future difficulties from system replacements or upgrades could damage our brand and reputation and have a material adverse effect on our results of operations, compliance with regulatory requirements, financial performance and future business prospects.

CYBER THREATS

Cybersecurity breaches have grown in frequency and complexity over recent years in the public and private sectors. Security measures are in place to safeguard against cybersecurity breaches such as firewalls, site monitoring and intrusion detection software. We continue to enhance our cyber resilience posture, the overall governance over information security and the security awareness of our employees through continuous training and continuous improvement efforts surrounding the security of our IT systems, the controls within our IT systems and our business processes. Our Cyber Security Framework and our Information and Cyber-Security Policy are based on the internationally recognized National Institute of Standards and Technology framework.

During fiscal 2019, the Corporation did not experience any major cyber breach. Despite the fact that we are protecting critical data and infrastructure from cyberattacks, theft, unauthorized usage and disclosure, viruses, sabotage and other cyber threats, there can be no certainty that we will not be the subject of data breaches which could have an adverse effect on our brand and reputation as well as entail significant legal and financial exposure.

DATA PROTECTION

We do not disclose any customers' personal information without the consent of our customers, unless otherwise required by law. In the course of our business, we collect, use and manage various data about our customers, including sensitive personal information but policies, procedures, guidelines, business rules and safeguards are in place to ensure that the personal information of our customers is protected and treated appropriately under applicable privacy laws. Each business unit within the Corporation has implemented security measures that are designed to safeguard personal information against unauthorized access, such as firewalls, site monitoring and intrusion detection software. Personal information will be retained only as long as necessary for the fulfilment of the purposes for which it was collected and for which consent was received. The Corporation is committed to providing transparency to its customers with respect to the Corporation's practices in handling their information.

Each year, our employees must agree to abide by the rules of our Code of Ethics and the Information and Cybersecurity Policy and are required to certify in writing that they will comply with them. Existing and proposed privacy legislation and regulations, including changes in the manner in which such legislation and regulations are interpreted by courts in Canada and the United States may impose limits on our collection, use and disclosure of certain kinds of information.

Any malfunction of our systems or security breaches resulting in unauthorized access to, loss or use of, customer and employee personal information could result in the potential loss of business, damage to our market reputation, litigation, regulatory scrutiny and penalties.

12.5 FINANCIAL RISKS

CAPITAL COMMITMENTS, LIQUIDITY AND DEBT

Cogeco Communications relies on its free cash flow generated by operations to fund its capital expenditures program and on capital markets to refinance its indebtedness and further grow its business through acquisitions. Capital markets are volatile and Cogeco Communications may not be able to access them at reasonable conditions if its credit profile and general economic conditions deteriorate. Such conditions could lead to higher cost of funding, deteriorating financial position and liquidity, and more restrictions on the Corporation's operations.

We may be unable to generate sufficient cash flow and maintain an adequate liquidity position to ensure and preserve the Corporation's financial stability/solvency and fund strategic imperatives as well as operational and financial obligations of the business.

CURRENCY AND INTEREST RATES

Our financial results are reported in Canadian dollars and a significant portion of our revenue, operating expenses and capital expenditures are realized in US dollars. For the purposes of financial reporting, any change in the value of the Canadian dollar against the US dollar during a given financial reporting period would result in variations on our operating results and financial condition. Although a significant portion of our indebtedness, which is denominated in US dollars, serves as hedges of net investments in foreign operations, our revenue, adjusted EBITDA and indebtedness could fluctuate materially as a result of foreign exchange rate fluctuations.

Interest rate volatility can also impact floating interest rate instruments and have a material adverse effect on our financial performance.

CREDIT RATINGS

Credit ratings issued by rating agencies can affect the availability and terms of the Corporation's financings. A reduction in the Corporation's credit ratings, particularly a downgrade below investment grade of secured debt currently rated as investment grade, could materially adversely affect our cost of capital and access to capital.

TAXATION MATTERS

Our business operations are subject to various tax laws and regulations. These tax laws and regulations are subject to frequent changes and evolving interpretation. While we believe we have adequately provided for all taxes based on the information available to us, the calculation of taxes requires significant judgment in interpreting laws and regulations. A failure to accurately assess and record taxes could result in material changes to tax amounts recorded and an assessment of interest and penalties having a material adverse effect on financial results.

Changes to Canadian and foreign tax policies in the tax jurisdictions where we are present may also have a material adverse effect on our current financial structure and the level of our future tax costs and liabilities.

12.6 ECONOMIC CONDITIONS

We are affected by general economic conditions, consumer confidence and spending, and the demand for our products and services. Adverse general economic conditions, such as economic downturns or recessions leading to a declining level of retail and commercial activity could have a negative impact on the demand for our products and services. More specifically, adverse general economic conditions could result in customers delaying or reducing purchases of our products and services or discontinuing using them, and a decline in the creditworthiness of our customers, which could increase our bad debt expense.

12.7 HUMAN-CAUSED AND NATURAL THREATS TO OUR NETWORK, INFRASTRUCTURE AND SYSTEMS

In the event of natural disasters, terrorist acts or other catastrophic occurrence, either natural or man-made, our ability to protect our network, infrastructure, including customer data, and to maintain ongoing operations could be significantly impaired. Although we have business continuity and disaster recovery plans and strategies in place, they may not be successful in mitigating the effects of a natural disaster, terrorist act or catastrophic occurrence which could have a material adverse effect on our business, prospects, financial condition and results of operations. Moreover, we have limited insurance coverage against the losses resulting from natural disasters affecting our networks.

CLIMATE CHANGE

The effects of global climate change are increasing the severity and frequency of natural threats on our business, such as weather-related events, and may result in increased operational and capital costs. Certain of our facilities are located in areas more prone to weather-related events such as Atlantic Broadband's operations in Florida. Some of the more significant climate-related risks that were identified include: 1) increased operational costs due to increase in fuel and energy prices coming from carbon taxes and cap and trade programs; and 2) increased operational and capital costs as a result of damage to facilities and/or equipment because of extreme weather events or increased variability in weather patterns. For example, increased temperatures could impact our network equipment which could entail the need for additional cooling devices and could reduce equipment lifespan. Ice storms or extreme precipitations could have a negative impact on the physical network infrastructure which could affect the delivery of service to our customers. Hurricanes and cyclones could impact or destroy the facilities or portions of the network and could also impact our insurance-related expenses. Impacts to our supply chain would adversely affect the ability of suppliers to supply required products and services and increased capital expenditures could result from the substitution of existing products and services with lower emissions options.

Climate-related risks are mitigated through business continuity and disaster recovery plans and strategies as well as through the implementation of energy efficiency initiatives that will contribute to the reduction of operational costs (refer to the "Corporate Social Responsibility" section). The magnitude of the effects of climate change could be unpredictable and therefore, our plans may not successfully mitigate the consequences of a natural disaster. This could have a material adverse effect on our business, prospects, financial condition and results of operations.

12.8 COMMUNITY ACCEPTANCE RISKS

The Corporation is committed to taking part in developing communities. Our markets cover many rural areas and smaller centres. By bringing affordable broadband services to underserved markets, we make an important contribution to their economic and social development. The availability of broadband services at competitive prices promotes job creation by local businesses by helping them become more competitive. Moreover, our network investments help companies establish operations, expand and diversify. While call centres are often outsourced in our industry, we are committed to providing our customers with local customer service agents from the communities where we operate. In addition, the Corporation has developed community-focused initiatives, reflecting the particular needs of their communities. In 2019, the Corporation contributed $7.8 million in cash and in-kind through donations and sponsorships, mostly contributing to culture, education, health and wellbeing. Lastly, YourTV/NousTV, our unique community television channels, are a powerful complement to our donations and sponsorship activities by providing broad visibility to local community activities and interests. YourTV/NousTV stations are dedicated to in-depth coverage of local people, places, events and issues of interest to each of the communities we serve and are funded by a regulated percentage of our gross video revenues.

Failure to maintain our community acceptance may affect our capacity to attract and retain customers therefore impacting our revenue generation and growth prospects. Furthermore, it may result in losing our social license to operate and our capacity to remain competitive in the market.

12.9 ETHICAL BEHAVIOR RISKS

Maintaining high ethical practices throughout the Corporation is particularly important in the context of the Corporation's continued expansion. The Corporation's Ethics Steering Committee, comprised of representatives from Human Resources, Legal, Finance and Internal Audit functions, provides executive oversight of our overall Ethics program, including the review of our Code of Ethics and related policies. Besides having a comprehensive Code of Ethics, the Corporation has an anonymous and confidential Ethics Line which allows employees and other individuals to report any perceived or actual instances of violations to the Corporation Code of Ethics and employees are also encouraged to use this tool to seek advice about ethical and lawful behaviour. In order to increase employee's awareness on ethics, a formal on-line training on the Code of Ethics is mandatory for all new employees and Board members and must be completed every two years subsequently. In order to constantly promote awareness around ethics related issues, the Corporation issues an ethics newsletter to all employees twice per year. Despite these efforts, the Corporation may experience ethics breaches which will not only adversely affect our reputation, but may also cause the Corporation to incur extraordinary expenses related to penalties and fines.

12.10 OWNERSHIP RISKS

We are controlled by Cogeco through its ownership of multiple voting shares. Cogeco is in turn controlled by Gestion Audem Inc., a company controlled by the members of the family of the late Henri and Marie-Jeanne Audet (the "Audet Family"), through its ownership of Cogeco's multiple voting and subordinate voting shares. Both Cogeco Communications and Cogeco are reporting issuers in Canada with subordinate voting shares listed on the Toronto Stock Exchange. Pursuant to the Conflicts Agreement in effect between us and Cogeco, all cable television undertakings must be owned or controlled by us. Cogeco is otherwise free to own and operate any other business or to invest as it deems appropriate. It is possible that situations could arise where the respective interests of the Audet Family and shareholders or other stakeholders of Cogeco and of the shareholders or other stakeholders of Cogeco Communications could differ and that the interests of these shareholders or stakeholders be adversely affected.

12.11 LITIGATION RISKS

We are involved in various litigation matters arising in the course of our business. The outcome of these claims or litigations is uncertain and may adversely affect our reputation, results of operation, liquidity or financial condition. Based on information currently known to us, we do not expect any of these claims and proceedings, individually or in total, to the extent not provided for through insurance or otherwise, to have a material adverse effect on our business, results of operations or financial condition.

13. CORPORATE SOCIAL RESPONSIBILITY PROGRAM

13.1 OVERVIEW

The Corporation has designed a corporate social responsibility ("CSR") program aimed at operating responsibly and sustainably and being a good corporate citizen. Concretely, this means we seek to integrate practices which improve the environmental and social impacts of our operations while ensuring the Corporation's continued growth.The CSR program integrates our corporate social responsibility objectives articulated around five pillars:

13.2 CSR GOVERNANCE

The CSR function is under the purview of the CSR Steering Committee that reports twice a year to the Corporate Governance Committee of the Board of Directors. The CSR Steering Committee, which is composed of executives from all business units, is responsible for reviewing the CSR Policy, identifying top risks, setting objectives and ambitions and monitoring CSR performance.

The CSR function is held at a corporate level and is headed by the Vice President, Enterprise Strategy and Social Responsibility. This vice presidency reports to the Senior Vice President and Chief Technology and Strategy Officer who reports to the President and Chief Executive Officer. The Vice President, Enterprise Strategy and Social Responsibility is responsible for the roll-out of corporate strategies and initiatives to promote the CSR principles and ultimately support the conduct of business in a socially responsible and ethical manner. Executives hold the business units accountable for implementing the initiatives and strategies defined by the CSR Steering Committee, including their business unit specific CSR action plans. The CSR team facilitates the integration of all business units' CSR initiatives.

The Corporation's CSR Policy, Code of Ethics and Supplier Code of Conduct together form the framework of our CSR Program.

13.3 FISCAL 2019 HIGHLIGHTS

To support the achievement of our CSR goals, we have developed key performance indicators for environment, social and governance ("ESG") objectives. During fiscal 2019, key initiatives of the CSR Program were rolled-out to our business units, namely Atlantic Broadband and Cogeco Connexion. Here below are some examples of the CSR initiatives that were deployed in fiscal 2019:

ENVIRONMENTAL HIGHLIGHTS

ACCOMPLISHMENTS

- 40% reduction of our Greenhouse Gas Emissions ("GHG") emissions on a per revenue basis compared to fiscal year 2014, surpassing our initially set commitment of 10%;
- 50% of residential customers receiving electronic bills at the end of fiscal year 2019, surpassing our commitment by 10%;
- We diverted more than 163,095 kilos of electronic waste from landfill during fiscal year 2019. For 2020 we are committed to ensuring that 100% of applicable facilities have an e-waste management strategy in place;
- We continued to measure and track our GHG emissions from all of the Corporation's business units and we implemented various energy efficiency measures as part of our energy management strategy. Measures put in place include the implementation of a thermostat replacement and temperature control project, HVAC replacement, installation of CO_2 cooling units in Cogeco Connexion's latest headend, and LED lighting retrofit. In terms of vehicle fleet management we replaced 113 vehicles (representing 9% of the Corporation's fleet) with more energy efficient vehicles. We also deployed a new GPS device into 607 vehicles that monitors driver behavior as well as other metrics related to vehicle performance and fuel efficiency. We expect to see an overall 5% reduction on fuel consumption with the new GPS solution;
- We published our seventh CDP (formerly "Carbon Disclosure Project") report;
- Cogeco Connexion voluntarily purchased carbon offsets to cover some of its GHG emissions from fiscal 2019 (300 tons of CO2e). The offsets purchased are Gold Standard and will fund various renewable energy projects outside Canada as well as sensitive natural habitat restoration projects in Québec;
- Approximately 20% of the Corporation's facilities underwent environmental assessments. No significant adverse impact on the environment was identified as a result of that exercise;
- We continued our implementation of the Canadian Energy Efficiency Voluntary Agreement ("CEEVA"). This agreement, developed by Canadian telecommunications companies together with Natural Resources Canada, intends to limit the energy consumption of set top-boxes provided to our customers. With this agreement in place, it is expected that the total annual energy consumption in Canada, with the telecommunications companies' contribution, including Cogeco Connexion, will be reduced and annual carbon dioxide emissions will be cut by over 100,000 tons. This is equivalent to the emissions of over 44,000 sub-compact new vehicles driving 15,000 km/year. By the end of fiscal 2019, 66% of set-top boxes purchased in Canada complied with the CEEVA standards;
- During our first corporate CSR day, we committed to phase out the use of plastic water bottles in all our operations and our employees expressed publicly their own commitment to engage in more responsible consumption habits.

SOCIAL HIGHLIGHTS

ACCOMPLISHMENTS

- We donated over $7.8 million in cash and in-kind donations during fiscal year 2019, representing 1.8% of Cogeco Communications' pre-tax profit to several organizations in our communities and territories. Our principal focus areas are health, culture, education and wellbeing;
- Our workplace-related incident rate was below industry averages in the jurisdictions where we operate;
- 36% of managerial level positions in fiscal 2019 were held by women, representing good progress towards our goal of reaching 35% by 2021;
- Cogeco Connexion launched a new employee community involvement program in fiscal 2019 which will be deployed to all business units through fiscal 2020;
- We partnered with Computers for Success Canada to donate used technology in order to support the program's intent to deliver improved access to technology for Canadians at risk of digital exclusion. During fiscal 2019, we donated more than 800 units to Computers for Success Canada;
- We participated in the Connected for Success program, through which we offered affordable Internet in fiscal 2019 to more than 475 low income families in Québec and Ontario;
- We improved wellness conditions by providing healthier food options in our office in Burlington and offering a relaxing room in our office in Trois-Rivières.

GOVERNANCE HIGHLIGHTS

ACCOMPLISHMENTS

- We remained in the top tier of family-controlled dual-class companies listed on a Canadian stock exchange according to the Globe and Mail's Board Games;
- 96% of new and current employees were trained on the Corporation's Code of Ethics;
- Overall, considering both Cogeco Communications and Cogeco, 54% of our Board of Directors members are women;
- Almost 80% of our top suppliers have acknowledged the Corporation's Supplier Code of Conduct or approved our suppliers' CSR standards. We are committed to achieving 100% by the end of fiscal 2020;
- We updated our Code of Ethics and provided online training to both employees and all members of the Board of Directors;
- As part of the purchasing process, we enhanced our CSR questionnaire used in the Request for Proposal process and we conducted ESG audits for suppliers of customer premise equipment;
- The Board has a written Board Diversity Policy to ensure that the Board, as a whole, can look at business issues from a number of different and relevant perspectives.

For more information on our initiatives and our performance, please refer to the latest CSR Report, which was published in January 2018. The Corporation will be releasing its next CSR Report in January 2020. It should further be noted that the Corporation will also provide annual updates relative to its CSR program and related commitments directly on the Corporation's website at corpo.cogeco.com.

RECOGNITIONS

The Corporation's CSR program and related initiatives were recognized during fiscal 2019 as follows:

- For the second year in a row, Cogeco Communications was named to Corporate Knights' 2018 Best 50 Corporate Citizens in Canada;
- Cogeco Communications is part of the cleanest 200 companies in the world ranking given by Corporate Knights;
- Cogeco Communications received the ISS Quality Score environmental badge, which recognizes our environmental disclosure practices;
- Cogeco Communications continues to be part of the *Jantzi Social Index*, consisting of 50 Canadian companies that passed a set of broadly based environmental, social and governance rating criteria;
- Ken Smithard, President of Cogeco Connexion, was recognized by Canada's Clean16 for 2020 as the leader in the Technology & Telecom category. This award is given to individuals who have made a measurable difference in advancing sustainability and clean capitalism in Canada;
- Cogeco Connexion was named to the 2019 Waste Diversion Champions list from REfficient. This award entails that over 100,000 pounds of waste have been diverted.

13.4 CSR IN ACTION

Cogeco’s first ever CSR day where awareness on the impacts of our daily activities was raised. The thematic for the day was "Responsible Consumption" and employees from all our business units also shared their own personal commitment towards using more responsible consumption habits.

Cogeco Connexion, in partnership with a local beekeeper, Miels des Trois-Rivières, installed bee hives at the Trois-Rivières regional office. This project, that supports the urban agricultural project initiated in 2017 by the Corporation's employees, contributes to the preservation of biodiversity and should have a beneficial effect on the twenty or so species of trees and shrubs found in the woods near the office. During the first year of operation, 270 kilos of honey were produced and proceeds from its sale were remitted to United Way Mauricie.

14. CONTROLS AND PROCEDURES

Internal control over financial reporting ("ICFR") is a process designed to provide reasonable, but not absolute, assurance regarding the reliability of financial reporting and of the preparation of financial statements for external purposes in accordance with IFRS. The President and Chief Executive Officer ("CEO") and the Senior Vice President and Chief Financial Officer ("CFO"), together with Management, are responsible for establishing and maintaining adequate disclosure controls and procedures ("DC&P") and ICFR, as defined in National Instrument 52-109. Cogeco Communications' internal control framework is based on the criteria published in the updated version released in May 2013 of the report *Internal Control Integrated Framework* issued by the *Committee of Sponsoring Organizations of the Treadway Commission*.

The CEO and CFO, supported by Management, evaluated the overall design and effectiveness of the Corporation's DC&P and ICFR at August 31, 2019, and concluded that they were effective.

15. ACCOUNTING POLICIES

15.1 CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Preparation of the consolidated financial statements in accordance with IFRS requires management to adopt accounting policies and to make estimates and assumptions that affect the reported amounts of assets and liabilities, contingent assets and liabilities and revenue and expenses during the reporting year. A summary of the Corporation's significant accounting policies is presented in note 2 of the Consolidated Financial Statements. The following accounting policies were identified as critical to Cogeco Communications' business operations.

REVENUE RECOGNITION

Revenue is measured based on the consideration received or receivable from a customer, net of returns and discounts. The Corporation recognizes revenue from the sale of products or the rendering of services when it transfers control to the customer. Revenue is recognized applying the following five steps:

- Identify the contract with a customer;
- Identify the performance obligations in the contract;
- Determine the transaction price;
- Allocate the transaction price to the performance obligations in the contract; and
- Recognize revenue when (or as) the Corporation satisfies a performance obligation.

More specifically, the Corporation's principal sources of revenue are recognized as follows:

- Monthly subscription revenue (including any discounts, rebates, refunds and credits) for Internet, video and telephony services and rental of equipment is recognized as the services are provided;
- Revenue from data services, long-distance and other pay-per-use services is recognized as the services are provided;
- Revenue generated from the sale of customer premise equipment or other equipment is recognized when the customer accepts the delivery of the equipment;

ALLOWANCE FOR DOUBTFUL ACCOUNTS

The allowance for doubtful accounts is established based on the estimated credit risk of the Corporation's customers, by examining such factors as the current economic conditions, forward-looking macroeconomic data and historical information (number of overdue days of the customer's balance outstanding as well as the customer's collection history).

BUSINESS COMBINATIONS

Fair value of assets acquired and liabilities assumed in a business combination is estimated based on information available at the date of acquisition and involves considerable judgment in determining the fair values assigned to the property, plant and equipment acquired and liabilities assumed on acquisition. Among other things, the determination of these fair values involves the use of discounted cash flow analyses, estimated future margins and estimated future customer counts.

CAPITALIZATION OF PROPERTY, PLANT AND EQUIPMENT

During construction of new assets, direct costs plus overhead costs directly attributable to the asset are capitalized. Borrowing costs directly attributable to the acquisition or construction of qualifying assets, which require a substantial amount of time to get ready for their intended use or sale, are capitalized until such time the assets are substantially ready for their intended use or sale. All other borrowing costs are recorded as financial expense in the period in which they are incurred.

The cost of replacing a part of property, plant and equipment that is ready for its intended use is added to the carrying amount of the property, plant and equipment or recognized as a separate component if applicable, only if it is probable that the economic benefits associated with the cost will flow to the Corporation and the cost can be measured reliably. The carrying amount of the replaced part is derecognized. All other day-to-day maintenance costs are recognized in profit or loss in the period in which they are incurred.

DEPRECIATION OF PROPERTY, PLANT AND EQUIPMENT AND AMORTIZATION OF INTANGIBLE ASSETS

Measurement of property, plant and equipment and intangible assets with finite useful lives requires estimates for determining the assets' expected useful lives and residual values. Management's judgment is also required to determine the components and the depreciation method used.

PROVISIONS

Management's judgment is used to determine the timing, likelihood and the amount of expected cash outflows as well as the discount rate.

CONTINGENCIES

Contingencies such as lawsuits, taxes and commitments under contractual and other commercial obligations are estimated based on applying significant judgement in determining if a loss is probable and in determining the estimated outflow of economic resources. Such contingencies are estimated based on the information available to the Corporation.

FAIR VALUE MEASUREMENT OF DERIVATIVE FINANCIAL INSTRUMENTS

The fair value of derivative financial instruments is estimated using valuation techniques based on several market data such as interest rates, foreign exchange rates and the Corporation's or counterparties' credit risks.

HEDGE ACCOUNTING

Management uses significant judgment in determining whether the Corporation's financial instruments qualify for hedge accounting, including the assumptions for effectiveness and also in estimating the probability that a transaction will occur, in the case of cash flow hedges of forecasted transaction.

MEASUREMENT OF DEFINED BENEFIT OBLIGATION

The net defined benefit obligation is determined using actuarial calculations that are based on several assumptions. The actuarial valuation uses the Corporation's assumptions for the discount rate, the expected rate of compensation increase and the mortality table. If the actuarial assumptions are found to be significantly different from the actual data subsequently observed, it could impact the reported amount of defined benefit pension cost recognized in profit or loss, the remeasurement of the net defined benefit asset or liability recognized directly in other comprehensive income and the net assets or net liabilities related to these obligations presented in the consolidated statement of financial position.

SHARE-BASED PAYMENT

Management estimates the fair value of stock-options granted using the Black-Scholes option pricing model. The estimates used by management include expected dividend yields, volatility of the Corporation's share price, the expected life of the option, the risk-free interest rate and the number of options expected to vest. Estimates are also used in the determination of the number of ISUs and PSUs that are expected to vest, which influences their fair value. The fair value of the PSUs is also estimated based on the level of Economic Value creation;

MEASUREMENT OF NON-FINANCIAL ASSETS

The measurement of non-financial assets requires the use of management judgment to identify the existence of impairment indicators and the determination of cash-generating units ("CGUs"). Furthermore, when determining the recoverable amount of a CGU or an asset, the Corporation uses significant estimates such as the estimation of future cash flows and discount rates applicable. Any significant modification of market conditions could translate into an inability to recover the carrying amounts of non-financial assets.

DEFERRED TAXES

Deferred tax assets and liabilities require estimates about the nature and timing of future permanent and temporary differences, the expected timing of reversals of those temporary differences and the future tax rates that will apply to those differences.

15.2 ADOPTION OF NEW ACCOUNTING STANDARDS

The following standards issued by the IASB were adopted by the Corporation on September 1, 2018:

IFRS 9 *Financial Instruments*

On September 1, 2018, the Corporation adopted IFRS 9, *Financial Instruments,* which replaces the guidance in IAS 39 *Financial Instruments: Recognition and Measurement.* IFRS 9 includes requirements for classification and measurement, impairment, derecognition and general hedge accounting. The Corporation adopted IFRS 9 on a retrospective basis.

The Corporation is applying the IFRS 9 expected credit losses method to estimate the provision for expected credit losses on its financial assets. The Corporation elected to continue to apply the hedge accounting requirements of IAS 39.

The adoption of IFRS 9 had no significant impact on the consolidated financial statements.

IFRS 15 *Revenue from Contracts with Customers*

On September 1, 2018, the Corporation adopted IFRS 15, *Revenue from Contracts with Customers*, on a fully retrospective basis. IFRS 15 establishes principles for reporting the nature, amount, timing and uncertainty of revenue and cash flows arising from an entity's contracts with customers. It provides a single, five-step model for an entity to recognize revenue in order to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods and services. IFRS 15 also provides guidance relating to the treatment of contract acquisition and contract fulfillment costs. In addition, IFRS 15 requires additional disclosure in the consolidated financial statements regarding the Corporation's revenue. IFRS 15 supersedes the following standards: IAS 11 *Construction Contracts*, IAS 18 *Revenue*, IFRIC 13 *Customer Loyalty Programmes*, IFRIC 15 *Agreements for the Construction of Real Estate*, IFRIC 18 *Transfers of Assets from Customers* and SIC-31 *Revenue-Barter Transactions Involving Advertising Services*.

The adoption of IFRS 15 has an impact on residential non-refundable upfront installation fees charged to broadband service customers. Such revenue is deferred and amortized over the period the fee remains material to the customer, which the Corporation estimated to be six months. The estimate required consideration of both quantitative and qualitative factors including average installation fee, average revenue per customer and customer behavior, among others. Prior to IFRS 15, these installation fees were deferred and amortized as revenue at the same pace as the revenue from the related services was earned, which was the average life of a customer's subscription for broadband service customers.

The adoption of IFRS 15 also impacted the consolidated financial statements with regards to the capitalization of costs to obtain a contract. Costs to obtain a contract (such as direct and incremental costs associated with the acquisition of customers) are recognized as an asset and recognized in operating expenses over the period of time the customer is expected to remain a customer of the Corporation. Prior to IFRS 15, direct and incremental costs associated with the acquisition of customers were capitalized as intangible assets for contracts lasting greater than one year, and amortized over the term of the revenue arrangement. For contracts with durations of less than one year, these costs were recognized in operating expenses as incurred.

Upfront fees paid by the Corporation to multiple-dwelling units such as condo associations, in order to gain access to serve and market occupants of the dwelling, are deferred as contract costs in other assets and recognized over the term of the contract, as a reduction of revenue. Prior to IFRS 15, these fees were capitalized in property, plant and equipment and recognized in depreciation expense, over the term of the contract.

RECLASSIFICATION OF RECONNECT COSTS

Following an in-depth analysis of all contract costs, stemming from the adoption of IFRS 15, the Corporation reviewed the reconnect and additional service activation costs ("reconnect costs") generated by the customer reconnect activity. Prompted by the significant change in technology that occurred over time regarding the activities required to reconnect customers, the Corporation determined that the reconnect costs are incurred to ensure that the customer premise equipment ("CPE") is functioning as per the intended use and within the required parameters. Thus the reconnect costs are directly attributable to bringing the CPE assets to their condition necessary for the intended operating manner.

Consequently, the Corporation changed its accounting policy with respect to reconnect costs which are now recognized as property, plant and equipment, and depreciated over the expected useful life of the CPE. Previously, reconnect costs were capitalized as intangible assets up to a maximum not exceeding the revenue generated by the reconnect activity, and amortized over the average life of a customer's subscription, not exceeding eight years.

The Corporation believes this change in accounting policy will better reflect the current nature of the reconnect costs.

IMPACTS OF CHANGES IN ACCOUNTING POLICIES ON THE COMPARATIVE FIGURES

The changes in accounting policies mentioned above were applied retrospectively and as a result the Corporation changed the comparative figures for the year ended August 31, 2018 and the opening statement of financial position as at September 1, 2017 and 2018. The impact of adopting these accounting policies is provided in note 3 of the Corporation’s consolidated financial statements.

15.3 FUTURE ACCOUNTING DEVELOPMENT IN CANADA

A number of new standards, interpretations and amendments to existing standards were issued by the IASB that are mandatory but not yet effective for the year ended August 31, 2019, and have not been applied in preparing these consolidated financial statements. The following standards may have a material impact on future consolidated financial statements of the Corporation:

Standard	Effective date
IFRS 16 *Leases*	Annual periods beginning on or after January 1, 2019
IFRIC 23 *Uncertainty over income tax treatments*	Annual periods beginning on or after January 1, 2019
Amendments to IFRS 3 *Business combinations*	Prospectively for acquisitions occurring on or after January 1, 2020, with early adoption permitted

IFRS 16 *Leases*

IFRS 16 replaces IAS 17 *Leases*, and establishes a comprehensive model for the identification of lease arrangements, and the recognition, measurement, presentation and disclosure in the financial statements of the lessees and lessors. The new standard is applicable to all leases, except for certain exceptions. A lessee will be required to recognize a right-of-use asset, representing its right to use the underlying asset, and a corresponding lease liability, representing its obligation to make the lease payments. The accounting treatment for lessors will remain largely the same as under IAS 17. At adoption, there is the option to either apply IFRS 16 with either a full retrospective approach whereby IFRS 16 will also be applied to comparative figures, or a modified retrospective approach whereby the cumulative effect of the initial application is adjusted to opening retained earnings.

IFRS 16 eliminates the distinction between operating and finance leases for lessees, requiring instead that future lease payments be capitalized and presented either as lease assets (right-of-use assets) or together with property, plant and equipment. IFRS 16 will result in an increase to both assets and liabilities recorded on the consolidated statements of financial position, stemming from recognizing the right-of-use assets and the corresponding lease liabilities. Total expenses over the lease term will remain unchanged, however the timing of recognition of the expenses will be effected. The adoption of IFRS 16 will result in a decrease in operating expenses, an increase in financial expense due to the accretion of the lease liability, and an increase in depreciation and amortization due to the depreciation of the right-of-use asset on the consolidated statements of profit or loss.

Compared to the results of the current standard, the results of applying the new standard should generally reflect increases in cash flows from operating activities and decreases in cash-flows from financing activities. This stems from the payment of the principal component of leases that are currently accounted for as operating leases, being presented as a cash flow use within the financing activities under the new standard. Total cash outflows over the lease term remain unchanged.

The application of this standard is mandatory for all IFRS reporters and will be applied by the Corporation on September 1, 2019, using the modified retrospective approach whereby the financial statements of prior periods presented are not restated. As permitted by IFRS 16, the Corporation has elected to apply certain practical expedients, most notably:

- Not separating non-lease components from lease components for certain classes of underlying assets;
- Applying a single discount rate to a portfolio of leases with similar characteristics;
- Excluding initial direct costs from measuring the right-of-use assets as at September 1, 2019;
- Using hindsight in determining the lease term where the contract contains extension or termination options;
- Electing not to recognize lease liabilities and right-of-use assets for short-term leases or low-value leases;
- Electing to exclude intangible assets from the application of IFRS 16.

The Corporation continues to assess the implications of this standard and to determine the effect on its consolidated financial statements. The adoption of IFRS 16 is expected to impact the consolidated financial statements as follows:

- Total assets at September 1, 2019 are expected to increase by approximately $43 million as a result of the recognition of right-of-use assets;
- Total liabilities at September 1, 2019 are expected to increase by approximately $43 million resulting from the recognition of lease liabilities;
- Retained earnings at September 1, 2019 are expected to remain unchanged.

IFRIC 23 *Uncertainty over income tax treatments*

IFRIC 23 clarifies the application of recognition and measurement requirements in IAS 12 *Income Taxes* when there is uncertainty over income tax treatments. It specifically addresses whether an entity considers uncertain tax treatments separately or as a group, the assumptions an entity makes about the examination of tax treatments by taxation authorities, how an entity determines taxable profit (tax loss), tax bases, unused tax losses, unused tax credits and tax rates and how an entity considers changes in facts and circumstances. IFRIC 23 should not have a significant impact on the consolidated financial statements.

IFRS 3 *Business combinations*

The amendments to IFRS 3 may affect whether future acquisitions are accounted for as business combinations or asset acquisitions, along with the resulting allocation of the purchase price between the net identifiable assets acquired and goodwill.

16. NON-IFRS FINANCIAL MEASURES

This section describes non-IFRS financial measures used by Cogeco Communications throughout this MD&A. These financial measures are reviewed in assessing the performance of the Corporation and used in the decision-making process with regards to our business units. Reconciliations between "free cash flow", "adjusted EBITDA", "adjusted EBITDA margin" and "capital intensity" and the most comparable IFRS financial measures are also provided. These financial measures do not have standard definitions prescribed by IFRS and, therefore, may not be comparable to similar measures presented by other companies.

This MD&A also makes reference to key performance indicators on a constant currency basis, including revenue, "adjusted EBITDA", acquisitions of property, plant and equipment and "free cash flow". Measures on a constant currency basis are considered non-IFRS measures and do not have any standardized meaning prescribed by IFRS and therefore, may not be comparable to similarly measures presented by other companies.

Non-IFRS measure	Application	Calculation	Most comparable IFRS measures
Free cash flow	Management and investors use free cash flow to measure Cogeco Communications' ability to repay debt, distribute capital to its shareholders and finance its growth.	Free cash flow: - Cash flow from operating activities add: - Amortization of deferred transaction costs and discounts on long-term debt; - Changes in non-cash operating activities; - Income taxes paid; and - Financial expense paid deduct: - Current income taxes; - Financial expense; and - Acquisition of property, plant and equipment.	Cash flow from operating activities
Adjusted EBITDA and adjusted EBITDA margin	Adjusted EBITDA and adjusted EBITDA margin are key measures commonly reported and used in the telecommunications industry, as they allow comparisons between companies that have different capital structures and are more current measures since they exclude the impact of historical investments in assets. Adjusted EBITDA is one of the key metrics employed by the financial community to value a business and its financial strength. Adjusted EBITDA for Cogeco Communications' business units is equal to the segment profit (loss) reported in note 6 of the Consolidated Financial Statements.	Adjusted EBITDA: - Profit for the year from continuing operations add: - Income taxes; - Financial expense; - Depreciation and amortization; and - Integration, restructuring and acquisition costs.	Profit for the year from continuing operations
		Adjusted EBITDA margin: - Adjusted EBITDA divided by: - Revenue	No comparable IFRS measure
Constant currency basis	Revenue, operating expenses, adjusted EBITDA, acquisitions of property, plant and equipment and free cash flow are measures presented on a constant currency basis to enable an improved understanding of the Corporation's underlying financial performance, undistorted by the effects of changes in foreign exchange rates.	Constant currency basis are obtained by translating financial results from the current periods denominated in US dollars at the foreign exchange rates of the comparable periods of the prior year. The average foreign exchange rates during the three-month period and year ended August 31, 2018 were 1.3100 USD/CDN and 1.2773 USD/CDN, respectively.	No comparable IFRS measure
Capital intensity	Capital intensity is used by Cogeco Communications' management and investors to assess the Corporation's investment in capital expenditures in order to support a certain level of revenue.	Capital intensity: - Acquisition of property, plant and equipment divided by: - Revenue	No comparable IFRS measure

16.1 FREE CASH FLOW RECONCILIATION

	Three months ended		Years ended	
	August 31, 2019	August 31, 2018 (1)	**August 31, 2019**	August 31, 2018 (1)
(in thousands of dollars)	**$**	$	**$**	$
Cash flow from operating activities	**304,702**	255,438	**868,711**	620,748
Amortization of deferred transaction costs and discounts on long-term debt	**2,940**	2,470	**9,454**	18,938
Changes in non-cash operating activities	**(73,274)**	(64,205)	**25,108**	23,903
Income taxes paid	**12,154**	25,342	**48,687**	175,163
Current income taxes	**(11,603)**	(9,301)	**(53,361)**	(68,288)
Financial expense paid	**34,867**	48,023	**165,507**	174,650
Financial expense	**(40,437)**	(47,709)	**(175,502)**	(185,456)
Acquisition of property, plant and equipment	**(145,099)**	(162,319)	**(434,545)**	(457,808)
Free cash flow	**84,250**	47,739	**454,059**	301,850

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

16.2 ADJUSTED EBITDA AND ADJUSTED EBITDA MARGIN RECONCILIATION

	Three months ended		Years ended	
	August 31, 2019	August 31, 2018 (1)	**August 31, 2019**	August 31, 2018 (1)
(in thousands of dollars, except percentages)	**$**	$	**$**	$
Profit for the period from continuing operations	**92,403**	75,870	**356,908**	384,578
Income taxes	**20,502**	18,084	**83,655**	(17,198)
Financial expense	**40,437**	47,709	**175,502**	185,456
Depreciation and amortization	**121,556**	120,071	**480,725**	433,654
Integration, restructuring and acquisition costs	**712**	1,677	**11,150**	20,328
Adjusted EBITDA	**275,610**	263,411	**1,107,940**	1,006,818
Revenue	**583,673**	566,184	**2,331,820**	2,147,404
Adjusted EBITDA margin	**47.2%**	46.5%	**47.5%**	46.9%

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

16.3 CAPITAL INTENSITY RECONCILIATION

	Three months ended		Years ended	
	August 31, 2019	August 31, 2018 (1)	**August 31, 2019**	August 31, 2018 (1)
(in thousands of dollars, except percentages)	**$**	$	**$**	$
Acquisition of property, plant and equipment	**145,099**	162,319	**434,545**	457,808
Revenue	**583,673**	566,184	**2,331,820**	2,147,404
Capital intensity	**24.9%**	28.7%	**18.6%**	21.3%

(1) Fiscal 2018 was restated to comply with IFRS 15 and to reflect a change in accounting policy as well as to reclassify results from Cogeco Peer 1 as discontinued operations. For further details, please consult the "Accounting policies" and "Discontinued operations" sections.

17. ADDITIONAL INFORMATION

This MD&A was prepared on October 30, 2019. Additional information relating to the Corporation, including its Annual Information Form, is available on the SEDAR website at www.sedar.com or on the Corporation's website at corpo.cogeco.com.

CONSOLIDATED FINANCIAL STATEMENTS

Consolidated Financial Statements

MANAGEMENT'S RESPONSIBILITY

RELATED TO THE CONSOLIDATED FINANCIAL STATEMENTS

The consolidated financial statements of Cogeco Communications Inc. (the "Corporation") and the financial information contained in this annual report are the responsibility of management. The consolidated financial statements include amounts determined by management based on estimates, which in their opinion are reasonable and fair. The consolidated financial statements have been prepared in accordance with International Financial Reporting Standards ("IFRS") and have been approved by the Board of Directors. Operating and financial information used elsewhere in the annual report is consistent with that of the consolidated financial statements.

In fulfilling its responsibilities, management of Cogeco Communications Inc. and its subsidiaries has developed, and continues to improve administrative and accounting systems in order to provide reasonable assurance that assets are safeguarded against loss or unauthorized use and maintains internal accounting controls to ensure that financial records are reliable for preparing the financial statements. The Board of Directors carries out its responsibility for the financial statements in this annual report principally through its Audit Committee, which reviews the annual consolidated financial statements of the Corporation and recommends their approval to the Board of Directors. The Committee periodically meets with management and the external auditor to discuss the results of the external and internal examinations and matters having an impact on financial information.

The independent auditor appointed by the shareholders, Deloitte LLP, Chartered Professional Accountants, is responsible for making an independent examination of the consolidated financial statements in accordance with Canadian auditing standards and to issue an opinion on the statements. The independent auditor has free access to the Audit Committee, with or without the presence of management. Their report follows.

Philippe Jetté
President and Chief Executive Officer

Patrice Ouimet
Senior Vice President and Chief Financial Officer

Montréal, October 30, 2019

INDEPENDENT AUDITOR'S REPORT

To the Shareholders of Cogeco Communications Inc.

Opinion

We have audited the consolidated financial statements of Cogeco Communications Inc. (the "Company"), which comprise the consolidated statements of financial position as at August 31, 2019 and 2018, the consolidated statements of profit or loss, consolidated statements of comprehensive income, consolidated statements of changes in shareholders' equity and consolidated statements of cash flows for the years then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies (collectively referred to as the "financial statements").

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Company as at August 31, 2019 and 2018, and its financial performance and its cash flows for the years then ended in accordance with International Financial Reporting Standards ("IFRS").

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards ("Canadian GAAS"). Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of our report. We are independent of the Company in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Other Information

Management is responsible for the other information. The other information comprises:

- Management's Discussion and Analysis
- The information, other than the financial statements and our auditor's report thereon, in the Annual Report.

Our opinion on the financial statements does not cover the other information and we do not and will not express any form of assurance conclusion thereon. In connection with our audit of the financial statements, our responsibility is to read the other information identified above and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit, or otherwise appears to be materially misstated.

We obtained Management's Discussion and Analysis and the Annual Report prior to the date of this auditor's report. If, based on the work we have performed on this other information, we conclude that there is a material misstatement of this other information, we are required to report that fact in this auditor's report. We have nothing to report in this regard.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with IFRS, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Company's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian GAAS will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian GAAS, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Company to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Company to express an opinion on the financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

The engagement partner on the audit resulting in this independent auditor's report is Christian Jacques.

Montréal, Québec
October 30, 2019

Deloitte LLP[1]

[1] CPA auditor, CA, public accountancy permit No. A124341

CONSOLIDATED STATEMENTS OF PROFIT OR LOSS

Years ended August 31,	Notes	2019	2018
(In thousands of Canadian dollars, except per share data)		$	$
			(restated, Note 3)
Revenue	*5*	**2,331,820**	2,147,404
Operating expenses	*9*	**1,203,980**	1,121,625
Management fees – Cogeco Inc.	*25 A)*	**19,900**	18,961
Integration, restructuring and acquisition costs	*6*	**11,150**	20,328
Depreciation and amortization	*10*	**480,725**	433,654
Financial expense	*11*	**175,502**	185,456
Profit before income taxes		**440,563**	367,380
Income taxes	*12*	**83,655**	(17,198)
Profit for the year from continuing operations		**356,908**	384,578
Profit (loss) for the year from discontinued operations	*8*	**75,380**	(24,381)
Profit for the year		**432,288**	360,197
Profit for the year attributable to:			
Owners of the Corporation		**415,353**	350,833
Non-controlling interest		**16,935**	9,364
		432,288	360,197
Earnings (loss) per share			
Basic	*13*		
Profit for the year from continuing operations		**6.89**	7.61
Profit (loss) for the year from discontinued operations		**1.53**	(0.49)
Profit for the year		**8.41**	7.12
Diluted	*13*		
Profit for the year from continuing operations		**6.83**	7.55
Profit (loss) for the year from discontinued operations		**1.51**	(0.49)
Profit for the year		**8.35**	7.06

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

Years ended August 31, *(In thousands of Canadian dollars)*	*Note*	**2019** **$**	2018 $
Profit for the year		**432,288**	360,197
Other comprehensive income (loss)			
Items to be subsequently reclassified to profit or loss			
Cash flow hedging adjustments			
Net change in fair value of hedging derivative financial instruments		**(81,171)**	34,462
Related income taxes		**21,511**	(9,082)
		(59,660)	25,380
Foreign currency translation adjustments			
Net foreign currency translation differences on net investments in foreign operations		**32,533**	61,703
Net changes on translation of long-term debt designated as hedges of net investments in foreign operations		**(20,754)**	(37,164)
Realized foreign currency translation adjustments on disposal of a subsidiary		**(29,809)**	—
Related income taxes		**1,256**	379
		(16,774)	24,918
		(76,434)	50,298
Items not to be subsequently reclassified to profit or loss			
Defined benefit plans actuarial adjustments			
Remeasurement of net defined benefit liability or asset	*23*	**(9,741)**	1,630
Related income taxes		**2,655**	(432)
		(7,086)	1,198
		(83,520)	51,496
Comprehensive income for the year		**348,768**	411,693
Comprehensive income for the year attributable to:			
Owners of the Corporation		**325,521**	389,170
Non-controlling interest		**23,247**	22,523
		348,768	411,693

CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY

Years ended August 31, 2019 and 2018	Share capital	Share-based payment reserve	Accumulated other comprehensive income	Retained earnings	Equity attributable to non-controlling interest	Total shareholders' equity
	Equity attributable to owners of the Corporation					
(In thousands of Canadian dollars)	$	$	$	$	$	$
			(restated, Note 3)	*(restated, Note 3)*	*(restated, Note 3)*	*(restated, Note 3)*
	(Note 20)		*(Note 21)*			
Balance at August 31, 2017	1,017,636	13,086	76,635	517,781	—	1,625,138
Profit for the year	—	—	—	350,833	9,364	360,197
Other comprehensive income for the year	—	—	37,139	1,198	13,159	51,496
Comprehensive income for the year	—	—	37,139	352,031	22,523	411,693
Issuance of subordinate voting shares under the Stock Option Plan	3,486	—	—	—	—	3,486
Share-based payment	—	7,438	—	—	—	7,438
Share-based payment previously recorded in share-based payment reserve for options exercised	591	(591)	—	—	—	—
Dividends (Note 20 C))	—	—	—	(93,699)	—	(93,699)
Effect of changes in ownership of a subsidiary on non-controlling interest	—	—	—	74,988	(74,988)	—
Acquisition of subordinate voting shares held in trust under the Incentive and Performance Share Unit Plans	(9,352)	—	—	—	—	(9,352)
Distribution to employees of subordinate voting shares held in trust under the Incentive and Performance Share Unit Plans	4,811	(4,673)	—	(138)	—	—
Issuance of common shares by a subsidiary to non-controlling interest, net of transaction costs (Note 7)	—	—	—	—	388,907	388,907
Total contributions by (distributions to) shareholders	(464)	2,174	—	(18,849)	313,919	296,780
Balance at August 31, 2018	**1,017,172**	**15,260**	**113,774**	**850,963**	**336,442**	**2,333,611**
Profit for the year	**—**	**—**	**—**	**415,353**	**16,935**	**432,288**
Other comprehensive income (loss) for the year	**—**	**—**	**(82,746)**	**(7,086)**	**6,312**	**(83,520)**
Comprehensive income (loss) for the year	**—**	**—**	**(82,746)**	**408,267**	**23,247**	**348,768**
Issuance of subordinate voting shares under the Stock Option Plan	**9,780**	**—**	**—**	**—**	**—**	**9,780**
Share-based payment	**—**	**5,913**	**—**	**—**	**—**	**5,913**
Share-based payment previously recorded in share-based payment reserve for options exercised	**1,717**	**(1,717)**	**—**	**—**	**—**	**—**
Dividends (Note 20 C))	**—**	**—**	**—**	**(103,708)**	**—**	**(103,708)**
Purchase and cancellation of subordinate voting shares	**(9,090)**	**—**	**—**	**(23,292)**	**—**	**(32,382)**
Acquisition of subordinate voting shares held in trust under the Incentive and Performance Share Unit Plans	**(2,504)**	**—**	**—**	**—**	**—**	**(2,504)**
Distribution to employees of subordinate voting shares held in trust under the Incentive and Performance Share Unit Plans	**6,315**	**(5,930)**	**—**	**(385)**	**—**	**—**
Total contributions by (distributions to) shareholders	**6,218**	**(1,734)**	**—**	**(127,385)**	**—**	**(122,901)**
Balance at August 31, 2019	**1,023,390**	**13,526**	**31,028**	**1,131,845**	**359,689**	**2,559,478**

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

At August 31, *(In thousands of Canadian dollars)*	*Notes*	2019 $	2018 $ *(restated, Note 3)*
Assets			
Current			
Cash and cash equivalents		**556,504**	84,725
Trade and other receivables	*24 A)*	**75,652**	97,294
Income taxes receivable		**17,706**	24,976
Prepaid expenses and other		**22,740**	29,473
Derivative financial instrument		**—**	1,330
		672,602	237,798
Non-current			
Other assets	*14*	**40,020**	42,677
Property, plant and equipment	*15*	**2,007,610**	2,323,678
Intangible assets	*16 A)*	**2,850,844**	2,927,388
Goodwill	*16 B)*	**1,373,439**	1,608,446
Derivative financial instruments		**—**	33,797
Pension plan assets	*23*	**—**	594
Deferred tax assets	*12*	**6,564**	5,665
		6,951,079	7,180,043
Liabilities and Shareholders' equity			
Liabilities			
Current			
Bank indebtedness	*22 B)*	**—**	5,949
Trade and other payables		**260,481**	302,806
Provisions	*17*	**36,553**	25,887
Income tax liabilities		**16,693**	16,133
Contract liabilities and other liabilities	*18*	**43,395**	59,656
Balance due on business combinations	*22 B)*	**4,520**	—
Current portion of long-term debt	*19*	**22,601**	77,188
		384,243	487,619
Non-current			
Long-term debt	*19*	**3,382,258**	3,781,020
Derivative financial instruments		**46,044**	—
Contract liabilities and other liabilities	*18*	**11,119**	20,125
Pension plan liabilities and accrued employee benefits	*23*	**14,355**	2,784
Deferred tax liabilities	*12*	**553,582**	554,884
		4,391,601	4,846,432
Shareholders' equity			
Equity attributable to owners of the Corporation			
Share capital	*20 B)*	**1,023,390**	1,017,172
Share-based payment reserve		**13,526**	15,260
Accumulated other comprehensive income	*21*	**31,028**	113,774
Retained earnings		**1,131,845**	850,963
		2,199,789	1,997,169
Equity attributable to non-controlling interest		**359,689**	336,442
		2,559,478	2,333,611
		6,951,079	7,180,043

Commitments, contingencies and guarantees (Note 26)

On behalf of the Board of Directors,

Louis Audet	**Joanne Ferstman**
Director	Director

CONSOLIDATED STATEMENTS OF CASH FLOWS

Years ended August 31,	Notes	2019	2018
(In thousands of Canadian dollars)		$	$
			(restated, Note 3)
Cash flow from operating activities			
Profit for the year from continuing operations		**356,908**	384,578
Adjustments for:			
Depreciation and amortization	*10*	**480,725**	433,654
Financial expense	*11*	**175,502**	185,456
Income taxes	*12*	**83,655**	(17,198)
Share-based payment		**7,226**	6,772
Loss on disposals and write-offs of property, plant and equipment		**2,770**	1,916
Defined benefit plans contributions, net of expense		**1,227**	(714)
		1,108,013	994,464
Changes in non-cash operating activities	*22 A)*	**(25,108)**	(23,903)
Financial expense paid		**(165,507)**	(174,650)
Income taxes paid		**(48,687)**	(175,163)
		868,711	620,748
Cash flow from investing activities			
Acquisition of property, plant and equipment	*15*	**(434,545)**	(457,808)
Acquisition of Spectrum licenses	*16 A)*	**—**	(32,306)
Redemption of short-term investments		**—**	54,000
Business combinations, net of cash and cash equivalents acquired	*7*	**(38,876)**	(1,756,935)
Proceeds on disposals of property, plant and equipment		**2,343**	1,383
		(471,078)	(2,191,666)
Cash flow from financing activities			
Increase (decrease) in bank indebtedness		**(5,949)**	2,148
Net increase (decrease) under the revolving facilities		**(443,955)**	384,568
Issuance of long-term debt, net of discounts and transaction costs		**—**	2,082,408
Repayment of long-term debt		**(77,639)**	(1,329,044)
Repayment of balance due on business combinations		**(655)**	(118)
Increase in deferred transaction costs		**(2,210)**	(3,168)
Issuance of subordinate voting shares	*20 B)*	**9,780**	3,486
Issuance of common shares by a subsidiary to non-controlling interest, net of transaction costs paid		**—**	388,907
Purchase and cancellation of subordinate voting shares	*20 B)*	**(32,382)**	—
Acquisition of subordinate voting shares held in trust under the Incentive and Performance Share Unit Plans	*20 B)*	**(2,504)**	(9,352)
Dividends paid on multiple voting shares	*20 C)*	**(32,951)**	(29,813)
Dividends paid on subordinate voting shares	*20 C)*	**(70,757)**	(63,886)
		(659,222)	1,426,136
Effect of exchange rate changes on cash and cash equivalents denominated in a foreign currency		**(439)**	1,989
Net change in cash and cash equivalents from continuing operations		**(262,028)**	(142,793)
Net change in cash and cash equivalents from discontinued operations	*8*	**733,807**	16,333
Cash and cash equivalents, beginning of the year		**84,725**	211,185
Cash and cash equivalents, end of the year		**556,504**	84,725

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
Years ended August 31, 2019 and 2018

NATURE OF OPERATIONS

Cogeco Communications Inc. ("Cogeco Communications" or the "Corporation") is a communications corporation operating in Canada under the Cogeco Connexion name in Québec and Ontario, and in the United States under the Atlantic Broadband brand (in 11 states along the East Coast, from Maine to Florida). Cogeco Communications provides residential and business customers with Internet, video and telephony services through its two-way broadband fibre networks.

On April 30, 2019, the Corporation completed the sale of its Cogeco Peer 1 subsidiary (see Note 8).

The Corporation is a subsidiary of Cogeco Inc. ("Cogeco"), which holds 31.8% of the Corporation's equity shares, representing 82.3% of the votes attached to the Corporation's voting shares. Cogeco Communications is a Canadian public corporation whose subordinate voting shares are listed on the Toronto Stock Exchange ("TSX") under the trading symbol "CCA".

The Corporation's registered office is located at 5 Place Ville Marie, Suite 1700, Montréal, Québec, H3B 0B3.

1. BASIS OF PRESENTATION

These audited consolidated financial statements have been prepared in accordance with International Financial Reporting Standards ("IFRS") issued by the International Accounting Standards Board ("IASB").

The consolidated financial statements have been prepared on a going concern basis using historical cost, except for financial instruments and derivative financial instruments (see Note 2 M)), cash-settled share-based payment arrangements (see Note 2 J)) and pension plan assets (see Note 2 K)), which are measured at fair value, and for the defined benefit obligation (see Note 2K)) and provisions (see Note 2 I)), which are measured at present value.

Financial information is presented in Canadian dollars, which is the functional currency of Cogeco Communications.

The consolidated financial statements were approved by the Board of Directors of Cogeco Communications at its meeting held on October 30, 2019.

2. SIGNIFICANT ACCOUNTING POLICIES

The accounting policies set out below have been applied consistently to all periods presented in the consolidated financial statements, unless otherwise indicated.

A) BASIS OF CONSOLIDATION

These consolidated financial statements include the accounts of the Corporation and its subsidiaries.

Subsidiaries are entities controlled by the Corporation. Control is achieved where the Corporation has the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities. Subsidiaries' financial statements are included in the consolidated financial statements from the date that control commences until the date that control ceases. Subsidiaries' year-end and accounting policies are aligned with those adopted by the Corporation. Non-controlling interest in the net assets and results of consolidated subsidiaries is identified separately from the Corporation's ownership interest in them. Non-controlling interest in the equity of a subsidiary consists of the amount of non-controlling interest calculated at the date of the original business combination and its share of changes in equity since that date. Changes in non-controlling interest in a subsidiary that do not result in a loss of control by the Corporation are accounted for as equity transactions.

Operating segments and percentage of interest in the principal subsidiaries at August 31, 2019 are as follows:

Operating segment	Principal subsidiaries	Percentage of equity interest	Voting rights
		%	%
Canadian broadband services	Cogeco Connexion	100	100
American broadband services	Atlantic Broadband	79	79

The Corporation has established special purpose entities ("SPEs") with the objective of mitigating the impact of stock price fluctuations in connection with its Incentive and Performance Share Unit Plans. SPEs are consolidated if, based on an evaluation of the substance of their relationship with the Corporation and the SPEs' risks and rewards, the Corporation concludes that it controls the SPEs. SPEs controlled by the Corporation were established under terms that impose strict limitations on the decision-making powers of the SPEs' management, resulting in the Corporation receiving the majority of the benefits related to the SPEs' operations and net assets, being exposed to the majority of risks incident to the SPEs' activities, and retaining the majority of the residual or ownership risks related to the SPEs or their assets.

All intercompany transactions and balances and any unrealized revenue and expense are eliminated in preparing the consolidated financial statements.

B) BUSINESS COMBINATIONS

Business combinations are accounted for using the acquisition method. Goodwill is measured as the excess of the fair value of the consideration transferred including the recognized amount of any non-controlling interest in the acquiree over the net recognized amount of the identifiable assets acquired and liabilities assumed, all measured at the acquisition date.

The consideration transferred is measured as the sum of the fair values of assets transferred, liabilities assumed, and equity instruments issued by the Corporation at the acquisition date, including any asset or liability resulting from a contingent consideration arrangement, in exchange for control of the acquiree.

A right to receive or an obligation to pay contingent consideration is classified as an asset or a liability or as equity. Contingent consideration classified as equity is not remeasured until it is finally settled within equity. Contingent consideration classified as an asset or a liability is measured either as a financial instrument or as a provision. Changes in fair values that qualify as measurement period adjustments of preliminary purchase price allocations are adjusted in the current period and such changes are applied on a retrospective basis.

Acquisition costs, other than those associated with the issuance of debt or equity securities, and integration and restructuring costs that the Corporation incurs in connection with a business combination are recognized in profit or loss as incurred.

C) REVENUE RECOGNITION

Revenue is measured based on the consideration received or receivable from a customer, net of returns and discounts. The Corporation recognizes revenue from the sale of products or the rendering of services when it transfers control to the customer. Revenue is recognized applying the following five steps:

- Identify the contract with a customer;
- Identify the performance obligations in the contract;
- Determine the transaction price;
- Allocate the transaction price to the performance obligations in the contract; and
- Recognize revenue when (or as) the Corporation satisfies a performance obligation.

More specifically, the Corporation's principal sources of revenue are recognized as follows:

Residential
- Monthly subscription revenue (including any discounts, rebates, refunds and credits) for Internet, video and telephony services and rental of equipment is recognized as the services are provided;
- Revenue from data services, long-distance and other pay-per-use services is recognized as the services are provided;
- Revenue generated from the sale of customer premise equipment or other equipment is recognized when the customer accepts the delivery of the equipment;

Commercial
- Monthly subscription revenue (including any discounts, rebates, refunds and credits) for Internet, video and telephony services and rental of equipment is recognized on a straight line basis over the contractual period arrangement;
- Revenue from data services, long-distance and other pay-per-use services is recognized as the services are provided;
- Revenue generated from the sale of customer premise equipment or other equipment is recognized when the customer accepts the delivery of the equipment; and
- Revenue from colocation, network connectivity, hosting, cloud and managed services is recognized on a straight line basis over the contractual period arrangement;

Other
- Revenue from advertising, late fees, rental income and other miscellaneous revenue is recognized as the services are provided.

Multiple-element arrangements

The Corporation offers certain products and services as part of multiple deliverable arrangements. The Corporation accounts for individual products or services separately if they are distinct performance obligations, such that a product or service is separately identifiable from other items in the bundled package and a customer can benefit from it on its own or with other readily available resources.

Consideration is measured and allocated between the components based upon stand-alone selling price while applying the relevant revenue recognition policy. The stand-alone selling price is based on the observable price for which the Corporation sells its products and services separately without a contract, adjusted for market conditions and other factors.

The Corporation considers that installation and activation fees are not distinct performance obligations because a customer cannot benefit from it, on its own. Accordingly, for residential service customers, they are deferred and amortized as revenue over the period of time the fee remains material to the customer, which the Corporation estimates to be approximately six months. The estimate requires consideration of both quantitative and qualitative factors including average installation fee, average revenue per customer and customer behavior, among others. For commercial service customers, they are deferred and amortized as revenue at the same pace as the revenue from the related services are earned over the term of the agreement

Unearned revenue, such as payments for goods and services received in advance of delivery, is recorded as contract liabilities in the statement of financial position until the service is provided or the product is delivered to the customer.

Contract cost assets are recognized in the statement of financial position as other assets, and are comprised of upfront fees paid to multiple-dwelling units as well as incremental costs of obtaining a contract. Upfront fees paid by the Corporation to multiple-dwelling units such as condo associations, in order to gain access to serve and market occupants of the dwelling, are recognized over the term of the contract, as a reduction of revenue. Costs to obtain a contract (such as sales commissions) are recognized in operating expenses over the period of time the customer is expected to remain a customer of the Corporation, not exceeding 4 years.

D) PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment are measured at cost, less accumulated depreciation and impairment losses.

During construction of new assets, direct costs plus overhead costs directly attributable to the asset are capitalized. Borrowing costs directly attributable to the acquisition or construction of qualifying assets, which require a substantial amount of time to get ready for their intended use or sale, are capitalized until such time the assets are substantially ready for their intended use or sale. All other borrowing costs are recorded as financial expense in the period in which they are incurred.

The cost of replacing a part of property, plant and equipment that is ready for its intended use is added to the carrying amount of the property, plant and equipment or recognized as a separate component if applicable, only if it is probable that the economic benefits associated with the cost will flow to the Corporation and the cost can be measured reliably. The carrying amount of the replaced part is derecognized. All other day-to-day maintenance costs are recognized in profit or loss in the period in which they are incurred.

Depreciation is recognized from the date the asset is ready for its intended use so as to write-off the cost of assets, other than freehold land and properties under construction, less their residual values over their useful lives, using the straight-line method. Assets held under finance leases are depreciated over their expected useful lives on the same basis as owned assets or, where shorter, the term of the relevant lease. Depreciation periods are as follows:

Buildings and leasehold improvements (1)	10 to 40 years
Networks and infrastructure (2)	3 to 20 years
Customer premise equipment	3 to 5 years
Data centre equipment (3)	3 to 7 years
Rolling stock and equipment (4)	3 to 10 years

(1) Leasehold improvements are amortized over the shorter of the term of the lease or economic life.

(2) Networks and infrastructure include cable towers, headends, transmitters, fibre and coaxial networks, customer drops and network equipment.

(3) Data centre equipment includes general infrastructure, mechanical and electrical equipment, security and access control. Servers that are included as part of the hosting product line are amortized on a straight-line basis over their expected useful life, which is three years.

(4) Rolling stock and equipment includes rolling stock, programming equipment, furniture and fixtures, computer and software and other equipments.

When significant parts of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

The estimated useful lives, residual values and depreciation method are reviewed annually, with the effect of any changes in estimate accounted for on a prospective basis.

The gain or loss arising on the disposal or write-off of an item of property, plant and equipment is determined as the difference between the sale proceeds, if any, and the carrying amount of the asset, and is recognized as profit or loss.

The Corporation does not record decommissioning obligations in connection with its fibre and coaxial networks. The Corporation expects to renew all of its agreements with utility companies to access their support structures in the future, thus the resulting present value of the obligation is not significant.

E) INTANGIBLE ASSETS

Intangible assets acquired separately

Intangible assets acquired separately are measured at cost less accumulated amortization and impairment losses, if they are amortizable, otherwise, only net of accumulated impairment losses. The useful lives of intangible assets are assessed as either finite or indefinite.

Identifiable intangible assets acquired in a business combination

Identifiable intangible assets acquired in a business combination are recognized separately from goodwill if they meet the definition of intangible asset and if their fair value can be measured reliably. The cost of these intangible assets equals their acquisition-date fair value.

Subsequent to initial recognition, identifiable intangible assets acquired in a business combination are recorded at cost less accumulated amortization and impairment losses, if they are amortizable, otherwise only at cost net of accumulated impairment losses. The useful lives of intangible assets are assessed as either finite or indefinite.

Intangible assets with finite useful lives

Intangible assets with finite useful lives are amortized over their useful life. The estimated useful lives are reviewed annually, with the effect of any changes in estimate being accounted for on a prospective basis. Intangible assets with finite useful lives are amortized as follows:

- Customer relationships are amortized on a straight-line basis over the estimated useful life, defined as the average life of a customer's subscription, not exceeding eight years;
- Spectrum licenses are amortized over the initial non-cancelable term of the licenses, not exceeding ten years;
- Favorable leases are amortized on a straight-line basis over the remaining non-cancelable term of the lease agreement;

Intangible assets with indefinite useful lives

Intangible assets with indefinite useful lives are those for which there is no foreseeable limit to their useful economic life as they arise from contractual or other legal rights that can be renewed without significant cost. They are comprised of Cable Distribution Undertaking Broadcasting Licenses and Franchises ("Cable Distribution Licenses") and Trade name. Cable Distribution Licenses are comprised of broadcast authorities' licenses and exemptions from licensing that allow access to homes and customers in a specific area. The Corporation has concluded that the Cable Distribution Licenses have indefinite useful lives since there are no legal, regulatory, contractual, economic or other factors that would prevent their renewals or limit the period over which they will contribute to the Corporation's cash flows.The Trade name is considered to have an indefinite economic life because of the institutional nature of the corporate trade name, its ability to maintain market recognition and profitable operations over long periods of time and the Corporation's commitment to develop and enhance its value. The Corporation reviews at the end of each reporting period whether events and circumstances continue to support indefinite useful life assessment for these Cable Distribution Licenses and the Trade name. Intangible assets with indefinite useful lives are not amortized, but tested for impairment at least annually or more frequently if there is any indication of impairment.

Goodwill represents the future economic benefits arising from a business combination that are not individually identified and separately recognized. It is not amortized but tested for impairment at least annually or more frequently if there is an indication of impairment.

F) IMPAIRMENT OF NON FINANCIAL ASSETS

At the end of each reporting period, the Corporation reviews the carrying value of its property, plant and equipment and intangible assets with finite useful lives to determine whether there is any indication of impairment. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss, if any.

Goodwill and intangible assets with indefinite useful lives are tested for impairment at least annually or more frequently if there is an indication of impairment.

The recoverable amount is the higher of fair value less costs to sell and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset for which the estimates of future cash flows have not been adjusted.

For the purpose of impairment testing, assets that cannot be tested on an individual basis are grouped together into the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or group of assets ("cash-generating unit" or "CGU"). When a reasonable and consistent basis of allocation can be identified, corporate assets are allocated to an individual CGU, otherwise they are allocated to the smallest group of CGU for which a reasonable and a consistent basis of allocation can be identified.

The most recent detailed calculation made in a preceding period of the recoverable amount of a CGU to which goodwill has been allocated may be used in the impairment test of that unit in the current period provided all of the following criteria are met:

- The assets and liabilities making up the unit have not changed significantly since the most recent recoverable amount calculation;
- The most recent recoverable amount calculation resulted in an amount that exceeded the carrying amount of the unit by a substantial margin; and
- Based on an analysis of events that have occurred and circumstances that have changed since the most recent recoverable amount calculation, the likelihood that a current recoverable amount determination would be less than the current carrying amount of the unit is remote.

An impairment loss is recognized when the carrying amount of an asset or a CGU exceeds its recoverable amount. Impairment losses recognized in respect of CGUs are allocated first to reduce the carrying amount of any allocated goodwill and then to reduce the carrying amount of other assets on a pro-rata basis. The impairment loss is recognized immediately in profit or loss in the period in which the loss occurs.

Impairment losses recognized in prior periods are assessed at each reporting date for any indications that the loss has decreased or no longer exists. An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortization, if no impairment loss had been recognized. A reversal of an impairment loss is recognized immediately in profit or loss.

For the purpose of impairment testing, goodwill is allocated to each of the Corporation's CGUs that are expected to benefit from the synergies of the related business combination. An impairment loss recognized for goodwill cannot be reversed.

G) LEASES

Lessee

Leases are classified as finance leases whenever the terms of the lease transfer substantially all the risks and rewards incidental to ownership of the asset to the lessee. All other leases are classified as operating leases.

Assets held under finance leases are recognized as assets of the Corporation at their fair value at the inception of the lease or, if lower, at the present value of the minimum lease payments as determined at the inception of the lease. Subsequent to initial recognition, the asset is accounted for in accordance with the accounting policy applicable to that asset. The corresponding liability is included in the statement of financial position as a finance lease obligation. Lease payments are apportioned between financial expense and reduction of the lease obligation so as to achieve a constant rate of interest on the remaining balance of the liability. Financial expense and depreciation of the assets are recognized in profit or loss in the period they occur.

Rentals payable under operating leases are charged to profit or loss on a straight-line basis over the term of the relevant lease.

Lessor

The Corporation leases certain equipment, primarily customer premise equipment, to its customers. These leases are classified as operating leases and rental revenue is recognized over the term of the relevant lease.

H) INCOME TAXES

Income tax expense represents the sum of the taxes currently payable and deferred. Current and deferred taxes are recognized in profit or loss, except when they relate to a business combination or to items that are recognized in other comprehensive income or directly in equity.

Current tax

The tax currently payable is based on taxable profit for the year. The Corporation's liability for current tax is calculated using tax rates that have been enacted or substantively enacted at the end of the reporting period.

Deferred tax

Deferred tax is recognized in respect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax assets and liabilities are not recognized if the temporary difference arises from the initial recognition of goodwill or assets or liabilities in a transaction that is not a business combination and that affects neither the taxable profit nor the accounting profit or is related to investments in subsidiaries to the extent that the Corporation is able to control the reversal and it is probable that the temporary differences will not reverse in the foreseeable future.

Deferred tax assets are generally recognized for unused tax losses and deductible temporary differences to the extent that it is probable that future taxable profits will be available against which, those unused tax losses and deductible temporary differences can be utilized. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the related tax benefit will be realized.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply in the period in which the liability is settled or the asset realized, based on tax rates that have been enacted or substantively enacted at the end of the reporting period. The measurement of deferred tax assets and liabilities reflects the tax consequences that would follow from the manner in which the Corporation expects, at the end of the reporting period, to recover or settle the carrying amount of its assets and liabilities.

Deferred tax assets and liabilities are offset when there is a legally enforceable right to set off current tax assets against current tax liabilities and when they relate to income taxes levied by the same taxation authority on the same taxable entity, or on different tax entities, but the Corporation intends to settle its current tax assets and liabilities on a net basis.

I) PROVISIONS

Provisions represent liabilities of the Corporation for which the amount or timing is uncertain. A provision is recorded when the Corporation has a legal or constructive present obligation as a result of a past event and it is probable that an outflow of economic benefits will be required to settle the obligation, and a reliable estimate can be made of the amount of the obligation. The amount recognized represents management's best estimate required to settle the obligation at the end of the reporting period, taking into account the obligation's risks and uncertainties. When the effect of the time value of money is material, the amount of the provision is determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability. When discounting is used, the increase in the provision due to the passage of time is recognized as financial expense.

When some or all of the economic benefits required to settle a provision are expected to be recovered from a third party, a receivable is recognized as an asset if it is virtually certain that reimbursement will be received and the amount of the receivable can be measured reliably.

J) SHARE-BASED PAYMENT

Equity-settled awards

The Corporation measures stock options granted to employees that vest rateably over the service period based on the fair value of each tranche on grant date by using the Black-Scholes pricing model and a compensation expense is recognized on a straight-line basis over the vesting period applicable to the tranche, with a corresponding increase in share-based payment reserve. Granted options vest equally over a period of five years beginning one year after the day such options are granted. When the stock options are exercised, share capital is credited by the sum of the consideration paid and the related portion previously recorded in share-based payment reserve.

The Corporation measures Incentive Share Units ("ISUs") and Performance Share Units ("PSUs") granted to employees based on the fair value of the Corporation's subordinate voting shares at the date of grant and a compensation expense is recognized over the vesting period, with a corresponding increase in share-based payment reserve. The total vesting period of each grant is three years less one day.

Cash-settled awards

The fair value of the amount payable to the members of the Board of Directors in respect of share appreciation rights under the Deferred Share Unit ("DSU") Plan of the Corporation, which are settled in cash or shares, is recognized as a compensation expense with a corresponding increase in pension plan liabilities and accrued employee benefits as of the date units are issued to the members of the Board of Directors. The accrued liability is remeasured at the end of each reporting period, until settlement, using the average closing price of the subordinate voting shares on the TSX for the twenty consecutive trading days immediately preceding by one day the closing date of the reporting period. Any changes in the fair value of the liability are recognized in profit or loss.

K) EMPLOYEE BENEFITS

Short-term employee benefits

Short-term employee benefits include wages, salaries, compensated absences, profit-sharing and bonuses. They are measured on an undiscounted basis and are expensed as the related service is provided. A liability is recognized for the amount expected to be paid under short-term cash bonus or profit sharing plans if the Corporation has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be estimated reliably.

Defined contribution plans

A defined contribution plan is a post-employment benefit plan under which an entity pays fixed contributions and will have no legal or constructive obligation to pay further amounts. Obligations for contributions to defined contribution plans are recognized as an expense in the periods during which services are rendered by employees.

Defined benefit plans

A defined benefit plan is a post-employment benefit plan whereby the amount of pension benefit that a plan participant will receive during retirement is defined and dependent on factors such as age, years of service and compensation. On each annual reporting date, independent actuaries extrapolate the data of the most recent full actuarial valuation to measure, for accounting purposes, the present value of the defined benefit obligation. The Corporation's net defined benefit liability in respect of defined benefit plans is calculated separately for each plan.

The present values of the defined benefit obligation, the current service cost and, if applicable, the past service cost are actuarially determined using the projected unit credit method (sometimes known as the accrued benefit method pro-rated on service) based on management's best-estimate assumptions on the discount rate, the expected rate of compensation increase and the mortality table.

Management determines the discount rate based on a review of the current market interest rates on investment-grade fixed-rate corporate bonds, which are rates adjusted to reflect the duration of the expected future cash outflows of retirement benefit payments.

The net defined benefit liability or asset recognized in the consolidated statement of financial position corresponds to the fair value of plan assets net of the present value of the defined benefit obligation. Any asset resulting from this calculation is limited to the present value of the economic benefits available in the form of refunds from the plans or in the form of reductions in future contributions to the plans.

The net defined benefit cost components of the defined benefit plans are recognized as follows:

- Service cost is recognized in profit or loss;
- Net interest on the net defined benefit liability or asset is recognized in profit or loss;
- Remeasurements of the net defined benefit liability or asset are recognized in other comprehensive income.

The service cost recognized in profit or loss comprises:

- Current service cost provided in exchange for employees services rendered during the period;
- Past service cost recognized in profit or loss in the period in which the plan is amended; and
- Gains or losses resulting from a settlement recognized in profit or loss in the period in which the plan settlement occurs.

Net interest on the net defined benefit liability or asset is calculated by multiplying the net defined benefit liability or asset by the discount rate.

Remeasurements of the net defined benefit liability or asset are recognized immediately in retained earnings and they are not reclassified to profit or loss in a subsequent period. Remeasurements of the net defined benefit liability or asset comprise:

- Actuarial gains and losses arising from experience adjustments, changes in financial assumptions and changes in demographic assumptions;
- The return on plan assets, except amounts included in interest income; and
- Any change in the effect of the asset ceiling, except amounts included in net interest on the net defined benefit liability or asset.

L) FOREIGN CURRENCY TRANSLATION

For the purpose of the consolidated financial statements, the profit or loss and financial position of each group entity are expressed in Canadian dollars, which is the functional and presentation currency of the Corporation.

Foreign currency transactions

Transactions in foreign currencies are translated to the respective functional currency of the Corporation's entities at the exchange rate in effect at the transaction date. Monetary assets and liabilities denominated in foreign currencies at the reporting date are translated to the functional currency at the exchange rate at that date. Foreign currency differences arising on translation are recognized as financial expense in profit or loss, except for those arising on the translation of financial instruments designated as a hedge of a net investment in foreign operations, and financial instruments designated as hedging instruments in a cash flow hedge, which are recognized in other comprehensive income until the hedged items are settled or recognized in profit or loss.

Foreign operations

The assets and liabilities of foreign operations, including goodwill and fair value adjustment arising on acquisition, are translated to Canadian dollars using exchange rates prevailing at the end of the reporting period.

Revenue and expense items are translated at the average exchange rates for the period, unless exchange rates fluctuated significantly or significant transactions occurred during that period, in which case the exchange rates at the date of the transactions are used. Exchange differences arising from the translation process of net investments in foreign operations are recognized as foreign currency translation adjustments in other comprehensive income and accumulated in equity.

The Corporation applies hedge accounting to foreign currency differences arising between the functional currency of the foreign operation and the Corporation's functional currency. Foreign currency differences arising on the translation of long-term debt designated as hedges of a net investment in foreign operations are recognized in other comprehensive income to the extent that the hedge is effective, and are presented within equity in the foreign currency translation balance. To the extent that the hedge is ineffective, such differences are recognized in profit or loss. When the hedged portion of a net investment is disposed of, the relevant amount in the cumulative amount of foreign currency translation adjustments is transferred to profit or loss as part of the profit or loss on disposal.

M) FINANCIAL INSTRUMENTS

Classification and measurement

All financial instruments, including derivatives, are included in the statement of financial position initially at fair value when the Corporation becomes a party to the contractual obligations of the instrument.

Subsequent to initial recognition, the classification of non-derivative financial instruments, based on their method of measurement, is as follows:

- Cash and cash-equivalents and trade and other receivables are classified and measured at amortized cost using the effective interest method, less any impairment loss;

- Transaction costs that are directly attributable to the acquisition or related to the issuance of financial assets or liabilities (other than financial assets and financial liabilities at fair value through profit or loss) are added to or deducted from the fair value of the financial assets or financial liabilities, as required, upon initial recognition. Transaction costs directly attributable to the acquisition of financial assets or liabilities at fair value through profit or loss are recognized immediately in profit or loss; and

- Bank indebtedness, trade and other payables, balance due on business combinations and long-term debt are classified and measured at amortized cost using the effective interest method. Directly attributable transaction costs are added to the initial fair value of financial instruments except for those incurred with respect to the revolving facilities which are recorded as other assets and amortized over the term of the related financing on a straight-line basis.

Financial assets are derecognized only when the Corporation no longer holds the contractual rights to the cash flows of the asset or when the Corporation transfers substantially all the risks and rewards of ownership of the financial asset to another entity. Financial liabilities are derecognized only when the Corporation's obligations are discharged, cancelled or expired.

Financial assets and financial liabilities are offset and the net amount reported in the statement of financial position if, and only if, there is a currently enforceable legal right to offset the recognized amounts and there is an intention to settle on a net basis, or to realize the assets and settle the liabilities simultaneously.

Derivative financial instruments, including hedge accounting

The Corporation uses interest rate swaps as derivative financial instruments to manage interest rate risk related to its floating rate long-term debt. The Corporation also uses equity swap agreements, which are not designated as hedging relationships, in order to manage cash flow exposures related to settling DSUs. The Corporation does not hold or use any derivative financial instruments for speculative trading purposes. Derivative financial instruments are recognized initially at fair value and related transaction costs are recognized in profit or loss as incurred. Subsequent to initial recognition, derivative financial instruments are measured at fair value, and changes therein are accounted for as described below, except for equity swap instruments whereby the changes are recorded in operating expenses. Net receipts or payments arising from derivative financial instruments are recognized as financial expense.

On initial designation of the hedge, the Corporation formally documents the relationship between the hedging instrument and the hedged item, including the risk management objectives and strategy in undertaking the hedging transaction, together with the methods that will be used to assess the effectiveness of the hedging relationship and measure the ineffectiveness. The Corporation makes an assessment, both at the inception of the hedge relationship as well as on an ongoing basis, whether the hedging instruments are expected to be "highly effective" in offsetting the changes in the cash flows of the respective hedged items during the period for which the hedge is designated and whether the actual results of each hedging relationship are within a range of 80-125 percent. For a cash flow hedge of a forecasted transaction, the transaction should be highly probable to occur and should present an exposure to variations in cash flows that could ultimately affect reported profit or loss.

Cash flow hedge accounting

When a derivative financial instrument is designated as the hedging instrument in a hedge of the variability in cash flows attributable to a particular risk associated with a recognized asset or liability or a highly probable forecasted transaction that could affect profit or loss, the effective portion of changes in the fair value of the derivative financial instrument is recognized in accumulated other comprehensive income and presented in the cash flow hedge reserve in equity. The amount recognized in accumulated other comprehensive income is removed and included in profit or loss in the same period as the hedged item affects profit or loss and in the same line item as the hedged item. Any ineffective portion of changes in the fair value of the derivative financial instrument is recognized immediately in profit or loss.

If the hedging instrument no longer meets the criteria for hedge accounting, expires, is sold, terminated, exercised, or the designation is revoked, then hedge accounting is discontinued prospectively. The cumulative gain or loss previously recognized in accumulated other comprehensive income and presented in cash flow hedge reserve in equity, remains there until the forecasted hedged item affects profit or loss. If the forecasted hedged item is no longer expected to occur, then the balance in accumulated other comprehensive income is recognized immediately in profit or loss. In other cases, the amount recognized in accumulated other comprehensive income is transferred to profit or loss in the same period in which the hedged item affects profit or loss.

Embedded derivatives

Embedded derivatives are separated from the host contract and accounted for separately if the economic characteristics and risks of the host contract and the embedded derivative are not closely related, if a separate instrument with the same terms as the embedded derivative would meet the definition of a derivative, and if the combined instrument is not measured at fair value through profit or loss.

Impairment of financial assets

A financial asset is impaired if objective evidence indicates that a loss event has occurred after the initial recognition of the asset, and that the loss event had a negative effect on the estimated future cash flows of that asset that can be estimated reliably.

Trade and other receivables ("receivables") are assessed at each reporting date to determine whether there is objective evidence that they are impaired. Objective evidence that receivables are impaired can include default or delinquency by a debtor or indications that a debtor will enter into bankruptcy. The Corporation considers evidence of impairment for receivables at both the specific asset level and on an aggregate basis. All individually significant receivables are assessed for specific impairment. Receivables that are not individually significant are assessed for impairment on an aggregate basis by grouping together receivables with similar risk characteristics.

An impairment loss, with respect to receivables assessed on an aggregate basis, is measured based on the lifetime expected credit loss model which is an estimate of all possible default events over the expected life of the financial instrument. An impairment loss is recognized in profit or loss and reflected in an allowance account presented in reduction of receivables. When a subsequent event causes the amount of the impairment loss to decrease, the decrease in impairment loss is reversed through profit or loss.

N) CASH AND CASH EQUIVALENTS

Cash and cash equivalents include cash and highly liquid investments that have an original maturity of three months or less.

O) EARNINGS PER SHARE

The Corporation presents basic and diluted earnings per share data for its multiple and subordinate voting shares. Basic earnings per share is calculated by dividing the profit or loss attributable to shareholders of the Corporation by the weighted average number of multiple and subordinate voting shares outstanding during the period, adjusted for subordinate voting shares held in trust under the ISU and PSU Plans. Diluted earnings per share is determined by further adjusting the weighted average number of multiple and subordinate voting shares outstanding for the effects of all potential dilutive subordinate voting shares, which comprise stock options, ISUs and PSUs granted to executive officers and designated employees.

P) SEGMENT REPORTING

An operating segment is a component of the Corporation that engages in business activities from which it may earn revenue and incur expenses, including revenue and expenses that relate to transactions with any of the Corporation's other components. All segments' operating results are reviewed regularly by the Corporation's chief operating decision maker ("CODM") to decide about resources to be allocated to the operating segment and to assess its performance, and for which discrete financial information is available. Segment operating results that are directly reported to the CODM include items directly attributable to an operating segment as well as those that can be allocated on a reasonable basis.

Q) ACCOUNTING JUDGMENTS AND USE OF ESTIMATES

The preparation of consolidated financial statements in accordance with IFRS requires management to make judgments, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets and liabilities, revenue and expenses.

Significant areas requiring the use of management's judgments and estimates relate to the following items:

- **Allowance for doubtful accounts**

  The allowance for doubtful accounts is established based on the estimated credit risk of the Corporation's customers, by examining such factors as the current economic conditions, forward-looking macroeconomic data and historical information (number of overdue days of the customer's balance outstanding as well as the customer's collection history) (see Note 24 A));

- **Business combinations**

  Fair value of assets acquired and liabilities assumed in a business combination is estimated based on information available at the date of acquisition and involves considerable judgment in determining the fair values assigned to the property, plant and equipment acquired and liabilities assumed on acquisition. Among other things, the determination of these fair values involves the use of discounted cash flow analyses, estimated future margins and estimated future customer counts (see Note 7);

- **Revenue from contracts with customers**

  The identification of performance obligations within a contract and the timing of satisfaction of those performance obligations, as well as determining the costs that are incremental to obtaining and fulfilling a contract, require judgment. Determining the transaction price for a contract requires estimating the revenue expected for delivering the performance obligations within the contract. Additionally, an estimate might be necessary when determining the stand-alone selling price of performance obligations and the allocation of the transaction price between performance obligations;

- **Depreciation of property, plant and equipment and amortization of intangible assets**

  Measurement of property, plant and equipment and intangible assets with finite useful lives requires estimates for determining the assets' expected useful lives and residual values. Management's judgment is also required to determine the components and the depreciation method used (see Note 10);

- **Provisions**

  Management's judgment is used to determine the timing, likelihood and the amount of expected cash outflows as well as the discount rate (see Note 17);

- **Contingencies**

  Contingencies such as lawsuits, taxes and commitments under contractual and other commercial obligations are estimated based on applying significant judgement in determining if a loss is probable and in determining the estimated outflow of economic resources. Such contingencies are estimated based on the information available to the Corporation;

- **Fair value measurement of derivative financial instruments**

  The fair value of derivative financial instruments is estimated using valuation techniques based on several market data such as interest rates, foreign exchange rates and the Corporation's or counterparties' credit risks;

- **Hedge accounting**

  Management uses significant judgment in determining whether the Corporation's financial instruments qualify for hedge accounting, including the assumptions for effectiveness and also in estimating the probability that a transaction will occur, in the case of cash flow hedges of forecasted transaction;

- **Measurement of defined benefit obligation**

  The net defined benefit obligation is determined using actuarial calculations that are based on several assumptions. The actuarial valuation uses the Corporation's assumptions for the discount rate, the expected rate of compensation increase and the mortality table. If the actuarial assumptions are found to be significantly different from the actual data subsequently observed, it could impact the reported amount of defined benefit pension cost recognized in profit or loss, the remeasurement of the net defined benefit asset or liability recognized directly in other comprehensive income and the net assets or net liabilities related to these obligations presented in the consolidated statement of financial position (see Note 23);

- **Share-based payments**

  Management estimates the fair value of stock-options granted using the Black-Scholes option pricing model. The estimates used by management include expected dividend yields, volatility of the Corporation's share price, the expected life of the option, the risk-free interest rate and the number of options expected to vest. Estimates are also used in the determination of the number of ISUs and PSUs that are expected to vest, which influences their fair value. The fair value of the PSUs is also estimated based on the level of Economic Value creation;

- **Measurement of non-financial assets**

  The measurement of non-financial assets requires the use of management judgment to identify the existence of impairment indicators and the determination of CGUs. Furthermore, when determining the recoverable amount of a CGU or an asset, the Corporation uses significant estimates such as the estimation of future cash flows and discount rates applicable. Any significant modification of market conditions could translate into an inability to recover the carrying amounts of non-financial assets (Note 16); and

- **Deferred taxes**

  Deferred tax assets and liabilities require estimates about the nature and timing of future permanent and temporary differences, the expected timing of reversals of those temporary differences and the future tax rates that will apply to those differences (see Note 12).

Such judgments and estimates are based on the facts and information available to the management of the Corporation. Changes in facts and circumstances may require the revision of previous estimates, and actual results could differ from these estimates.

3. CHANGES IN ACCOUNTING POLICIES

IFRS 9 *Financial Instruments*

On September 1, 2018, the Corporation adopted IFRS 9, *Financial Instruments,* which replaces the guidance in IAS 39 *Financial Instruments: Recognition and Measurement*. IFRS 9 includes requirements for classification and measurement, impairment, derecognition and general hedge accounting. The Corporation adopted IFRS 9 on a retrospective basis.

The Corporation is applying the IFRS 9 expected credit losses method to estimate the provision for expected credit losses on its financial assets. The Corporation elected to continue to apply the hedge accounting requirements of IAS 39.

The adoption of IFRS 9 had no significant impact on the consolidated financial statements.

IFRS 15 *Revenue from Contracts with Customers*

On September 1, 2018, the Corporation adopted IFRS 15, *Revenue from Contracts with Customers*, on a fully retrospective basis. IFRS 15 establishes principles for reporting the nature, amount, timing and uncertainty of revenue and cash flows arising from an entity's contracts with customers. It provides a single, five-step model for an entity to recognize revenue in order to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods and services. IFRS 15 also provides guidance relating to the treatment of contract acquisition and contract fulfillment costs. In addition, IFRS 15 requires additional disclosure in the consolidated financial statements regarding the Corporation's revenue. IFRS 15 supersedes the following standards: IAS 11 *Construction Contracts*, IAS 18 *Revenue*, IFRIC 13 *Customer Loyalty Programmes*, IFRIC 15 *Agreements for the Construction of Real Estate*, IFRIC 18 *Transfers of Assets from Customers* and SIC-31 *Revenue-Barter Transactions Involving Advertising Services*.

The adoption of IFRS 15 has an impact on residential non-refundable upfront installation fees charged to broadband service customers. Such revenue is deferred and amortized over the period the fee remains material to the customer, which the Corporation estimated to be six months. The estimate required consideration of both quantitative and qualitative factors including average installation fee, average revenue per customer and customer behavior, among others. Prior to IFRS 15, these installation fees were deferred and amortized as revenue at the same pace as the revenue from the related services was earned, which was the average life of a customer's subscription for broadband service customers.

The adoption of IFRS 15 also impacted the consolidated financial statements with regards to the capitalization of costs to obtain a contract. Costs to obtain a contract (such as direct and incremental costs associated with the acquisition of customers) are recognized as an asset and recognized in operating expenses over the period of time the customer is expected to remain a customer of the Corporation. Prior to IFRS 15, direct and incremental costs associated with the acquisition of customers were capitalized as intangible assets for contracts lasting greater than one year, and amortized over the term of the revenue arrangement. For contracts with durations of less than one year, these costs were recognized in operating expenses as incurred.

Upfront fees paid by the Corporation to multiple-dwelling units such as condo associations, in order to gain access to serve and market occupants of the dwelling, are deferred as contract costs in other assets and recognized over the term of the contract, as a reduction of revenue. Prior to IFRS 15, these fees were capitalized in property, plant and equipment and recognized in depreciation expense, over the term of the contract.

RECLASSIFICATION OF RECONNECT COSTS

Following an in-depth analysis of all contract costs, stemming from the adoption of IFRS 15, the Corporation reviewed the reconnect and additional service activation costs ("reconnect costs") generated by the customer reconnect activity. Prompted by the significant change in technology that occurred over time regarding the activities required to reconnect customers, the Corporation determined that the reconnect costs are incurred to ensure that the customer premise equipment ("CPE") is functioning as per the intended use and within the required parameters. Thus the reconnect costs are directly attributable to bringing the CPE assets to their condition necessary for the intended operating manner.

Consequently, the Corporation changed its accounting policy with respect to reconnect costs which are now recognized as property, plant and equipment, and depreciated over the expected useful life of the CPE. Previously, reconnect costs were capitalized as intangible assets up to a maximum not exceeding the revenue generated by the reconnect activity, and amortized over the average life of a customer's subscription, not exceeding eight years.

The Corporation believes this change in accounting policy will better reflect the current nature of the reconnect costs.

IMPACT OF CHANGES IN ACCOUNTING POLICIES ON THE COMPARATIVE FIGURES

The changes in the accounting policies mentioned above were applied retrospectively and as a result the Corporation changed the comparative figures for the year ended August 31, 2018 and the consolidated statements of financial position as at August 31, 2018 and September 1, 2017. The impact on the Corporation's consolidated financial statements of adopting these accounting policies is provided below.

CONSOLIDATED STATEMENT OF PROFIT OR LOSS

Year ended August 31, 2018	As previously reported	IFRS 15 impact	Reclassification impact	As currently reported
(In thousands of Canadian dollars, except per share data)	$	$	$	$
Revenue	2,147,597	(193)	—	2,147,404
Operating expenses	1,126,723	(619)	(4,479)	1,121,625
Management fees – Cogeco Inc.	18,961	—	—	18,961
Integration, restructuring and acquisition costs	20,328	—	—	20,328
Depreciation and amortization	431,598	(2,827)	4,883	433,654
Financial expense	185,456	—	—	185,456
Profit before income taxes	364,531	3,253	(404)	367,380
Income taxes	(16,191	(1,129)	122	(17,198)
Profit for the year from continuing operations	380,722	4,382	(526)	384,578
Loss for the year from discontinued operations	(24,381)	—	—	(24,381)
Profit for the year	356,341	4,382	(526)	360,197
Profit for the year attributable to:				
Owners of the Corporation	347,150	4,185	(502)	350,833
Non-controlling interest	9,191	197	(24)	9,364
	356,341	4,382	(526)	360,197
Earnings (loss) per share				
Basic				
Profit for the year from continuing operations	7.54			7.61
Loss for the year from discontinued operations	(0.49)			(0.49)
Profit for the year	7.04			7.12
Diluted				
Profit for the year from continuing operations	7.48			7.55
Loss for the year from discontinued operations	(0.49)			(0.49)
Profit for the year	6.98			7.06

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION

As at August 31, 2018	As previously reported	IFRS 15 impact	Reclassification impact	As currently reported
(In thousands of Canadian dollars)	$	$	$	$
Assets				
Current				
Cash and cash equivalents	84,725	—	—	84,725
Trade and other receivables	97,294	—	—	97,294
Income taxes receivable	24,976	—	—	24,976
Prepaid expenses and other	29,473	—	—	29,473
Derivative financial instrument	1,330	—	—	1,330
	237,798	—	—	237,798
Non-current				
Other assets	7,349	35,328	—	42,677
Property, plant and equipment	2,302,676	(8,692)	29,694	2,323,678
Intangible assets	2,971,088	(16,801)	(26,899)	2,927,388
Goodwill	1,608,446	—	—	1,608,446
Derivative financial instruments	33,797	—	—	33,797
Pension plan assets	594	—	—	594
Deferred tax assets	5,665	—	—	5,665
	7,167,413	9,835	2,795	7,180,043
Liabilities and Shareholders' equity				
Liabilities				
Current				
Bank indebtedness	5,949	—	—	5,949
Trade and other payables	302,806	—	—	302,806
Provisions	25,887	—	—	25,887
Income tax liabilities	16,133	—	—	16,133
Contract liabilities and other liabilities	67,699	(8,043)	—	59,656
Current portion of long-term debt	77,188	—	—	77,188
	495,662	(8,043)	—	487,619
Non-current				
Long-term debt	3,781,020	—	—	3,781,020
Contract liabilities and other liabilities	40,560	(20,435)	—	20,125
Pension plan liabilities and accrued employee benefits	2,784	—	—	2,784
Deferred tax liabilities	543,856	10,079	949	554,884
	4,863,882	(18,399)	949	4,846,432
Shareholders' equity				
Equity attributable to owners of the Corporation				
Share capital	1,017,172	—	—	1,017,172
Share-based payment reserve	15,260	—	—	15,260
Accumulated other comprehensive income	113,500	274	—	113,774
Retained earnings	821,409	27,708	1,846	850,963
	1,967,341	27,982	1,846	1,997,169
Equity attributable to non-controlling interest	336,190	252	—	336,442
	2,303,531	28,234	1,846	2,333,611
	7,167,413	9,835	2,795	7,180,043

As at September 1, 2017	As previously reported	IFRS 15 impact	Reclassification impact	As currently reported
(In thousands of Canadian dollars)	$	$	$	$
Assets				
Current				
Cash and cash equivalents	211,185	—	—	211,185
Short-term investments	54,000	—	—	54,000
Trade and other receivables	90,387	—	—	90,387
Income taxes receivable	4,210	—	—	4,210
Prepaid expenses and other	20,763	—	—	20,763
Derivative financial instrument	98	—	—	98
	380,643	—	—	380,643
Non-current				
Other assets	7,095	28,839	—	35,934
Property, plant and equipment	1,947,239	(6,258)	29,881	1,970,862
Intangible assets	1,978,302	(14,850)	(26,687)	1,936,765
Goodwill	1,023,424	—	—	1,023,424
Derivative financial instruments	759	—	—	759
Deferred tax assets	10,918	—	—	10,918
	5,348,380	7,731	3,194	5,359,305
Liabilities and Shareholders' equity				
Liabilities				
Current				
Bank indebtedness	3,801	—	—	3,801
Trade and other payables	316,762	—	—	316,762
Provisions	23,010	—	—	23,010
Income tax liabilities	103,649	—	—	103,649
Contract liabilities and other liabilities	85,005	(8,338)	—	76,667
Balance due on business combinations	118	—	—	118
Derivative financial instruments	192	—	—	192
Current portion of long-term debt	131,915	—	—	131,915
	664,452	(8,338)	—	656,114
Non-current				
Long-term debt	2,444,518	—	—	2,444,518
Contract liabilities and other liabilities	31,462	(18,470)	—	12,992
Pension plan liabilities and accrued employee benefits	4,934	—	—	4,934
Deferred tax liabilities	603,747	11,016	846	615,609
	3,749,113	(15,792)	846	3,734,167
Shareholders' equity				
Equity attributable to owners of the Corporation				
Share capital	1,017,636	—	—	1,017,636
Share-based payment reserve	13,086	—	—	13,086
Accumulated other comprehensive income	76,635	—	—	76,635
Retained earnings	491,910	23,523	2,348	517,781
	1,599,267	23,523	2,348	1,625,138
Equity attributable to non-controlling interest	—	—	—	—
	1,599,267	23,523	2,348	1,625,138
	5,348,380	7,731	3,194	5,359,305

CONSOLIDATED STATEMENT OF CASH FLOWS

Year ended August 31, 2018	As previously reported	IFRS 15 impact	Reclassification impact	As currently reported
(In thousands of Canadian dollars)	$	$	$	$
Cash flow from operating activities				
Profit for the year from continuing operations	380,722	4,382	(526)	384,578
Adjustments for:				
Depreciation and amortization	431,598	(2,827)	4,883	433,654
Financial expense	185,456	—	—	185,456
Income taxes	(16,191)	(1,129)	122	(17,198)
Share-based payment	6,772	—	—	6,772
Loss on disposals and write-offs of property, plant and equipment	1,916	—	—	1,916
Defined benefit plans contributions, net of expense	(714)	—	—	(714)
	989,559	426	4,479	994,464
Changes in non-cash operating activities	(16,645)	(7,258)	—	(23,903)
Financial expense paid	(174,650)	—	—	(174,650)
Income taxes paid	(175,163)	—	—	(175,163)
	623,101	(6,832)	4,479	620,748
Cash flow from investing activities				
Acquisition of property, plant and equipment	(445,154)	3,631	(16,285)	(457,808)
Acquisition of intangible and other assets	(15,007)	3,201	11,806	—
Acquisition of Spectrum licenses	(32,306)	—	—	(32,306)
Redemption of short-term investments	54,000	—	—	54,000
Business combinations, net of cash and cash equivalents acquired	(1,756,935)	—	—	(1,756,935)
Proceeds on disposals of property, plant and equipment	1,383	—	—	1,383
	(2,194,019)	6,832	(4,479)	(2,191,666)
Cash flow from financing activities				
Increase in bank indebtedness	2,148	—	—	2,148
Net increase under the revolving facilities	384,568	—	—	384,568
Issuance of long-term debt, net of discounts and transaction costs	2,082,408	—	—	2,082,408
Repayment of long-term debt	(1,329,044)	—	—	(1,329,044)
Repayment of balance due on business combinations	(118)	—	—	(118)
Increase in deferred transaction costs	(3,168)	—	—	(3,168)
Issuance of subordinate voting shares	3,486	—	—	3,486
Issuance of common shares by a subsidiary to non-controlling interest, net of transaction costs paid	388,907	—	—	388,907
Acquisition of subordinate voting shares held in trust under the Incentive and Performance Share Unit Plans	(9,352)	—	—	(9,352)
Dividends paid on multiple voting shares	(29,813)	—	—	(29,813)
Dividends paid on subordinate voting shares	(63,886)	—	—	(63,886)
	1,426,136	—	—	1,426,136
Effect of exchange rate changes on cash and cash equivalents denominated in a foreign currency	1,989	—	—	1,989
Net change in cash and cash equivalents from continuing operations	(142,793)	—	—	(142,793)
Net change in cash and cash equivalents from discontinued operations	16,333	—	—	16,333
Cash and cash equivalents, beginning of the year	211,185	—	—	211,185
Cash and cash equivalents, end of the year	84,725	—	—	84,725

4. NEW ACCOUNTING STANDARDS AND INTERPRETATIONS ISSUED BUT NOT YET EFFECTIVE

A number of new standards, interpretations and amendments to existing standards were issued by the IASB that are mandatory but not yet effective for the year ended August 31, 2019, and have not been applied in preparing these consolidated financial statements. The following standards may have a material impact on future consolidated financial statements of the Corporation:

Standard	Effective date
IFRS 16 *Leases*	Annual periods beginning on or after January 1, 2019
IFRIC 23 *Uncertainty over income tax treatments*	Annual periods beginning on or after January 1, 2019
Amendments to IFRS 3 *Business combinations*	Prospectively for acquisitions occurring on or after January 1, 2020, with early adoption permitted

IFRS 16

IFRS 16 replaces IAS 17 *Leases*, and establishes a comprehensive model for the identification of lease arrangements, and the recognition, measurement, presentation and disclosure in the financial statements of the lessees and lessors. The new standard is applicable to all leases, except for certain exceptions. A lessee will be required to recognize a right-of-use asset, representing its right to use the underlying asset, and a corresponding lease liability, representing its obligation to make the lease payments. The accounting treatment for lessors will remain largely the same as under IAS 17. At adoption, there is the option to either apply IFRS 16 with either a full retrospective approach whereby IFRS 16 will also be applied to comparative figures, or a modified retrospective approach whereby the cumulative effect of the initial application is adjusted to opening retained earnings.

IFRS 16 eliminates the distinction between operating and finance leases for lessees, requiring instead that future lease payments be capitalized and presented either as lease assets (right-of-use assets) or together with property, plant and equipment. IFRS 16 will result in an increase to both assets and liabilities recorded on the consolidated statements of financial position, stemming from recognizing the right-of-use assets and the corresponding lease liabilities. Total expenses over the lease term will remain unchanged, however the timing of recognition of the expenses will be effected. The adoption of IFRS 16 will result in a decrease in operating expenses, an increase in financial expense due to the accretion of the lease liability, and an increase in depreciation and amortization due to the depreciation of the right-of-use asset on the consolidated statements of profit or loss.

Compared to the results of the current standard, the results of applying the new standard should generally reflect increases in cash flows from operating activities and decreases in cash-flows from financing activities. This stems from the payment of the principal component of leases that are currently accounted for as operating leases, being presented as a cash flow use within the financing activities under the new standard. Total cash outflows over the lease term remain unchanged.

The application of this standard is mandatory for all IFRS reporters and will be applied by the Corporation on September 1, 2019, using the modified retrospective approach whereby the financial statements of prior periods presented are not restated. As permitted by IFRS 16, the Corporation has elected to apply certain practical expedients, most notably:

- Not separating non-lease components from lease components for certain classes of underlying assets;
- Applying a single discount rate to a portfolio of leases with similar characteristics;
- Excluding initial direct costs from measuring the right-of-use assets as at September 1, 2019;
- Using hindsight in determining the lease term where the contract contains extension or termination options;
- Electing not to recognize lease liabilities and right-of-use assets for short-term leases or low-value leases;
- Electing to exclude intangible assets from the application of IFRS 16.

The Corporation continues to assess the implications of this standard and to determine the effect on its consolidated financial statements. The adoption of IFRS 16 is expected to impact the consolidated financial statements as follows:

- Total assets at September 1, 2019 are expected to increase by approximately $43 million as a result of the recognition of right-of-use assets;
- Total liabilities at September 1, 2019 are expected to increase by approximately $43 million resulting from the recognition of lease liabilities;
- Retained earnings at September 1, 2019 are expected to remain unchanged.

IFRIC 23

IFRIC 23 *Uncertainty over income tax treatments* clarifies the application of recognition and measurement requirements in IAS 12 *Income Taxes* when there is uncertainty over income tax treatments. It specifically addresses whether an entity considers uncertain tax treatments separately or as a group, the assumptions an entity makes about the examination of tax treatments by taxation authorities, how an entity determines taxable profit (tax loss), tax bases, unused tax losses, unused tax credits and tax rates and how an entity considers changes in facts and circumstances. IFRIC 23 should not have a significant impact on the consolidated financial statements.

IFRS 3

The amendments to IFRS 3 *Business combinations* may affect whether future acquisitions are accounted for as business combinations or asset acquisitions, along with the resulting allocation of the purchase price between the net identifiable assets acquired and goodwill.

5. REVENUE

(In thousands of Canadian dollars)	Canadian broadband services 2019 $	Canadian broadband services 2018 $	American broadband services 2019 $	American broadband services 2018 $	Inter-segment eliminations and other 2019 $	Inter-segment eliminations and other 2018 $	Consolidated 2019 $	Consolidated 2018 $
							Years ended August 31,	
Revenue								
Residential (1)	**1,164,479**	1,171,426	**885,688**	729,101	**—**	—	**2,050,167**	1,900,527
Commercial (2)	**130,226**	124,017	**123,541**	94,753	**—**	—	**253,767**	218,770
Other (3)	**262**	4,463	**27,624**	23,518	**—**	126	**27,886**	28,107
	1,294,967	1,299,906	**1,036,853**	847,372	**—**	126	**2,331,820**	2,147,404

(1) Includes revenue from Internet, video and telephony residential customers, bulk residential customers and Internet resellers customers.
(2) Includes revenue from Internet, video and telephony commercial customers.
(3) Includes advertising revenue, late fees, rental income and other miscellaneous revenue.

6. OPERATING SEGMENTS

The Corporation's segment profit (loss) is reported in two operating segments: Canadian broadband services and American broadband services . The reporting structure reflects how the Corporation manages its business activities to make decisions about resources to be allocated to the segments and to assess their performance.

The Canadian and American broadband services segments provide a wide range of Internet, video and telephony services primarily to residential customers as well as business services across their coverage areas. The Canadian broadband services activities are carried out by Cogeco Connexion in the provinces of Québec and Ontario and the American broadband services activities are carried out by Atlantic Broadband in 11 states: Connecticut, Delaware, Florida, Maine, Maryland, New Hampshire, New York, Pennsylvania, South Carolina, Virginia and West Virginia.

The previously reported Business ICT services segment, comprised of the Cogeco Peer 1 operations, is now reported in discontinued operations following the sale on April 30, 2019 of the Cogeco Peer 1 subsidiary. Information about the discontinued segment is provided in Note 8.

The Corporation and its chief operating decision maker assess the performance of each operating segment based on its segment profit (loss), which is equal to revenue less operating expenses. The other expenses, except for management fees, financial expense and income taxes, are reported by segment solely for external reporting purposes. Management fees, financial expense and income taxes are managed on a consolidated basis and, accordingly, are not reflected in segmented results. The Inter-segment eliminations and other, eliminate any intercompany transactions included in each segment's operating results and include head office activities. Transactions between operating segments are measured at the amounts agreed to between the parties.

Year ended August 31, 2019 *(In thousands of Canadian dollars)*	Canadian broadband services $	American broadband services $	Inter-segment eliminations and other $	Consolidated $
Revenue (1)	1,294,967	1,036,853	—	2,331,820
Operating expenses	606,286	571,208	26,486	1,203,980
Management fees – Cogeco Inc.	—	—	19,900	19,900
Segment profit (loss)	688,681	465,645	(46,386)	1,107,940
Integration, restructuring and acquisition costs (2)	9,299	1,851	—	11,150
Depreciation and amortization	254,345	226,301	79	480,725
Financial expense				175,502
Profit before income taxes				440,563
Income taxes				83,655
Profit for the year from continuing operations				356,908
Acquisition of property, plant and equipment	241,940	192,605	—	434,545

(1) Revenue by geographic market includes $1,294,967 in Canada and $1,036,853 in the United States.

(2) Comprised of restructuring costs within the Canadian broadband services segment and acquisition and integration costs related to the FiberLight network acquisition in the American broadband services segment.

Year ended August 31, 2018	Canadian broadband services	American broadband services	Inter-segment eliminations and other	Consolidated
(In thousands of Canadian dollars)	$	$	$	$
	(restated, Note 3)	*(restated, Note 3)*		*(restated, Note 3)*
Revenue [(1)]	1,299,906	847,372	126	2,147,404
Operating expenses	618,886	478,172	24,567	1,121,625
Management fees – Cogeco Inc.	—	—	18,961	18,961
Segment profit (loss)	681,020	369,200	(43,402)	1,006,818
Integration, restructuring and acquisition costs [(2)]	—	20,328	—	20,328
Depreciation and amortization	244,407	188,958	289	433,654
Financial expense				185,456
Profit before income taxes				367,380
Income taxes				(17,198)
Profit for the year from continuing operations				384,578
Acquisition of property, plant and equipment	245,228	212,580	—	457,808
Acquisition of Spectrum licenses	32,306	—	—	32,306

(1) Revenue by geographic market includes $1,300,032 in Canada and $847,372 in the United States.

(2) Comprised mainly of acquisition and integration costs in connection with the MetroCast acquisition completed on January 4, 2018.

The following tables set out certain segmented and geographic market information at August 31, 2019 and August 31, 2018:

				At August 31, 2019
	Canadian broadband services	**American broadband services**	**Inter-segment eliminations and other**	**Total**
(In thousands of Canadian dollars)	**$**	**$**	**$**	**$**
Property, plant and equipment	**1,124,698**	**882,827**	**85**	**2,007,610**
Intangible assets	**996,296**	**1,854,548**	**—**	**2,850,844**
Goodwill	**4,662**	**1,368,777**	**—**	**1,373,439**

					At August 31, 2018
	Canadian broadband services	American broadband services	Business ICT services	Inter-segment eliminations and other	Total
(In thousands of Canadian dollars)	$	$	$	$	$
	(restated, Note 3)	*(restated, Note 3)*	*(restated, Note 3)*		*(restated, Note 3)*
Property, plant and equipment	1,135,404	821,080	367,030	164	2,323,678
Intangible assets	1,000,177	1,869,626	57,585	—	2,927,388
Goodwill	4,662	1,332,781	271,003	—	1,608,446

			At August 31, 2019
	Canada	**United States**	**Total**
(In thousands of Canadian dollars)	**$**	**$**	**$**
Property, plant and equipment	**1,124,783**	**882,827**	**2,007,610**
Intangible assets	**996,296**	**1,854,548**	**2,850,844**
Goodwill	**4,662**	**1,368,777**	**1,373,439**

				At August 31, 2018
	Canada	United States	Europe	Total
(In thousands of Canadian dollars)	$	$	$	$
	(restated, Note 3)	*(restated, Note 3)*	*(restated, Note 3)*	*(restated, Note 3)*
Property, plant and equipment	1,436,613	860,411	26,654	2,323,678
Intangible assets	1,040,937	1,885,504	947	2,927,388
Goodwill	221,867	1,371,992	14,587	1,608,446

7. BUSINESS COMBINATIONS

BUSINESS COMBINATION IN FISCAL 2019

Purchase of a fibre network and corresponding assets

On October 3, 2018, the Corporation's subsidiary, Atlantic Broadband, completed the acquisition of the south Florida fibre network previously owned by FiberLight, LLC. The transaction, combined with the dark fibers acquired from FiberLight in the second quarter of fiscal 2018, added 350 route miles to Atlantic Broadband's existing south Florida footprint.

The acquisition was accounted for using the purchase method and was subject to post closing adjustments. The final allocation of the purchase price of this acquisition is as follows:

	Final	Preliminary
	August 31, 2019	November 30, 2018
(In thousands of Canadian dollars)	**$**	$
Purchase price		
Consideration paid at closing	**38,876**	38,876
Balance due on business combinations	**5,005**	5,005
	43,881	43,881
Net assets acquired		
Trade and other receivables	**1,308**	1,743
Prepaid expenses and other	**335**	335
Property, plant and equipment	**28,785**	45,769
Intangible assets	**3,978**	—
Goodwill	**11,093**	—
Trade and other payables assumed	**(644)**	(644)
Contract liabilities and other liabilities assumed	**(974)**	(3,322)
	43,881	43,881

BUSINESS COMBINATION IN FISCAL 2018

MetroCast business combination

On January 4, 2018, the Corporation's subsidiary, Atlantic Broadband, completed the acquisition of substantially all of the assets of Harron Communications, L.P. cable systems operating under the MetroCast brand name ("MetroCast"). This acquisition extended Atlantic Broadband's footprint across 11 states on the East Coast of the United States from Maine to Florida. The transaction valued at US$1.4 billion was subject to post closing adjustments. This acquisition was financed through a combination of US$1.7 billion under a new Senior Secured Term Loan B, whereby US$583 million was used to refinance the existing First Lien Credit Facilities, and US$40.4 million drawn under a new US$150 million Senior Secured Revolving Credit facility, combined with a US$315 million equity investment by Caisse de dépôt et placement du Québec ("CDPQ") in Atlantic Broadband's holding company, representing 21% of Atlantic Broadband.

The acquisition was accounted for using the purchase method and was subject to post closing adjustments. During fiscal 2018, adjustments were made to the working capital resulting in a reduction of the purchase price by $5.2 million (US$4.2 million). The final allocation of the purchase price of this acquisition was as follows:

	Final
	August 31, 2018
(In thousands of Canadian dollars)	$
Purchase price	
Consideration paid at closing	1,762,163
Working capital adjustments	(5,222)
	1,756,941
Net assets acquired	
Cash and cash equivalents	6
Trade and other receivables	5,075
Prepaid expenses and other	1,989
Property, plant and equipment	280,491
Intangible assets	944,738
Goodwill	529,689
Trade and other payables assumed	(5,047)
	1,756,941

8. DISPOSAL OF A SUBSIDIARY AND DISCONTINUED OPERATIONS

On April 30, 2019, the Corporation completed the sale of Cogeco Peer 1, its Business ICT services subsidiary. As a result of the sale, the Corporation recognized the following gain on disposal in the consolidated statement of profit or loss for the year ended August 31, 2019:

(In thousands of Canadian dollars)	$
Gross proceeds, net of cash disposed	720,314
Working capital adjustments	691
Transaction costs	(10,903)
Net proceeds from sale, net of cash disposed	710,102
Net assets disposed	(625,738)
Gain on disposal of a subsidiary	**84,364**

The following table presents the carrying value of the net assets disposed of:

(In thousands of Canadian dollars)	$
Trade and other receivables	19,988
Income taxes receivable	1,126
Prepaid expenses and other	8,532
Property, plant and equipment	361,774
Intangible assets	49,618
Other assets	9,594
Goodwill	272,591
Deferred tax assets	2,061
Trade and other payables	(22,416)
Provisions	(34)
Contract liabilities and other liabilities	(25,104)
Deferred tax liabilities	(22,183)
Foreign currency translation adjustment	(29,809)
	625,738

As a result and in accordance with IFRS 5, *Non-current Assets Held for Sale and Discontinued Operations*, the Corporation reclassified the current and prior year results and cash flows of Cogeco Peer 1 as discontinued operations separate from the Corporation's continuing operations. The results of Cogeco Peer 1 are excluded from both continuing operations and operating segments information in the consolidated financial statements and the notes to the consolidated financial statements, unless otherwise noted, and are presented net of tax in the consolidated statement of profit or loss for the current and comparative period.

The profit or loss of the discontinued operations was as follows:

	Years ended August 31,	
	2019 [(1)]	2018
(In thousands of Canadian dollars)	$	$
Revenue	174,990	275,952
Operating expenses	132,390	197,545
Depreciation and amortization	43,999	95,891
Financial expense	(1,304)	(2,902)
Gain on disposal of a subsidiary	(84,364)	—
Profit (loss) before income taxes	84,269	(14,582)
Income taxes	8,889	9,799
Profit (loss) for the year from discontinued operations	75,380	(24,381)

(1) Fiscal 2019 amounts reflect the eight-month period ended April 30, 2019.

The cash flows of the discontinued operations were as follows:

	Years ended August 31,	
	2019 (1)	2018
(In thousands of Canadian dollars)	$	$
Cash flow from operating activities	41,962	65,720
Cash flow from investing activities	691,729	(49,492)
Effect of exchange rate changes on cash and cash equivalents denominated in foreign currencies	116	105
Net change in cash and cash equivalents from discontinued operations	733,807	16,333

(1) Fiscal 2019 amounts reflect the eight-month period ended April 30, 2019.

9. OPERATING EXPENSES

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
		(restated, Note 3)
Salaries, employee benefits and outsourced services	345,041	317,118
Service delivery costs(1)	661,214	615,267
Customer related costs(2)	83,401	68,744
Other external purchases(3)	114,324	120,496
	1,203,980	1,121,625

(1) Include cost of equipment sold, content and programming costs, payments to other carriers, franchise fees and network costs.

(2) Include advertising and marketing expenses, selling costs, billing expenses, bad debts and collection expenses.

(3) Include office building expenses, professional service fees, Canadian Radio-television and Telecommunications Commission ("CRTC") fees, losses and gains on disposals and write-offs of property, plant and equipment and other administrative expenses.

10. DEPRECIATION AND AMORTIZATION

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
		(restated, Note 3)
Depreciation of property, plant and equipment	423,432	387,726
Amortization of intangible assets	57,293	45,928
	480,725	433,654

11. FINANCIAL EXPENSE

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
Interest on long-term debt	176,798	179,680
Net foreign exchange gains	(2,744)	(2,134)
Amortization of deferred transaction costs	1,836	1,884
Capitalized borrowing costs (1)	(690)	(2,074)
Other	302	8,100
	175,502	185,456

(1) For the years ended August 31, 2019 and 2018, the weighted average interest rate used in the capitalization of borrowing costs was 4.5%.

12. INCOME TAXES

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
		(restated, Note 3)
Current	53,361	68,288
Deferred	30,294	(85,486)
	83,655	(17,198)

The following table provides the reconciliation between income tax expense at the Canadian statutory federal and provincial income tax rates and the consolidated income tax expense:

Years ended August 31,	2019	2018
(in thousands of Canadian dollars)	$	$
		(restated, Note 3)
Profit before income taxes	440,563	367,380
Combined Canadian income tax rate	26.50%	26.50%
Income taxes at combined Canadian income tax rate	116,749	97,356
Difference in operations' statutory income tax rates	1,466	(3)
Impact on deferred taxes as a result of changes in substantively enacted tax rates [(1)]	15	(94,175)
Impact on income taxes arising from non-deductible expenses and non-taxable profit	(565)	1,670
Tax impacts related to foreign operations	(28,633)	(22,099)
Other	(5,377)	53
Income taxes at effective income tax rate	83,655	(17,198)

(1) On December 22, 2017, the US Federal administration enacted the Tax Cuts and Jobs Act (the "Act"). The tax reform reduced the general federal corporate tax rate from 35% to 21% starting after 2017. As a result, deferred income taxes and net deferred tax liabilities have been reduced by approximately $94 million (US$74 million) in fiscal 2018. In addition, the Act calls for other changes such as interest deductibility limitations, full deduction of acquisitions of tangible assets, net operating losses limitations as well as base erosion anti-avoidance.

The following table shows deferred income taxes resulting from temporary differences between the carrying amounts of assets and liabilities for accounting purposes and the amounts used for tax purposes, as well as tax losses carryforwards:

At August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
		(restated, Note 3)
Property, plant and equipment	(205,251)	(173,352)
Intangible assets and goodwill	(514,233)	(500,068)
Contract liabilities and other liabilities	15,214	16,904
Non-capital losses and other tax credits carryforwards, net of unrecognized benefits related to tax losses	135,205	112,738
Other	22,047	(5,441)
Net deferred tax liabilities	(547,018)	(549,219)
Financial statement presentation:		
Deferred tax assets	6,564	5,665
Deferred tax liabilities	(553,582)	(554,884)
Net deferred tax liabilities	(547,018)	(549,219)

The movements in deferred tax asset and liability balances during fiscal 2019 and 2018 were as follows:

Year ended August 31, 2019	Balance beginning of the year	Recognized in profit or loss	Recognized in other comprehensive income (loss)	Discontinued operations	Foreign currency translation adjustments	Balance end of the year
(In thousands of Canadian dollars)	$	$	$	$	$	$
	(restated, Note 3)					
Property, plant and equipment	**(173,352)**	**(44,351)**	**—**	**14,055**	**(1,603)**	**(205,251)**
Intangible assets and goodwill	**(500,068)**	**(28,718)**	**—**	**18,850**	**(4,297)**	**(514,233)**
Contract liabilities and other liabilities	**16,904**	**(2,198)**	**—**	**482**	**26**	**15,214**
Non-capital losses and other tax credits carryforwards, net of unrecognized benefits related to tax losses	**112,738**	**44,531**	**—**	**(23,704)**	**1,640**	**135,205**
Other	**(5,441)**	**442**	**25,422**	**1,551**	**73**	**22,047**
	(549,219)	**(30,294)**	**25,422**	**11,234**	**(4,161)**	**(547,018)**

Year ended August 31, 2018	Balance beginning of the year	Recognized in profit or loss	Recognized in other comprehensive income (loss)	Discontinued operations	Foreign currency translation adjustments	Balance end of the year
(In thousands of Canadian dollars)	$	$	$	$	$	$
	(restated, Note 3)	*(restated, Note 3)*			*(restated, Note 3)*	*(restated, Note 3)*
Property, plant and equipment	(176,139)	8,852	—	(2,340)	(3,725)	(173,352)
Intangible assets and goodwill	(563,153)	68,316	—	5,293	(10,524)	(500,068)
Contract liabilities and other liabilities	3,505	12,815	—	520	64	16,904
Non-capital losses and other tax credits carryforwards, net of unrecognized benefits related to tax losses	133,791	(11,178)	—	(13,614)	3,739	112,738
Other	(2,695)	6,681	(9,135)	(329)	37	(5,441)
	(604,691)	85,486	(9,135)	(10,470)	(10,409)	(549,219)

At August 31, 2019, the Corporation and its subsidiaries had accumulated federal income tax losses, the benefits of which have been recognized in these financial statements, unless indicated otherwise. The benefits represent the amount expected to be realized, based on management's assessment of the Corporation's projected future profitability, deferred tax liabilities reversal and available carryback and carryforward periods, among others. These losses expire as follows:

	2025	2026	2027	Thereafter	Total
(In thousands of Canadian dollars)	$	$	$	$	$
United States	**44,614**	**73,369**	**39,683**	**388,997**	**546,663**

The Corporation and its subsidiaries also had accumulated capital losses in Canada amounting to $1,518 million which can be carried forward indefinitely and used against Canadian capital gains, and $103 million of unrealized foreign exchange temporary differences, the benefits of which have not been recognized in these consolidated financial statements.

13. EARNINGS PER SHARE

The following table provides the reconciliation between basic and diluted earnings per share:

Years ended August 31,	2019	2018
(In thousands of Canadian dollars, except number of shares and per share data)	$	$
		(restated, Note 3)
Profit for the year from continuing operations attributable to owners of the Corporation	339,973	375,214
Profit (loss) for the year from discontinued operations attributable to owners of the Corporation	75,380	(24,381)
Profit for the year attributable to owners of the Corporation	415,353	350,833
Weighted average number of multiple and subordinate voting shares outstanding	49,359,124	49,296,872
Effect of dilutive stock options [(1)]	181,471	162,139
Effect of dilutive incentive share units	95,816	107,472
Effect of dilutive performance share units	133,757	133,931
Weighted average number of diluted multiple and subordinate voting shares outstanding	49,770,168	49,700,414
Earnings (loss) per share		
Basic		
Profit for the year from continuing operations	6.89	7.61
Profit (loss) for the year from discontinued operations	1.53	(0.49)
Profit for the year	8.41	7.12
Diluted		
Profit for the year from continuing operations	6.83	7.55
Profit (loss) for the year from discontinued operations	1.51	(0.49)
Profit for the year	8.35	7.06

(1) For the year ended August 31, 2019, 185,635 stock options (258,325 in 2018) were excluded from the calculation of diluted earnings per share as the exercise price of the options was greater than the average share price of the subordinate voting shares.

14. OTHER ASSETS

At August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
		(restated, Note 3)
Contract costs [(1)]	36,372	35,328
Transaction costs	3,121	4,482
Other	527	2,867
	40,020	42,677

(1) Include incremental costs of obtaining a contract and upfront fees paid to multiple-dwelling units.

The table below provides a reconciliation of the contract costs balance:

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
Balance, beginning of the year	35,328	28,839
Additions	17,666	12,947
Amortization	(8,972)	(7,003)
Foreign currency translation adjustments	422	797
Discontinued operations	(8,072)	(252)
Balance, end of the year	36,372	35,328

15. PROPERTY, PLANT AND EQUIPMENT

During fiscal 2019 and 2018, property, plant and equipment variations were as follows:

Years ended August 31, 2019 and 2018	Land, buildings and leasehold improvements	Networks and infrastructure (1)	Data centre equipment (2)	Customer premise equipment (3)	Rolling stock and equipment (3) (4)	Total
(In thousands of Canadian dollars)	$	$	$	$	$	$
		(restated, Note 3)				*(restated, Note 3)*
Cost						
Balance at August 31, 2017	246,261	3,324,795	317,114	647,299	401,633	4,937,102
Acquisitions through business combinations	7,715	245,585	—	16,524	10,667	280,491
Additions	5,445	285,660	—	102,245	64,458	457,808
Disposals and write-offs	(96)	(14,694)	—	(48,334)	(3,344)	(66,468)
Foreign currency translation adjustments	1,098	39,306	—	7,325	2,919	50,648
Discontinued operations	2,631	15,818	23,263	—	10,076	51,788
Balance at August 31, 2018	**263,054**	**3,896,470**	**340,377**	**725,059**	**486,409**	**5,711,369**
Acquisitions through business combinations	**—**	**28,785**	**—**	**—**	**—**	**28,785**
Additions	**6,292**	**289,417**	**—**	**84,892**	**53,944**	**434,545**
Disposals and write-offs	**(4)**	**(8,675)**	**—**	**(43,233)**	**(2,764)**	**(54,676)**
Foreign currency translation adjustments	**545**	**21,161**	**—**	**3,850**	**1,549**	**27,105**
Discontinued operations	**(142,615)**	**(321,089)**	**(340,377)**	**—**	**(85,148)**	**(889,229)**
Balance at August 31, 2019	**127,272**	**3,906,069**	**—**	**770,568**	**453,990**	**5,257,899**
Accumulated depreciation and impairment losses						
Balance at August 31, 2017	89,964	1,976,556	142,595	473,900	283,225	2,966,240
Depreciation expense	6,715	262,862	—	80,762	37,387	387,726
Disposals and write-offs	(38)	(12,464)	—	(47,387)	(3,280)	(63,169)
Foreign currency translation adjustments	302	15,142	—	2,945	1,145	19,534
Discontinued operations	10,886	23,383	32,365	—	10,726	77,360
Balance at August 31, 2018	**107,829**	**2,265,479**	**174,960**	**510,220**	**329,203**	**3,387,691**
Depreciation expense	**7,115**	**280,437**	**—**	**88,393**	**47,487**	**423,432**
Disposals and write-offs	**(4)**	**(5,541)**	**—**	**(41,623)**	**(2,395)**	**(49,563)**
Foreign currency translation adjustments	**180**	**8,512**	**—**	**1,605**	**631**	**10,928**
Discontinued operations	**(55,646)**	**(212,737)**	**(174,960)**	**—**	**(78,856)**	**(522,199)**
Balance at August 31, 2019	**59,474**	**2,336,150**	**—**	**558,595**	**296,070**	**3,250,289**
Carrying amounts						
At August 31, 2018	155,225	1,630,991	165,417	214,839	157,206	2,323,678
At August 31, 2019	**67,798**	**1,569,919**	**—**	**211,973**	**157,920**	**2,007,610**

(1) Networks and infrastructure include cable towers, headends, transmitters, fibre and coaxial networks, customer drops, and network equipment.

(2) Data centre equipment includes general infrastructure, mechanical and electrical equipment, security and access control.

(3) The software that ensures the proper operation of the customer premise equipment is now presented in the Customer premise equipment category while it was previously presented in the Rolling stock and equipment category.

(4) Rolling stock and equipment includes rolling stock, programming equipment, furniture and fixtures, computer and software and other equipments.

16. INTANGIBLE ASSETS AND GOODWILL

A) INTANGIBLE ASSETS

During fiscal 2019 and 2018, intangible assets variations were as follows:

	Finite useful life			Indefinite useful life		
Years ended August 31, 2019 and 2018	Customer relationships (1)	Spectrum Licenses (2)	Other (3)	Cable Distribution Licenses	Trade name	Total
(In thousands of Canadian dollars)	$	$	$	$	$	$
			(restated, Note 3)			*(restated, Note 3)*
Cost						
Balance at August 31, 2017	412,859	—	1,208	1,771,811	25,934	2,211,812
Acquisitions through business combinations	195,264	—	2,131	747,343	—	944,738
Additions	—	32,306	—	—	—	32,306
Fully amortized	—	—	(2,131)	—	—	(2,131)
Foreign currency translation adjustments	16,629	—	—	64,447	—	81,076
Discontinued operations	(29,880)	—	43	—	—	(29,837)
Balance at August 31, 2018	**594,872**	**32,306**	**1,251**	**2,583,601**	**25,934**	**3,237,964**
Acquisitions through business combinations	**3,978**	**—**	**—**	**—**	**—**	**3,978**
Foreign currency translation adjustments	**7,683**	**—**	**—**	**29,720**	**—**	**37,403**
Discontinued operations	**(173,317)**	**—**	**(1,251)**	**—**	**(25,934)**	**(200,502)**
Balance at August 31, 2019	**433,216**	**32,306**	**—**	**2,613,321**	**—**	**3,078,843**
Accumulated amortization and impairment losses						
Balance at August 31, 2017	274,548	—	499	—	—	275,047
Amortization expense	42,900	897	2,131	—	—	45,928
Fully amortized	—	—	(2,131)	—	—	(2,131)
Foreign currency translation adjustments	5,579	—	—	—	—	5,579
Discontinued operations	(14,097)	—	250	—	—	(13,847)
Balance at August 31, 2018	**308,930**	**897**	**749**	**—**	**—**	**310,576**
Amortization expense	**53,706**	**3,587**	**—**	**—**	**—**	**57,293**
Foreign currency translation adjustments	**3,047**	**—**	**—**	**—**	**—**	**3,047**
Discontinued operations	**(142,168)**	**—**	**(749)**	**—**	**—**	**(142,917)**
Balance at August 31, 2019	**223,515**	**4,484**	**—**	**—**	**—**	**227,999**
Carrying amounts						
At August 31, 2018	285,942	31,409	502	2,583,601	25,934	2,927,388
At August 31, 2019	**209,701**	**27,822**	**—**	**2,613,321**	**—**	**2,850,844**

(1) Customer relationships include long-term contractual agreements with customers.

(2) In 2018, the Corporation' subsidiary, Cogeco Connexion, was the successful bidder on 23 Spectrum licenses of 2,500 MHz and 2,300 MHz, primarily in its Ontario and Québec wireline footprints, in the auction for residual Spectrum licenses organized by Innovation, Science & Economic Development ("ISED") Canada for a total price of $24.3 million. In addition it also acquired 10 Spectrum licenses of 2,500 MHz in non-metropolitan areas of Ontario, from Kian Telecom, for a consideration of $8 million. Both transactions were completed in June 2018.

(3) Prior to the adoption of the changes in accounting policies described in Note 3, this category also included reconnect and additional service activation costs in the Broadband services segments, as well as direct and incremental costs associated with the acquisition of customers.

B) GOODWILL

During fiscal 2019 and 2018, goodwill variations were as follows:

Years ended August 31, 2019 and 2018 *(In thousands of Canadian dollars)*	$
Cost	
Balance at August 31, 2017	1,434,084
Acquisitions through business combinations	529,689
Foreign currency translation adjustments	53,110
Discontinued operations	14,796
Balance at August 31, 2018	**2,031,679**
Acquisitions through business combinations	**11,093**
Foreign currency translation adjustments	**24,903**
Discontinued operations	**(694,236)**
Balance at August 31, 2019	**1,373,439**
Accumulated impairment losses	
Balance at August 31, 2017	410,660
Discontinued operations	12,573
Balance at August 31, 2018	**423,233**
Discontinued operations	**(423,233)**
Balance at August 31, 2019	**—**
Carrying amounts	
At August 31, 2018	1,608,446
At August 31, 2019	**1,373,439**

C) IMPAIRMENT TESTING OF GOODWILL AND INTANGIBLE ASSETS

The Corporation tests goodwill and intangible assets with indefinite useful lives for impairment annually, or more frequently when indicators of impairment are identified.

Goodwill is allocated to cash-generating units ("CGU") based on the level at which management monitors goodwill. The allocation is made to CGUs that are expected to benefit from the synergies of the business combination from which it arose.

Intangible assets with indefinite useful lives who do not generate independent cash inflows from those of other assets or group of assets, are allocated and tested for impairment as part of the CGU to which they belong.
For the purpose of impairment testing, goodwill and intangible assets with indefinite useful lives are allocated to each of the Corporation's CGUs as follows:

At August 31,		**2019**			2018
Operating segment / CGU	**Goodwill**	**Cable Distribution Licenses**	Goodwill	Cable Distribution Licenses	Trade name
(In thousands of Canadian dollars)	**$**	**$**	$	$	$
Canadian broadband services	**4,662**		4,662		
Ontario		**857,696**		857,696	—
Québec		**109,304**		109,304	—
American broadband services	**1,368,777**		1,332,781		
Southern Florida		**248,617**		244,129	—
South Carolina		**41,215**		40,471	—
Pennsylvania		**509,465**			—
Western Pennsylvania				406,011	—
Eastern Pennsylvania				94,257	
Delaware/Maryland/Virginia		**418,394**			—
Maryland/Delaware				53,526	—
Maryland/Virginia				357,315	—
Eastern Connecticut		**95,723**		93,995	—
New Hampshire/Maine		**332,907**		326,897	—
Discontinued operations	**—**	**—**	271,003	—	25,934
Total	**1,373,439**	**2,613,321**	1,608,446	2,583,601	25,934

Goodwill and intangible assets with indefinite useful lives are considered impaired if the recoverable amount is less than the carrying amount. The recoverable amount of each CGU is calculated based on the higher of value in use and fair value less cost to sell. The value in use is determined using cash flow projections derived from internal financial projections covering a period of five to eight years. They reflect management's expectations of revenue growth, expenses and capital expenditures for each CGU based on past experience and expected growth for the segment. Cash flows beyond that period are extrapolated using an estimated terminal growth rate determined with regard to projected growth rates for the specific markets in which the CGUs participate and are not considered to exceed the long-term average growth rates for those markets. Discount rates applied to the cash flow forecasts are derived from the Corporation's pre-tax weighted average cost of capital, adjusted for the different risk profiles of the individual CGUs.

At June 30, 2019 and 2018, the Corporation performed impairment tests for its CGUs within the Canadian and American broadband services segments. The recoverable amount of each CGU was determined to be higher than its carrying amount and no impairment loss has been recognized for the years ended August 31, 2019 and 2018. The 2017 calculation of the recoverable amount of the Canadian broadband services, which represented the most recent detailed calculation made in a preceding year, was used in the impairment tests of its CGUs at June 30, 2019.

The following represents the key assumptions that were used to determine the recoverable amounts in the most recent impairment tests performed for each of the Corporation's operating segments:

		2019		2018
	Pre-tax discount rate	**Terminal growth rate**	Pre-tax discount rate	Terminal growth rate
Operating segment	%	%	%	%
Canadian broadband services	**10.0**	**2.0**	10.0	2.0
American broadband services	**7.8 to 9.1**	**2.5 to 3.0**	7.9 to 8.8	2.5 to 3.0

The following table presents for each operating segment, the change in the pre-tax discount rate and in the terminal growth rate used in the tests performed, that would have been required in order for the recoverable amount to equal the carrying value of the CGU at the date of the most recent impairment tests:

	Increase in pre-tax discount rate	**Decrease in terminal growth rate**
Operating segment	%	%
Canadian broadband services	**10.2 to 12.1**	**12.1 to 15.4**
American broadband services	**0.4 to 10.9**	**0.6 to 43.8**

17. PROVISIONS

During fiscal 2019, provisions variations were as follows:

Year ended August 31, 2019	Withholding and stamp taxes (1)	Programming and content costs (2)	Other (3)	**Total**
(In thousands of Canadian dollars)	$	$	$	$
Balance, beginning of the year	**7,232**	**6,596**	**12,059**	**25,887**
Provisions made during the year	**—**	**13,932**	**3,990**	**17,922**
Provisions used during the year	**—**	**(1,205)**	**(6)**	**(1,211)**
Provisions reversed during the year	**—**	**(5,748)**	**—**	**(5,748)**
Foreign currency translation adjustments	**(255)**	**10**	**13**	**(232)**
Discontinued operations	**—**	**—**	**(65)**	**(65)**
Balance, end of the year	**6,977**	**13,585**	**15,991**	**36,553**

(1) The provisions for withholding and stamp taxes relate to contingent liabilities for withholding and stamp taxes relating to fiscal years prior to the acquisition of a subsidiary by the Corporation.

(2) The provisions for programming and content costs include provisions for retroactive rate increases as well as additional royalties or content costs as a result of periodical audits from service providers.

(3) The other provisions include provisions for contractual obligations and other legal obligations.

18. CONTRACT LIABILITIES AND OTHER LIABILITIES

At August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
Advance billings	36,085	52,372
Deferred customer connection fees	17,642	24,779
Customer deposits and prepayments	536	593
Contract liabilities	54,263	77,744
Other liabilities	251	2,037
	54,514	79,781

Contract liabilities represent future performance obligations to our customers with respect to services or goods for which consideration was received or is due from the customer. During fiscal 2019 and 2018, contract liabilities variations were as follows:

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
Balance, beginning of the year	77,744	89,492
Revenue deferred in the previous period and recognized in the current period	(38,879)	(55,018)
Net additions arising from operations	40,044	43,951
Additions arising from business combinations	454	—
Foreign currency translation adjustments	584	968
Discontinued operations	(25,684)	(1,649)
Balance, end of the year	54,263	77,744

19. LONG-TERM DEBT

At August 31,	Maturity	Interest rate		2019	2018
(In thousands of Canadian dollars, except percentages)		%		$	$
Corporation					
Term Revolving Facility [a)]					
Canadian Revolving Facility					
Revolving loan – US$310 million in 2018	January 2024	—		—	404,705
Senior Secured Notes [b)]					
Series A – US$25 million	September 2024	4.14		33,155	32,540
Series B - US$150 million	September 2026	4.29		198,845	195,176
Senior Secured Notes Series B [c)]	—	—		—	54,994
Senior Secured Notes - US$215 million [d)]	June 2025	4.30		284,996	279,711
Senior Secured Debentures Series 2 [e)]	November 2020	5.15		199,744	199,544
Senior Secured Debentures Series 3 [f)]	February 2022	4.93		199,457	199,255
Senior Secured Debentures Series 4 [g)]	May 2023	4.18		298,697	298,381
Subsidiaries					
First Lien Credit Facilities [h)]					
Senior Secured Term Loan B Facility - US$1,678.8 million (US$1,695.8 million in 2018)	January 2025	4.36	(1) (2)	2,189,965	2,167,792
Senior Secured Revolving Facility - US$20 million in 2018	January 2023	—		—	26,110
				3,404,859	3,858,208
Less current portion				22,601	77,188
				3,382,258	3,781,020

(1) Interest rate on debt includes applicable credit spread.

(2) A US subsidiary of the Corporation entered into interest rate swap agreements to fix the interest rate on a notional amount of US$1.1 billion of its LIBOR based loans. These agreements have the effect of converting the floating US Libor base rate into fixed rates ranging from 2.017% to 2.262% for maturities between January 31, 2021 and November 30, 2024, under the Senior Secured Term Loan B Facility. Taking into account these agreements, the effective interest rate on the Senior Secured Term Loan B Facility is 4.38%.

a) The Corporation has a Term Revolving Facility of $800 million with a syndicate of lenders. On December 4, 2018, the maturity was extended until January 24, 2024 and can be further extended annually. The amended and restated Term Revolving Facility is available in Canadian dollars, US dollars, Euros and British Pounds and interest rates are based on banker's acceptance, US dollar base rate loans, LIBOR loans in US dollars, Euros or British Pounds, plus the applicable credit spread. The Term Revolving Facility provides access to a swingline with a limit of $30 million. The Term Revolving Facility is indirectly secured by a first priority fixed and floating charge and a security interest on substantially all present and future real and personal properties and undertaking of every nature and kind of the Corporation and its subsidiaries, except for the unrestricted subsidiaries, and provides for certain permitted encumbrances, including purchased money obligations, existing funded obligations and charges granted by any subsidiary prior to the date when it becomes a subsidiary, subject to a maximum amount. The provisions under this facility provide for restrictions on the operations and activities of the Corporation and its subsidiaries, except for the unrestricted subsidiaries. Generally, the most significant restrictions relate to total indebtedness, financial expense, permitted investments, distributions to shareholders including dividends on multiple and subordinate voting shares and share repurchases, as well as the incurrence and maintenance of certain financial ratios primarily linked to EBITDA from continuing operations, adjusted for integration, restructuring and acquisition costs ("adjusted EBITDA").

b) On August 27, 2014, the Corporation completed, pursuant to a private placement, the issuance of US$25 million Senior Secured Notes Series A and of US$150 million Senior Secured Notes Series B. The Senior Secured Notes Series A bear interest at 4.14% per annum payable semi-annually and mature on September 1, 2024, and the Senior Secured Notes Series B bear interest at 4.29% per annum payable semi-annually and mature on September 1, 2026. The Senior Secured Notes Series A and B are redeemable at any time at Cogeco Communications' option, in whole or in part, at 100% of the principal amount plus a make-whole premium. These Notes are indirectly secured by a first priority fixed and floating charge and a security interest on substantially all present and future real and personal property and undertaking of every nature and kind of the Corporation and its subsidiaries except for the unrestricted subsidiaries. The provisions under these debentures provide for restrictions on the operations and activities of the Corporation and its subsidiaries except for the unrestricted subsidiaries. Generally, the most significant restrictions relate to permitted indebtedness, dispositions and maintenance of certain financial ratios.

c) The Corporation reimbursed the Senior Secured Notes Series B at their maturity date, on October 1, 2018.

d) On June 27, 2013, the Corporation completed, pursuant to a private placement, the issuance of US$215 million Senior Secured Notes. The Senior Secured Notes bear interest at 4.30% payable semi-annually and mature on June 16, 2025. The Senior Secured Notes are redeemable at the Corporation's option at any time, in whole or in part, at 100% of the principal amount plus a make-whole premium. These Notes are indirectly secured by a first priority fixed and floating charge and a security interest on substantially all present and future real and personal property and undertaking of every nature and kind of the Corporation and its subsidiaries except for the unrestricted subsidiaries. The provisions under these debentures provide for restrictions on the operations and activities of the Corporation and its subsidiaries except for the unrestricted subsidiaries. Generally, the most significant restrictions relate to permitted indebtedness, dispositions and maintenance of certain financial ratios.

e) On November 16, 2010, the Corporation completed pursuant to a public debt offering, the issuance of $200 million Senior Secured Debentures Series 2. These debentures mature on November 16, 2020 and bear interest at 5.15% per annum payable semi-annually. These debentures are indirectly secured by a first priority fixed and floating charge and a security interest on substantially all present and future real and personal property and undertaking of every nature and kind of the Corporation and its subsidiaries except for the unrestricted subsidiaries. The provisions under these debentures provide for restrictions on the operations and activities of the Corporation and its subsidiaries except for the unrestricted subsidiaries. Generally, the most significant restrictions relate to permitted indebtedness, dispositions and maintenance of certain financial ratios.

f) On February 14, 2012, the Corporation completed pursuant to a public debt offering, the issuance of $200 million Senior Secured Debentures Series 3. These debentures mature on February 14, 2022 and bear interest at 4.925% per annum payable semi-annually. These debentures are indirectly secured by a first priority fixed and floating charge and a security interest on substantially all present and future real and personal property and undertaking of every nature and kind of the Corporation and its subsidiaries except for the unrestricted subsidiaries. The provisions under these debentures provide for restrictions on the operations and activities of the Corporation and its subsidiaries except for the unrestricted subsidiaries. Generally, the most significant restrictions relate to permitted indebtedness, dispositions and maintenance of certain financial ratios.

g) On May 27, 2013, the Corporation completed pursuant to a public debt offering, the issuance of $300 million Senior Secured Debentures Series 4. These debentures mature on May 26, 2023 and bear interest at 4.175% per annum payable semi-annually. These debentures are indirectly secured by a first priority fixed and floating charge and a security interest on substantially all present and future real and personal property and undertaking of every nature and kind of the Corporation and its subsidiaries except for the unrestricted subsidiaries. The provisions under these debentures provide for restrictions on the operations and activities of the Corporation and its subsidiaries except for the unrestricted subsidiaries. Generally, the most significant restrictions relate to permitted indebtedness, dispositions and maintenance of certain financial ratios.

h) On January 4, 2018, in connection with the financing of the MetroCast acquisition, a new $2.1 billion (US$1.7 billion) Senior Secured Term Loan B maturing January 2025, and a $188 million (US$150 million) Senior Secured Revolving facility maturing January 2023 were entered into by two of Cogeco Communications' US subsidiaries, whereby $733 million (US$583 million) was used to reimburse the pre-existing Term Loan A-2, A-3, B and Revolving Facility. An amount of $7.3 million was charged to financial expense, representing the unamortized deferred transaction costs pertaining to the early reimbursement of the Term Loan A-2, A-3 and B facilities in January 2018.

   The interest rate on these First Lien Credit Facilities is based on LIBOR plus an applicable credit spread. Commencing in August 2018, the Senior Secured Term Loan B is subject to a quarterly amortization of 0.25% until its maturity date. In addition to the quarterly amortization, the loan shall be prepaid according to a prepayment percentage of excess cash flow generated during the prior fiscal year defined below and such payments starting in fiscal 2020, if applicable.

   (i) 50% if Atlantic Broadband's ratio of net senior secured indebtedness / adjusted EBITDA ("Leverage Ratio") is greater than or equal to 5.1 to 1.0;

(ii) 25% if Atlantic Broadband’s Leverage Ratio is greater than or equal to 4.6 to 1.0 but less than 5.1 to 1.0; and
(iii) 0% if Atlantic Broadband’s Leverage Ratio is less than 4.6 to 1.0.

ABB's leverage ratio was below 4.6 to 1.0 as of August 31, 2019, therefore no excess cash flow prepayments are applicable in fiscal 2020. The First Lien Credit Facilities are non-recourse to the Corporation and most of its Canadian subsidiaries, and are indirectly secured by a first priority fixed and floating charge on substantially all present and future real and personal property and undertaking of every nature and kind of Atlantic Broadband and its subsidiaries. The provisions under these facilities provide for restrictions on the operations and activities of Atlantic Broadband and its subsidiaries. Generally, the most significant restrictions relate to permitted indebtedness, investments, distributions and maintenance of certain financial ratios.

20. SHARE CAPITAL

A) AUTHORIZED

Unlimited number of:

Class A Preference shares, without voting rights, redeemable by the Corporation and retractable at the option of the holder at any time at a price of $1 per share, carrying a cumulative preferential cash dividend at a rate of 11% of the redemption price per year.

Class B Preference shares, without voting rights, could be issued in series.

Multiple voting shares, 10 votes per share.

Subordinate voting shares, 1 vote per share.

B) ISSUED AND PAID

At August 31,	**2019**	2018
(In thousands of Canadian dollars, except number of shares)	**$**	$
15,691,100 multiple voting shares	**98,346**	98,346
33,717,668 subordinate voting shares (33,874,114 at August 31, 2018)	**939,633**	937,226
	1,037,979	1,035,572
76,935 subordinate voting shares held in trust under the Incentive Share Unit Plan (111,717 at August 31, 2018)	**(5,409)**	(7,569)
118,667 subordinate voting shares held in trust under the Performance Share Unit Plan (143,377 at August 31, 2018)	**(9,180)**	(10,831)
	1,023,390	1,017,172

During fiscal 2019 and 2018, subordinate voting share transactions were as follows:

Years ended August 31,		**2019**		2018
	Number of shares	**Amount**	Number of shares	Amount
(In thousands of Canadian dollars, except number of shares)		**$**		$
Balance, beginning of the year	**33,874,114**	**937,226**	33,813,777	933,149
Shares issued for cash under the Stock Option Plan	**170,754**	**9,780**	60,337	3,486
Share-based payment previously recorded in share-based payment reserve for options exercised	**—**	**1,717**	—	591
Purchase and cancellation of subordinate voting shares [1]	**(327,200)**	**(9,090)**	—	—
Balance, end of the year	**33,717,668**	**939,633**	33,874,114	937,226

(1) On May 1, 2019, the Corporation announced that the TSX accepted its notice of intention for a normal course issuer bid, enabling it to acquire for cancellation up to 1,869,000 subordinate voting shares from May 3, 2019 to May 2, 2020. During fiscal 2019, the Corporation purchased and cancelled 327,200 subordinate voting shares with an average stated value of $9.1 million, for consideration of $32.4 million. The excess of the purchase price over the average stated value of the shares totaled $23.3 million and was charged to retained earnings.

During fiscal 2019 and 2018, subordinate voting shares held in trust under the Incentive Share Unit Plan transactions were as follows:

Years ended August 31,		2019		2018
	Number of shares	Amount	Number of shares	Amount
(In thousands of Canadian dollars, except number of shares)		$		$
Balance, beginning of the year	111,717	7,569	105,219	5,801
Subordinate voting shares acquired	9,688	864	42,390	3,790
Subordinate voting shares distributed to employees	(44,470)	(3,024)	(35,892)	(2,022)
Balance, end of the year	76,935	5,409	111,717	7,569

During fiscal 2019 and 2018, subordinate voting shares held in trust under the Performance Share Unit Plan transactions were as follows:

Years ended August 31,		2019		2018
	Number of shares	Amount	Number of shares	Amount
(In thousands of Canadian dollars, except number of shares)		$		$
Balance, beginning of the year	143,377	10,831	122,614	8,058
Subordinate voting shares acquired	18,609	1,640	62,204	5,562
Subordinate voting shares distributed to employees	(43,319)	(3,291)	(41,441)	(2,789)
Balance, end of the year	118,667	9,180	143,377	10,831

C) DIVIDENDS

For the year ended August 31, 2019, quarterly eligible dividends of $0.525 per share, for a total of $2.10 per share or $103.7 million, were paid to the holders of multiple and subordinate voting shares, compared to quarterly eligible dividends of $0.475 per share, for a total of $1.90 per share or $93.7 million for the year ended August 31, 2018.

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
Dividends on multiple voting shares	32,951	29,813
Dividends on subordinate voting shares	70,757	63,886
	103,708	93,699

At its October 30, 2019 meeting, the Board of Directors of Cogeco Communications declared a quarterly eligible dividend of $0.58 per share for multiple voting and subordinate voting shares, payable on November 27, 2019 to shareholders of record on November 13, 2019.

D) SHARE-BASED PAYMENT PLANS

The Corporation offers an Employee Stock Purchase Plan for the benefit of its employees and those of its subsidiaries and a Stock Option Plan to its executive officers and designated employees. No more than 10% of the outstanding subordinate voting shares are available for issuance under these plans. Furthermore, the Corporation offers an Incentive Share Unit Plan ("ISU Plan") and a Performance Share Unit Plan ("PSU Plan") for executive officers and designated employees, and a Deferred Share Unit Plan ("DSU Plan") for members of the Board of Directors ("Board").

Stock purchase plan

The Corporation offers, for the benefit of its employees and those of its subsidiaries, an Employee Stock Purchase Plan, which is accessible to all employees up to a maximum of 7% of their base annual salary and the Corporation contributes 25% of the employee contributions. The subscriptions are made monthly and employee subordinate voting shares are purchased on the stock market.

Stock option plan

A total of 3,432,500 subordinate voting shares are reserved for the purpose of the Stock Option Plan. The minimum exercise price at which options are granted is equal to the market value of such shares at the time the option is granted. Options vest equally over a period of five years beginning one year after the day such options are granted and are exercisable over ten years.

Under the Stock Option Plan, the following options were granted by the Corporation and are outstanding at August 31:

Years ended August 31,	2019		2018	
	Options	Weighted average exercise price	Options	Weighted average exercise price
		$		$
Outstanding, beginning of the year	819,393	65.27	652,385	56.61
Granted (1)	201,525	65.62	281,350	85.08
Exercised (2)	(170,754)	57.28	(60,337)	57.77
Cancelled	(134,550)	72.43	(54,005)	72.28
Outstanding, end of the year	715,614	65.93	819,393	65.27
Exercisable, end of the year	264,374	55.99	277,108	49.76

(1) For the year ended August 31, 2019, the Corporation granted 97,725 (126,425 in 2018) stock options to Cogeco's executive officers as executive officers of the Corporation.
(2) The weighted average share price for options exercised during the year was $92.43 ($83.46 in 2018).

At August 31, 2019, the range of exercise prices, the weighted average exercise price and the weighted average remaining contractual life of options are as follows:

At August 31, 2019	Options outstanding			Options exercisable	
Range of exercise prices	Number outstanding	Weighted average remaining contractual life	Weighted average exercise price	Number exercisable	Weighted average exercise price
$		(years)	$		$
38.08 to 50.10	138,699	3.10	44.75	138,699	44.75
50.11 to 62.13	162,500	6.54	61.84	67,175	61.64
62.14 to 65.75	163,490	9.08	65.19	1,160	65.61
65.76 to 85.00	65,290	6.24	67.58	28,740	67.58
85.01 to 103.09	185,635	8.21	85.40	28,600	85.20
	715,614	6.86	65.93	264,374	55.99

The weighted average fair value of stock options granted for the period ended August 31, 2019 was $9.60 ($13.37 in 2018) per option. The weighted average fair value of each option granted was estimated at the grant date for purposes of determining share-based payment expense using the Black-Scholes option pricing model based on the following weighted-average assumptions:

Years ended August 31,	2019	2018
	%	%
Expected dividend yield	3.18	2.24
Expected volatility (1)	20.37	20.12
Risk-free interest rate	2.42	1.65
Expected life (in years)	6.0	6.0

(1) The expected volatility is based on the historical volatility of the Corporation's subordinate voting shares for a period equivalent to the expected life of the options.

A compensation expense of $379,000 ($873,000 in 2018) was recorded for the year ended August 31, 2019 related to this plan.

ISU plan

The Corporation offers to its executive officers and designated employees an Incentive Share Unit ("ISU") Plan. According to this plan, executive officers and designated employees periodically receive a given number of ISUs which entitle the participants to receive subordinate voting shares of the Corporation after three years less one day from the date of grant. The number of ISUs is based on the dollar value of the award and the average closing stock price of the Corporation for the previous twelve month period ending August 31. ISUs are redeemable in case of death, permanent disability, normal retirement or termination of employment not for cause. A trust was created for the purpose of purchasing these shares on the stock market in order to protect against stock price fluctuation and the Corporation instructed the trustee to purchase subordinate voting shares of the Corporation on the stock market. These shares are purchased and are held in trust for the participants until they are fully vested. The trust, considered as a special purpose entity, is consolidated in the Corporation’s financial statements with the value of the acquired subordinate voting shares held in trust under the ISU Plan presented in reduction of share capital.

Under the ISU Plan, the following ISUs were granted by the Corporation and are outstanding at August 31:

Years ended August 31,	2019	2018
Outstanding, beginning of the year	105,475	101,538
Granted	37,600	47,900
Distributed	(44,470)	(35,892)
Cancelled	(26,780)	(8,071)
Outstanding, end of the year	71,825	105,475

A compensation expense of $2,046,000 ($2,461,000 in 2018) was recorded for the year ended August 31, 2019 related to this plan.

PSU plan

The Corporation also offers a Performance Share Unit ("PSU") Plan for the benefit of its executive officers and designated employees. The objectives of the PSU Plan are to retain executive officers and designated employees, to align their interests with those of the shareholders and to sustain positive corporate performance, as measured by an economic value creation formula, a performance measure used by management. The number of PSUs is based on the dollar value of the award and the average closing stock price of the Corporation for the previous twelve month period ending August 31. The PSUs vest over a three-year less one day period, based on the level of increase in the economic value of the Corporation or the relevant subsidiary for the preceding three-year period ending August 31, meaning that no vesting will occur if there is no increase in the economic value. The participants are entitled to receive dividend equivalents in the form of additional PSUs but only with respect to vested PSUs. PSUs are redeemable in case of death, permanent disability, normal retirement or termination of employment not for cause, in which cases, the holder of PSUs is entitled to payment of the PSUs in proportion to the time of employment from the date of the grant to the date of termination versus the three-year less one day vesting period. A trust was created for the purpose of purchasing these shares on the stock market in order to protect against stock price fluctuation and the Corporation instructed the trustee to purchase subordinate voting shares of the Corporation on the stock market. These shares are purchased and are held in trust for the participants until they are fully vested. The trust, considered as a special purpose entity, is consolidated in the Corporation's financial statements with the value of the acquired subordinate voting shares held in trust under the PSU Plan presented in reduction of share capital.

Under the PSU Plan, the following PSUs were granted by the Corporation and are outstanding at August 31:

Years ended August 31,	2019	2018
Outstanding, beginning of the year	133,181	115,207
Granted (1)	45,800	65,525
Performance-based additional units granted	200	2,639
Distributed	(43,319)	(41,441)
Cancelled	(31,889)	(12,184)
Dividend equivalents	3,578	3,435
Outstanding, end of the year	107,551	133,181

(1) For the year ended August 31, 2019, the Corporation granted 14,625 (19,025 in 2018) PSUs to Cogeco's executive officers as executive officers of the Corporation.

A compensation expense of $1,400,000 ($2,198,000 in 2018) was recorded for the year ended August 31, 2019 related to this plan.

DSU plan

The Corporation also offers a Deferred Share Unit ("DSU") Plan for members of the Board to assist in the attraction and retention of qualified individuals to serve on the Board of the Corporation. Each existing or new member of the Board may elect to be paid a percentage of the annual retainer in the form of DSUs with the balance, if any, being paid in cash. The number of DSUs that a member is entitled to receive is based on the average closing price of the subordinate shares on the TSX for the twenty consecutive trading days immediately preceding by one day the date of issue. Dividend equivalents are awarded with respect to DSUs in a member's account on the same basis as if the member was a shareholder of record of subordinate shares on the relevant record date, and the dividend equivalents are credited to the individual's account as additional DSUs. DSUs are redeemable and payable in cash or in shares, upon an individual ceasing to be a member of the Board or in the event of the death of the member.

Under the DSU Plan, the following DSUs were issued by the Corporation and are outstanding at August 31:

Years ended August 31,	2019	2018
Outstanding, beginning of the year	42,607	40,446
Issued	11,328	6,662
Redeemed	(12,351)	(5,549)
Dividend equivalents	1,095	1,048
Outstanding, end of the year	42,679	42,607

A compensation expense of $1,792,000 (compensation expense reduction of $181,000 in 2018) was recorded for the year ended August 31, 2019 related to this plan.

21. ACCUMULATED OTHER COMPREHENSIVE INCOME

During fiscal 2019 and 2018, accumulated other comprehensive income variations were as follows:

Years ended August 31, 2019 and 2018	Cash flow hedge reserve	Foreign currency translation	Total
(In thousands of Canadian dollars)	$	$	$
		(restated, Note 3)	*(restated, Note 3)*
Balance at August 31, 2017	438	76,197	76,635
Other comprehensive income for the year	25,380	11,759	37,139
Balance at August 31, 2018	**25,818**	**87,956**	**113,774**
Other comprehensive loss for the year	**(59,660)**	**(23,086)**	**(82,746)**
Balance at August 31, 2019	**(33,842)**	**64,870**	**31,028**

22. ADDITIONAL CASH FLOW INFORMATION

A) CHANGES IN NON-CASH OPERATING ACTIVITIES

Years ended August 31,	**2019**	2018
(In thousands of Canadian dollars)	**$**	$
		(restated, Note 3)
Trade and other receivables	**(1,734)**	(2,434)
Prepaid expenses and other	**(1,100)**	(4,168)
Other assets	**(8,665)**	(5,930)
Trade and other payables	**(24,143)**	(4,994)
Provisions	**10,103**	4,410
Contract liabilities and other liabilities	**431**	(10,787)
	(25,108)	(23,903)

B) CHANGES IN LIABILITIES ARISING FROM FINANCING ACTIVITIES

Years ended August 31, 2019 and 2018	Bank indebtedness	Balance due on business combinations	Current and non-current portion of long-term debt	Total
(In thousands of Canadian dollars)	$	$	$	$
Balance at August 31, 2017	3,801	118	2,576,433	2,580,352
Increase in bank indebtedness	2,148	—	—	2,148
Net increase under the revolving facilities	—	—	384,568	384,568
Issuance of long-term debt, net of discounts and transaction costs	—	—	2,082,408	2,082,408
Repayment of long-term debt	—	—	(1,329,044)	(1,329,044)
Repayment of balance due on business combinations	—	(118)	—	(118)
Total cash flows from (used in) financing activities excluding equity	2,148	(118)	1,137,932	1,139,962
Effect of changes in foreign exchange rates	—	—	126,789	126,789
Amortization of discounts and transaction costs	—	—	17,054	17,054
Total non-cash changes	—	—	143,843	143,843
Balance at August 31, 2018	**5,949**	**—**	**3,858,208**	**3,864,157**
Decrease in bank indebtedness	**(5,949)**	**—**	**—**	**(5,949)**
Net decrease under the revolving facilities	**—**	**—**	**(443,955)**	**(443,955)**
Repayment of long-term debt	**—**	**—**	**(77,639)**	**(77,639)**
Increase in deferred transaction costs	**—**	**—**	**(1,778)**	**(1,778)**
Balance due on business combinations	**—**	**5,005**	**—**	**5,005**
Repayment of balance due on business combinations	**—**	**(655)**	**—**	**(655)**
Total cash flows from (used in) financing activities excluding equity	**(5,949)**	**4,350**	**(523,372)**	**(524,971)**
Effect of changes in foreign exchange rates	**—**	**170**	**62,405**	**62,575**
Amortization of discounts and transaction costs	**—**	**—**	**7,618**	**7,618**
Total non-cash changes	**—**	**170**	**70,023**	**70,193**
Balance at August 31, 2019	**—**	**4,520**	**3,404,859**	**3,409,379**

23. EMPLOYEE BENEFITS

A) DEFINED CONTRIBUTION PLANS AND COLLECTIVE REGISTERED RETIREMENT SAVING PLANS

The Corporation and its subsidiaries offer to their employees defined contribution plans or collective registered retirement savings plans. Under these plans, the Corporation and its subsidiaries' obligations are limited to the payment of the monthly employer's contribution. The total expense recognized with respect to these plans amounted to $8,026,000 ($7,858,000 in 2018) for the year ended August 31, 2019 and is included in the Corporation's consolidated statement of profit and loss under "salaries, employee benefits and outsourced services".

B) DEFINED BENEFIT PLANS

The Corporation and its subsidiaries sponsor a defined benefit plan for the benefit of their employees and a separate defined benefit plan for the benefit of their executive officers, which provide pensions based on the number of years of service and the average salary during the employment of each participant. In addition, the Corporation and its subsidiaries offer to their designated executive officers a supplementary pension plan. Each year at August 31 the Corporation and its subsidiaries measure plan assets at fair value, as well as the defined benefit obligation for all plans. The most recent actuarial valuation of the pension plan for the benefit of the employees was at August 31, 2018 and the next required valuation is at August 31, 2019, which is expected to be completed in February 2020. For the executive officers' plans, the most recent actuarial valuation was at August 31, 2017 and the next required valuation is at August 31, 2020.

The following table provides a reconciliation of the change in the defined benefit obligations and plan assets at fair value and a statement of the funded status at August 31:

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
Defined benefit obligation (1)		
Defined benefit obligation, beginning of the year	51,183	48,501
Current service cost	1,788	1,820
Past service cost	(131)	—
Interest cost	1,854	1,754
Contributions by plan participants	280	285
Benefits paid	(1,635)	(1,450)
Actuarial losses (gains) on obligation arising from:		
Experience adjustments	(513)	1,434
Changes in financial assumptions	6,541	(1,161)
Defined benefit obligation reallocated to Cogeco's pension plans (2)	(1,681)	—
Defined benefit obligation, end of the year	57,686	51,183
Plan assets at fair value		
Plan assets at fair value, beginning of the year	51,777	47,644
Interest income	1,848	1,695
Return on plan assets, except amounts included in interest income	(3,713)	1,903
Administrative expense	(303)	(250)
Contributions by plan participants	280	285
Employer contributions	1,038	1,950
Benefits paid	(1,635)	(1,450)
Plan assets reallocated to Cogeco's pension plans (2)	(1,642)	—
Plan assets at fair value, end of the year	47,650	51,777
Funded status		
Plan assets at fair value	47,650	51,777
Defined benefit obligation	57,686	51,183
Net defined benefit asset (liability)	(10,036)	594

(1) The weighted average duration of the defined benefit obligation at August 31, 2019 and 2018 is 14 years.

(2) Arose following the transfer of Cogeco Communications' employees to Cogeco.

The net defined benefit asset and liability is included in the Corporation's consolidated statement of financial position under ''Pension plan assets'' and "Pension plan liabilities and accrued employee benefits", respectively.

Pension plan liabilities and accrued employee benefits

At August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
Pension plan liabilities	10,036	—
Accrued employee benefits	4,319	2,784
	14,355	2,784

Defined benefit costs recognized in profit or loss

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
Recognized in operating expenses (salaries, employee benefits and outsourced services)		
Current service cost	1,788	1,820
Past service cost	(131)	—
Administrative expense	303	250
Recognized in financial expense (other)		
Net interest	6	59
	1,966	2,129

Defined benefit costs recognized in other comprehensive income

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
Actuarial losses (gains) arising from:		
Experience adjustments	(513)	1,434
Change in financial assumptions	6,541	(1,161)
Return on plan assets, except amounts included in interest income	3,713	(1,903)
	9,741	(1,630)

The expected employer contributions to the Corporation's defined benefit plans should be approximately $2,730,000 in 2020.

Plan assets consist of:

At August 31,	2019	2018
	%	%
Equity securities (1)	58	58
Debt securities (1)	19	20
Deposits in trust (2)	17	15
Other	6	7
Total	100	100

(1) All debt and equity securities have a quoted price in active markets.

(2) Deposits in trust prescribed by the Canada Revenue Agency for funded supplemental employee retirement plans are non-interest-bearing.

The significant weighted average assumptions used in measuring the Corporation's defined benefit obligation and defined benefit costs are as follows:

At August 31,	2019	2018
	%	%
Defined benefit obligation		
Discount rate	2.85	3.65
Rate of compensation increase	2.75	2.75
Mortality table	CPM-2014	CPM-2014
Defined benefit costs		
Discount rate	3.00	3.75
Rate of compensation increase	2.75	2.75
Mortality table	CPM-2014	CPM-2014

C) EXPOSURE TO ACTUARIAL RISKS

The Corporation is exposed to the following actuarial risks:

Investment risk

The investment strategy of the plans is to diversify the nature of the returns on assets. Given the long-term nature of the defined benefit obligation, a portion of the assets are invested in equity securities in order to maximize return. Since equity securities are inherently volatile and risky, the Corporation sets investment goals, both in terms of asset mix percentage and target return, which is monitored monthly and adjusted as needed.

Interest rate risk

A decrease in the interest rate on investment-grade fixed-rate Corporate bonds will reduce the discount rate used and increase the present value of the defined benefit obligation. However, the increase in the obligation would be partly offset by an increase in the value of plan investments in debt securities.

Salary risk

Active members expected benefits are linked to their pre-retirement compensation. The present value of the defined benefit obligation is calculated using management's best estimate of the expected rate of compensation increase of plan members. Increasing that assumption would increase the defined benefit obligation.

D) SENSITIVITY ANALYSIS

The sensitivity analysis of the defined benefit obligation was calculated based on reasonably possible changes to each key actuarial assumption without considering simultaneous changes to several key actuarial assumptions. A change in one actuarial assumption could trigger a change in another actuarial assumption, which could amplify or mitigate the impact of the change in these assumptions on the present value of the defined benefit obligation. The sensitivity analysis was prepared in accordance with the Corporation's accounting policies described in Note 2 K). The actual results of items subject to estimates may differ.

At August 31, 2019	Change in assumption	Increase in the defined benefit obligation
(In thousands of Canadian dollars)	%	$
Discount rate decrease	0.10	862
Expected rate of compensation increase	0.25	149

24. FINANCIAL INSTRUMENTS

A) FINANCIAL RISK MANAGEMENT

Management’s objectives are to protect the Corporation and its subsidiaries against material economic exposures and variability of results, and against certain financial risks including credit, liquidity, interest rate and foreign exchange risks.

Credit risk

Credit risk represents the risk of financial loss for the Corporation if a customer or counterparty to a financial asset fails to meet its contractual obligations. The Corporation is exposed to credit risk arising from the derivative financial instruments, cash and cash equivalents and trade accounts receivable, the maximum exposure of which is represented by the carrying amounts reported on the statement of financial position.

Credit risk from derivative financial instruments arises from the possibility that counterparties to the interest rate swaps may default on their obligations in instances where these agreements have positive fair values for the Corporation. The Corporation reduces this risk by completing transactions with financial institutions that carry a credit rating equal to or superior to its own credit rating. The Corporation assesses the creditworthiness of the counterparties in order to minimize the risk of counterparties default under the agreements. At August 31, 2019, management believes that the credit risk relating to its derivative financial instruments is minimal, since the lowest credit rating of the counterparties to the agreements is "A" by Standard & Poor’s rating services ("S&P").

Cash equivalents consist mainly of highly liquid money market short-term investments. The Corporation has deposited the cash and cash equivalents with reputable financial institutions, for which management believes the risk of loss to be remote.

The Corporation is also exposed to credit risk in relation to its trade accounts receivable. To mitigate such risk, the Corporation continuously monitors the financial condition of its customers and reviews the credit history or worthiness of each new large customer. The Corporation establishes an allowance for lifetime expected credit losses related to doubtful accounts. The doubtful accounts allowance is calculated on a specific-identification basis for larger customer accounts receivable and on a statistically derived basis for the remainder. Factors such as the current economic conditions, forward-looking macroeconomic data and historical information (number of overdue days of the customer’s balance outstanding as well as the customer’s collection history) are examined. The Corporation believes that its allowance for doubtful accounts is sufficient to cover the related credit risk. The Corporation has credit policies in place and has established various credit controls, including credit checks, deposits on accounts and advance billing, and has also established procedures to suspend the availability of services when customers have fully utilized approved credit limits or have violated existing payment terms. Since the Corporation has a large and diversified clientele dispersed throughout its market areas in Canada and the United States, there is no significant concentration of credit risk.

The following table provides further details on trade and other receivables, net of allowance for doubtful accounts:

At August 31, *(In thousands of Canadian dollars)*	2019 $	2018 $
Trade accounts receivable	74,021	95,541
Allowance for doubtful accounts	(6,759)	(6,497)
	67,262	89,044
Other accounts receivable	8,390	8,250
	75,652	97,294

Trade accounts receivable past due is defined as the amount outstanding beyond normal credit terms and conditions for the respective customers. A large portion of the Corporation's customers are billed and pay before the services are rendered. The Corporation considers the amount outstanding at the due date as trade accounts receivable past due.
The following table provides further details on trade accounts receivable past due net of allowance for doubtful accounts at August 31, 2019 and 2018:

At August 31, *(In thousands of Canadian dollars)*	2019 $	2018 $
Less than 60 days past due	18,645	32,857
60 to 90 days past due	899	3,022
More than 90 days past due	3,074	4,923
	22,618	40,802

The following table shows changes in the allowance for doubtful accounts for the years ended August 31, 2019 and 2018:

Years ended August 31, *(In thousands of Canadian dollars)*	2019 $	2018 $
Balance, beginning of the year	6,497	3,820
Provision for impaired receivables	24,059	18,921
Net use	(23,176)	(15,161)
Foreign currency translation adjustments	21	38
Discontinued operations	(642)	(1,121)
Balance, end of the year	6,759	6,497

Liquidity risk

Liquidity risk is the risk that the Corporation will not be able to meet its financial obligations as they become due. The Corporation manages liquidity risk through the management of its capital structure and access to different capital markets. It also manages liquidity risk by continuously monitoring actual and projected cash flows to ensure sufficient liquidity to meet its obligations when due. At August 31, 2019, the Corporation had used $0.6 million of its $800 million amended and restated Term Revolving Facility for a remaining availability of $799.4 million. Management believes that the committed Term Revolving Facility will, until its maturity in 2024, provide sufficient liquidity to manage its long-term debt maturities and support working capital requirements. In addition, two subsidiaries related to Atlantic Broadband also benefit from a Senior Secured Revolving Facility of $199.4 million (US$150 million), of which $3.2 million (US$2.4 million) was used at August 31, 2019 for a remaining availability of $196.2 million (US$147.6 million).

The following table summarizes the contractual maturities of the financial liabilities and related capital amounts at August 31, 2019:

		Contractual cash flows						
	Carrying amount	2020	2021	2022	2023	2024	Thereafter	Total
(In thousands of Canadian dollars)	$	$	$	$	$	$	$	$
Trade and other payables [(1)]	245,236	245,236	—	—	—	—	—	245,236
Balance due on business combinations	4,520	4,520	—	—	—	—	—	4,520
Long-term debt	3,404,859	22,601	222,601	222,601	322,601	22,601	2,637,398	3,450,403
	3,654,615	272,357	222,601	222,601	322,601	22,601	2,637,398	3,700,159

(1) Excluding accrued interest on long-term debt.

The following table is a summary of interest payable on long-term debt that is due for each of the next five years and thereafter, based on the principal amount and interest rate prevailing on the outstanding debt at August 31, 2019 and their respective maturities:

	2020	2021	2022	2023	2024	Thereafter	Total
(In thousands of Canadian dollars)	$	$	$	$	$	$	$
Interest payments on long-term debt	151,883	145,747	134,687	128,776	115,265	72,837	749,195
Interest receipts on derivative financial instruments	(30,887)	(25,482)	(21,621)	(17,854)	(10,412)	(1,755)	(108,011)
Interest payments on derivative financial instruments	31,263	25,760	21,830	18,016	10,410	1,731	109,010
	152,259	146,025	134,896	128,938	115,263	72,813	750,194

Interest rate risk

The Corporation is exposed to interest rate risks on its floating interest rate instruments. Interest rate fluctuations will have an effect on the repayment of these instruments. At August 31, 2019, all of the Corporation's long-term debt was at fixed rate, except for the amounts drawn under the First Lien Credit Facilities, which are subject to floating interest rates.

To reduce the risk on the floating interest rate instruments, the Corporations' US subsidiary entered into interest rate swap agreements. The following table shows the interest rate swaps outstanding at August 31, 2019:

Type of hedge	Notional amount	Receive interest rate	Pay interest rate	Maturity	Hedged item
Cash flow	US$1.1 billion	US Libor base rate	2.017% - 2.262%	January 2021 - November 2024	Senior Secured Term Loan B

The sensitivity of the Corporation's annual financial expense to an increase of 1% in the interest rate applicable to the unhedged portion of these facilities would represent an increase of approximately $7.7 million based on the outstanding debt at August 31, 2019.

Foreign exchange risk

The Corporation is exposed to foreign exchange risk with respect to the interest associated with its long-term debt denominated in US dollars. The impact of a 10% increase in the exchange rate of the US dollar into Canadian dollars would increase financial expense by approximately $12 million based on the outstanding debt at August 31, 2019.

The Corporation faces exposure to foreign exchange risk on cash and cash equivalents, trade and other receivables, trade and other payables and provisions denominated in US dollars, Euros or British Pounds. The Corporation's exposure to foreign currency risk is as follows:

At August 31,			2019			2018
	US	Euro	British Pounds	US	Euro	British Pounds
(In thousands of Canadian dollars)	$	$	$	$	$	$
Financial assets (liabilities)						
Cash and cash equivalents	10,160	455	42	17,987	961	93
Trade and other receivables	—	—	—	3,625	191	—
Trade and other payables and provisions	(10,615)	(6,977)	—	(21,825)	(7,232)	—
	(455)	(6,522)	42	(213)	(6,080)	93

Due to their short-term nature, the risk arising from fluctuations in foreign exchange rates is not significant. The impact of a 10% fluctuation in the foreign exchange rates (US dollar, Euro and British Pound) would not change financial expense significantly.

Furthermore, the Corporation's net investments in foreign operations are exposed to market risk attributable to fluctuations in foreign currency exchange rates, notably changes in the value of the Canadian dollar versus the US dollar. The risk related to the US dollar aggregate investments is mitigated since a portion was borrowed in US dollars.

The following table shows the aggregate investments in foreign operations attributable to owners of the Corporation and the notional amount of debt borrowed to hedge these investments at August 31, 2019:

Type of hedge	Notional amount of debt	Aggregate investments	Hedged item
Net investments	US$390 million	US$1,000 million	Net investments in foreign operations in US dollar

The exchange rate used to translate the US dollar currency into Canadian dollars for the consolidated statement of financial position accounts at August 31, 2019 was $1.3295 ($1.3055 in 2018) per US dollar. A 10% decrease in the exchange rate of the US dollar into Canadian dollars would decrease other comprehensive income by approximately $81.1 million.

Market risk

The Corporation uses derivative instruments to manage the exposure to the risk of changes in the price of its subordinate voting shares under the DSU plan. As such, the Corporation uses equity swap agreements on its subordinate voting shares to economically hedge the cash flow exposure. A 5% variation in the market price of its subordinate voting shares at August 31, 2019 would result in a variation, net of the hedge, of approximately $0.1 million in operating expenses for 2019.

B) FAIR VALUE OF FINANCIAL INSTRUMENTS

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Fair values are estimated at a specific point in time, by discounting expected cash flows at rates for assets and liabilities of the same remaining maturities and conditions. These estimates are subjective in nature and involve uncertainties and significant judgment, and therefore, cannot be determined with precision. In addition, income taxes and other expenses that would be incurred on disposition of these financial instruments are not reflected in the fair values. As a result, the fair values are not necessarily the net amounts that would be realized if these instruments were settled. The Corporation has determined the fair value of its financial instruments as follows:

- The carrying amount of cash and cash equivalents, trade and other receivables, bank indebtedness and trade and other payables approximates fair value because of the short-term nature of these instruments;
- Interest rates under the terms of the Corporation's Term Revolving Facility and First Lien Facilities are based on bankers' acceptance, US dollar base rate loans, LIBOR loans in US dollars, Euros or British Pounds plus applicable credit spread. Therefore, the carrying value approximates fair value for these facilities, since they have conditions similar to those currently available to the Corporation;
- The fair value of the Senior Secured Debentures Series 2, 3 and 4, Senior Secured Notes Series B and Senior Secured Notes are based upon current trading values for similar financial instruments;

The carrying value of all the Corporation's financial instruments approximates fair value, except as otherwise noted in the following table:

At August 31,	2019		2018	
	Carrying value	**Fair value**	Carrying value	Fair value
(In thousands of Canadian dollars)	**$**	**$**	$	$
Long-term debt	**3,404,859**	**3,521,418**	3,858,208	3,941,543

All financial instruments recognized at fair value on the consolidated statement of financial position must be measured based on the three fair value hierarchy levels, which are as follows:

- Level 1: quoted prices (unadjusted) in active markets for identical assets or liabilities;
- Level 2: inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly (i.e., as prices) or indirectly (i.e., derived from prices); and
- Level 3: inputs for the asset or liability that are not based on observable market data (unobservable inputs).

The Corporation considers that its derivative financial instruments are classified as Level 2 under the fair value hierarchy. The fair value of derivative financial instruments is estimated using valuation models that reflect projected future cash flows over contractual terms of the derivative financial instruments and observable market data, such as interest and currency exchange rate curves.

C) CAPITAL MANAGEMENT

The Corporation's objectives in managing capital are to ensure sufficient liquidity to support the capital requirements of its various businesses, including growth opportunities. The Corporation manages its capital structure and makes adjustments in light of general economic conditions, the risk characteristics of the underlying assets and the Corporation's working capital requirements. Management of the capital structure involves the issuance of new debt, the repayment of existing debt using cash generated by operations and the level of distribution to shareholders.

The capital structure of the Corporation is composed of shareholders' equity, cash and cash equivalents, bank indebtedness, long-term debt and assets or liabilities related to derivative financial instruments.

The provisions of financing agreements provide for restrictions on the activities of the Corporation. Generally, the most significant restrictions relate to permitted investments and dividends on multiple and subordinate voting shares, as well as the maintenance of certain financial ratios primarily linked to the adjusted EBITDA, financial expense and total indebtedness. At August 31, 2019 and 2018 the Corporation was in compliance with all of its debt covenants and was not subject to any other externally imposed capital requirements.

The following table summarizes certain of the key ratios used to monitor and manage the Corporation's capital structure:

Years ended August 31,	**2019**	2018 (3)
Net indebtedness (1) / adjusted EBITDA (2)	**2.6**	3.8
Adjusted EBITDA (2) / financial expense (2)	**6.3**	5.4

(1) Net indebtedness is defined as the total of bank indebtedness, balance due on business combinations and principal on long-term debt, less cash and cash equivalents.

(2) Adjusted EBITDA and financial expense for the year ended August 31, 2018 include eight months of MetroCast operations.

(3) Ratios for 2018 include indebtedness related to the Cogeco Peer 1 subsidiary, which was reimbursed following its disposal in fiscal 2019.

D) CATEGORIES OF FINANCIAL INSTRUMENTS

At August 31,	**2019**	2018
(In thousands of Canadian dollars)	**$**	$
Financial assets		
Financial assets measured and classified at amortized cost	**632,156**	182,019
Derivative financial instruments in designated hedge relationships	**—**	35,126
	632,156	217,145
Financial liabilities		
Financial liabilities measured and classified at amortized cost	**3,669,860**	4,166,963
Derivative financial instruments in designated hedge relationships	**46,044**	—
	3,715,904	4,166,963

25. RELATED PARTY TRANSACTIONS

A) MANAGEMENT FEES AND OTHER RELATED PARTY TRANSACTIONS

Cogeco Communications is a subsidiary of Cogeco, which holds 31.8% of the Corporation's equity shares, representing 82.3% of the Corporation's voting shares.

Cogeco provides executive, administrative, financial and strategic planning services and additional services to the Corporation under a Management Services Agreement (the "Agreement"). On May 1, 2019, the Corporation and Cogeco agreed to amend the Agreement in order to replace the methodology used to establish the management fees payable by the Corporation to Cogeco, which was based on a percentage of the consolidated revenue of the Corporation, with a new methodology based on the costs incurred by Cogeco plus a reasonable mark-up. This cost-plus methodology was adopted to avoid future variations of the management fee percentage due to the frequent changes of the Corporation's consolidated revenue pursuant to business acquisitions and divestitures. Prior to this change, management fees represented 0.75% of the consolidated revenue from continuing and discontinued operations of the Corporation (0.85% for the period prior to the MetroCast acquisition on January 4, 2018). Provision is made for future adjustment upon the request of either Cogeco or the Corporation from time to time during the term of the Agreement. For fiscal 2019 management fees paid to Cogeco amounted to $19.9 million, compared to $19.0 million for fiscal 2018.

No direct remuneration is payable to Cogeco's executive officers by the Corporation. However, during fiscal 2019 and 2018, the Corporation granted stock options and PSUs to these executive officers, as executive officers of Cogeco Communications, as shown in the following table:

Years ended August 31,	**2019**	2018
Stock options	**97,725**	126,425
PSUs	**14,625**	19,025

The following table shows the amounts that the Corporation charged Cogeco with regards to the Corporation's stock options, ISUs and PSUs granted to these executive officers, as well as DSUs issued to Board directors of Cogeco:

Years ended August 31,	**2019**	2018
(In thousands of Canadian dollars)	**$**	$
Stock options	**1,046**	915
ISUs	**61**	1
PSUs	**981**	990
DSUs	**631**	—

B) COMPENSATION OF KEY MANAGEMENT PERSONNEL

Key management personnel are comprised of the members of the Board and of the Management Committee of the Corporation. The compensation paid or payable to key management personnel for employee services, which excludes the compensation to executive officers of Cogeco paid under the Management Services Agreement, is as follows:

Years ended August 31,	2019	2018
(In thousands of Canadian dollars)	$	$
Salaries and other short-term employee benefits	2,729	2,959
Post-employment benefits	152	515
Share-based payments	1,756	3,283
	4,637	6,757

26. COMMITMENTS, CONTINGENCIES AND GUARANTEES

A) COMMITMENTS

At August 31, 2019, the Corporation and its subsidiaries are committed under operating lease agreements and other long-term contracts to make annual payments as follows:

	2020	2021	2022	2023	2024	Thereafter
(In thousands of Canadian dollars)	$	$	$	$	$	$
Operating lease agreements (1)	22,728	22,105	20,851	21,087	20,012	53,412
Acquisitions of property, plant and equipment and intangible assets (2)	15,201	14,625	22,355	18,613	21,272	—
Other long-term contracts (3)	25,603	15,174	6,178	5,899	5,666	20,113
	63,532	51,904	49,384	45,599	46,950	73,525

(1) Include operating lease agreements for rent of premises and support structures.

(2) Include minimum spend commitments under acquisitions of customer premise equipment and software licenses.

(3) Include long-term commitments with suppliers to provide services including minimum spend commitments.

B) CONTINGENCIES

On August 15, 2019, the CRTC issued its costing decision setting final rates for aggregated wholesale Internet services for resellers, significantly lowering the interim rates it had previously fixed in 2016 and applying the new rates on a retroactive basis. On September 13, 2019, the Corporation, along with other telecommunications service providers, jointly filed an application for leave to appeal the CRTC order to the Federal Court of Appeal ("FCA") and to suspend its effect pending the Court decision to hear the matter. The FCA granted the interim stay on September 27, 2019, with the result, for the time being, of not having to implement the new rates nor to make the retroactive payments estimated at $25 million for the Corporation as of August 31, 2019, based on the CRTC's final aggregated wholesale service rates being disputed in court. Due to FCA granting of the interim stay and the significant uncertainty surrounding both the outcome and the amount, the Corporation has therefore not recorded the impact of the new reduced rates in the 2019 financial statements.

The Corporation and its subsidiaries are involved in matters involving litigations or potential claims from customers and suppliers arising out of the ordinary course and conduct of its business. Although such matters cannot be predicted with certainty, management does not consider the Corporation's exposure to litigations to be significant to these consolidated financial statements. At August 31, 2019 and 2018, no liability has been recorded with respect to these litigations and potential claims, except for those disclosed in Note 17.

C) GUARANTEES

In the normal course of business, the Corporation provides indemnification in conjunction with certain transactions. While many of the agreements specify a maximum potential exposure, some do not specify a maximum amount. The overall maximum amount of an indemnification obligation will depend on future events and conditions and therefore cannot be reasonably estimated. As a result, we cannot determine how they could affect our future liquidity, capital resources or credit risk profile. At August 31, 2019 and 2018, no liability has been recorded with respect to these indemnifications, except for those disclosed in Note 17.

Business combinations and asset disposals

In connection with the acquisition or sale of a business or assets, in addition to possible indemnifications relating to failure to perform covenants and breach of representations and warranties, the Corporation has agreed to indemnify the seller or the purchaser against claims related to events that occurred prior to the date of acquisition or sale.

Long-term debt

Under the terms of the Senior Secured Notes, the Corporation has agreed to indemnify the lenders against changes in regulations relative to withholding taxes and costs incurred due to changes in laws.

Sale of services

As part of transactions involving the sale of services, the Corporation and its subsidiaries may be required to make payments to counterparties as a result of breaches of representations and warranties made into the service agreements.

Purchase and development of assets

As part of transactions involving the purchase and development of assets, the Corporation and its subsidiaries may be required to pay counterparties for costs and losses incurred as a result of breaches of representations and warranties contained in the purchase agreements.

INVESTOR INFORMATION

CREDIT RATINGS

The table below shows Cogeco Communications' and Atlantic Broadband's credit ratings:

At August 31, 2019	S&P	DBRS	Moody's
Cogeco Communications			
Senior Secured Notes and Debentures	**BBB-**	**BBB (low)**	**NR**
Atlantic Broadband			
First Liens Credit Facilities	**BB-**	**NR**	**B1**

NR : Not rated

Our ability to access debt capital markets and bank credit markets and the cost and amount of funding available partly depends on the quality of our credit ratings. Obligations rated in the "BBB" category are considered investment grade and their cost of funding is typically lower relative to the "BB/B" rating category. In addition, obligations with "BBB" ratings generally have greater access to funding than those with "BB/B" ratings.

SHARE INFORMATION

At August 31, 2019		Registrar / Transfer agent
Number of multiple voting shares (10 votes per share) outstanding	**15,691,100**	Computershare Trust Company of Canada 100 University Avenue, 9th Floor Toronto, ON M5J 2Y1 Tel.: 514-982-7555 Tel.: 1-800-564-6253 Fax: 416-263-9394
Number of subordinate voting shares (1 vote per share) outstanding	**33,717,668**	
Stock exchange listing	The Toronto Stock Exchange	
Trading symbol	CCA	

DIVIDENDS

DIVIDEND DECLARATION

At its October 30, 2019 meeting, the Board of Directors of Cogeco Communications declared a quarterly eligible dividend of $0.58 per share for multiple voting and subordinate voting shares, payable on November 27, 2019 to shareholders of record on November 13, 2019. The declaration, amount and date of any future dividend will continue to be considered and approved by the Board of Directors of the Corporation based upon the Corporation's financial condition, results of operations, capital requirements and such other factors as the Board of Directors, at its sole discretion, deems relevant. There is therefore no assurance that dividends will be declared, and if declared, the amount and frequency may vary.

TRADING STATISTICS

Quarters ended	Nov. 30	Feb. 28	May 31	Aug. 31	2019 Total
(in dollars, except subordinate voting share volumes)	$	$	$	$	
The Toronto Stock Exchange					
High	**69.51**	**82.82**	**93.63**	**107.34**	
Low	**61.68**	**62.78**	**82.29**	**90.84**	
Close	**64.60**	**82.29**	**92.70**	**104.64**	
Volume (subordinate voting shares)	**4,895,169**	**5,098,057**	**5,196,782**	**6,448,128**	**21,638,136**

Quarters ended	Nov. 30	Feb. 28	May 31	Aug. 31	2018 Total
(in dollars, except subordinate voting share volumes)	$	$	$	$	
The Toronto Stock Exchange					
High	95.21	92.37	76.89	72.26	
Low	83.92	70.56	66.04	63.60	
Close	92.06	72.32	68.05	64.77	
Volume (subordinate voting shares)	6,089,635	5,082,407	4,334,547	4,948,934	20,455,523

CUSTOMER STATISTICS

	August 31, 2019	May 31, 2019	February 28, 2019	November 30, 2018	August 31, 2018
CONSOLIDATED					
Primary service units	**2,711,812**	**2,707,227**	**2,703,223**	**2,711,932**	2,751,383
Internet service customers	**1,234,380**	**1,229,399**	**1,214,566**	**1,204,602**	1,207,225
Video service customers	**962,138**	**965,008**	**976,377**	**988,398**	1,006,020
Telephony service customers	**515,294**	**512,820**	**512,280**	**518,932**	538,138
CANADA					
Primary service units	**1,810,366**	**1,813,212**	**1,825,011**	**1,831,628**	1,866,918
Internet service customers	**788,243**	**785,703**	**785,004**	**778,996**	782,277
Penetration as a percentage of homes passed	**44.7%**	**44.6%**	**44.7%**	**44.4%**	44.7%
Video service customers	**649,583**	**657,747**	**668,771**	**675,699**	688,768
Penetration as a percentage of homes passed	**36.8%**	**37.4%**	**38.1%**	**38.5%**	39.3%
Telephony service customers	**372,540**	**369,762**	**371,236**	**376,933**	395,873
Penetration as a percentage of homes passed	**21.1%**	**21.0%**	**21.1%**	**21.5%**	22.6%
UNITED STATES					
Primary service units	**901,446**	**894,015**	**878,212**	**880,304**	884,465
Internet service customers	**446,137**	**443,696**	**429,562**	**425,606**	424,948
Penetration as a percentage of homes passed(1)	**50.8%**	**50.7%**	**49.6%**	**49.2%**	49.7%
Video service customers	**312,555**	**307,261**	**307,606**	**312,699**	317,252
Penetration as a percentage of homes passed(1)	**35.6%**	**35.1%**	**35.5%**	**36.2%**	37.1%
Telephony service customers	**142,754**	**143,058**	**141,044**	**141,999**	142,265
Penetration as a percentage of homes passed(1)	**16.2%**	**16.3%**	**16.3%**	**16.4%**	16.6%

(1) In the first quarter of fiscal 2019, the number of homes passed in the American broadband services segment have been adjusted upwards in order to reflect the number of non-served multi-dwelling unit passings within the footprint and consequently, the penetration as a percentage of homes passed for fiscal 2018 have also been adjusted.

BOARD OF DIRECTORS AND CORPORATE MANAGEMENT

BOARD OF DIRECTORS

✪ **LOUIS AUDET**, Eng., MBA, C.M., **Executive Chairman of the Board**
Westmount (Québec)

✪■ **JAMES C. CHERRY**, B.Com, FCPA, FCA, **Lead Director**
Elizabethtown (Ontario)
Corporate Director

●■ **COLLEEN ABDOULAH**, MBA, APR
Denver (Colorado)
Corporate director

●■★ **PATRICIA CURADEAU-GROU**, B. Com., Finance, ICD.D
Montréal (Québec)
Corporate director

◆ **PIPPA DUNN**, LLB
London (UK)
Founder and partner of Broody (an incubator for startups and accelerator to more established businesses)

●★ **JOANNE FERSTMAN**, CPA, CA, B.Com
Toronto (Ontario)
Corporate Director

★ **PHILIPPE JETTÉ**, Eng.
Dollard-des-Ormeaux (Québec)
President and Chief Executive Officer of Cogeco and Cogeco Communications

●◆ **LIB GIBSON**, M.Sc., B.Sc., ICD.D
Toronto (Ontario)
Corporate Director

■◆★ **DAVID MCAUSLAND**, B.C.L., LL.B.
Baie-D'Urfé (Québec)
Partner at McCarthy Tétrault (Major law firm in Canada)

■◆ **CAROLE J. SALOMON**, B.A., MBA
Toronto (Ontario)
President and Chief Executive Officer of Cardavan Corporation (Management consultancy)

Legend :

✪ Attends as an observer and participates in meetings of all the committees
● Member of the Audit Committee
■ Member of the Human Resources Committee
◆ Member of the Corporate Governance Committee
★ Member of the Strategic Opportunities Committee

CORPORATE HEAD OFFICE

5 Place Ville Marie
Suite 1700
Montréal (Québec)
H3B 0B3
corpo.cogeco.com

CORPORATE MANAGEMENT

LOUIS AUDET

Executive Chairman of the Board

PHILIPPE JETTÉ

President and Chief Executive Officer

ELIZABETH ALVES

Vice President, Enterprise Strategy and Social Responsibility

PHILIPPE BONIN

Vice President, Corporate Development

NATHALIE DORVAL

Vice President, Regulatory Affairs and Copyright

CHANTAL FRAPPIER

Vice President, Internal Audit

MARTIN GRENIER

Vice President, Procurement

CHRISTIAN JOLIVET

Senior Vice President, Corporate Affairs, Chief Legal Officer and Secretary

MARIE-HÉLÈNE LABRIE

Senior Vice President, Chief Public Affairs and Communications Officer

STÉPHANE LACOMBE

Vice President, Information Technology

MARIE GINETTE LEPAGE

Vice President, Wireless Solutions and Innovation

PIERRE MAHEUX

Vice President, Corporate Controller

LUC NOISEUX

Senior Vice President and Chief Technology and Strategy Officer

DIANE NYISZTOR

Senior Vice President, Chief Human Resources Officer

PATRICE OUIMET

Senior Vice President and Chief Financial Officer

ANDRÉE PINARD

Vice President and Treasurer

JÉRÔME PRAT

Vice President, Total Compensation and HR Systems

LIETTE VIGNEAULT

Vice President, Talent and Employee Experience

OPERATIONS INFORMATION

CANADIAN BROADBAND SERVICES

COGECO CONNEXION

KEN SMITHARD
President

5 Place Ville Marie
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Montréal (Québec)
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AMERICAN BROADBAND SERVICES

ATLANTIC BROADBAND

FRANK VAN DER POST
President

2 Batterymarch Park
Suite 205
Quincy, MA 02169
www.atlanticbb.com

CORPORATE INFORMATION

ANNUAL MEETING
The Annual Meeting of Shareholders will be held at 11:45 a.m. on Wednesday, January 15, 2020, at the Centre Mont-Royal, Mont-Royal room 1, 4th Floor, Montréal (Québec).

AUDITORS
Deloitte LLP
1190 Avenue des Canadiens-de-Montréal
Suite 500
Montréal (Québec)
H3B 0M7

LEGAL COUNSEL
Stikeman Elliott LLP
1155 René-Lévesque Blvd. West
40th Floor
Montréal (Québec)
H3B 3V2

TRANSFER AGENT FOR SUBORDINATE VOTING AND MULTIPLE VOTING SHARES, AND TRUSTEE FOR SENIOR SECURED DEBENTURES AND NOTES
Computershare Trust Company of Canada

QUARTER ENDS
November, February, May

YEAR END
August 31

INQUIRIES

The Annual Report, Annual Information Form, Quarterly Reports and Information Circular are available in the Investors section of the Corporation's website (corpo.cogeco.com) or upon request by calling 514-764-4700.

Des versions françaises du rapport annuel, de la notice annuelle, des rapports trimestriels et de la circulaire d'information sont disponibles sous la section « Investisseurs » du site Internet de la société (corpo.cogeco.com) ou sur demande au 514-764-4700.

INVESTORS AND ANALYSTS

For financial information about the Corporation, please contact the Department of Finance of the Corporation.

SHAREHOLDERS

For any inquiries regarding a change of address or a change of registration of shares, please contact Computershare Trust Company of Canada. For any other inquiries please refer to the Shareholder Engagement Policy which can be found on the "Information for Shareholders" section on the Corporation's website at corpo.cogeco.com.

DUPLICATE COMMUNICATIONS

Some shareholders may receive more than one copy of publications such as Quarterly Reports and the Annual Report. Every effort is made to avoid such duplication. Shareholders who receive duplicate mailings should advise Computershare Trust Company of Canada.

ETHICS LINE

The Corporation's parent company, Cogeco Inc., makes available an anonymous and confidential Ethics Line for its employees and the employees of all of its business units and other individuals who wish to report any perceived or actual instances of violations of the Cogeco Code of Ethics (including complaints regarding accounting, internal accounting controls and audit matters). The Ethics Line is operated by a specialized external provider that is independent of Cogeco Inc. Reports can be made through secured confidential toll-free telephone lines or the web site described below. All reports submitted through the Ethics Line will be examined by the Vice President, Internal Audit and/or the Senior Vice President, Corporate Affairs, Chief Legal Officer and Secretary. Individuals will be protected from dismissal or retaliation of any kind for reporting truthfully and in good faith.

By telephone:

Canada or United States: **1-877-706-2640**

Web site of ClearView Connects: www.clearviewconnects.com corpo.cogeco.com

COGECO
COMMUNICATIONS

Personnel Bios

Atlantic Broadband

Danny L. Jobe, Vice President of Operations

Mr. Jobe has over 25 years of experience in the cable television industry. Mr. Jobe is the Vice President of Operations for Atlantic Broadband and is responsible for the day-to-day operations in eleven states. In addition to his current role, he has held senior management positions with MetroCast Communications and NESBE Cable.

Mr. Jobe is active in industry organizations and has been a long-time board member and Past Chairman of the Virginia Cable Telecommunications Association ("VCTA"). Mr. Jobe has also served on the Board of Directors of the Broadband Cable Association of Pennsylvania and the Board of Directors of the Cable Telecommunications Association of Maryland, Delaware, and the District of Columbia. Mr. Jobe is the immediate Past Chairman of the Board of Directors of the Maryland Broadband Cooperative, a member-owned cooperative providing middle-mile broadband connectivity in rural Maryland.

Mr. Jobe is a member of the 2012 Class of the Society of Cable Television Engineers Executive Leadership Program at the Tuck School of Business at Dartmouth College. Mr. Jobe is a 2012 inductee into the Virginia Cable Telecommunications Hall of Fame.

William Newborg, Director of Grants and Funding

Mr. Newborg is a 34-year telecommunications industry veteran experienced in telephone, cable and high-speed internet and Business Services.

Currently, Mr. Newborg is tasked with heading up the newly created position within Atlantic Broadband as Director of Grants and Funding for eleven states. Prior to that, Mr. Newborg was the General Manager for Virginia Operations for Atlantic Broadband.

Mr. Newborg has spent his entire career in Virginia working for large cable operators in Hampton Roads as well as smaller operators in rural Virginia markets.

In 2008, Mr. Newborg was responsible for the systems rebuild of the Virginia properties while serving as the General Manager for MetroCast Communications. In January 2018, Atlantic Broadband acquired MetroCast and he served as the General Manager for Virginia Operations.

Mr. Newborg has served on the Board of Directors of multiple local organizations and served on the King George County Broadband Authority Management Committee. Mr. Newborg is a member of the Board of Directors of the Virginia Cable Telecommunications Association.

Michael Scott, Construction Supervisor for Virginia and Maryland

Mr. Scott is a 34-year telecommunications veteran experienced in all phases of technical and construction methods for Residential and Commercial telephone, cable, and High-speed Internet, including Enterprise level Commercial Services.

Currently Mr. Scott is responsible for the day-to-day operations for the Atlantic Broadband residential and commercial construction team in Virginia and Maryland. Prior to Atlantic Broadband, Mr. Scott served as a Maintenance Technician and Construction Lead for MetroCast during the Rebuild of the Virginia systems. In 2018, Mr. Scott was promoted to Supervisor of Construction for Virginia and Maryland.

Mr. Scott started his telecommunications career with Verizon in South Carolina doing underground service drop burials. During his 20-year employment with Verizon, he was promoted to the Local Manager of Operations. During his tenure, he developed and implemented the National Bury Service Wire Group, which is still operating today on a national basis.

Mr. Scott is a member of the Society of Cable Television Engineers and is a past member of the Board of Directors of the Palmetto Protection Utility Services in South Carolina.

County Representatives

David Sadler, Caroline County

David Sadler is the Point of Contact for Caroline County -for questions pertaining to the 2021 VATI grant application. Mr. Sadler realizes that the problem of lack of access in rural Virginia is not a problem unique to Caroline. This is the reason he works to support solutions that not only help Caroline residents, but area residents, such as the current VATI Grant.

Mr. Sadler currently serves as IT director for Caroline County, and owns an IT installation and consulting company that serves many businesses from Fredericksburg to Richmond. As IT director he has worked with current wired and wireless providers to provide solutions the County Administration offices need to conduct business. Currently he manages the County owned wireless network that connects multiple sites to allow them to conduct business on Caroline Counties private network. This network connects offices that are separated and spread across our rural county. He currently oversees the county network, and is working hard to modernize the network with the focus being on improved security.

Prior to starting with Caroline County, Mr. Sadler worked in the Private Sector as sole proprietor of On-Site P.C. In this position he worked to coordinate with Cable, Telephone and Fiber providers to integrate solutions to businesses large and small. He has overseen and actually performed large scale wired and wireless network installations in Virginia and Maryland. Mr. Sadler has been in IT for 22 years and has worked with all Wired and many of the wireless providers that offer internet in Caroline County. He has extensive knowledge of both the availability of internet in Caroline, as well as the limitations of possible Solutions. Because of this knowledge he has been appointed to Caroline County Broadband Committee, where he works with a panel of highly qualified county residents in the IT field, to find viable solutions to bridge the digital divide that exists in Caroline county.

Cassie Thompson, Lancaster County

Ms. Thompson is a dynamic, creative and results driven former senior executive with over 30 years' experience with the Central Intelligence Agency. She possesses a diverse background having served the majority of her career in the Agency's National Clandestine Service and also tours in other Agency Directorates and overseas. She combines excellent organizational and leadership qualifications with demonstrated achievements in management, training and recruiting. She has a collaborative management style that enables her to work successfully across an organization and maintain solid business relationships. She communicates requirements to staff and can accomplish tasks through team building and through strengthening morale and performance. A strategic thinker with problem solving skills, she has a reputation for motivating, mentoring, and inspiring a workforce.

She currently serves as Chair of the Lancaster County Broadband Authority. The Lancaster Board of Supervisors formed the Lancaster County Broadband Authority under the Virginia Wireless Service Authorities Act in July 2018. The Authority immediately set about gathering the information needed to formulate a long-term strategy for broadband expansion in the County. Using publicly available information, LCBA mapped the unserved areas with an emphasis on identifying the distribution of low- and middle-income residents and K-12 students. To future-proof what will be a large investment of public funds, LCBA committed to providing the highest possible level of service with gigabit-capable fiber to the home. LCBA applied to the Virginia Department of Housing and Community Development for a Telecommunications Planning Grant, and enlisted the support of the Center for Innovative Technology to analyze the county's demographic characteristics and to confirm the unmet economic and social needs to be served. LCBA is in the final stage of completing the requirements for that grant. In March 2020, the LCBA submitted an application to the USDA Rural Utilities Service (RUS) ReConnect 2 Program for a grant to fund the expansion of broadband to all unserved and underserved homes and businesses in the County. The LCBA regularly informs the community of its activities with monthly reports to the Board of Supervisors, articles in the local paper (Rappahannock Record), local radio station interviews, public outreach gatherings (pre-COVID) and via its up-to-date website (lancova-broadband.org).

Judy Rowe, Mathews County

In two resolutions in June 2019, the Mathews Broadband Advisory Board was created, and Judy Rowe was appointed Chair. As an advocate for students in Mathews County, she has pleaded equity for students who lacked broadband access. Surveys by the MCPS proved that 30 - 35% of families had none to very limited access. Having brought the first computer into the schools, she campaigned over many years for more and more technology that would benefit her students. In working with gifted learners, she mentored a young boy who needed online math courses through Johns-Hopkins Center for Talented Youth (CTY). Upon retirement she has tutored and taught both K-12 and GED students in math, facilitating online learning in several arenas. When asked to help Mathews' Coalition-4-Kids find access to online programs like the Homework Help

Program, through Virginia Public Library, she applied for and got a grant to run late buses and open computer labs to give students access.
Until December 2018 Ms. Rowe spoke monthly to both the Board of Supervisors and the School Board, begging them to take action against this outrageous discrimination. Nothing happened. Promises from politicians never materialized. Asked to help get a pay raise for teachers, she made broadband a bigger issue to show that it could also produce much needed revenue for the county to help the schools. In December 2018, BOS members tried to prevent her speaking, but many people offered to help: The Sheriff, the Superintendent of Schools, and an internet entrepreneur. They brought together knowledgeable, tech savvy and persistent stakeholders in eight categories to support the effort along with technology directors, from the schools, the county, and the library. Ms. Rowe is a passionate champion of the need for universal broadband in Mathews County.

Kevin Gentry, Middlesex County

At Middlesex County, Director of Information Technology Kevin Gentry is responsible for the day to day operations and long-term planning for the County's data systems. He has worked for them since 2006, assuming the Director role in 2011. The nature of small government IT departments necessitates that the director must have a hand in every facet of operations and that is certainly the case in Middlesex. He has overseen sweeping upgrades in the County's technology infrastructure including project managing two 911 phone upgrades. He also served on the committee to upgrade the County's public safety radio system. In 2018, he oversaw the successful deployment of a Voice-Over-IP (VOIP) phone upgrade to replace the County's 25-year-old telephone system. The target of a random State Police/FBI technology audit in 2019, Middlesex County received top marks for its security posture and network integrity.
In his capacity as Executive Director of the Middlesex Broadband Authority, Mr. Gentry has been a tireless advocate for bringing internet services to the citizens of Middlesex. In addition to working on funding numerous projects, he has done outreach in the community to find out where the demand is most critical and provided innovative ways to finance small deployments. One such program, Middlesex Surfs, was conceived to provide low interest loans to families who lack the capital investment for installation of broadband. Whether it's staying up late to answer emails from concerned citizens or going down to meet with neighborhood communities, Kevin sees the need for broadband firsthand. In going to meet with various social groups like the Kiwanis or the Rotary or local churches, it's clear that Middlesex is in a very tenuous position when it comes to the digital divide. He has made it a personal mission to get critical broadband resources to the citizens of Middlesex County.
Mr. Gentry also served as the president of the Middle Peninsula's theater group, The Court House Players, from 2014 to 2016. He serves as an advisor to the Middlesex Museum. He has two sons, Kevin Jr., and Nick. Mr. Gentry resides in Middlesex County, Virginia.

MIDDLE PENINSULA
PLANNING DISTRICT COMMISSION

MPPDC Region Broadband Plan and Final Recommendations

SEPTEMBER, 2017

Table of Contents

Executive Summary

This report describes the approach that the localities and the Pamunkey Tribe of the Middle Peninsula Planning District could pursue (the "Project", or "PamunkeyNet") as an effort to expand access to improved and more affordable broadband coverage throughout the region.

The broadband study convened by the Middle Peninsula Planning District Commission was to provide the PDC with an effective and actionable course of action that will promote the availability of affordable, high speed broadband and Internet services in the PDC region . The overall goal of this effort is to:

- Identify the kind, type and cost of a highly resilient and redundant broadband network needed to support the activities of residents, businesses, and local governments in the Middle Peninsula region.
- Specify the cost and technical characteristics of a high performance, affordable wireless broadband network that would leverage existing assets, including existing towers and the King and Queen network, existing public safety towers, and where feasible, some commercial cellular towers.
- Specify the cost and technical characteristics of a first phase Fiber Technology Corridor on Route 33 that would be integrated with the planned Telework Center.
- Specify the cost and technical characteristics for a fiber to the home initiative on the Pamunkey Reservation.
- Identify financially feasible and sustainable strategies to achieve these goals.
- Identify the steps needed to be taken to initiate and develop the project if a decision is made to move forward.

Vision Statement

In the Middle Peninsula region, PamunkeyNet will:

- Build and operate a modern high performance wireless and fiber broadband infrastructure that provides the region with an economic development tool to retain existing businesses, attract new businesses, and help create jobs.
- Provide a robust broadband infrastructure using both wireless and fiber technologies that provides rural residents with improved Internet and Internet-based services at affordable prices.
- Support small businesses, home-based businesses, and home-based workers with affordable Internet access and Internet-based business services.
- Provide businesses and residents with a choice of competitive service providers and a choice of Internet-based services at a variety of affordable price points.
- Create a new Pamunkey Tribe business enterprise (PamunkeyNet) that will assist with funding, oversee network operations, and manage the business aspects of the Project.

Overview of the Strategy

The approach for this project has three primary objectives:

- Create a new business enterprise owned by the Pamunkey tribe.
- Create a network of existing and new wireless towers throughout the Middle Peninsula region that will have a high performance backbone between towers and local access radios on each tower to provide affordable business, residential, and institutional broadband Internet service.
- Create a fiber-based Technology Corridor on Route 33 between Rappahannock Community College, the planned Telework Center, and the Middle Peninsula airport.
- Provide the Pamunkey Tribe with state of the art Gigabit fiber services on the reservation.

The project will use and expand upon the existing successful King and Queen wireless network. Tower locations will be identified using several criteria:

- Make best possible use of existing local government (e.g. county) tower assets, including public safety towers and public safety backbone radio systems.
- Where affordable, lease space on privately owned towers to keep capital costs as low as possible.
- Build new towers where existing tower assets are not available or affordable, including the Pamunkey Reservation

Tower site identification and placement will be based on a goal of providing the maximum service coverage possible in each of the six counties in the Project area. The relatively flat terrain of the Middle Peninsula lends itself well to providing excellent wireless broadband service, but heavy tree cover will create line of sight problems for some potential users. Some businesses and residents may find it necessary to install a wooden or steel utility pole to get the customer radio above local tree cover.

Design Goals

A network initiative in partnership with the Pamunkey Tribe should have the following characteristics:

- Equal access to all residents and businesses over time – The goal of the initiative should be to deliver high performance broadband services to all residents, businesses, and local governments/agencies as rapidly as possible consistent with fiscally conservative operations.
- Scalable - The initial design of the network should support a graceful expansion over time.
- Small and home-based business support - The network should be able to support business needs, especially small businesses, business from home, and work from home opportunities. This is particularly important for future business attraction success.
- Enterprise business support - Provide business and carrier-class services over a fiber backbone to attract medium and large businesses to the region.

- Redundancy and Resiliency – The network should be designed to achieve a redundant "ring" architecture to minimize downtime from accidental fiber cuts and network equipment failures. Residents, schools, businesses and anchor tenants should have a high reliability network.
- Business Approach - Infrastructure investments by the enterprise should be carefully targeted to be financially sustainable over the long term. The goal should be operational expenses managed on a cost-plus basis.
- Funding Strategy - The enterprise should develop a "basket" of funding options, including long term service commitments from anchor tenants (e.g. K12 schools, the local public safety agencies, etc.), state and Federal grant opportunities, revenue from the network itself, and one time fees for costs associated with connecting a new customer to the network.

Next Steps

Next steps include:

- Identify the initial partners and interested parties that are ready to commit to the project, including the Pamunkey Tribe, the Middle Peninsula PDC, Rappahannock Community College, and other regional entities.
- Identify legal counsel for advice on company formation and tax rules. While tribal businesses are exempt from Federal taxes and may be exempt from state taxes, the entity may still have to register with the Virginia State Corporation Commission (SCC) and file annual reports even if there is not tax liability.
- Formation of the legal entity that will be responsible for the ownership and governance of PamunkeyNet. This would be formed by and owned by the Pamunkey tribe with a governing board/partners that include regional entities like the Middle Peninsula Planning District Commission and Rappahannock Community College.
- Once the entity is formed, it should register as an ETC (Eligible Telecommunications Carrier), which would give it access to certain kinds of Federal and state grants and loans.
- Identify a basket of funding sources for capital projects (fiber backbone, colocation facility, and regional wireless expansion).
- Begin working with the counties to identify additional county-owned sites where towers could be located.
- Begin close coordination with county-level and any regional public safety tower projects, which could provide a valuable source of funding where towers could support dual use—public safety voice/data communications and wireless broadband access.
- Identify additional planning funds to support detailed network design activities for both the wireless and fiber portions of the planned network.

Improving Broadband Access

In the Middle Peninsula region, both fiber and wireless technologies and systems are going to be important to meet the goal of improving access to broadband. The rest of this section provides more detail and some specific build out strategies. There are three major parts of any modern network:

- The **Core Network** provides access to the Internet, a place for service providers (ISPs) to distribute their services locally on the network, and for larger institutional and business customers to meet service providers. The King and Queen network has an existing wireless core network. As the network expands regionally, a colocation facility and meet point at the Telework Center will provide the equipment space and facilities to support continuous expansion of both the fiber and wireless portions of the network.
- The **Distribution** portion of the network connects the Core Network with collections of users. The Distribution network will include both fiber and wireless portions of the network.
- The **Access or Last Mile** portion of the network connects individual users and businesses to the network, and like the Distribution network, that connection will be by fiber or by a wireless link.

For improved wireless access in the region, the Project can use existing and new towers to improve access to broadband services. The well-established model of local fiber access supported by a high capacity wireless link can be used as an important business attraction and retention tool. This hybrid wireless-fiber model can also be used to provide rural residential fiber service to support work from home and business from home opportunities.

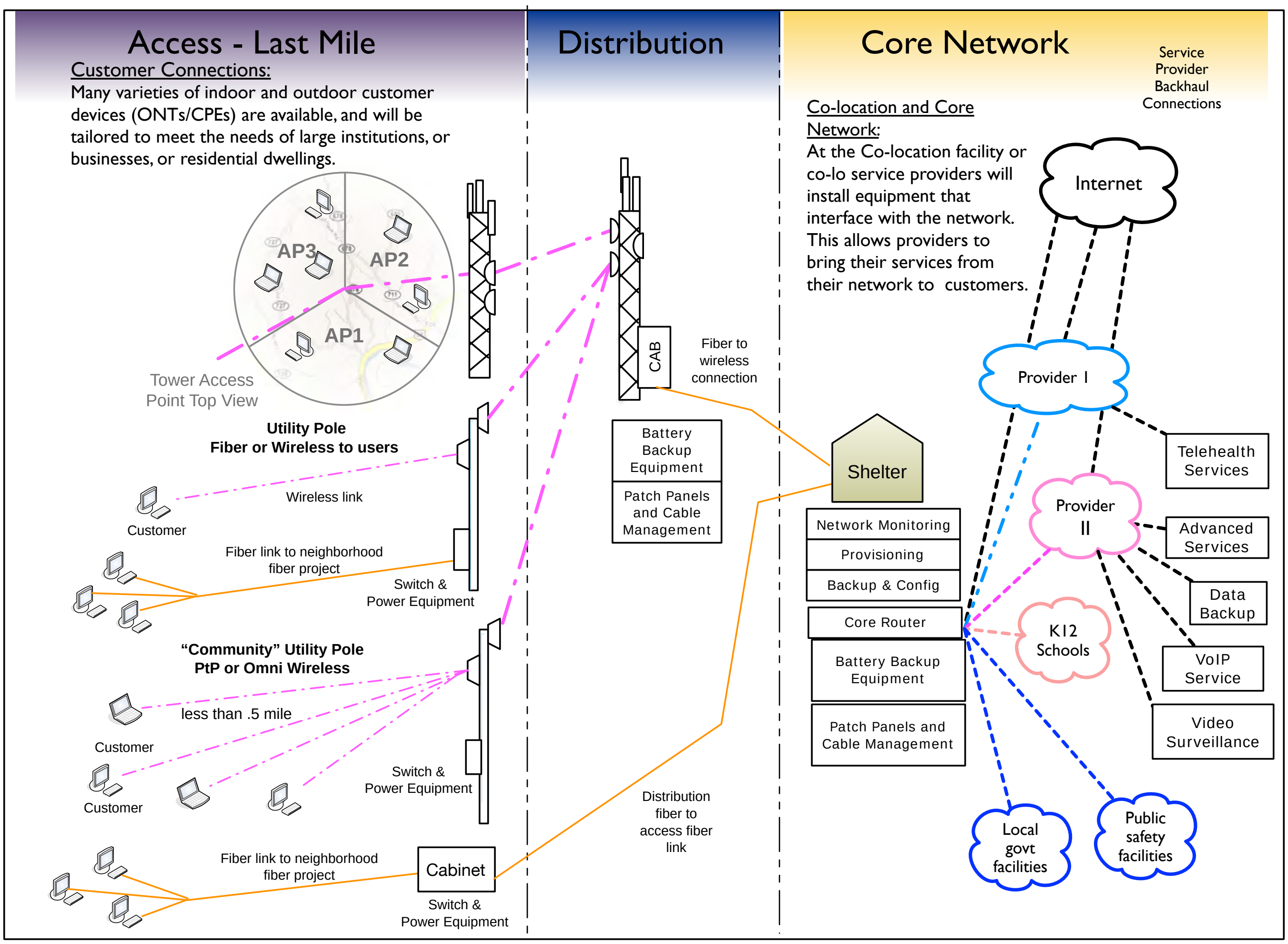
Businesses and residents in the region may obtain Internet service:

- With a small radio directly attached to their home or business that receives a signal directly from one of the Project towers.
- With a small radio attached to a utility pole (60 or 70') to improve line of sight to a Project tower.
- With a small radio directly attached to their home or business that receives a signal from a "community" utility pole. The "community" pole with receive a signal from a distant Project tower and redistribute it locally to a cluster of customers (typically within a half mile).
- With a fiber connection to the fiber installed along Route 33 and in other areas as additional fiber network segments are added.

The existing King and Queen network uses point to point wireless component which provides backhaul between towers and for redundancy and improved service reliability.

The table below summarizes how fiber and wireless can work together in a variety of ways.

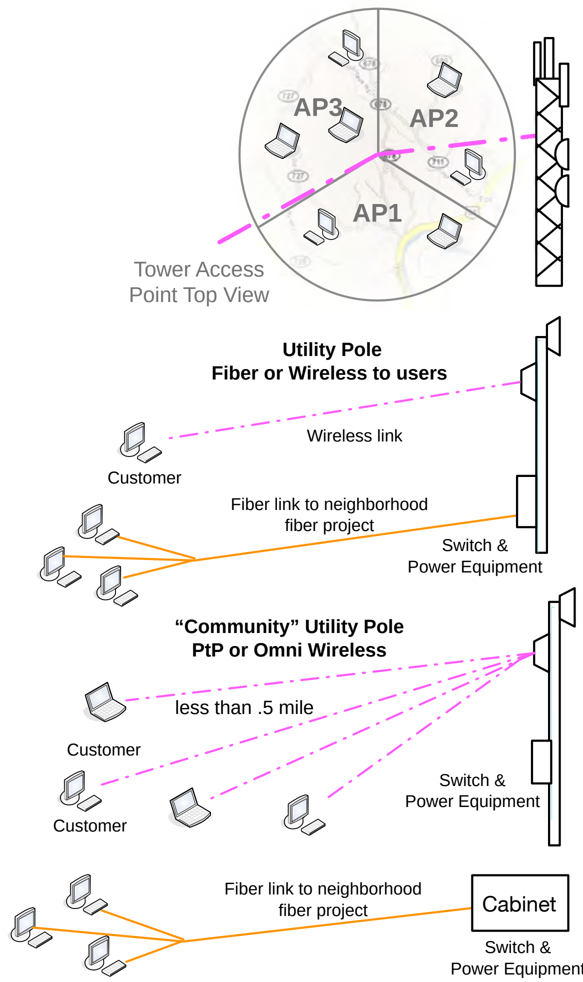
Distribution Type	Access Type	Capacity
Wireless	Wireless	Typical customer connection starting at 5 to 10 Megabits, can be higher, with 50 Meg connections common. More dependent on the capacity of the wireless Distribution link.
Wireless	Fiber	Users can have fiber Gigabit connections locally, but total throughput dependent upon the capacity of the wireless link, which can be up to a Gigabit, depending on distance and budget.
Fiber	Fiber	Any amount of bandwidth needed, with standard connection typically a Gigabit (1,000 Megabits).
Fiber	Wireless	Typical customer connection starting at 5 to 10 Megabits, can be higher, with 50 Meg connections common.



Last Mile Access

The Last Mile Access is the portion of the network that connects customers to their service provider and the Internet. Both broadband wireless and fiber links can be utilized to provide service.

There are several ways that customers can receive service:



- Service providers can install their own local access radios on the Distribution towers, using both point to multi-point and point-to-point radios to deliver service to their customers.
- A single user utility pole (or inexpensive steel lattice tower) can be installed on the property of a single resident or business. A radio at the top of the pole receives service from another tower site (typically one of the Distribution towers).
- A utility pole (or inexpensive steel lattice tower) can be installed near a cluster of homes (e.g. a rural residential sub-division, several homes in close proximity on a rural road). Service providers can install their point to multi-point radios on this pole and provide economical service to several customers from a single pole.
- A utility pole (or inexpensive steel lattice tower) can be installed in a rural subdivision. A service provider installs a point to point radio on the pole, and fiber cable can be run from the pole past several homes to offer fiber service with wireless backhaul.
- Customers near existing fiber can have a fiber drop installed directly to their home or business.

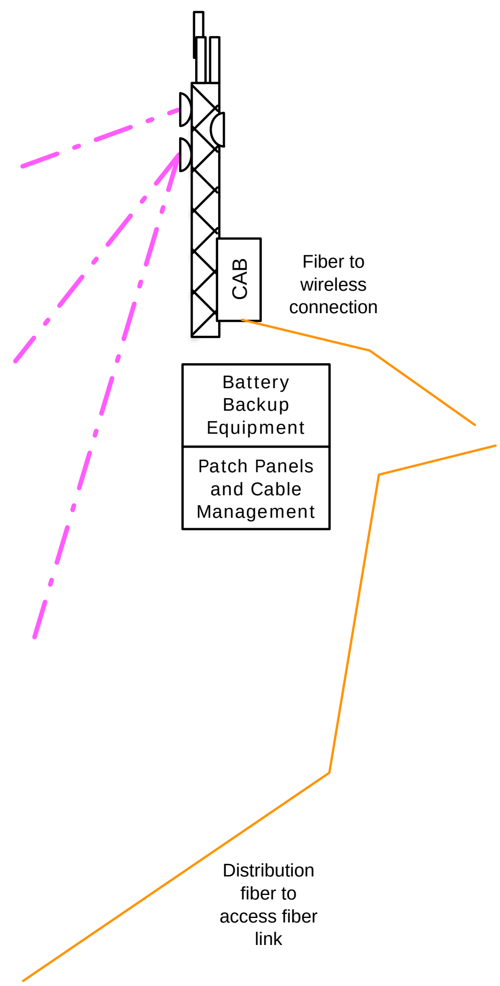
For the fiber to the home project on the Pamunkey Reservation, fiber will be deployed to the premises in the cluster of homes and community buildings in the area around the Pamunkey Indian Museum (about 40 homes and community buildings). A wireless tower will provide high performance Internet backhaul connectivity to the local fiber.

Distribution Network

Distribution is the portion of the network between the Distribution sites to the Last Mile Access portion of the network. It is desirable for each distribution site to have a connection back to more than one Distribution site (tower) on a redundant ring. This ring topology protects against hardware failure at the port level and does provide some protection if one of the tower to tower wireless links is disabled by an equipment failure.

These tower sites are typically 120' to 180' tall to provide the height needed to enable Line Of Sight (LOS) between towers, and for local access, to enable service providers to mount point to multi-point radios on the towers. That is, the towers provide two functions:

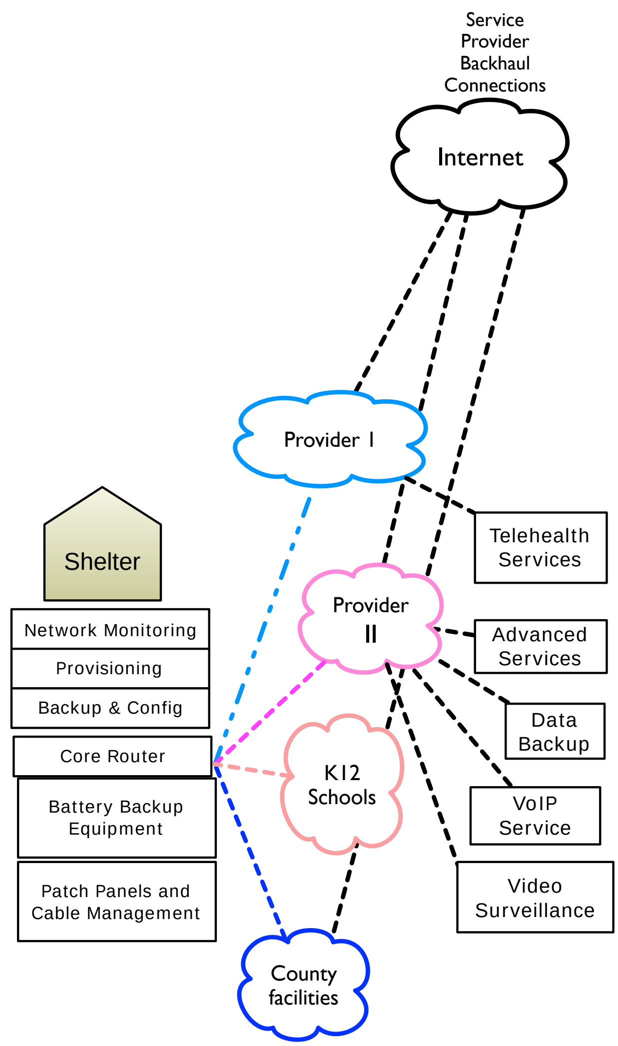
- Space for backhaul connections to other towers in the region.
- Space for local access radios to provide Internet access within 2-3 miles of the tower (or farther with good Line Of Sight).
- The existing King andQueen network provides good coverage in many parts of that county, and this model will be expanded to provide service in the other Middle Peninsula counties.
- The Technology Corridor between Rappahannock Community College, the Telework Center, and the Middle Peninsula airport will provide the first phase of middle mile (distribution) fiber. Additional fiber segments can be added as needed.



Core Network and Service Providers

In the past, the telephone company switch office (Central Office, or CO) has provided that function. Today, many communities have either a community-owned data center or a privately owned data center that offers an affordable range of options for customers of broadband services.

The Co-Location facility provides a meet point for various public and private fiber cables and networks to inter-connect. In the Middle Peninsula, the planned Telework Center, on the Route 33 first phase fiber segment, would be an ideal location for a colocation facility and service provider meet point.



A colocation facility is a controlled environment (i.e. secure, heated, and air-conditioned) room with Internet access through wired and/or wireless systems. The colocation facility is a place where fiber, wireless, and copper-based network facilities meet. It is equipped to house high-end network equipment, servers, and other electronic gear. A variety of middle layer network components and services can be located within the co-lo including, for example, directory services, replicated content servers, routing services, and other elements needed to deliver new multimedia services to the home and small office from multiple, competing providers.

Characteristics of the colocation facility are:

- A reliable source of AC electric power is required, with backup UPS (Uninterruptible Power Supply) service, and additional power backup available by an onsite generator.
- Controlled access to the facility (e.g. by electronic keycard) 24 hours/day, seven days a week.
- Racks for locating network equipment and servers, and optionally locked cages for equipment racks.
- Sufficient cooling capacity for the network's current and long-term needs.

Network Design and Cost Estimates

About the Cost Estimate Summaries

The estimate tables in this section shows the estimated costs for the tower improvements and new towers. Additional cost estimate information will be included in the next draft of this report.

Tower Construction

The line items for each named tower include the cost of the tower, site preparation, estimated cost of electric service, generator cost and placement, cost of the tower, and labor to assemble and erect the tower, and backbone equipment.

Fiber Construction

Line items contained in the fiber construction estimate include the labor needed to install underground conduit, place the fiber in the conduit, place handholes and splice closures, and the equipment needed to provision the lit network.

Project Management

Project Management, Network Integration, Configuration, and Testing for a telecom build requires thorough and detailed planning, experience in procuring construction materials for a telecom project, and the ability to oversee and convey project information to contractors through the duration of the project, including construction inspection work (ensuring construction contractors have done their job properly).

Some configuring and testing will take place after the network is built and before it is ready for use. This fee includes all of the project management, contractor supervision, procurement activities, and many other activities related to getting the network/towers built.

Engineering, Construction Inspection, and Permitting

This work include a full design of the outside plant network (towers), cabinet specifications, and extensive detail (CAD drawings where needed) that specifies how the wireless towers and network equipment (if any) is to be installed. These documents have to be completed prior to bidding out any construction work, and are usually included as part of a construction bid package. The detail site plan engineering if required, and any other engineering, inspection work, and permitting necessary to complete construction.

Some costs will be incurred based on the permitting requirements of the project. If shelters/cabinets are able to be placed on some properties at no charge, the cost of leases will be lower. If cabinets or shelters have to be placed on private property, the cost of the land or long term leases will increase. Some property owners prefer to receive ten or twenty years of lease payments up front, which can make this cost unpredictable. The cost of permits needed for crossing wetlands, streams, other sensitive areas, and State, County, or City permits are also included in this category.

Miscellaneous Fees and Technical Services

Many projects routinely incur a variety of mostly small amounts for fees and services. Typical items might include railroad crossing fees, lease and title fees, notary fees, legal fees for lease agreements or other legal matters, fees for archeological studies, etc.

Bookkeeping and Administration

Network projects create substantial amounts of paperwork, invoices, and related bookkeeping requirements. This amount may vary based on whether or not the Project has the work done by an outside firm or by Project staff. Projects funded by federal or state grants often have additional reporting requirements that increase the requirements placed on staff and grant administrators.

Contingency

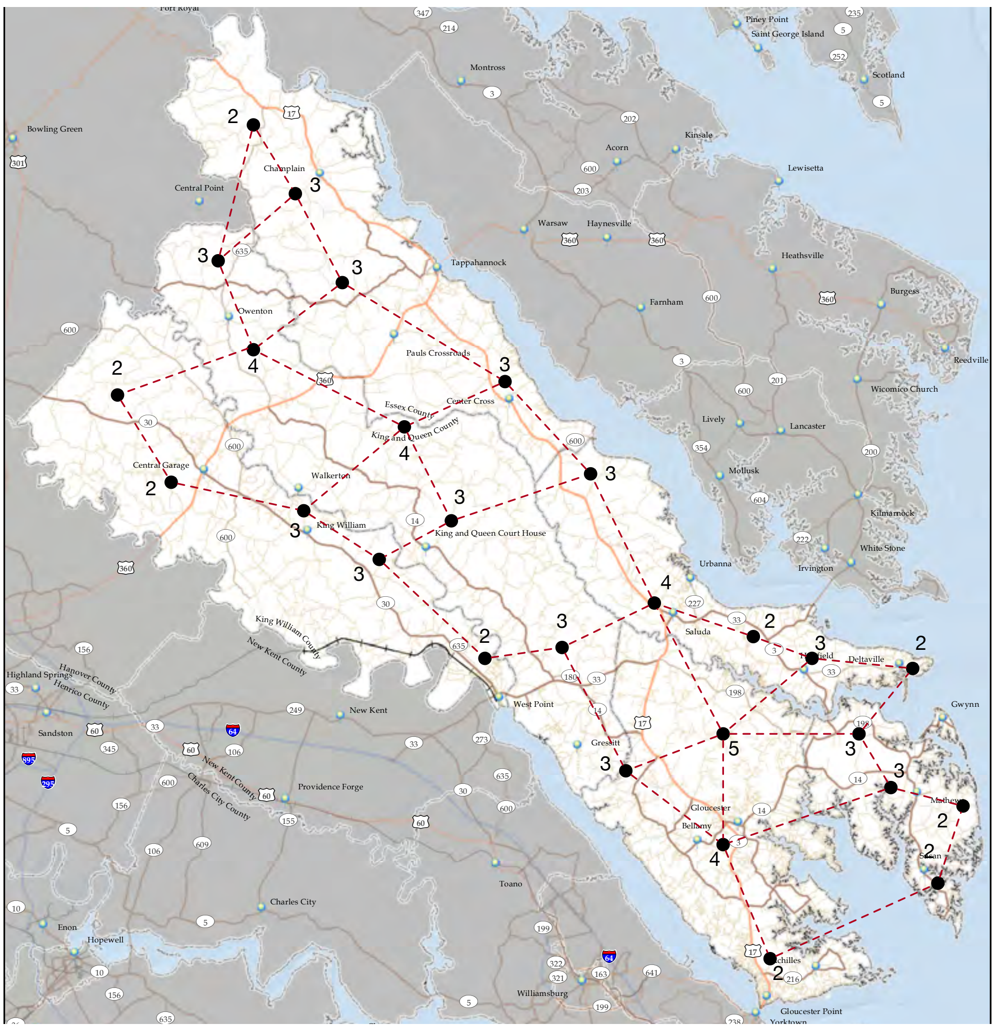
We recommend that a small contingency fund be allocated for unanticipated expenses which could include higher than expected construction costs or retail costs, higher site leases than expected, archeological discovery and research, right of way acquisition, and other unplanned costs.

Wireless Network Design

A conceptual network design for a regional broadband network is illustrated below, using a wireless architecture similar to that currently employed in King and Queen County. The design includes:

Full redundancy — Each of the 27 (estimated) sites is connected to 2, 3, 4, or 5 other sites. Failure of any single link will not interrupt customer service. Two thirds of the sites have links to three other sites, meaning they can tolerate two point to point link failures and continue to function.

Licensed frequencies — The point to point links will use licensed radio frequencies to minimize interference problems and to improve performance.



Excellent coverage — The estimated number of sites is based on the propagation studies in the previous section that indicates 90% or better coverage is available. Individual customers may still have line of site issues, which can generally be addressed with a local utility power or inexpensive steel tower.

Segmentation — The multiple point to point links, coupled with careful traffic routing, will enable the network to provide good bandwidth based on local customer traffic demands. Internet feeds can be accommodated in several locations throughout the network.

Wireless Tower Cost Estimates

This section of the report provides an estimate of the cost of constructing new towers where they may be needed.

Any placement of new towers should be preceded by a careful viewshed analysis (how much area/users are likely to be able to receive service). Site acquisition and site preparation costs can affect the overall cost of such a project. Existing county properties (e.g. fire/rescue stations, county parks, dump transfer sites, etc.) may be candidates for towers.

Tower- Space Only Cost Estimate

For towers currently owned by the localities (e.g. public safety towers) that might be candidates for Project use, modest upgrades to equipment at the base of the tower would make them "broadband-ready." Upgrades to existing towers typically may include adding or upgrading generators, additional cabinet or shelter space for service provider equipment, and sometime fencing and physical access changes.

1	ITEM/PROJECT	UNITS	Estimated Cost (Conservative)	BEST ESTIMATE (WEIGHTED AVERAGE)
2	Small Telecom Cabinet	1	$6,000	$6,000
3	10kW Liquid Propane Generator	1	$6,000	$6,000
4	Cabinet Foundation and Installation	1	$800	$800
5	Spare Fuses	1	$20	$20
6	Power System Installation Materials	1	$40	$40
7	Samlex 1000W Inverter	1	$450	$450
8	Samlex SEC1230-UL Battery Charger	1	$300	$300
9	100ah 12v Non Spillable Backup Battery	1	$350	$350
10	DC Voltage Monitoring Device	1	$60	$60
11	Unmanaged Rack Mount PDU (6O)	1	$45	$45
12	Cabinet Installation Labor	1	$1,000	$1,000
13	Power System Installation Labor	1	$500	$500
14	Generator Installation Labor	1	$1,700	$1,700
15	Ubiquiti Access Point + 120° Sector	3	$375	$1,880
16	Project Management		18%	$3,446
17	Estimated Construction Cost			$22,591

New Tower Only Cost Estimate

New towers have a range of configurations and cost options. This estimate is for a new 180' tower with no radio equipment (that is, the cost of the bare tower). If located on existing county properties, the time needed to plan for construction can be shortened. If site acquisition or a site lease (of private property) is required, purchase or lease negotiations can add several months to the process. Note that some counties may require a full permitting process even if a new tower is placed on existing county-owned property. The permit process can add sixty to one hundred and twenty days to the time needed to put a new tower in service

1	ITEM/PROJECT	UNITS	COST(HIGH)	BEST ESTIMATE (WEIGHTED AVERAGE)
2	Small Telecom Cabinet	1	$3,000.00	$3,000
3	10kW Liquid Propane Generator	1	$6,000.00	$6,000
4	Cabinet Foundation and Installation	1	$800.00	$800
5	New Power Service / Installation	1	$1,250.00	$1,250
6	180' Self Supporting Tower Construction Materials	1	$22,000.00	$22,000
7	Spare Fuses	1	$20.00	$20
8	Power System Installation Materials	1	$40.00	$40
9	Samlex 1000W Inverter	1	$450.00	$450
10	Samlex SEC1230-UL Battery Charger	1	$300.00	$300
11	100ah 12v Non Spillable Backup Battery	1	$350.00	$350
12	DC Voltage Monitoring Device	1	$60.00	$60
13	Unmanaged Rack Mount PDU (6O)	1	$45.00	$45
14	Tower Site Land Clearing and Site Development	1	$12,500.00	$12,500
15	180' guyed Tower Construction Labor	1	$26,000.00	$26,000
16	Cabinet Installation Labor	1	$1,000.00	$1,000
17	Power System Installation Labor	1	$500.00	$500
18	Generator Installation Labor	1	$1,700.00	$1,700
19	FCC License Coordination	1	$1,500.00	$1,500
20	Construction Total:			$77,515
21	Project Management, Network Engineering, Testing			$23,260
22	Site Engineering, Surveying, viewshed analysis Etc.			$9,500
23	Misc Fees, Technical Services			$7,500
24	Bookkeeping and Administration			$5,000
25	Contingency			$12,280
26	TOTAL:			$135,055

180' Tower Cost Estimate with Two Backhaul Links

This cost estimate includes the cost of both point to point backhaul radios to connect the tower to two other towers in the network and the cost of the local access radios that would deliver service to nearby businesses and residents. This is for a self-supporting tower, and a similar guyed tower would be somewhat less expensive.

1	ITEM/PROJECT	UNITS	COST (LOW)	COST (HIGH)	TOTAL (LOW)	TOTAL (HIGH)	BEST ESTIMATE (WEIGHTED AVERAGE)
2	Small Telecom Cabinet	1	$4,000	$6,000	$4,000	$6,000	$4,600
3	10kW Liquid Propane Generator	1	$4,000	$6,000	$4,000	$6,000	$4,600
4	Cabinet Foundation and Installation	1	$1,000	$1,500	$1,000	$1,500	$1,150
5	New Power Service / Installation	1	$1,250	$3,000	$1,250	$3,000	$1,775
6	Tower Construction Materials	1	$25,000	$35,000	$25,000	$35,000	$28,000
7	Spare Fuses	1	$10	$20	$10	$20	$13
8	Power System Installation Materials	1	$20	$40	$20	$40	$26
9	Samlex 1000W Inverter	1	$350	$450	$350	$450	$380
10	Samlex SEC1230-UL Battery Charger	1	$200	$300	$200	$300	$230
11	100ah 12v Non Spillable Backup Battery	1	$250	$350	$250	$350	$280
12	DC Voltage Monitoring Device	1	$40	$60	$40	$60	$46
13	Unmanaged Rack Mount PDU (6O)	1	$35	$45	$35	$45	$38
14	Tower Site Land Clearing and Site Development	1	$7,500	$12,500	$7,500	$12,500	$9,000
15	Tower Construction Labor	1	$25,000	$32,000	$25,000	$32,000	$27,100
16	Cabinet Installation Labor	1	$600	$1,000	$600	$1,000	$720
17	Power System Installation Labor	1	$300	$500	$300	$500	$360
18	Generator Installation Labor	1	$1,250	$1,700	$1,250	$1,700	$1,385
19	FCC License Coordination	2	$750	$1,500	$1,500	$3,000	$1,950
20	Dragonwave Horizon Quantum 11GHz Link (includes below)	2	$19,500	$22,500	$39,000	$45,000	$40,800
21	Horizon Quantum Radio		$0	$0	$0	$0	$0
22	Dragonwave 4' to 6' dish		$0	$0	$0	$0	$0
23	Coaxial Cabling		$0	$0	$0	$0	$0
24	Dragonwave Power Supply		$0	$0	$0	$0	$0
25	DPRM - Dual Pol Radio Mount		$0	$0	$0	$0	$0
26	Tower Site Switch	1	$1,700	$2,300	$1,700	$2,300	$1,880
27	Ubiquiti Access Point + 120° Sector	3	$375	$500	$1,125	$1,500	$1,313
28	Construction Total:				$113,005	$150,765	$124,333
29	Project Management, Network Engineering, Testing						$31,090
30	Site Engineering, Surveying, Etc.						$7,500
31	Misc Fees, Technical Services						$10,000
32	Contingency						$17,300
33	TOTAL:						$190,223

180' Tower Cost Estimate with Three Backhaul Links

This cost estimate includes the cost of both point to point backhaul radios to connect the tower to three other towers in the network and the cost of the local access radios that would deliver service to nearby businesses and residents. This is for a self-supporting tower, and a similar guyed tower would be somewhat less expensive.

1	ITEM/PROJECT	UNITS	COST (LOW)	COST (HIGH)	TOTAL (LOW)	TOTAL (HIGH)	BEST ESTIMATE (WEIGHTED AVERAGE)
2	Small Telecom Cabinet	1	$4,000	$6,000	$4,000	$6,000	$4,600
3	10kW Liquid Propane Generator	1	$4,000	$6,000	$4,000	$6,000	$4,600
4	Cabinet Foundation and Installation	1	$1,000	$1,500	$1,000	$1,500	$1,150
5	New Power Service / Installation	1	$1,250	$3,000	$1,250	$3,000	$1,775
6	Tower Construction Materials	1	$25,000	$35,000	$25,000	$35,000	$28,000
7	Spare Fuses	1	$10	$20	$10	$20	$13
8	Power System Installation Materials	1	$20	$40	$20	$40	$26
9	Samlex 1000W Inverter	1	$350	$450	$350	$450	$380
10	Samlex SEC1230-UL Battery Charger	1	$200	$300	$200	$300	$230
11	100ah 12v Non Spillable Backup Battery	1	$250	$350	$250	$350	$280
12	DC Voltage Monitoring Device	1	$40	$60	$40	$60	$46
13	Unmanaged Rack Mount PDU (6O)	1	$35	$45	$35	$45	$38
14	Tower Site Land Clearing and Site Development	1	$7,500	$12,500	$7,500	$12,500	$9,000
15	Tower Construction Labor	1	$25,000	$32,000	$25,000	$32,000	$27,100
16	Cabinet Installation Labor	1	$600	$1,000	$600	$1,000	$720
17	Power System Installation Labor	1	$300	$500	$300	$500	$360
18	Generator Installation Labor	1	$1,250	$1,700	$1,250	$1,700	$1,385
19	FCC License Coordination	3	$750	$1,500	$2,250	$4,500	$2,925
20	Dragonwave Horizon Quantum 11GHz Link (includes below)	3	$19,500	$22,500	$58,500	$67,500	$61,200
21	Horizon Quantum Radio		$0	$0	$0	$0	$0
22	Dragonwave 4' to 6' dish		$0	$0	$0	$0	$0
23	Coaxial Cabling		$0	$0	$0	$0	$0
24	Dragonwave Power Supply		$0	$0	$0	$0	$0
25	DPRM - Dual Pol Radio Mount		$0	$0	$0	$0	$0
26	Tower Site Switch	1	$1,700	$2,300	$1,700	$2,300	$1,880
27	Ubiquiti Access Point + 120° Sector	3	$375	$500	$1,125	$1,500	$1,313
28	Construction Total:				$133,255	$174,765	$145,708
29	Project Management, Network Engineering, Testing						$36,430
30	Site Engineering, Surveying, Etc.						$7,500
31	Misc Fees, Technical Services						$10,000
32	Contingency						$19,970
33	TOTAL:						$219,608

180' Tower Cost Estimate with Four Backhaul Links

This cost estimate includes the cost of both point to point backhaul radios to connect the tower to four other towers in the network and the cost of the local access radios that would deliver service to nearby businesses and residents. This is for a self-supporting tower, and a similar guyed tower would be somewhat less expensive.

1	ITEM/PROJECT	UNITS	COST (LOW)	COST (HIGH)	TOTAL (LOW)	TOTAL (HIGH)	BEST ESTIMATE (WEIGHTED AVERAGE)
2	Small Telecom Cabinet	1	$4,000	$6,000	$4,000	$6,000	$4,600
3	10kW Liquid Propane Generator	1	$4,000	$6,000	$4,000	$6,000	$4,600
4	Cabinet Foundation and Installation	1	$1,000	$1,500	$1,000	$1,500	$1,150
5	New Power Service / Installation	1	$1,250	$3,000	$1,250	$3,000	$1,775
6	Tower Construction Materials	1	$25,000	$35,000	$25,000	$35,000	$28,000
7	Spare Fuses	1	$10	$20	$10	$20	$13
8	Power System Installation Materials	1	$20	$40	$20	$40	$26
9	Samlex 1000W Inverter	1	$350	$450	$350	$450	$380
10	Samlex SEC1230-UL Battery Charger	1	$200	$300	$200	$300	$230
11	100ah 12v Non Spillable Backup Battery	1	$250	$350	$250	$350	$280
12	DC Voltage Monitoring Device	1	$40	$60	$40	$60	$46
13	Unmanaged Rack Mount PDU (6O)	1	$35	$45	$35	$45	$38
14	Tower Site Land Clearing and Site Development	1	$7,500	$12,500	$7,500	$12,500	$9,000
15	Tower Construction Labor	1	$25,000	$32,000	$25,000	$32,000	$27,100
16	Cabinet Installation Labor	1	$600	$1,000	$600	$1,000	$720
17	Power System Installation Labor	1	$300	$500	$300	$500	$360
18	Generator Installation Labor	1	$1,250	$1,700	$1,250	$1,700	$1,385
19	FCC License Coordination	4	$750	$1,500	$3,000	$6,000	$3,900
20	Dragonwave Horizon Quantum 11GHz Link (includes below)	4	$19,500	$22,500	$78,000	$90,000	$81,600
21	Horizon Quantum Radio		$0	$0	$0	$0	$0
22	Dragonwave 4' to 6' dish		$0	$0	$0	$0	$0
23	Coaxial Cabling		$0	$0	$0	$0	$0
24	Dragonwave Power Supply		$0	$0	$0	$0	$0
25	DPRM - Dual Pol Radio Mount		$0	$0	$0	$0	$0
26	Tower Site Switch	1	$1,700	$2,300	$1,700	$2,300	$1,880
27	Ubiquiti Access Point + 120° Sector	3	$375	$500	$1,125	$1,500	$1,313
28	Construction Total:				$153,505	$198,765	$167,083
29	Project Management, Network Engineering, Testing						$41,780
30	Site Engineering, Surveying, Etc.						$7,500
31	Misc Fees, Technical Services						$10,000
32	Contingency						$22,640
33	TOTAL:						$249,003

180' Tower Cost Estimate with Five Backhaul Links

This cost estimate includes the cost of both point to point backhaul radios to connect the tower to five other towers in the network and the cost of the local access radios that would deliver service to nearby businesses and residents. This is for a self-supporting tower, and a similar guyed tower would be somewhat less expensive.

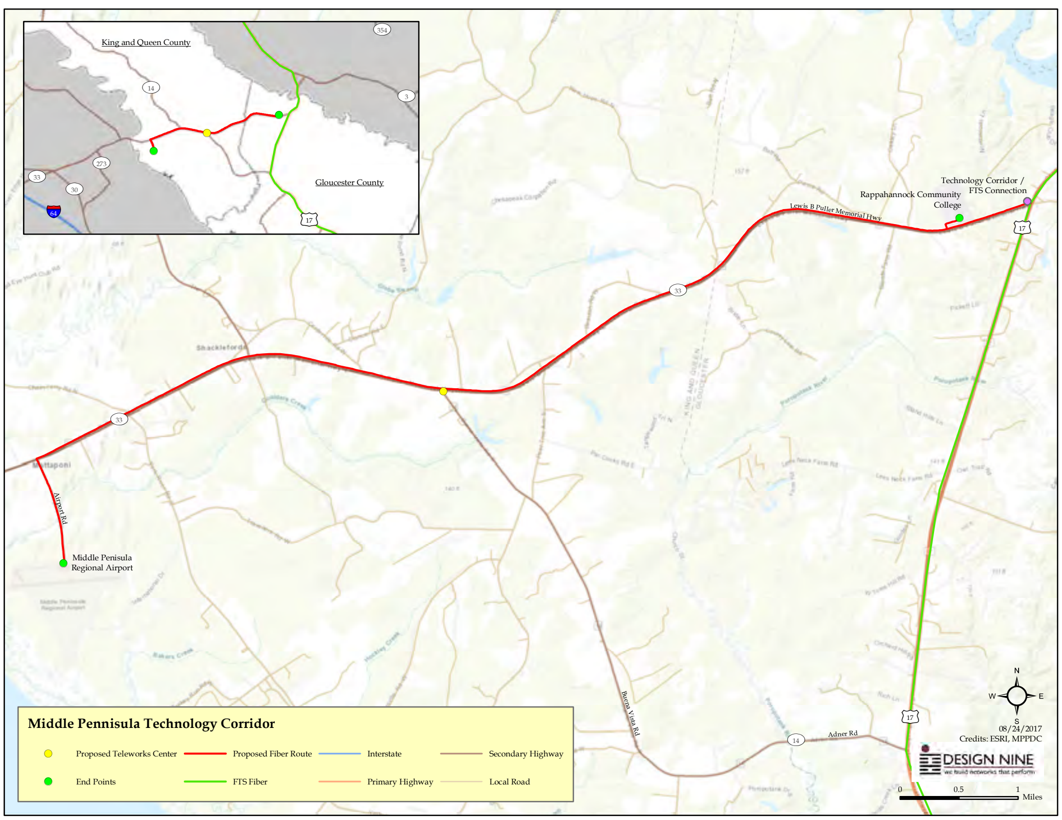
1	ITEM/PROJECT	UNITS	COST (LOW)	COST (HIGH)	TOTAL (LOW)	TOTAL (HIGH)	BEST ESTIMATE (WEIGHTED AVERAGE)
2	Small Telecom Cabinet	1	$4,000	$6,000	$4,000	$6,000	$4,600
3	10kW Liquid Propane Generator	1	$4,000	$6,000	$4,000	$6,000	$4,600
4	Cabinet Foundation and Installation	1	$1,000	$1,500	$1,000	$1,500	$1,150
5	New Power Service / Installation	1	$1,250	$3,000	$1,250	$3,000	$1,775
6	Tower Construction Materials	1	$25,000	$35,000	$25,000	$35,000	$28,000
7	Spare Fuses	1	$10	$20	$10	$20	$13
8	Power System Installation Materials	1	$20	$40	$20	$40	$26
9	Samlex 1000W Inverter	1	$350	$450	$350	$450	$380
10	Samlex SEC1230-UL Battery Charger	1	$200	$300	$200	$300	$230
11	100ah 12v Non Spillable Backup Battery	1	$250	$350	$250	$350	$280
12	DC Voltage Monitoring Device	1	$40	$60	$40	$60	$46
13	Unmanaged Rack Mount PDU (6O)	1	$35	$45	$35	$45	$38
14	Tower Site Land Clearing and Site Development	1	$7,500	$12,500	$7,500	$12,500	$9,000
15	Tower Construction Labor	1	$25,000	$32,000	$25,000	$32,000	$27,100
16	Cabinet Installation Labor	1	$600	$1,000	$600	$1,000	$720
17	Power System Installation Labor	1	$300	$500	$300	$500	$360
18	Generator Installation Labor	1	$1,250	$1,700	$1,250	$1,700	$1,385
19	FCC License Coordination	5	$750	$1,500	$3,750	$7,500	$4,875
20	Dragonwave Horizon Quantum 11GHz Link (includes below)	5	$19,500	$22,500	$97,500	$112,500	$102,000
21	Horizon Quantum Radio		$0	$0	$0	$0	$0
22	Dragonwave 4' to 6' dish		$0	$0	$0	$0	$0
23	Coaxial Cabling		$0	$0	$0	$0	$0
24	Dragonwave Power Supply		$0	$0	$0	$0	$0
25	DPRM - Dual Pol Radio Mount		$0	$0	$0	$0	$0
26	Tower Site Switch	1	$1,700	$2,300	$1,700	$2,300	$1,880
27	Ubiquiti Access Point + 120° Sector	3	$375	$500	$1,125	$1,500	$1,313
28	Construction Total:				$173,755	$222,765	$188,458
29	Project Management, Network Engineering, Testing						$47,120
30	Site Engineering, Surveying, Etc.						$7,500
31	Misc Fees, Technical Services						$10,000
32	Contingency						$25,310
33	TOTAL:						$278,388

Fiber Technology Corridor estimate

The Middle Peninsula Technology Corridor fiber would be anchored by the Telework Center, Rappahannock Community College (RCC), and the Middle Peninsula airport. The PamunkeyNet colocation facility would be located in secure space in the Telework Center, and would serve as a meet-me point for service providers, and would have additional rack space available for lease by public and private interested parties who need secure off-site space for servers, data backup, and other uses.

The fiber will continue past RCC to meet FTS fiber on route 17. Meeting FTS would give PamunkeyNet a reliable and redundant fiber connection to Norfolk and D.C.—where inexpensive sources of Internet backhaul will be available—FTS has a fully redundant fiber ring around the Bay. The fiber-enabled Technology Corridor will give the Middle Peninsula essential economic development tools:

- A local fiber backbone that provides ten miles of Gigabit service availability that can be used to attract high technology companies to the region.
- A high performance connection out of the region with a fully redundant backhaul connection that will be of great interest to relocating companies.



The cost tables below provide a pre-engineering estimate of the cost of construction 10.4 miles of underground fiber construction along Route 33. Handholes would be placed every four hundred feet for convenient customer fiber access (shorter fiber drops at less cost). Both business and residential Gigabit fiber connections would be available to any location along the entire route. The standard customer connection for both business and residential customers would be a Gigabit of bandwidth, and both GPON and Active Ethernet services can be offered. Active Ethernet is particularly important so that business class/carrier class services can be offered on the network.

The network can be extended easily in either direction (east or west) with additional fiber segments, and any additional fiber switch capacity required would be placed in the Telework Center colo facility. The network will support 10Gig, 100Gig, and light path services as requested by larger and enterprise business customers.

With the connection to the FTS fiber on Route 17, the Technology Corridor will be able to offer businesses whatever amount of bandwidth they need to compete globally at affordable prices, giving the Middle Peninsula the network needed for economic growth and jobs attraction.

Middle Peninsula Technology Corridor - Route Overview

0	ITEM/PROJECT	VALUE
1	Miles of Fiber / Conduit Installed	10.4
2	Number of Handholes Installed	92
3	Splice Closures Installed	31
4	Cabinets Installed	0
5	Number of Customers Connected	48

Middle Peninsula Technology Corridor - Cost Summary

0	ITEM/PROJECT	ESTIMATED
1	Middle Peninsula Technology Corridor - Construction Materials	$188,378.00
2	Middle Peninsula Technology Corridor - Distribution Labor	$617,110.00
3	Middle Peninsula Technology Corridor - Drop Construction	$100,920.00
4	Network Construction Subtotal	$906,408.00
5	Project Management, Network Engineering, Integration, and Testing	$147,651.60
6	Engineering, Permitting (15% of construction costs)	$57,200.00
7	Misc Fees, Advertising, Technical Services	$10,000.00
8	Bookkeeping and Administration	$2,500.00
9	Other Costs Subtotal	$217,351.60
10	Project Total	$1,123,759.60
11	Contingency at 10%	$112,375.96
12	Gigabit fiber backbone Total (with contingency)	$1,236,135.56

Colocation Facility Cost Estimate

If space is allocated at the Telework Center, it would be an ideal location for a colocation facility and meet-me point. Two hundred fifty to five hundred square feet would be entirely adequate. The room would require 24/7 controlled access from an exterior door, dedicated HVAC (primarily enhanced cooling), some battery back up UPS (Uninterruptible Power System), and outdoor space adjacent to the room for a small generator to provide power during an extended power outage.

The space could be 250 to 500 square feet, and would be initially provisioned with six enclosed racks. PamunkeyNet equipment would use less than one rack, leaving five additional racks of leasable space. The facility costs also include the network equipment required to support up to 48 fiber customers with Gigabit service. There would be ample space to increase capacity with additional fiber switches, and 1000 or more fiber customers could be easily served out of the facility.

The facility would also be used to house servers and other equipment needed to support the wireless network. Dedicated redundant Juniper core routers would provide routing and access to service providers selling Internet and other services on the network.

1	ITEM	UNITS	BEST ESTIMATE (WEIGHTED AVERAGE)
2	Network Room fit up in Telework Center	1	$22,500.00
3	Network Room Lighting / Electrical Fit-up	1	$14,500.00
4	Dedicated Network Room Cooling - Split Mini Unit 24k BTUs	2	$6,000.00
5	Enclosed Rack	6	$5,250.00
6	Patch Panel (144 port)	2	$7,500.00
7	New Power Service / Installation	1	$4,000.00
8	Unmanaged Rack Mount PDU (6O)	12	$1,200.00
9	Patch Cables (POP)	48	$936.00
10	Calix 48V DC System Retrofit Kit	1	$1,700.00
11	Calix E7-2 Chassis	2	$1,650.00
12	Calix E7-2 GE-24 Card	4	$17,500.00
13	Calix Advantage System Support and Maintenance (1 year)	1	$3,000.00
14	CMS Server	1	$3,750.00
15	Dell Server	1	$3,000.00
16	Juniper core router for service provider network access	2	$25,000.00
17	Rack Mount UPS (AC)	2	$1,450.00
18			$118,936.00

Gigabit Fiber on the Pamunkey Reservation

For the fiber to the home project on the Pamunkey Reservation, fiber will be deployed to the premises in the cluster of homes and community buildings in the area around the Pamunkey Indian Museum (about 40 homes and community buildings). A wireless tower will provide high performance Internet backhaul connectivity to the local fiber.

The map below shows the area where approximately 6.5 miles of fiber will be installed underground, connecting 34+ homes and several community buildings, including the Museum. The Gigabit fiber infrastructure will provide the tribe with a state of the art network and a long term asset that will support telemedicine and telehealth services, distance learning and access to college classes, jobs from home, and businesses from home.

The table on the next page provides a breakdown of costs. For the wireless backhaul, one of the towers in the previous cost estimate will be installed at an appropriate location and be connected to the local fiber.

Pamunkey Reservation FTTH Cost Summary

0	ITEM/PROJECT	ESTIMATED
1	Pamunkey Reservation FTTH Construction Materials	$57,246.16
2	Pamunkey Reservation FTTH Distribution Labor	$254,528.00
3	Pamunkey Reservation FTTH Structures, Cabinets, and Equipment	$38,311.00
4	Pamunkey Reservation FTTH Drop Construction	$46,800.00
5	Network Construction Subtotal	$396,885.16
6	Project Management, Network Engineering, Integration, and Testing	$59,532.77
7	Engineering, Permitting	$35,750.00
8	Misc Fees, Advertising, Technical Services	$10,000.00
9	Bookkeeping and Administration	$2,500.00
10	Other Costs Subtotal	$107,782.77
11	Project Total	$504,667.93
12	Contingency at 10%	$50,466.79
13	Project Total (with contingency)	$555,134.73

SUMMARY PROJECT COST ESTIMATE

The first table below shows both a "worst case estimate" if no existing towers are available other than what is available with the existing five towers in the King and Queen network and a more likely estimate using some existing tower space (e.g. public safety towers). If approximately 30% of the 22 estimated towers are available for use at a reasonable fee (or no fee) and are in locations that provide appropriate coverage, we estimate that the total cost for tower construction and tower enhancement would be approximately $3.4 million.

Tower Type	Number of Towers	Per Tower Construction	Totals
Two backhaul links	7	$190,223	$1,331,561
Three backhaul links	10	$219,608	$2,196,080
Four backhaul links	4	$249,003	$996,012
Fiver backhaul links	1	$278,333	$278,333
Total estimate for all new towers	22		$4,801,986
Estimated total using 30% existing towers			$3,361,390
Customer radio fund for 500 new customers			$87,500
Total wireless expansion cost			$3,448,890

The table below summarizes the costs of the three portions of the network, along with a recommended operational reserve for the first two years of operations.

Region-side wireless expansion (some use of existing towers)	$3,448,890
Technology Corridor Gigabit fiber backbone	$1,236,136
Telework Center colocation facility	$118,936
Pamunkey Reservation FTTH project	$555,135
PamunkeyNet two year operational reserve	$500,000
Total	$5,859,096

NEIGHBORHOOD UTILITY POLE ACCESS COSTS

A single wooden utility pole with a wireless connection to a 180' tower and local access radios could provide access to any residence with line of sight within a half mile or more. This would spread the cost of pole construction and equipment costs across several households or businesses. There are many rural areas in the Middle Peninsula region where there is a cluster of homes along a relatively short stretch of road. All of those homes could share the use of a single local utility pole access site.

V1	VARIABLE	VALUE	NOTES
V2	Weight Variable	5	0-10 scale used in Best Estimate column (10 is best)
V3	Towers	1	Number of Towers
V4	Height	60	Tower Height
V5	Type	Wooden Utility Pole	Tower Type
V7	Backbone Radio System Licensed / Un-licensed	Un-licensed	
V8	Backbone Links	1	
	Site Development (Average)	1,000	

1	ITEM/PROJECT	UNITS	COST (LOW)	COST (HIGH)	TOTAL (LOW)	TOTAL (HIGH)	BEST ESTIMATE
2	Site Development (Clearing, Road Improvements, etc.)	1	- n/a -	- n/a -	- n/a -	- n/a -	$1,000
3	3x3 NEMA Box	1	$300.00	$600.00	$300.00	$600.00	$450
4	New Power Service / Installation	1	$500.00	$1,250.00	$500.00	$1,250.00	$875
5	60' Wooden Utility Pole Construction Materials	1	$2,500.00	$3,500.00	$2,500.00	$3,500.00	$3,000
6	Spare Fuses	1	$10.00	$20.00	$10.00	$20.00	$15
7	Power System Installation Materials	1	$20.00	$40.00	$20.00	$40.00	$30
8	Samlex 1000W Inverter	1	$350.00	$450.00	$350.00	$450.00	$400
9	Samlex SEC1230-UL Battery Charger	1	$200.00	$300.00	$200.00	$300.00	$250
10	100ah 12v Non Spillable Backup Battery	4	$250.00	$350.00	$1,000.00	$1,400.00	$1,200
11	DC Voltage Monitoring Device	1	$40.00	$60.00	$40.00	$60.00	$50
12	Unmanaged Rack Mount PDU (6O)	1	$35.00	$45.00	$35.00	$45.00	$40
13	60' Wooden Utility Pole Construction Labor & Contracting	1	$2,000.00	$3,000.00	$2,000.00	$3,000.00	$2,500
14	Power System Installation Labor	1	$300.00	$500.00	$300.00	$500.00	$400
15	Ubiquiti IsoBeam PTP System	2	$200.00	$400.00	$400.00	$800.00	$600
16	Ubiquiti Access Point + 120° Sector	3	$375.00	$500.00	$1125.00	$1500.00	$1,313
17	Total:				$8,780.00	$13,465.00	$12,122.50

Planning for Tower Development

New Tower Siting Considerations

There are many factors in choosing sites to develop for towers. The cost of site prep in an area with unfavorable conditions can quickly outweigh the cost of the actual tower.

Site work - Land acquisition and leases are not included in tower estimate. Site preparation is estimated and assumes a typical site with some small vegetation and work needed. If a site will require more extensive land clearing or road improvement work it should be estimated on a site by site basis.

Generator - a small liquid propane generator is included in the estimate for this tower. The estimate does not include a tank and tank install because in our experience this cost is typically covered by the local gas company as long as there is a service contract.

Cellular Carriers and Upgrades - Towers at this size must be specifically engineered for their location and equipment load. The pricing shown above is estimated at a size which will support one cell provider, and WISP/Public Safety equipment. Designing to accommodate multiple cellular providers should be expected to increase the cost by $7,500 to $15,000.

- Favorable site leasing or purchasing conditions such as county properties, infrastructure sites, industrial areas, or areas with other towers.
- The site must be useful to the network from the wireless engineering standpoint. Evaluate how the new site will fit into the wireless network and determine if it desirable early in the process.
- Proposed tower sites should be close to a road and accessible by truck. Improving access to a site and repairing damage caused by construction is expected, but constructing new roads on a site will increase costs dramatically.
- Proposed sites should be close to grid power. While evaluating a site locate the nearest utility poles or pedestals. If there is no transformer near the site, within 500 feet, there will likely be higher costs to bring power in.
- Mostly flat, or gently sloping sites cost less to develop than sites with steep terrain. When considering tower sites look for flat areas to place the tower and compound. It may be worth sacrificing some altitude or doing some additional clearing to avoid major ground disturbances and earth work.
- It is common to clear some trees and vegetation while developing a tower site, but excessive clearing requirements will raise costs. If sites are in a wooded area look for locations where vegetation is sparse and the tree growth is somewhat young (e.g., 8-10" in diameter). Large trees or very dense brush will be more expensive to clear.
- Look for secure sites with limited access. Sites are better off in an area that doesn't get frequent visitors.

- Look for tower sites with the potential to connect to fiber networks. Access to multiple fiber providers on a wireless network will be very important to potential tenants and the economic viability of the network.

Things to avoid

- Avoid dense residential areas and retail areas when evaluating tower sites.
- Avoid parcels with creeks or other water features that could be an impediment to construction.
- Large concrete trucks will have to access the site while constructing the towers. During site evaluation consider the entire route that trucks will have to take.
- Avoid locating tower sites near areas where permitting could be an issue. Historic Districts, airports, scenic locations, and areas with strict zoning should be avoided.

Funding Options

The relatively low cost of tower upgrades and new tower construction suggests the most expedient funding is direct financial support from the Project. If grant funds are needed (e.g. several new towers are proposed), working with public safety officials to combine public safety grant opportunities and public safety capital funds could be very beneficial.

Operation and Management Considerations

Towers are passive infrastructure, and if properly designed and constructed, require minimal maintenance. If the tower is shared with public safety users, those agencies will install their own radios, antennas, and electronics, which could relieve the Project of any responsibility for equipment management and configuration, and equipment repairs and replacement. A contract with a qualified tower maintenance and tower climbing firm will be required to do tower climbs and repairs to equipment on the tower.

Recommendation and Next Steps

An preliminary analysis of existing county towers and potential county-owned sites for new towers suggests that good coverage could be obtained with careful site analysis. If the Project moves forward, line of sight and viewshed studies are recommended for existing towers and for any possible new sites.

Next steps would include securing funding, line of sight and viewshed analysis of existing sites, identification of county-owned property for new towers, line of sight and viewshed analysis of the new sites, determination of tower type for new towers (guyed or self supporting), and discussions with service providers. final identification of sites, complete detailed network engineering including site layouts and Line of Sight engineering, and work with public safety officials.

Typical Construction Schedule

The timeline and activities describe the typical process for constructing a tower. Combining multiple sites into a single construction project will expand the timeline below but overall will save time and expense. Delays in the site identification and procurement stages of a project are the most common delays for counties and cities.

- *Month One*
    - Project kick-off
    - Site identification
    - Network design
    - Prep work and site plan development needed for permitting

- *Month Two*
    - Pre-construction site planning
    - Lease / MOU negotiation
    - Procurement
    - Submission of permit application

- *Month Three*
    - Processing of permit applications, public meetings and ballon tests as needed.
    - Permit approval
    - Submission of purchase orders for tower, radios, equipment.

- *Month Four-Five*
    - Site clearing and preparation
    - Tower materials shipping
    - Foundation construction
    - Inspection
    - Tower construction
    - Construction wrap-up

- *Month Six*
    - Equipment installation and network testing
    - Tower is put in service

Creating the Enterprise

The Middle Peninsula Broadband Network (PamunkeyNet) will be operated as an independent entity owned by the Pamunkey Tribe. This will provide the network with two important requirements:

- The enterprise will have the business and management flexibility needed to make decisions efficiently and effectively in the fast-moving broadband business environment.
- As a Pamunkey enterprise, it will be vested in the community and can be managed on behalf of the broader community and economic development goals of the community.

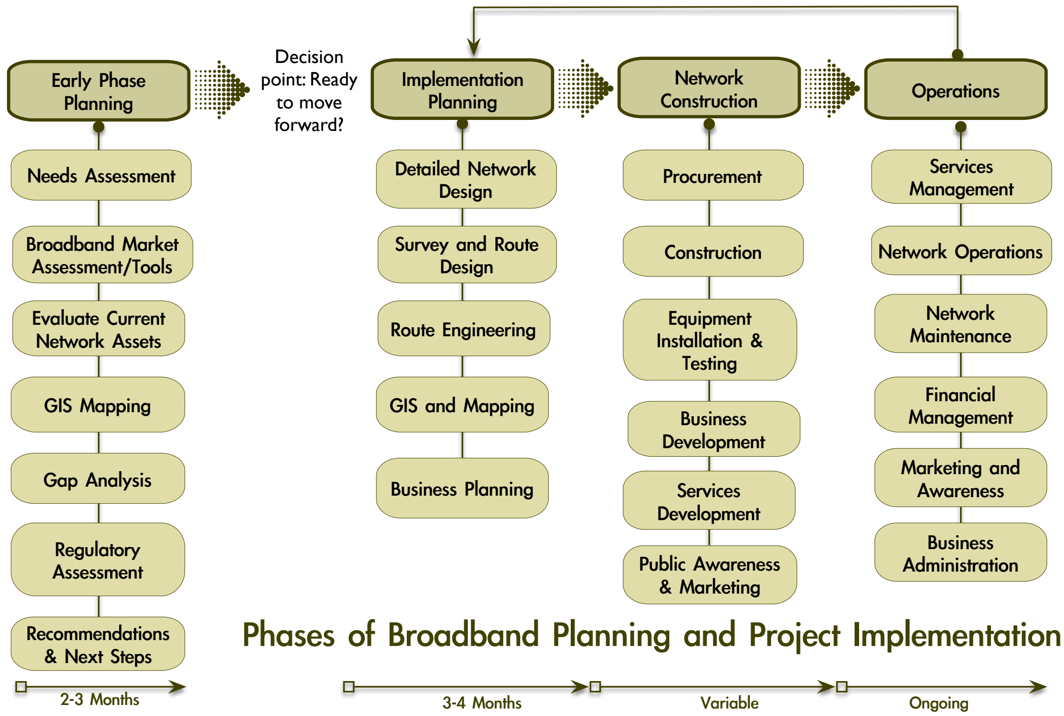
The network will be operated as a single high performance hybrid wireless and fiber optic network available to any and all service providers, including incumbent providers who want access to the significant market opportunity represented by the network. This shared business model is fundamentally different from the twentieth century copper-based networks where each provider has to build and operated a completely duplicated network (i.e. two providers each build a separate and duplicated network to reach the same customers, which results in higher costs across the board for customers).

The Project will have several essential roles:

- ***Contract and Staff Management*** - The Project will hold contracts for outsourced network operations, outsourced network repairs and maintenance, outsourced construction of network extensions, and service provider contracts for the services offered on the network. The Project will need a small number of staff, but the scope of the network should minimize staff requirements.
- ***Financial Management*** - The Project will be responsible for the financial oversight of the network. The routine bookkeeping and accounting will likely require, at most, a full time bookkeeper and a part time or full time billing clerk.
- ***Public Awareness*** - The Project will need to maintain a modest, ongoing public awareness campaign to ensure that residents and local businesses are aware of the opportunity to obtain higher performance, broadband services from the Project. The Project will need a sharp focus on name and brand awareness in the Middle Peninsula region to be successful.
- Project Development/Management - As funding sources are developed for individual network projects, the Project will provide financial and project oversight of these projects during the implementation and construction phase.

For the Project, the development of a successful Pamunkey-owned network will require attention in several areas including the technical (network equipment selection), engineering and construction, and business and financial planning. It is important to note that the business and financial planning are critical elements that will in large part determine the long term success of the effort. This section provides an overview of the key task areas and activities.

The illustration below shows the sequence of key phases and activities in the course of a network project. On the pages following this diagram is more detailed information about the individual tasks and activities that will lead to successful completion of a fully operational network, including the business processes required.



To be successful, the Project requires a plan that ensures the right resources are available at the appropriate times during the various phases of development. Some resources must be identified and procured during the planning phase, some during the implementation and construction phases, and some during the operations phase.

Financial Planning – Financial planning includes the development of short term and long term budget estimates and pro-formas. These materials form the basis of developing a funding plan, as well as providing a solid base for ongoing evaluation of the success of the enterprise.

Business Model – The business model selected determines the kind and type of revenue that will be generated by the project, and also affects the kind and type of expenses that are incurred. Following the King and Queen business model, the Project will provide retail broadband Internet service purchased on a wholesale basis from a private sector Internet provider.

Legal Counsel – Whether the retail or wholesale business model is chosen, there is a short term and long term need for legal counsel familiar with telecom and broadband business agreements and contracts. Well written contracts with construction companies, wholesale Internet providers, and other contractors protect the Project.

Engineering – For new tower sites, engineering services will be required to prepare site plans, manage the permit process paperwork, provide support where public meetings are provided prior to permit approval, and to handle other tower site work (e.g. balloon tests). Where fiber cable is being deployed, if it is hung on utility poles or placed underground in conduit, prior to construction, the routes must be surveyed and engineered drawings must be developed to meet DOT (Dept. of Transportation) requirements and to provide contractors with the information needed to construct the network to industry and state technical requirements.

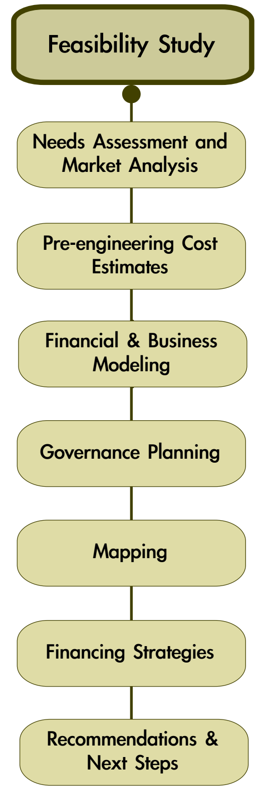
Network Design – The logical design of the network must be matched to expected public and private uses (e.g. support for shared public safety use, business uses, K12 use, residential and small business use). The network design must also meet the requirements of large and small businesses, and for large businesses with extensive broadband and data needs, the network must be capable of meeting both current needs and future growth.

Equipment – Once a network design is complete, an evaluation of equipment vendors must take place, ideally via a bidding process to ensure that the selected equipment will meet all of the business and technical requirements of the network, at the best possible price. A Total Cost of Ownership (TCO) evaluation should be completed to ensure that the right initial price is balanced with the longer term costs of extended warranties and technical support. The least expensive purchase price for equipment may be more expensive over time than equipment from a vendor with a higher initial equipment cost but lower support and warranty fees.

Build Out – While community network build outs are generally much less expensive than other typical community projects like water and sewer development, care must be taken to select contractors with the appropriate experience constructing towers or installing fiber. The cost of construction can vary widely, so the development of very specific bid documents that include the right engineering information as well as a carefully structured proposal response on pricing is needed to ensure the community obtains the right contractor at the right price.

Early Phase Planning

The work in this report represents some of the activities of the early phase planning. The early phase work should include:



Needs Assessment and Market Analysis – An evaluation of current assets and projections of future needs, based on local business and economic conditions. Design Nine is working with the PDC and the counties to map existing tower and fiber assets, incorporate the logical and physical King and Queen network into a regional design, and to perform propagation studies to identify where towers should be located to maximize Internet access regionally.

Pre-engineering Cost Estimates – Pre-engineering cost estimates of potential network projects provide a baseline for understanding the costs of getting started, provide necessary inputs to the financial pro forma development, and also inform funding strategies.

Financial and Business Modeling – A ten year financial pro forma, using inputs from the business requirements analysis and the cost estimates, provides an early test of the financial sustainability of the project and provides a long term road map for financial management.

Governance Planning – Before making a commitment to move to implementation planning, it is necessary to have a basic understanding of the key operations and management tasks related to operating the enterprise.

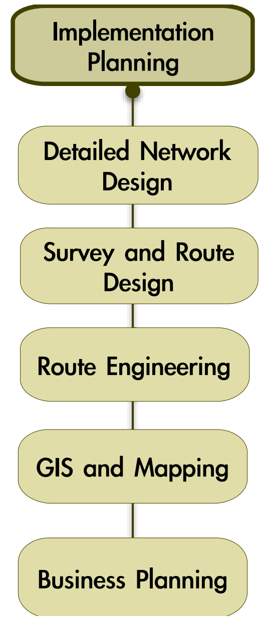
Mapping – Mapping of current assets, areas and business locations of needs, economic growth areas, and key customers and stakeholders informs the development of the network architecture and the financial pro forma.

Funding Strategies – Before moving to the next steps, it is vital to understand where the planning, engineering, and initial construction funds will come from. There are many options available.

Next Steps – A list of key activities and milestones needed to move the project ahead.

Implementation Planning Phase

This phase produces the equipment and construction specifications needed to bid out the work of constructing new network assets (e.g. towers, access radio equipment, backhaul radios and frequencies, etc.).



Business and Financial Planning – The Project Manager and Network Integrator perform detailed business and financial planning. This includes planning how the business front office and back office will be run.

Governance Model - The formal governance model is determined and legal arrangements between governing entities are negotiated and contracts signed. For PamunkeyNet, the tribe would probably form a tribe-owned LLC with a governing board and/or partners like the MPPDC.

Funding Sources - Funding sources are identified and fun raising commences. Partner agreements which may include network resources (IRUs) or dividends from network income are determined.

Business Administration Planning - Determining how the actual network business will be operated is determined at this time. Front and back office operating models are identified, outsourced business functions are identified and planned.

Tower Site and/or Route Engineering – An on the ground survey is needed to complete tower layouts and a final site/route design. This work is performed by an engineering firm that also has the responsibility to produce the engineered design and obtain required permitting. The field survey confirms that the final route can be built to the necessary standards and regulations.

Construction Methodology (Design vs. Design/Build) - One method to shorten the design and build phases of a project are to award up front a "design build" contract where the engineering firm is also responsible for construction. This approach can shorten this part of the project significantly and is often recommended for projects where time is of the essence.

Engineered Drawings and Cost Estimates – The full set of engineered drawings or site plan and tower specifications is attached to the construction bid documents and becomes the basis for the awarded construction contract.

Permitting - The engineer or design/build firm will prepare all required permit forms and submit the permits with the plans. Some permits will require that Project pay a fee to the permitting entity. It is important to start the permitting process early to avoid delays.

Network Architecture Design (Detailed) – Final analysis of vendor equipment is performed and selection is made.

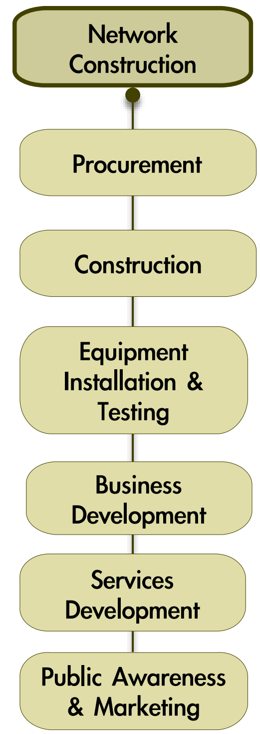
Equipment Selection -Analysis is performed to determine which equipment offers the lowest Total Cost of Ownership (typically analyzed over ten years or more).

Detailed Network Architecture - The detailed network design starts with the completed network architecture and completely specifies all of the equipment, cabinets, patch cables, power supplies, radios, batteries, and all other necessary parts and equipment needed to create a functional network. The output is a complete Bill Of Materials (BOM) used to create purchase orders for equipment, as well as specifications for the configuration of routers and switches.

Equipment and Materials Specifications – The engineering or design/build firm also completes a detailed list of all equipment required for the construction. Bill Of Materials includes all wireless equipment, fiber, conduit, handholes, fiber splice enclosures, and related hardware needed to install the fiber cable underground and/or on utility poles.

Construction Phase

The documents produced in the Implementation Phase are used to bid out the construction work and to procure the network equipment needed to produce an operational network.



Procurement – At the beginning of the construction phase the Project will bid out the project construction.

- Construction Contracts - Multiple contractors may be involved depending on how the engineering and construction documents were planned in earlier phases.
- Other Physical materials - The network integrator will also be responsible for procuring all physical assets not the responsibility of the construction contractors which may include shelters, cabinets, generators.
- Network Equipment - All network equipment such as servers, switches, and routers must be purchased and tracked.
- Operating Contracts - If outsourced business functions are to be used, the agreements have to be drafted and qualified outsourced firms need to be selected.

Construction Management – The construction work is bid out and an award is made to a qualified contractor with the best price. It is common to negotiate the final cost of this work once a firm has been selected.

- Engineering Inspection - Depending on how the construction contracts were awarded will determine if the engineering firm is responsible for inspecting the contractors work performed during construction.

Network Equipment Installation – Network equipment is ordered from a vendor that meets the technical specifications. Equipment must be tested, installed in cabinets or shelters, powered up, and connected to the fiber cable. After installation and

- Staging - The site where equipment will be installed must be designed with the correct power circuits, racks, and grounding for equipment. Cable trays and other accessories will be installed to accommodate the physical connections to equipment.
- Installation - Equipment must be configured which may involve staging in a laboratory or bench. Once on site equipment will be installed in the racks, and the physical cable connections made. Equipment will then be powered up and can be configured.
- Configuration/Integration - Prior to installation equipment can be pre-configured in a lab or staging area. After installation the initial configuration is completed or confirmed and con-

nections to other network equipment is tested. Adding one device can require modifications to the configuration throughout the network.

- Testing - When equipment is installed and configured, end to end network testing of the equipment must be completed. Testing will confirm that network elements are communicating properly. Testing is required not only when new network elements are installed, but also when new services or features are configured on the network.

Business Process Development – During the construction phase, business and operational decisions must be made to produce a set of business processes that will guide the day to day operations of the network.

- A business process will be developed for essentially all recurring activities on the network, including new customer provisioning, service provider billing, utility locating, processing invoices, and so on.
- Some functions can be outsourced to create local private sector jobs (e.g. field maintenance, utility locating).
- Internal processes overlapping with the network configuration will be created for new customers joining the network, and the definition of new services.
- Legal contracts and other related business documents must be developed as part of this process.

Services Development– Negotiations with qualified service providers continues.

- Additional development and specification of the Master Agreements and Service Level Agreements (the contracts between the network and the Service Providers) are finalized
- The network and the providers enter into contractual agreements.
- Wholesale Internet providers will work with the Network Operator to define services and configure the delivery of the service over the network.

Contracts, Agreements, and Leases – The construction phase will generate the need for a variety of legal documents. Some will be related directly to the construction (e.g. an easement agreement to have conduit cross property)

- Typical documents include the development of the Master Network Agreement that is used to sign service providers to the network. Other contracts would include the development of a draft network operations agreement if network operations is outsourced, and a similar agreement for outside plant maintenance and repairs.

Marketing and Public Awareness – As the network is constructed, a modest but ongoing public awareness and publicity effort is required to ensure that business customers, schools, local government agencies and other potential users of the network are aware of the project and the possibility of reducing costs and obtaining more and better services.

Operational Considerations

As construction is approaching completion PamunkeyNet must begin to put the human resources and business processes in place to support, monitor and maintain the network.

The goal is to create a financially sustainable tribal enterprise that over the long term creates good-paying jobs for Pamunkey tribe members. During the first two or three years, a training period will be needed to train tribe staff and to ensure that they have the business, operations, and maintenance experience to support the enterprise. During that time, one or more third party firms may be needed on a contract basis to provide some of the operations and maintenance functions of the network. Any companies contracted for support should be under contract at least two to three months before the first customer comes online.

Network Monitoring – The Project will need on or two months of testing and configuration before the first customer is brought online. This time will be spent configuring monitoring equipment, configuring alerts, setting up internal processes, and bringing NOC (Network Operations Center) staff up to speed on the new environment.

Outside Plant Maintenance – As soon as the contractor completes construction the Project will be responsible for maintaining the network. Some responsibilities such as utility locating, fiber repairs, and maintenance of generators, HVAC systems, and other assets will begin before the network is under full operations.

Internet Service – As the Project signs on wholesale Internet providers they will need time to bring their connections into the co-lo, install equipment, and configure their network for the new services. If construction is involved this process could take several months.

Going Beyond Internet Service

Even though the Network is will start with just Internet service, the network will become more valuable and useful to businesses and residents of the region if additional services are offered over time.   These can either be new "traditional" services (VoIP telephone, IPTV) or can be niche services like security (e.g. closed circuit video), healthcare, gaming or any other service which can be delivered over the network.

Overview of Roles and Responsibilities

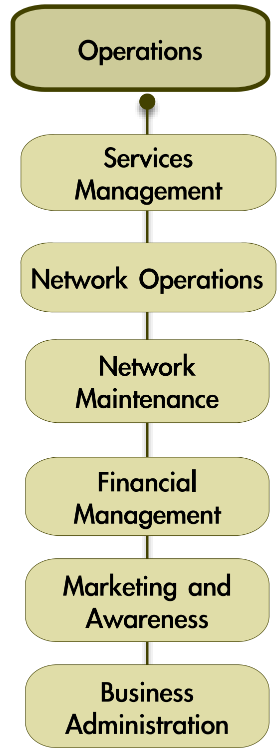
PamunkeyNet will have a range of roles and responsibilities. The table below provides a summary of key activities and responsibilities. Additional detail on the tasks and activities of the enterprise are discussed in more detail in the next section.

Activity	Responsibility
Financial Oversight	Enterprise Board
The Board will provide financial oversight and fiscal agency.	
Bookkeeping and Accounting	Enterprise Board
The network will generate a set of accounts payable and accounts receivable tasks, along with normal financial reporting (e.g. income statement, cash flow statement, balance sheet, etc.).	
Network Monitoring	Tribe or outsourced
The enterprise must have a 24/7 process in place to respond to emergency repairs. This can be based on alerts received from dark fiber users and/or active monitoring equipment put in place by the to provide additional alert capability independent of dark fiber customers.	
Break-Fix	Designated break-fix firm
The enterprise must have a contract in place for 24/7/365 emergency repairs to conduit and fiber.	
Equipment Replacement - scheduled	Enterprise staff
Routine and preventative maintenance on the passive network components will be occasional at best, but enterprise staff and/or a qualified fiber contractor must be able to make routine (scheduled) repairs.	
Utility Marking Services	Enterprise staff or third party locating service
The enterprise will have to be registered with the Virginia 811 service and must be prepared to manage locate requests (which have to be completed in a specified period of time. Enterprise staff could be trained to do the locates or a third party could provide this service.	
Site Maintenance	Enterprise staff
Enterprise staff will perform regular maintenance activities at the sites, including mowing, painting, replacing lights, and related maintenance.	
Network Operations	Enterprise staff
Enterprise staff must be able to respond to emergency break-fix alerts and be prepared to manage the repair process on nights and weekends.	
Inventory Management	Enterprise Staff
Enterprise staff will maintain an inventory of in-use conduit, fiber cable, handholes, and patch panel ports, and also maintain the spares inventory.	

Tier 2 Support	Enterprise staff
The enterprise must provide support to dark fiber lessees who report connectivity problems with their fiber strands.	
Tier 1 Support / Direct Customer Support	Enterprise staff
Service Providers provide end user support to their customers.	
End User Billing	Enterprise staff
Customers will get invoiced monthly.	
Sales to End Users	Enterprise staff
Service providers are responsible for selling their services to customer prospects, obtaining contracts, and providing Tier 1 customer support.	
Network Marketing and Awareness	Enterprise staff, PDC, localities
The Enterprise will develop and maintain a modest and ongoing public awareness and marketing effort to ensure that the Enterprise receives the maximum economic and community benefit from the network.	

Operations Areas of Responsibility

Once the Project has integrated the existing King and Queen network with new network assets, customers will begin (or continue) to receive service. At that point, the enterprise becomes operational and a variety of ongoing activities begin to take place.



Management and Oversight

The Enterprise needs a board of directors and a senior manager responsible for day to day oversight. The senior manager should have a strong business background with experience in successfully starting and managing new businesses.

Services Management

Services are a vital part of any Network. In essence the Service Providers are the customers of the network. The actual network end users (institutions, businesses, and residents) are the Enterprises's customers.

Network Operations

Operations can be managed in-house, but start-up networks sometimes find it less expensive to out-source operations to a qualified firm. Operations must include 24/7/365 activities, and it is generally better in the first several years, when the network is small, to use a service rather than bear the expense of several dedicated technical staff that would be needed to cover nights, weekends, holidays, and vacations.

Financial Management

The Enterprise will have to maintain a budget, pay contractors and staff, collect revenue, and bill for services provisioned on the network. Bills need to include a level of detail meaningful to customers. During the planning phase, the Enterprise needs to determine several items about billing such as partial month billing, credits for service outages, and credits for bad payers.

Monthly bills need to be created and sent to the service providers. Tracking payment and handing billing disputes needs to be performed. Often the NOC staff are responsible for creating the bills and handing billing inquiries while an accounting office is responsible for sending invoices and tracking payments. In the event of billing disputes the NOC staff, the customer (in most cases a Service Provider), and the accountant are involved in developing a remedy for a billing dispute.

Prudent and careful financial management is needed for accounts receivables and accounts payables, along with other normal bookkeeping activities--chart of accounts maintenance, bank deposits, check writing, and other related tasks. A part time bookkeeper may be an affordable solution in the early days of operations.

Accounting Budget Support

As the Open Network is a business enterprise, maintaining an operational budget is required. The network will have operational costs such as pole rentals, locate costs, annual equipment maintenance, electric bills, debt service, or other costs. Having an accounting office is often out of the reach of a small network so these functions can be completed by an outsourced company or even completed by NOC staff.

Marketing and Awareness

The Enterprise is responsible for marketing the network. Marketing incentives can be time based, geography based, or revenue based. While service providers will be responsible for their own marketing and sales efforts, an ongoing modest awareness/marketing campaign is required to ensure that customer take rate targets are met.

Annual Pricing Review

The Project should plan to have all tower leases renew around the same time so that it may review the market and make adjustments to the monthly lease rate if necessary. Working with providers before making any changes will be an important factors in meeting the Project's goals.

Network Operations Center (NOC)

Network Operations Center or NOC is a 24/7/365 staffed facility with many tools to manage, operate, debug and assist the NOC staff in identifying the root cause of issues reported, in monitoring network electronics, and to keep the network running smoothly. The NOC operators will be available during extended business hours (Monday-Friday, 8 AM to 8 PM) to deal with routine customer needs, and the NOC will provide 24/7/365 monitoring the network and connected customers for outages and follow up repairs. The NOC can be an outsourced remote center or can reside on the network.

Help Desk

The Enterprise is responsible for handling Tier 1 support to their customers--the network end users. This Help Desk is part of the NOC, and should be staffed to handle problems during both normal business hours and on nights and weekends.

Monitoring

One of the tools available to the NOC is software which monitors the active elements of the network. Some monitoring systems are available from the manufacturers of the network hardware, known as Element Management Systems (EMS), as well as systems which use standards-based software tools to monitor the network for problems. Monitoring takes a variety of forms, including a standard uptime monitor that periodically checks the status of the Network Elements as well as more sophisticated tools that monitor bandwidth, CPU cycles, temperature, fan speeds, etc.

Monitoring systems are useful not only during troubleshooting with a service provider or end user but as well as providing proactive capabilities to prevent problems or outages. As an example, a sophisticated monitoring system could provide NOC technicians with alarms when bandwidth exceeds a set threshold, allowing the technician to take proactive actions to prevent an outage.

Ticketing

Trouble Ticketing or just Ticketing is a system or process that uses software to manage and track reported troubles, outages, orders, or questions submitted online via Web forms or via email and phone calls. NOC staff are responsible for tracking all tickets and timestamps as well as allowing the providers visibility into the system to see what action is being taken or what is planned for an outage or other problem that arises on the network.

Ticketing systems include Web based portals, text messaging tools, and e-mail based responders, and can receive and respond to tickets in a variety of ways including phone calls, emails, SMS, or other means.

Outage Reporting

When an outage is discovered via monitoring or a call to the Help Desk, outage reports can be broadcast to Service Providers or end users. This type of proactive reporting can reduce the burden of calls to the NOC by notifying the service providers of pre-existing outages.

Provisioning and Order Management

Provisioning is the act of setting up services on the network. Provisioning can be for service providers, end users, or can be required for core network requirements. For service provider and end user provisioning, the end result is usually a billable event such as adding, changing, or terminating a end user service.

Once a new customer has been identified, the fiber or wireless link has to be provisioned. This process is initiated via a self service portal, an order ticket, or some other automated mechanism and flows through a defined process which may include external work orders to contractors and ultimately ends in a billing event when the customer is active and will be billed for services.

While provisioning is the setting up of services on the actual network elements, Order Management is a higher level activity that can include dispatch of physical assets, estimating of network build costs, or processing a more complex order for Network changes. Order Management can be provided through a Ticketing system or can be a stand alone system in larger networks.

Performance Reporting and Metrics

To provide proactive feedback to network operators, owners, and service providers there can be systems dedicated specifically to reporting on the health and reliability of the network. Metrics can also be created out of the ticketing system, provisioning system, or order management. Overall the performance of not only the network, but also of contractors, outsourced providers, vendors, and even data on service providers can be reported on and used as a mechanism to view the health of the network and entities charged with providing services. As an example, a ticketing system report could indicate the average length of time before a ticket is addressed by NOC personnel, or the monitoring system can report on the total number and average length of time for outages in a given period.

Change Management

Any time there are changes made to the network via provisioning, repair, or otherwise, it is vital that those changes be managed and tracked. Simple methods of Change Management include keeping a record of every update in a spreadsheet, or keeping configuration files in a directory on a server. More complex methods involve using change tracking software to automatically capture network changes and provide capabilities for reversing changes in the event of an outage or interruption of services.

Network Maintenance

While routine maintenance (e.g. replacement of worn out equipment) may be limited in the first year or two of operations, non-routine/emergency maintenance support must be in place as soon as the network has customers. Maintaining network equipment involves regular patching of firmware or software upgrades as well as performing physical maintenance if required. Network elements must be patched when critical security or performance updates are released from the manufacturer. Maintenance which can potentially cause an outage need to be scheduled with the NOC and these events often occur as scheduled maintenance windows during non critical times (typically on weekends at 2-5am). Examples of required physical maintenance can include keeping equipment in clean working conditions such as cleaning fans, testing UPS systems, or replacing batteries as needed.

Security

Security is both a physical and logical problem in keeping networks operational. Physical security includes protecting expensive or sensitive equipment with access controls or locks. Logical security can include required password rotation, keeping equipment on the latest security release of software, and protecting confidential information of end users and service providers. Firewalls are needed to protect the network not only from outside threats, but the network needs to be protected against internal attacks as well.

Outside Plant Maintenance

Wireless networks are susceptible to occasional damage from severe weather, including lightning strikes, ice damage, and water damage. Radios near the tops of towers experience extremes of heat and cold repeatedly, and repairs or replacement is more frequent than for fiber network equipment, which is usually installed at ground level in more protected cabinets or shelters.

Fiber is occasionally damaged (e.g. tree limb falling on aerial fiber, backhoe damaging buried fiber), and a qualified firm must be available to make repairs within two to four hours. This service is almost always outsourced to a qualified private sector company and is referred to as “break-fix”

In addition to break-fix underground utilities often need to be “located” when new construction, street repairs, or other activities disturbing the earth occur near buried cable. The network should belong to the local dial-before-you-dig service and should respond to tickets originating from those systems. Utilizing an accurate inventory of the network if digging will occur in close proximity to owned plant, NOC staff will dispatch a locator to locate the fiber cable. This is often part of the break-fix contract, but can be outsourced to another entity specializing in such work. In small municipal networks, the Public Works department will often locate fiber optic cable as they are already locating water and sewer assets.

Backups and Configuration Management

NOC staff are responsible for keeping secure backups of all Network Element configurations, backups of critical systems mentioned in this chapter including ticketing, provisioning, and billing. Backups should be stored locally for a quick restoration in the event of a failure, but also should be kept offsite in a physically diverse location.

Inventory Management

Keeping track of all Network Elements and all network assets is key to keeping a network reliable and operational. Inventory systems should:

- Track equipment location, in-service dates, serials numbers, model numbers
- Link equipment with end-users or service providers
- Provide location reports for technicians and service providers
- Store logical information such as IP addresses, OS versions, etc.

Managing the physical assets is also required in a network. Tracking all Outside Plant (OSP) assets reduces the time needed to find and solve outages, and reduces the time required to provision new services, or create work orders for changes to the physical network. A network asset management system provides an overall view of the physical state of the network. Fiber optic OSP management systems should:

- Track conduit, cables, buffer tubes, individual fiber, splices.
- Generate reports and information for splice work.

Wireless OSP management systems should:

- Track all in-service radios (location, model, type, serial number).
- Maintain adequate spare radios for all makes/models in-use.

Outreach

Outreach is often required to make sure that the local and regional community are aware of the network. Working with local economic developers, chambers of commerce, local technology companies is often required. Additionally municipal and Open Access Fiber projects receive regional and national awareness. Local, regional, state and even national elected officials need to be aware of the network, how it was funded, and how it is benefiting local constituents.

Growing the Network

Often the network is built in stages. There may be a pilot phase or a small deployment followed by larger deployments. These deployments need to be planned and managed, but the PamunkeyNet board of directors should constantly be looking for new funding opportunities like state or federal grants. While the network is being expanded, the NOC staff will be responsible for bringing newly constructed segments of the network into operations.

Operations Costs and Revenue

Annual Expense Projections

Budget Item	Description	Annual
Network Ops	Outsourced network monitoring and operations contract expense.	**$48,000**
PamunkeyNet Staff	At least three staff members will be needed during the first two years (Project Manager, bookkeeper, and technician).	**$225,000**
Legal Services	Legal counsel on an as-needed basis for review of construction and service contracts, IRU agreements, and other business documents.	**$7,500**
Accounting	Part time accounting and bookkeeping services will be required	**$4,800**
Maintenance	Generators require periodic maintenance, along with other routine tasks. This can be performed by PamunkeyNet staff.	**$2,400**
Training	PamunkeyNet staff will require technical training on an annual basis, including fiber construction techniques, wireless network management, fiber splicing, and server administration.	**$25,000**
Internet backhaul	PamunkeyNet will follow the King and Queen model of providing retail Internet, purchased from a qualified service provider.	**$72,000**
Spares/Supplies	Spare radios, replacement fiber equipment, cables, and other supplies.	**$24,000**
Utilities	Each tower site requires electric power, and the colocation facility will also require electric service. Will vary depending on number of sites.	**$12000**
Locates	Once some fiber has been constructed, it will be necessary to provide locates. PamunkeyNet staff can be trained to do this work.	**$1,500**
Pole Use Fees	No aerial fiber is anticipated for the Technology Corridor first phase fiber, but aerial fiber may be deployed in later phases.	**$0**
Storage	Storage space for spare conduit, fiber, splice closures, handholes and other spare parts will be needed. A rental storage unit or used shipping container would be adequate.	**$1,800**
Site Leases	Some towers and/or fiber switch equipment may be placed on private property which would require annual site leases. This will vary depending on the availability of local government properties that may be available for tower placement.	**$12,000**
Break-Fix reserve fund	PamunkeyNet will need a fund to cover fiber damage and wireless repairs. A regular annual contribution to the fund will be needed.	**$35,000**
Insurance	Some insurance is likely to be needed (general liability, unemployment, asset insurance, umbrella policy).	**$15,000**
Office administration	Expenses related to providing office space, office equipment (printers, computers, laptops, etc), office supplies for two employees.	**$34,200**
Marketing activities	PamunkeyNet will need a well-designed and consistent marketing plan to ensure the project meets its customer subscriber goals.	**$35,000**
Total Costs	**Projected annual expenses**	**$555,200**

Revenue Discussion

Operating as a retail service provider, PamunkeyNet will need 1000+ customers to break even by the end of the second year. The table below shows one possible scenario for expected revenue. Several assumptions have been made in this projection.

- PamunkeyNet will have a cash reserve adequate to fund operational shortfalls (revenue does not exceed expenses) in the first two years. This should be a minimum of 50% of expected expenses, or about $500,000 for the first two years.
- PamunkeyNet has a capital fund for adding fiber customers that are adjacent to the Technology Corridor fiber (i.e. within 500 to 1000 feet). Some fiber drops have been included in the cost estimate, but adding more customers will require funding the fiber drop connections (average about $1500/drop).
- The initial capital funding of PamunkeyNet includes the full cost of building the Technology Corridor fiber and colocation facility.
- The initial capital funding of PamunkeyNet includes the full cost of adding a minimum of ten new wireless access points on new or leased towers.
- PamunkeyNet takes over operations of the existing King and Queen network, including all existing customers.
- Each of the towers in the expanded PamunkeyNet (about 15 access sites) is able to have an average of 50-60 customers per site at the end of the first two years (15 sites * 60 = 900 customers).

Revenue Projections

Service Item	Description	Monthly Fee	Estimated Customers	Projected Annual Revenue
5Meg down/1 Meg up Residential Wireless	Expected to be the most popular and affordable service.	$35	650	**$273,000**
10 Meg down/10 Meg up Residential and Smalll Business Wireless	A higher bandwidth service that would meet work from home needs.	$90	200	**$216,000**
100/25 Business class fiber service	Business class GPON fiber service.	$150	12	**$21,600**
Gigabit residential fiber service	Best effort GPON Gigabit residential service	$75	10	**$9,000**
Gigabit business fiber service	Business class Active Ethernet fiber service	$850	3	**$30,600**
Installation fees	Non-recurring wireless and fiber one time installation fees			**$15,000**
Total	Total estimated annual revenue			**$565,200**

Funding the Enterprise

Funding Needs

PamunkeyNet will need a basket of funding to support various tasks, activities and capital expenses. These include:

Capital Expenses — As outlined in previous portions of this report, there are three major capital expenditures: the Gigabit fiber backbone, the Telework Center colocation facility, and the wireless expansion to all of the Middle Peninsula counties.

Operational Expenses — PamunkeyNet, managed carefully, should have a growth path to sustainability within two years, but will need a cash reserve to cover revenue deficits, especially in the first year. While the goal should be that revenue will cover all operational expenses as quickly as possible, an operational reserve will provide a financial cushion for early operations.

Training — While training is a relatively minor cost compared to capital and operational expenses, funds to train Pamunkey tribe members will be a critical success factor.

Customer Connections — The capital cost estimate includes the cost of connecting some fiber and wireless customers, but successful networks have a strategy for underwriting one time connection fees. This is particularly important for adding new fiber customers, where the drop cost connection from the existing backbone can be anywhere from $750 to several thousand dollars. Some projects subsidize these costs directly, and others have had success providing low interest or no interest financing.

Fiber Expansion — PamunkeyNet will be successful financially in part by continued expansion of the fiber network to other areas of the PDC. Fiber customers, especially business fiber customers, provide higher levels of revenue that can help fund further expansion.

Funding Opportunities

As a Federally recognized tribe, the Pamunkeys bring a unique opportunity to the Middle Peninsula. As a sovereign nation, the tribe is not subject to a number of state-level and Federal regulations that have often hindered other community broadband efforts. Federally recognized tribes are not subject to Federal taxes, among other benefits.

Federally recognized tribes are also eligible for a variety of Federal funds that are not available to other communities and local governments. These include:

USDA Community Connect grants — Tribes are eligible for these telecommunications grants. Grant funds are limited, but many communities have difficulty meeting the unserved/underserved requirements. The Pamunkey tribe may be well-positioned to be competitive.

USDA Distance Learning and Telemedicine — The DTL program is designed to assist rural areas with education and health needs. Eligible entities providing education and medical care via telecommunications include Indian tribes or tribal organizations, state or local units of government, consortia, and private for-profit or not-for profit corporations. 15% match is required.

Tribal Mobility Fund — On Tribal lands, eligible telecommunications carriers (ETCs) that provide service on these lands, have access to spectrum capable of 3G or better, and are financially capable of providing service are eligible to participate in spectrum auctions. Provisions have also been provided for a tribally-owned or controlled entity that is not yet an ETC to participate in an auction as long as that entity has a pending ETC designation application using a short-form application in time to meet a set deadline. Providing cellular voice/data services is more technically challenging that broadband only wireless services, but there may be opportunities for the tribe to partner with a cellular carrier for certain areas of the region.

FirstNet — FirstNet is the First Responder Network Authority, an independent authority within the Department of Commerce's National Telecommunications and Information Administration (NTIA). Congress charged FirstNet to take "all actions necessary" to build, deploy, and operate the network, in consultation with Federal, state, ***tribal***, and local public policy entities. The Act provides $7 billion in funding towards deployment of this network, as well as $135 million for a new State and Local Implementation Grant Program administered by NTIA to support State, regional, tribal and local jurisdictions' efforts to plan and work with FirstNet to ensure the network meets their wireless public safety communications needs.

Dept. of Homeland Security — More than $1.6 billion was allocated to DHS grant programs provide funding to state, local, ***tribal*** and territorial governments to improve the nation's readiness in preventing, protecting against, responding to, recovering from and mitigating terrorist attacks, major disasters and other emergencies. There may be significant opportunities for PamukeyNet to partner with public safety initiatives in the region to qualify for these funds.

USDA Telecom Infrastructure Loans and Loan Guarantees — Federally recognized tribes are eligible for these loan packages. A loan may not be ideal for funding initial capital expansion, but once PamunkeyNet is financially in the black, loans for fiber expansion could be useful source of funding.

Dept. of Justice Coordinated Tribal Assistance Solicitation — This program is intended to address tribal criminal justice and public safety needs. PamunkeyNet and local public safety officials may be able to combine efforts to qualify for these funds.

HUD Indian Community Development Block Grants — Eligible applicants for assistance include any Indian tribe. Provides funds to eligible grantees for housing rehabilitation, land acquisition, community facilities, infrastructure construction, and economic development activities.

Planning for Success

With more than a dozen years of operation for a variety of community-owned network infrastructure projects around the country, there is very little "experimentation" that is still necessary. With more than three hundred communities making investments in broadband infrastructure, there is now enough information about what works and what does not work to be able to identify best practice across nearly all areas of operations, planning, management, and finance.

Develop Partnerships with Public Safety

The Project should develop partnerships with public safety entities in the region. These partnerships could be expanded as well as new partnerships created to jointly work on activities involving mapping and needs assessment, tower siting, pursuing grant funding, advertising and marketing, and others.

Training is Essential

If PamunkeyNet is to grow into a sustainable tribal enterprise with good jobs, training of tribe members with the aptitude and interest for technically challenging work will be essential. PamunkeyNet should develop a partnership with Rappahannock Community College (RCC) and other technical training resources to ensure that over a period of two or three years, more tribe members have the qualifications and training to join the PamunkeyNet staff. Over time, the goal should be to reduce reliance on outsourced resources.

RCC currently has some technically oriented courses that will useful, but additional programs like the Cisco Network Academy and Microsoft server and networking certifications (e.g. MTA, MCSA, MCSE) will be important to develop workers with technical skills not just for PamunkeyNet but to create a pipeline of trained workers for private sector companies that want to locate in the fiber-enabled Technology Corridor.

Outsource Where Sensible and Economical

Overstaffing on start up networks has been a common source of early financial difficulties for some community broadband projects. Given the relatively small scope of the proposed initial projects, PamunkeyNet should seek to outsource some maintenance and operational tasks where using internal staff may be more expensive.

Use grants Prudently

Grants can be extremely important in the early stages of an effort to support planning activities and/or to fund a Phase One build out initiative. But grants rarely will allow spending on operational expenses. Grants should be used as one time cash injections to support very specific capital expansion goals (like the initial wireless and fiber "phase one" portions of PamunkeyNet). Communities that have relied too heavily on "the next grant" as a key source of expansion or operational funding usually experience financial problems within two or three years.

Manage finances

Broadband infrastructure projects require hard-nosed financial oversight. Projects that have developed financial problems have usually over-estimated early revenue, under-estimated expenses, and/or simply spent too much without aligning expenses with revenue. Volunteer board members who are contributing time while also maintaining a full time job (often in local government) may not provide enough financial oversight to ensure that staff use the budget as a tool to measure financial performance.

Use Market Demand Testing to Drive Expansion

The initial business plan should have a minimum three to ten year projection of connected premises (i.e. the take rate), including K12 schools, local government facilities, large and small businesses, health care facilities, and residential customers (if fiber to the home is part of the business plan). Take rates directly affect revenue: if take rate projections are not being met, revenue shortfalls are likely. Take rates (both raw numbers and month to month growth rates) should be analyzed at least quarterly (monthly would be preferable).

Increased Wood Utility Pole Use

Tree cover is a constant problem for rural residents and businesses, as good line of site is required for fixed wireless Internet services. Even newer technologies like white space and LTE systems work better with clear line of sight to distant towers.

The increased use of wooden utility poles is already common in some other Virginia counties, and increased use of this technique to get the customer CPE radio/antenna above tree cover is a relatively simple solution.

The utility poles would normally be placed on private property, subject to existing or updated ordinances governing the placement of wooden utility poles. The local government would have no responsibility for maintenance and repairs.

Depending on the source of the poles and the location where it is mounted the cost of installing a new pole with wireless equipment could be in the $10,000 to $15,000 range. Major cost factors include the cost of moving construction equipment to site, the cost of labor, and the cost of shipping the pole. At remote locations the cost to install a electric utility service can also be high. This is a conservative estimate for a single pole. Constructing multiple sites at once and identifying local sources of labor could reduce the cost substantially. Some Virginia counties provide "by right" permitting of these poles if they are placed on private property, which can reduce the cost of installing them.

Plan for marketing and public awareness efforts

If the Project move forward, it will be necessary to have a modest but regular marketing and awareness campaign to ensure that area businesses know that the new network is available, that they know what services are available on the network, and they know how to order service.

Plan for Expansion

Most community-funded efforts start small. This minimizes financial risk. But some projects tend to stall out after the first year or two. The underlying problem is twofold: even small networks have a certain amount of fixed operational costs regardless of size, and the network needs enough revenue to pay those expenses, as well as make principal and interest payments on any loans. The second problem is that network infrastructure wears out and needs routine maintenance. Lack of funding to keep the network in good condition will degrade service over time. The solution is to have an expansion plan (which could be modest) that contributes to revenue growth over time.

Budget for Customer Connections

If the network is going to achieve financial sustainability, new customers have to be added on a schedule that matches the financial projections. For wireless networks, the cost of the customer radio installed at the premises has to be included in growth cost projections. For fiber networks, this means the project must have the funds to support adding customer "drops" from the distribution fiber on poles or underground in right of way at the edge of the street or road. This is where careful budgeting and adequate funding is a necessity. The worst possible outcome is to have business and residents requesting a connection to the network but having a lack of the funds to make that "last hundred feet" connection. There are a variety of charge back and fee-based strategies for raising the capital needed to complete drops, and a plan that supports funding of new customer connections is essential.

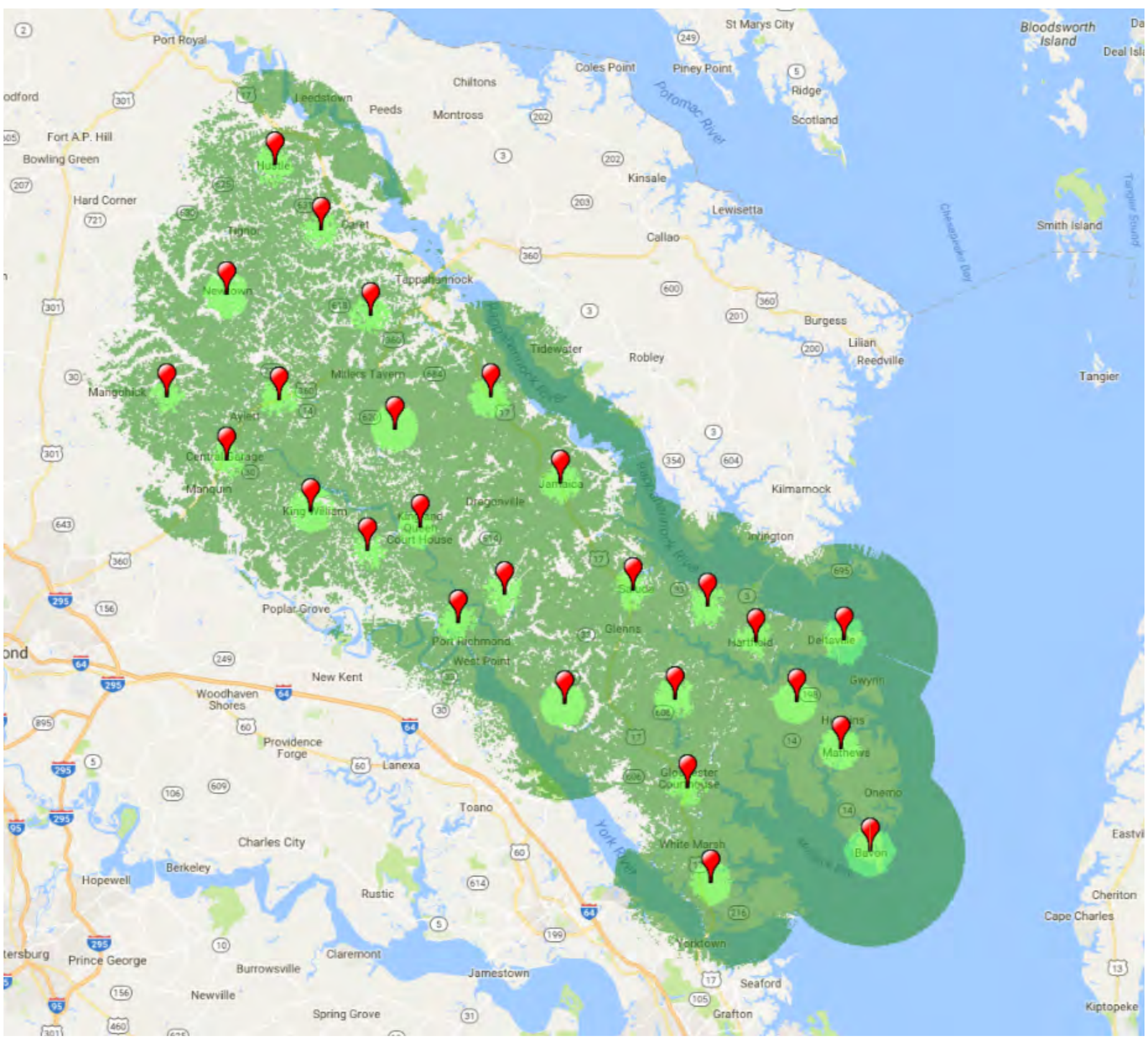
Maintain a Towers Opportunity Map/List

The Project should maintain a list or map of wireless tower opportunities. At least quarterly the Project should reach out to local planning and permitting departments to see if any new towers are under development in the region and identify co-location opportunities. The list could be expanded to include underground projects and available properties for tower development.

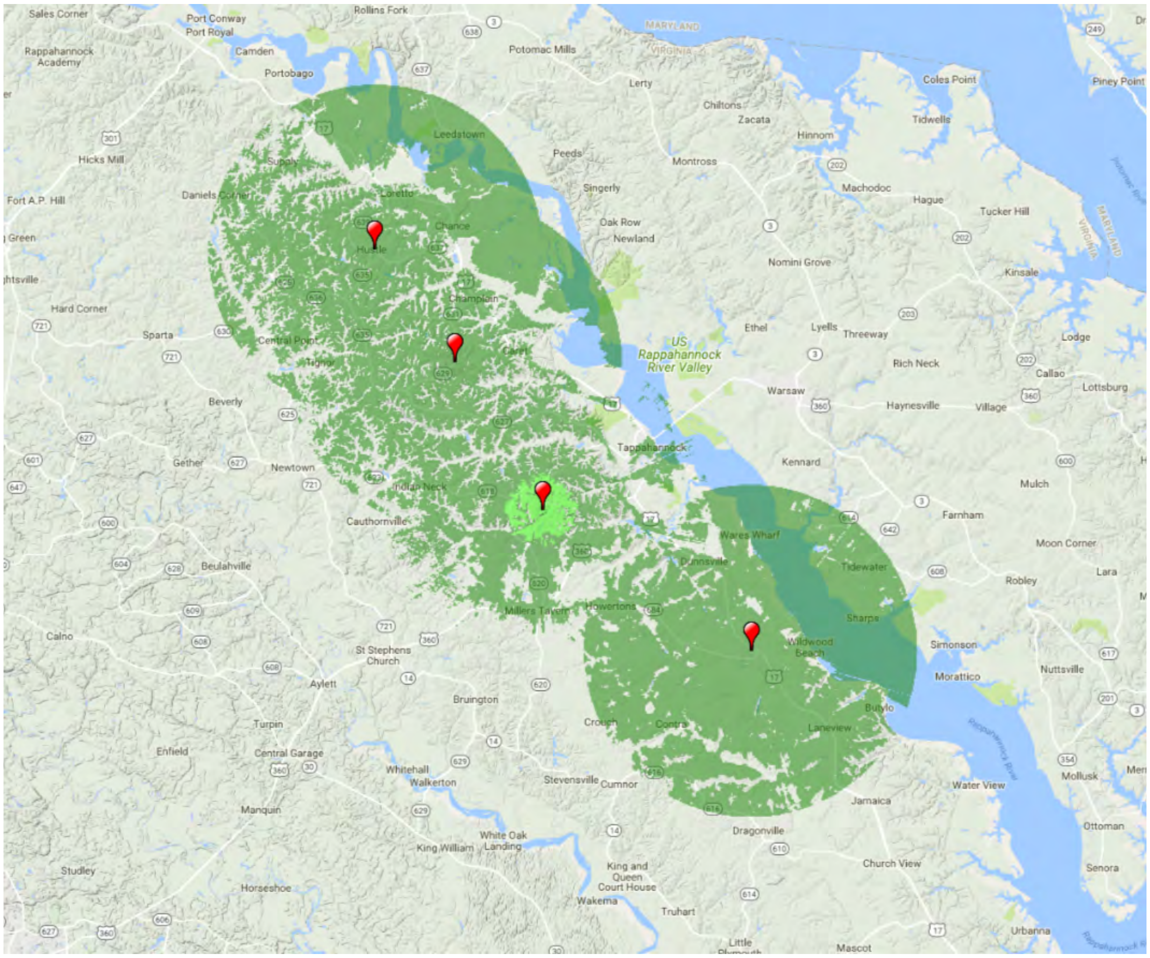
Appendix A: Propagation/Coverage Studies

The studies on the following pages provide a view of estimated tower coverage using the newer LTE radio frequencies. Tower sites have been placed to optimize coverage for this estimate, and if the project moves forward, site assessment and identification would be an early project task. The goal should be to utilize existing local government towers as much as possible, but some new towers may be needed to provide good coverage. There should be close coordination between public safety tower needs (used for first responder/public safety voice communications) and broadband tower expansion. It may also be possible to lease space on some privately owned cellular towers if lease rates are affordable.

Regional Study

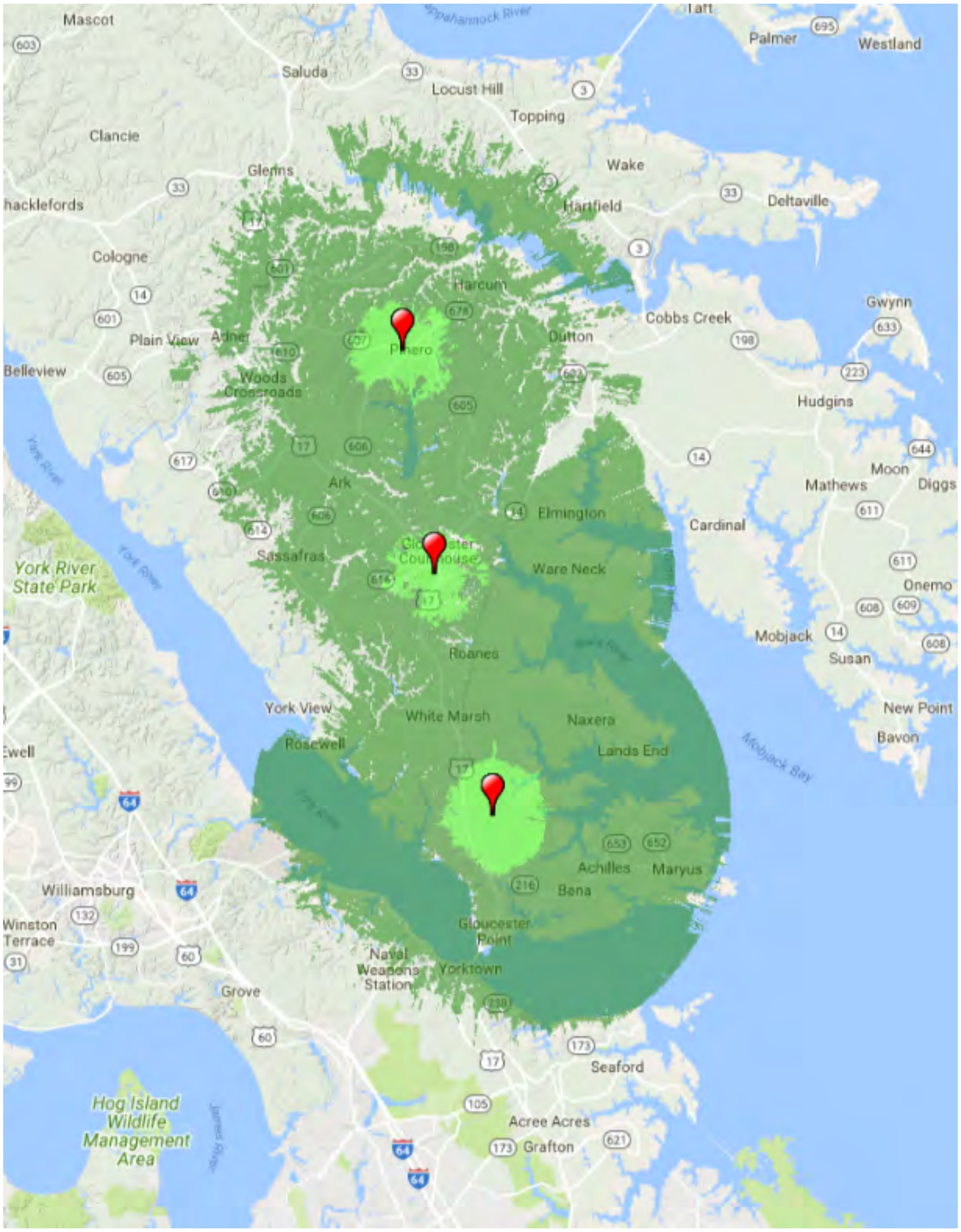


Essex Study



Sales Corner
Port Conway
Port Royal
Rollins Fork
Rappahannock Academy
Camden
Portobago
Potomac Mills
MARYLAND
VIRGINIA
Lerty
Coles Point
Piney Point
Chiltons
Zacata
Tidwells
Leedstown
Hinnom
Hicks Mill
Peeds
Montross
Machodoc
Singerly
Hague
Tucker Hill
Fort A.P. Hill
Daniels Corner
Oak Row
Newland
Nomini Grove
Kinsale
Hard Corner
Sparta
Ethel
Lyells
Threeway
Lodge
US Rappahannock River Valley
Rich Neck
Callao
Lottsburg
Warsaw
Haynesville
Village
Beverly
Tappahannock
Gether
Newtown
Kennard
Mulch
Farnham
Cauthornville
Moon Corner
Wares Wharf
Dunnsville
Tidewater
Robley
Lara
Beulahville
Millers Tavern
Howertons
Sharps
Calno
Simonson
St Stephens Church
Wildwood Beach
Morattico
Nuttsville
Aylett
Bruington
Turpin
Laneview
Enfield
Central Garage
Whitehall
Walkerton
Stevensville
Cumnor
Jamaica
Water View
Mollusk
Manquin
King William
White Oak Landing
Dragonville
Ottoman
Studley
King and Queen Court House
Church View
Horseshoe
Wakema
Senora
Truhart
Urbanna
Mascot

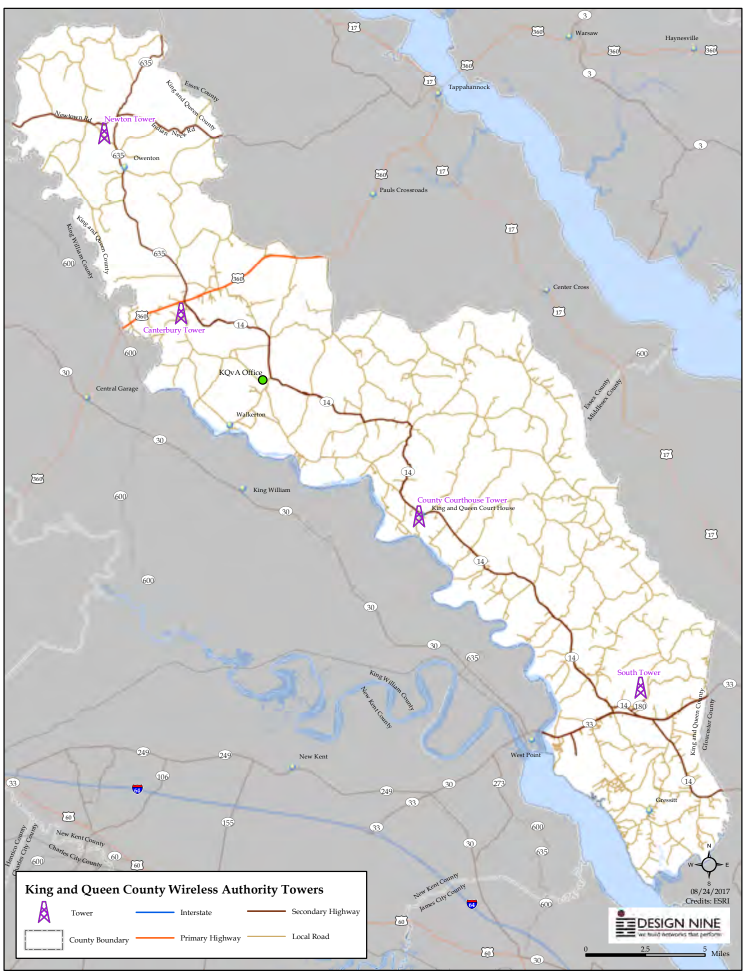
Gloucester Study



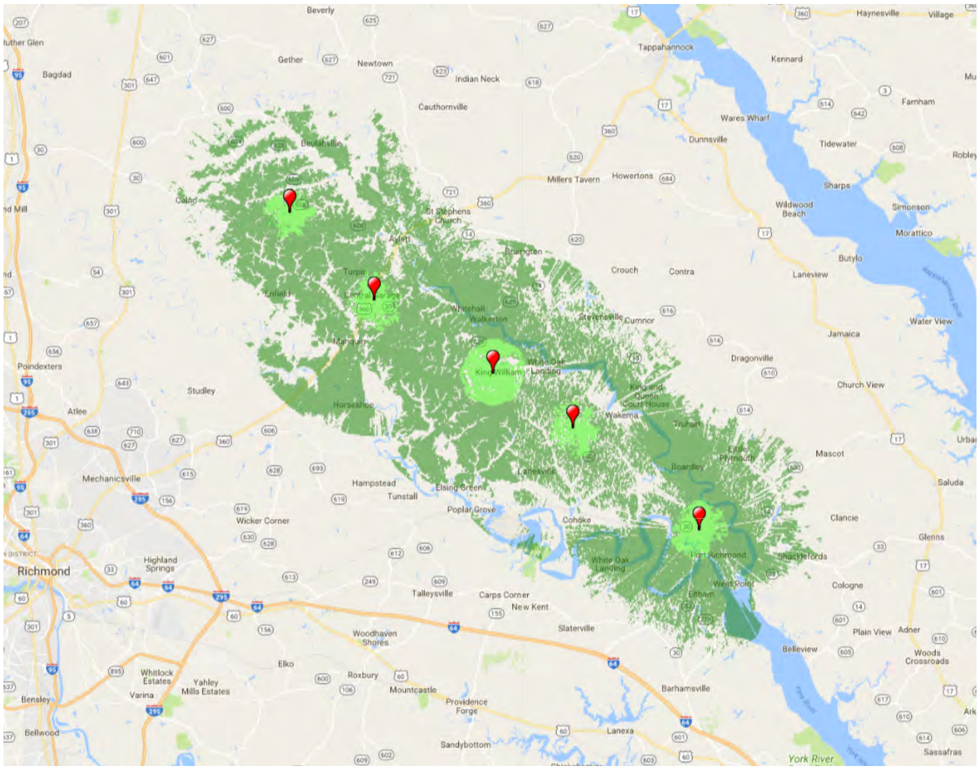
KING AND QUEEN STUDY

The existing King and Queen network has existing tower sites (shown in the map below) that provide good coverage throughout the county. The network offers a range of five different wireless services. PamunkeyNet will benefit by taking over the existing network and would have a revenue stream from existing customers while new tower sites and the Route 33 fiber is being constructed.

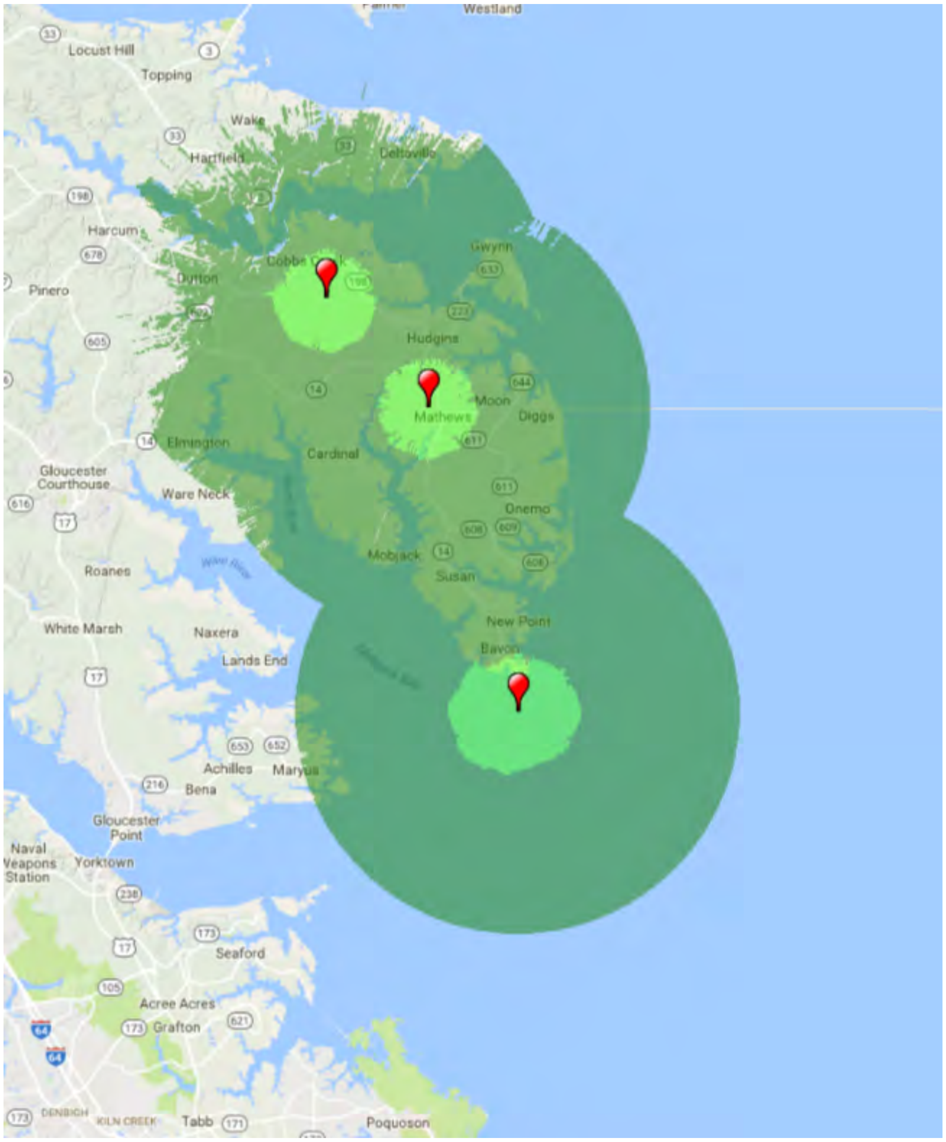
Wireless Service	Description	Monthly Fee
512 Kb down/128 Kb up	Basic "lifeline" service	$30
1 Mb down/512 Kb up	Standard service for light Internet use	$40
2 Mb down/768 Kb up	Supports some streaming video	$50
3 Mb down/3 Mb up	Supports streaming video, some work from home	$60
6 Mb down/6 Mb up	Small business class service, multiple residential users	$90



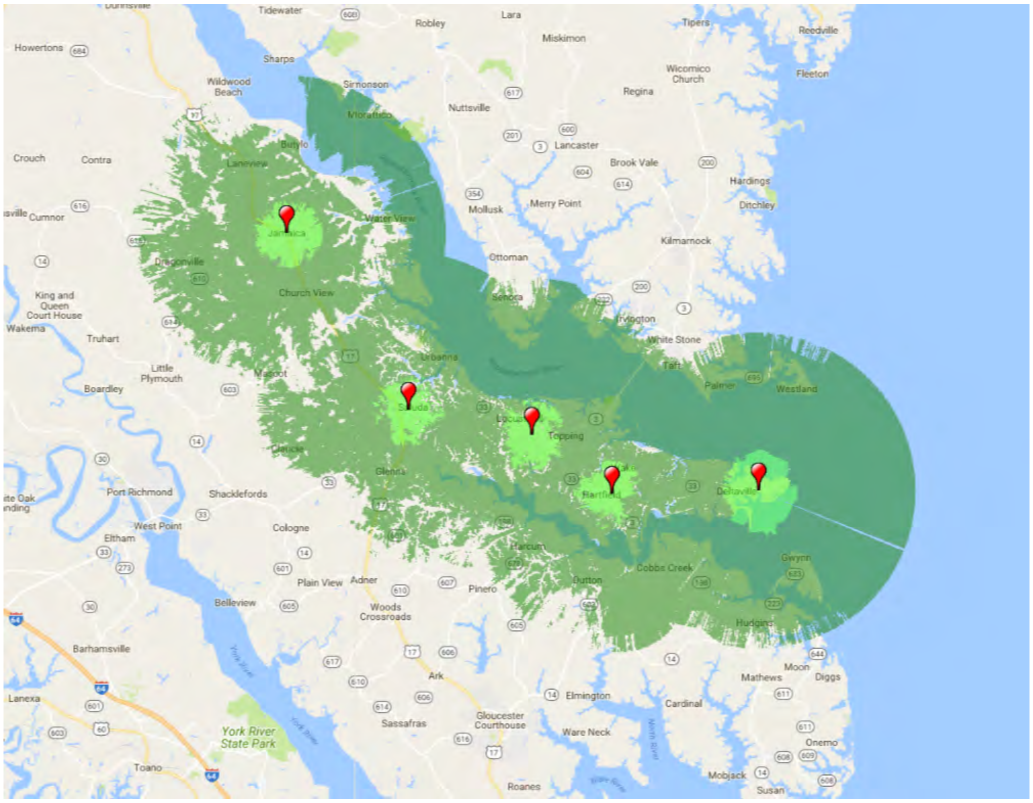
King William Study



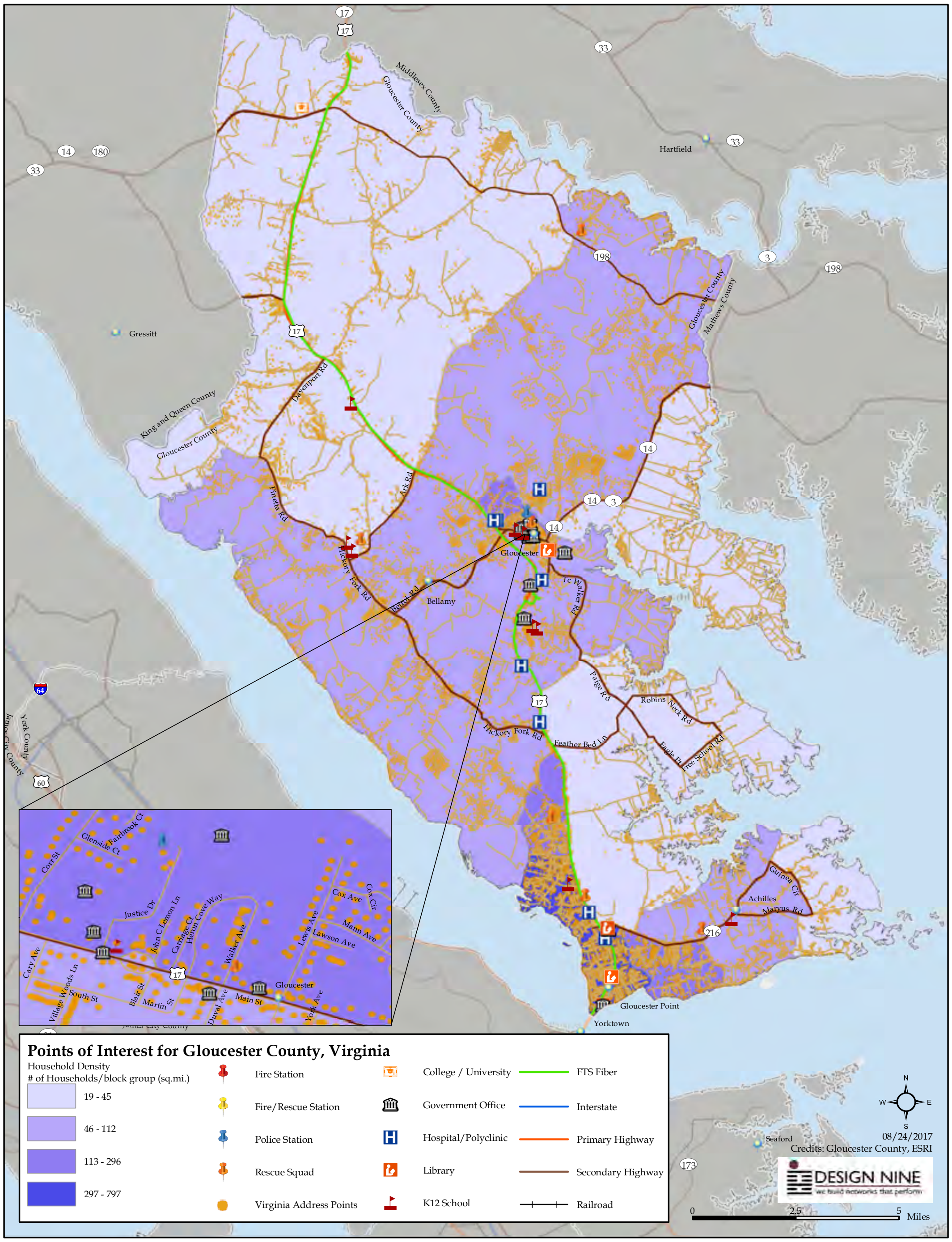
MATHEWS STUDY

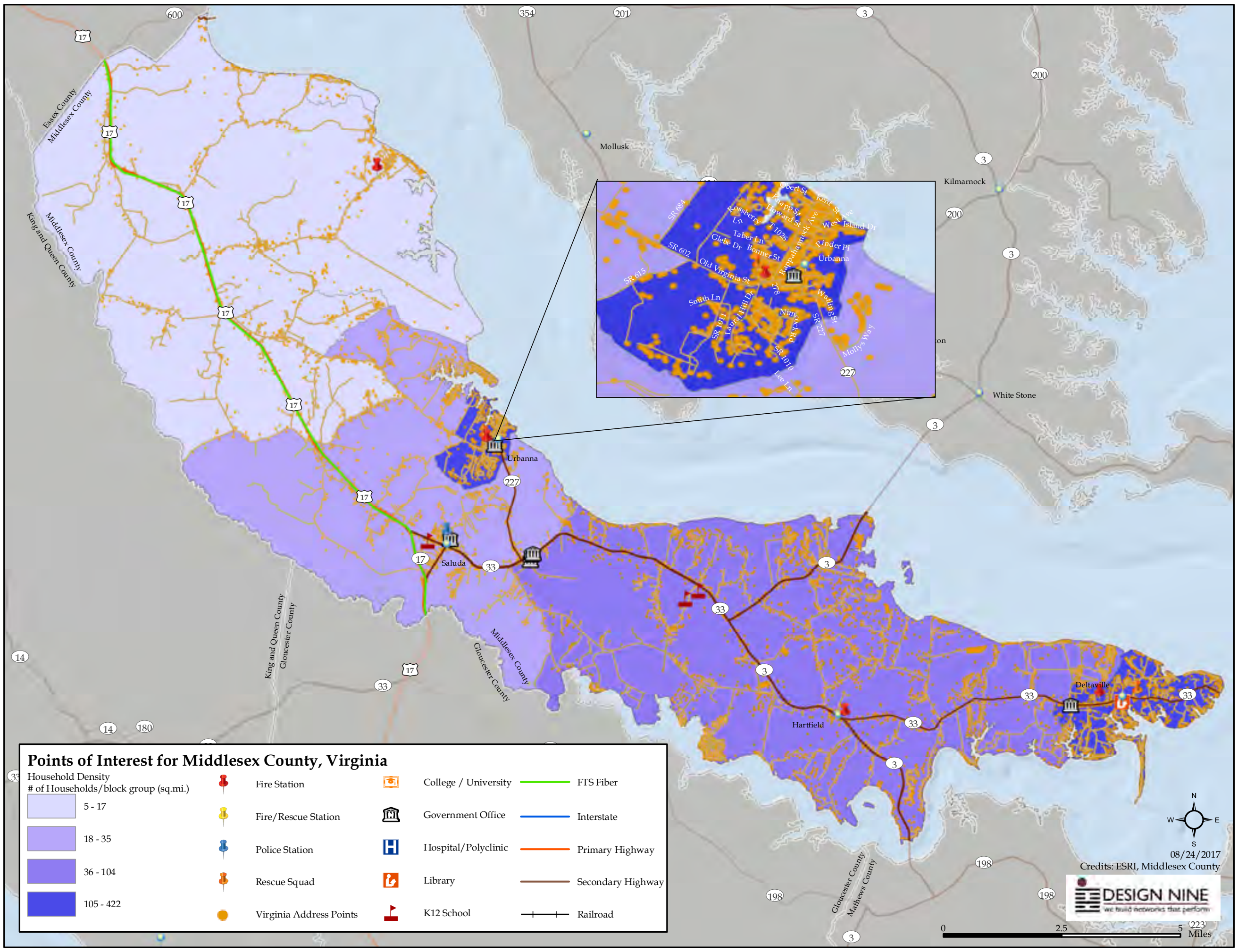


MIDDLESEX STUDY

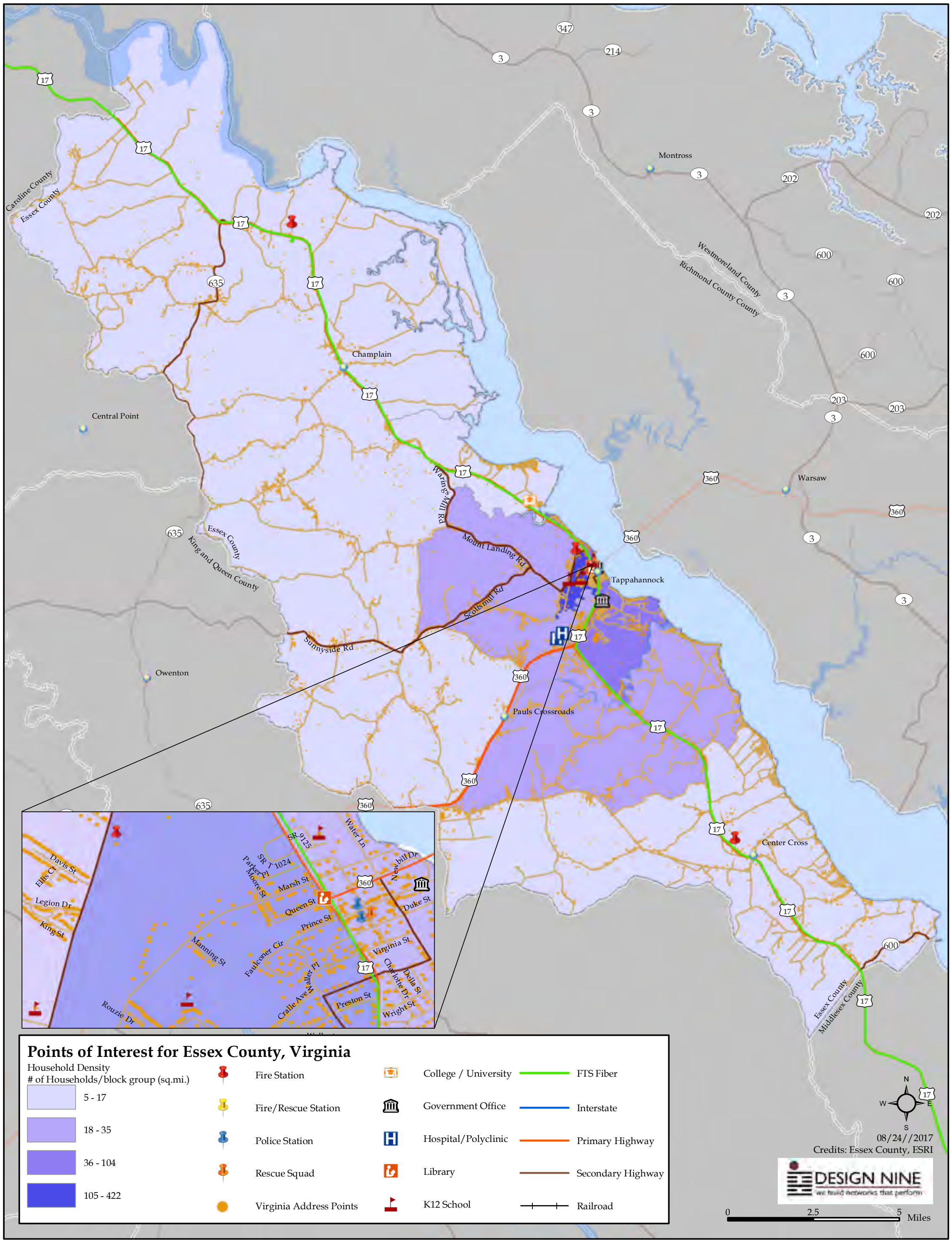


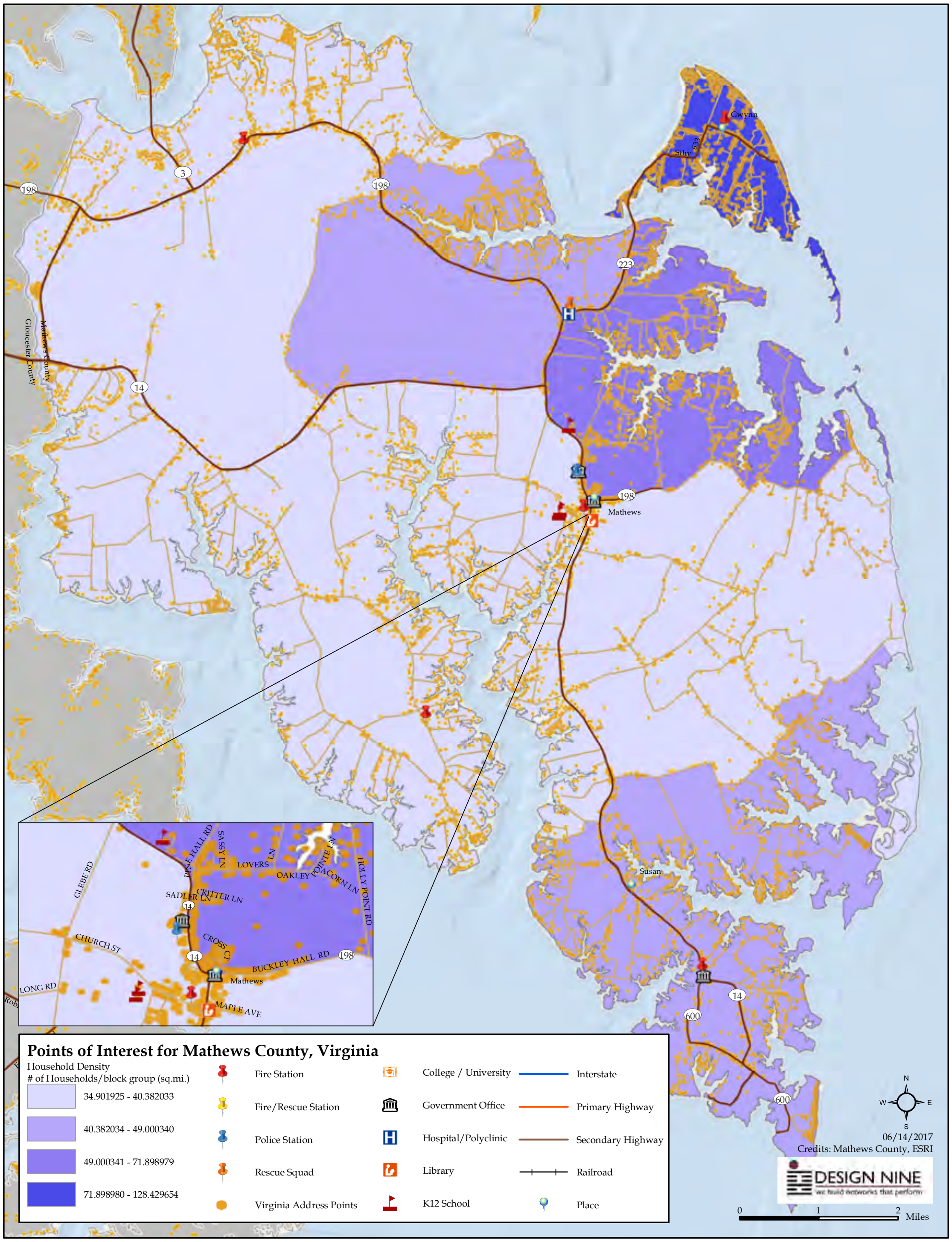
Appendix B: Area Maps

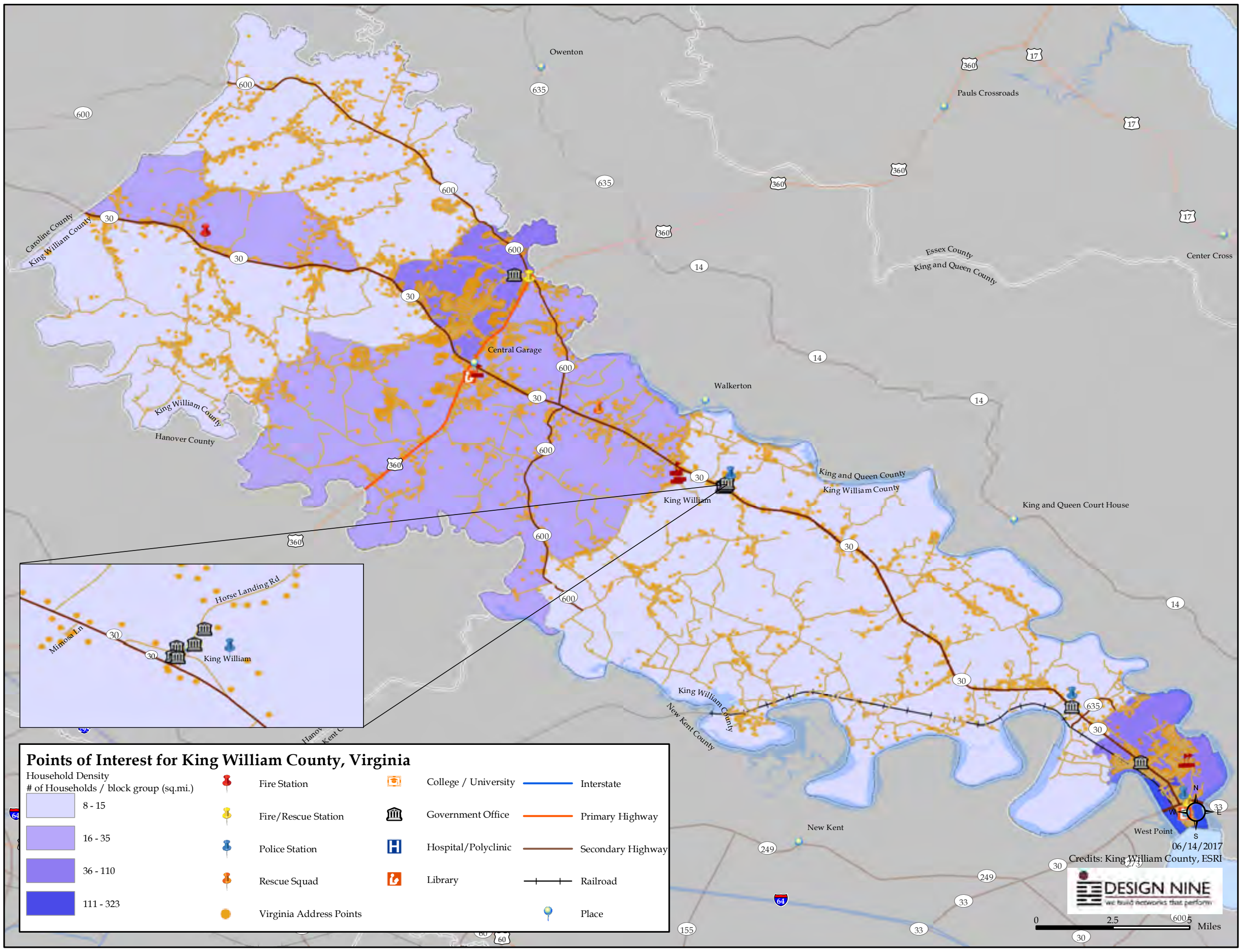


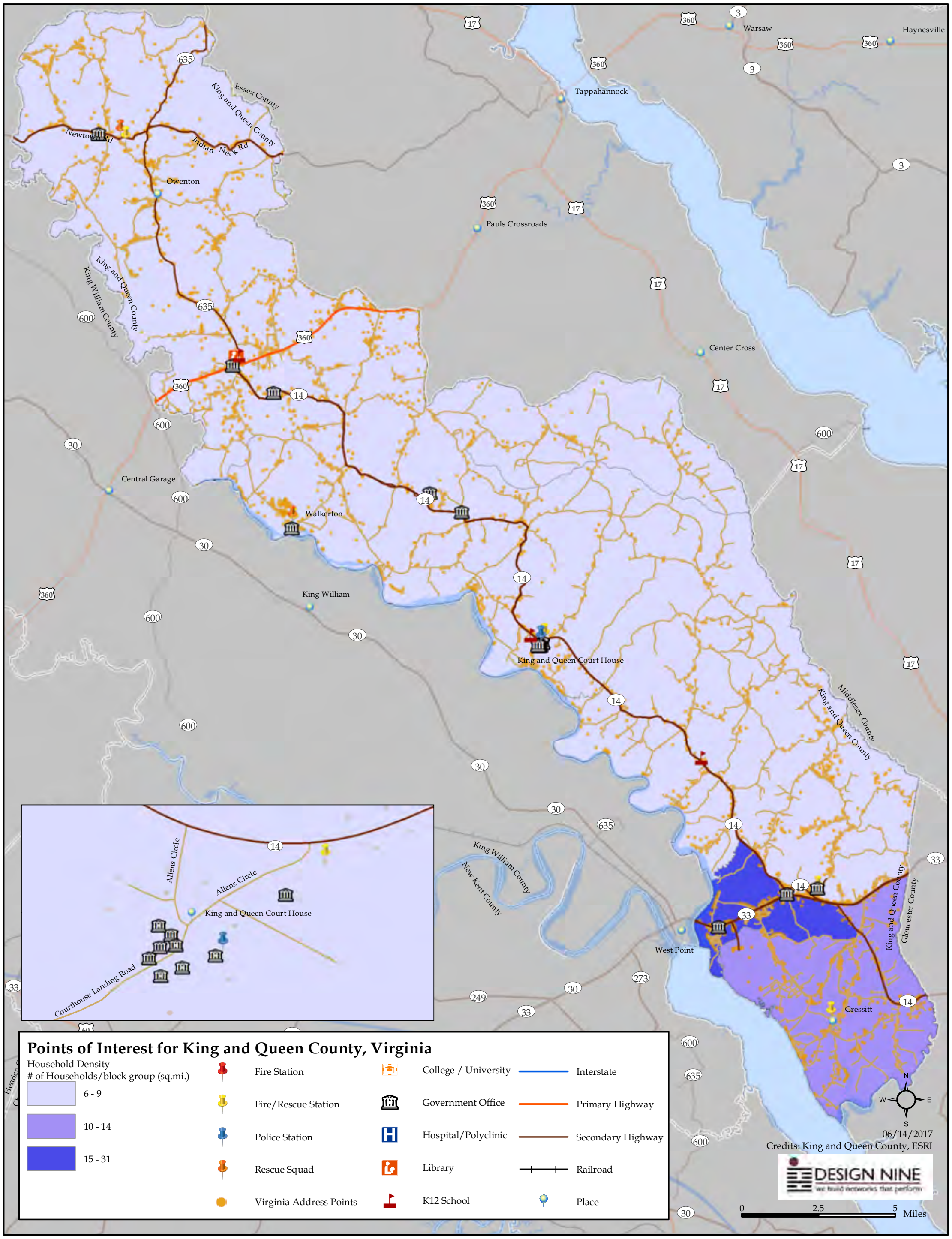


Points of Interest for Middlesex County, Virginia
Household Density
# of Households/block group (sq.mi.)
5 - 17
18 - 35
36 - 104
105 - 422
Fire Station
Fire/Rescue Station
Police Station
Rescue Squad
Virginia Address Points
College / University
Government Office
Hospital/Polyclinic
Library
K12 School
FTS Fiber
Interstate
Primary Highway
Secondary Highway
Railroad
Urbanna
Saluda
Hartfield
Deltaville
Mollusk
Kilmarnock
White Stone
08/24/2017
Credits: ESRI, Middlesex County
DESIGN NINE
Miles

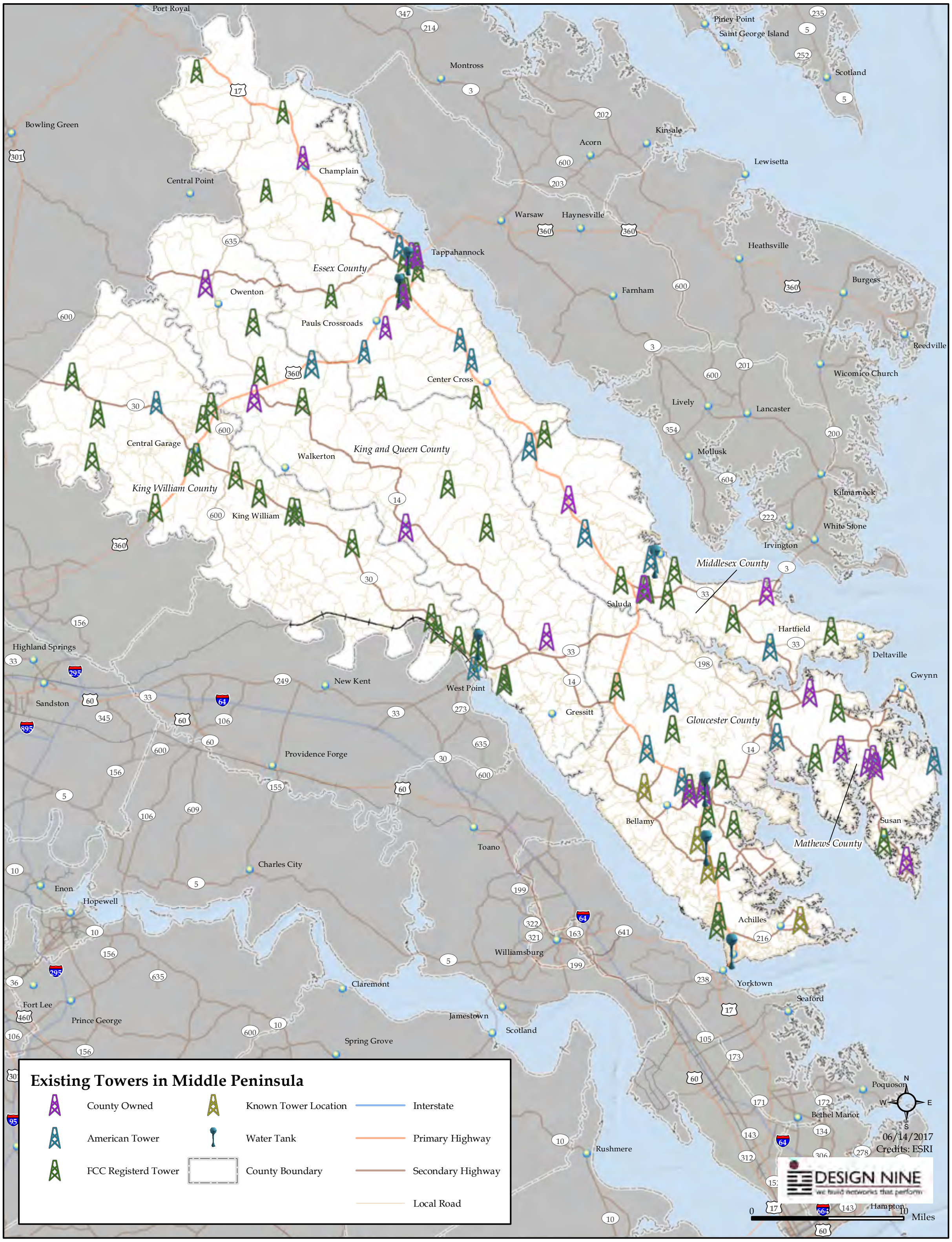

Points of Interest for Essex County, Virginia
Household Density
# of Households/block group (sq.mi.)
5 - 17
18 - 35
36 - 104
105 - 422
Fire Station
Fire/Rescue Station
Police Station
Rescue Squad
Virginia Address Points
College / University
Government Office
Hospital/Polyclinic
Library
K12 School
FTS Fiber
Interstate
Primary Highway
Secondary Highway
Railroad
Tappahannock
Champlain
Central Point
Owenton
Pauls Crossroads
Center Cross
Montross
Warsaw
Caroline County
Essex County
King and Queen County
Westmoreland County
Richmond County County
Middlesex County
Mount Landing Rd
Sunnyside Rd
Smithmill Rd
08/24//2017
Credits: Essex County, ESRI
DESIGN NINE
we build networks that perform
0
2.5
5
Miles


Points of Interest for Mathews County, Virginia
Household Density
# of Households/block group (sq.mi.)
34.901925 - 40.382033
40.382034 - 49.000340
49.000341 - 71.898979
71.898980 - 128.429654
Fire Station
Fire/Rescue Station
Police Station
Rescue Squad
Virginia Address Points
College / University
Government Office
Hospital/Polyclinic
Library
K12 School
Interstate
Primary Highway
Secondary Highway
Railroad
Place
06/14/2017
Credits: Mathews County, ESRI
DESIGN NINE
Miles
Mathews
Susan
Gwynn
GLEBE RD
CHURCH ST
LONG RD
SADLER LN
CRITTER LN
LOVERS LN
OAKLEY
ACORN LN
HOLLY POINT RD
BUCKLEY HALL RD
MAPLE AVE
CROSS CT


Points of Interest for King William County, Virginia
Household Density
# of Households / block group (sq.mi.)
8 - 15
16 - 35
36 - 110
111 - 323
Fire Station
Fire/Rescue Station
Police Station
Rescue Squad
Virginia Address Points
College / University
Government Office
Hospital/Polyclinic
Library
Interstate
Primary Highway
Secondary Highway
Railroad
Place
Owenton
Pauls Crossroads
Central Garage
Walkerton
King William
King and Queen Court House
Center Cross
Essex County
King and Queen County
King William County
Caroline County
Hanover County
New Kent County
New Kent
West Point
Horse Landing Rd
06/14/2017
Credits: King William County, ESRI
DESIGN NINE
Miles



Points of Interest for King and Queen County, Virginia
Household Density
# of Households/block group (sq.mi.)
6 - 9
10 - 14
15 - 31
Fire Station
Fire/Rescue Station
Police Station
Rescue Squad
Virginia Address Points
College / University
Government Office
Hospital/Polyclinic
Library
K12 School
Interstate
Primary Highway
Secondary Highway
Railroad
Place
06/14/2017
Credits: King and Queen County, ESRI
DESIGN NINE
we build networks that perform
0
2.5
5
Miles
Warsaw
Haynesville
Tappahannock
Essex County
King and Queen County
Newtown Rd
Indian Neck Rd
Owenton
Pauls Crossroads
King William County
Center Cross
Central Garage
Walkerton
King William
King and Queen Court House
Middlesex County
New Kent County
West Point
Gressitt
Gloucester County
Allens Circle
Courthouse Landing Road



Existing Towers in Middle Peninsula
County Owned
American Tower
FCC Registerd Tower
Known Tower Location
Water Tank
County Boundary
Interstate
Primary Highway
Secondary Highway
Local Road
06/14/2017
Credits: ESRI
DESIGN NINE
Miles
Essex County
King and Queen County
King William County
Middlesex County
Gloucester County
Mathews County
Tappahannock
Saluda
West Point
Yorktown
Williamsburg

Appendix C: Glossary

Active network: Typically a fiber network that has electronics (fiber switches and CPE) installed at each end of a fiber cable to provide "lit" service to a customer.

Passive network: Refers to infrastructure that does not have any powered equipment associated with it. Examples include wireless towers, conduit (plastic duct), handholes, and dark fiber.

Dark fiber: Dark fiber is fiber cable that does not have any electronics at the ends of the fiber cable, so no laser light is being transmitted down the cable.

Lit network: A "lit"network (or lit fiber) is the same as an active network. "Lit" refers to the fact that the fiber equipment at each end use small lasers transmitting very high frequency light to send the two way data traffic over the fiber.

FTTH/FTTP/FTTx: Fiber to the Home (FTTH), Fiber to the Premises (FTTP), and Fiber to the X (FTTx) all refer to Internet and other broadband services delivered over fiber cable to the home or business rather than the copper cables traditionally used by the telephone and cable companies.

Symmetric connection: The upload and download bandwidth (speed) is equal. This is important for businesses and for work from home/job from home opportunities.

Asymmetric connection: The upload and download bandwidth (speed) are not equal. Cable Internet and satellite Internet services are highly asymmetric, with upload speeds typically 1/10 of download speeds. Asymmetric services are problematic for home-based businesses and workers, as it is very difficult to use common business services like two way videoconferencing or to transfer large files to other locations.

IP video: Video in various forms, including traditional packages of TV programming, delivered over the Internet rather than by cable TV or satellite systems.

Latency: The time required for information to travel across the network from one point to another. Satellite Internet suffers from very high latency because the signals must travel a round trip to the satellite in stationary orbit (22,500 miles each way). High latency makes it very difficult to use services like videoconferencing.

Fiber switch: Network electronic equipment usually found in a cabinet or shelter

CPE: Customer Premises Equipment, or the box usually found in a home or business that provides the Internet connection. DSL modems and cable modems are examples of CPE, and in a fiber network, there is a similarly-sized fiber modem device.

Handhole: Handholes are open bottom boxes with removable lids that are installed in the ground with the lids at ground level. The handholes provide access to fiber cable and splice closures that are placed in the handhole. Handholes are also called pull boxes.

Pull boxes: Pull boxes (also called handholes) are used to provide access to fiber cable and splice closures. They are called pull boxes because they are also used during the fiber cable construction process to pull the fiber cable through conduit between two pull boxes.

Splice closures: Splice closures come in a variety of sizes and shapes and are used to provide access to fiber cable that has been cut open to give installers access to individual fiber strands. Splice closures are designed to be waterproof (to keep moisture out of the fiber cable) and can be mounted on aerial fiber cable or placed underground in handholes.

Splicing: The process of providing a transparent joint (connection) between two individual fiber strands so that laser light passes through. A common use of splicing is to connect a small "drop" cable of one or two fiber strands to a much larger (e.g. 144 fiber strand) cable to provide fiber services to a single home or business.

SCADA: Supervisory Control and Data Acquisition. Used by the electric utility industry and some other utilities (e.g. water/sewer) to manage their systems.

Colo facility: Colo is short for Colocation. Usually refers to a prefab concrete shelter or data center where network infrastructure converges. A colo or data center can also refer to a location where several service provider networks meet to exchange data and Internet traffic.

Backhaul: Typically refers to a high capacity Internet path out of a service area or locality that provides connectivity to the worldwide Internet.

Appendix D: Key Broadband Technologies

In the Middle Peninsula region, there is no one technology that is going to provide a "one size fits all" solution for homes, businesses and institutions. While wireless broadband will be a primary means of access for many if not most homes and businesses, fiber routes in key areas to support economic, community, public safety, and K12 use may be important complementary network assets.

Fiber Systems

Fiber is a future proof investment. The upper limit of fiber capacity has not yet been found, and off the shelf hardware can handle thousands of times the needs of an average home or business well into the future. Fiber has a life expectancy of thirty to forty years, and may last much longer than that; every year, the number goes up as fiber systems installed in the 1970s continue to perform adequately. A single fiber can carry all the traffic and services needed by a home or business, including voice telephone service, television programming, live videoconferencing, and HD television.

Fiber's primary drawback is its apparent high cost compared to other systems. Fiber is often unfairly compared to wireless, with the misleading conclusion that wireless is much cheaper. Regrettably, most fiber versus wireless studies compare the start up costs for wireless to the thirty year life cycle costs of fiber infrastructure. During a thirty year period, fiber is installed just once, while wireless systems will have to be replaced entirely several times. Properly costed over a thirty year period, fiber is actually less expensive than wireless, with many times the capacity.

Metro Ethernet is a point-to-point service provided over fiber. Metro Ethernet networks can deliver service as far as 50 miles from network element locations and provide speeds up to 10 Gigabits per second (10GB Metro Ethernet circuits are now commonly available from some providers).

Carrier Ethernet is the term used to describe Active or Metro Ethernet deployed to the premises. Carrier Ethernet is available in 100 Mbps and 1 Gbps utilizing a pair or a single fiber strand and speeds of 10 Gbps over a pair of fiber optic strands. Carrier Ethernet can be deployed at distances of up to 50 miles (80km) from the central office.

A Passive Optical Network, or PON, is a fiber optic network based upon a splitter technology. A single PON port can support up to 64 customers utilizing either daisy chained splitters or a central splitter location. For service providers PON is cost effective as it allows the service providers to create "fiber light" networks and fewer network elements. However, PON has many drawbacks including bandwidth limitations due to the shared nature of the feeder fibers as all customers fed from a splitter share bandwidth over a single fiber (or single pair in some networks). A major drawback of PON, if field splitters are used, is the upgradeability of the network which usually requires additional feeder fiber to be deployed which is costly as it is considered a "forklift upgrade."

CARRIER FIBER (ACTIVE) ETHERNET CHARACTERISTICS	
Bandwidth	1 Gbps standard
Line sharing	Each user has a dedicated 1Gbps between the premises and the core location.
Latency	Not latent
Symmetric/Asymmetric	Symmetric
Effective Distance	up to 50 miles (10km, 20km, 40km, and 80km optics available)
Services Support	Multiple services, multiple providers
Typical per subscriber build cost	$3250 - $3500

PON FIBER (PASSIVE) CHARACTERISTICS	
Bandwidth	2.4 Gbps/1.24 Gbps (shared between users on a port). A few 10Gig PON systems are now being deployed because the older PON systems are running out of bandwidth.
Line sharing	Each port is shared by a power of 2 premises (2, 4, 8, 16, 32, or 64) depending on how the network is configured.
Latency	Minimal latency.
Symmetric/Asymmetric	Asymmetric
Effective Distance	up to 25 miles (40km)
Services Support	Multiple services, multiple providers
Typical per subscriber build cost	$3250

We are now seeing even small and medium-sized businesses asking for fiber connections. Fiber is the only transmission system that will be able to deliver all the services businesses and residents will expect and demand in just a few years. Communities that choose to delay fiber infrastructure investments will be at a severe disadvantage in the next several years when trying to attract and retain businesses and workers.

In business areas of the region, fiber is an absolute requirement to retain existing businesses and to attract new ones. Many of subdivisions could have fiber within the neighborhood and wireless backhaul, and multiple services (e.g. video, Internet, voice, data backup) could be delivered within the neighborhood by fiber. In growth areas, retail and office space would become more valuable with high performance fiber availability.

Fixed Point Access Wireless

Fixed point wireless Internet access via private sector providers is already available in some areas of the region. This service introduces additional competition for Internet access customers, which can lower prices and create incentives to offer better customer service from the providers. Over time, most fixed point Internet users (five to seven years out) will want to migrate to fiber connections which will have the capacity to provide a much wider range of services, including HD TV, telemedicine, and tele-health, among other applications.

Fixed point wireless infrastructure investments (e.g. locations for towers, towers, fiber and duct backhaul connections) can be re-used over time to support mobile wireless services and long term public safety voice and data services.

The goal would be to identify existing tower sites that could be reached affordably with fiber. Fiber access to these towers will lower the cost of backhaul for local wireless broadband providers while simultaneously allowing them to increase bandwidth and overall performance.

Wireless broadband services will be important in rural parts of the region. And wireless is not going away; it will remain as an important component of a well-designed community broadband system--as a mobility solution. As we travel around the community, we want to be able to access the Web, check email, make phone calls, and do other sorts of things. Wireless services enable that, and in rural areas, wireless services are an important step up from dial-up.

WiMax and LTE capacities and distances are widely exaggerated. It is very common to see promises of "up to 80-100 megabits" of capacity and distances of "10 to 20 miles." With respect to bandwidth, that 100 megabits of capacity will be shared among all connected users, so if 100 households are trying to access the network via a single WiMax access point, the usable bandwidth may be more like 2-4 megabits per household or per user. Distances are limited by line of sight.

Both WiFi and WiMax signals will work over many miles, but only with narrow angle antennas and clear line of sight. While WiFi can easily reach ten miles or more with clear line of sight, and WiMax can reach twenty miles with clear line of sight, in practice these optimum distances are rarely achieved; it is more realistic to consider WiFi usable over 2-4 miles and WiMax over 4-8 miles. Tree cover is particularly problematic, and it is often necessary to remove tree limbs, an entire tree, or to relocate the antenna in order to get a good signal.

LTE and television "white space" systems are emerging standards that can provide connectivity at much longer distances (five to ten miles is possible under ideal circumstances) and the radio frequencies used are better able to penetrate at least some foliage. Bandwidth of several megabits are possible, and compare very favorably with copper-based systems like DSL. But even these systems will have a limited ability to handle TV programming, interactive videoconferencing, and other business class services.

FIXED POINT WIRELESS CHARACTERISTICS	
Bandwidth	5Mbps - 10Mbps on average for rural/residential service. Higher speeds available at higher cost.
Line sharing	In most Wireless ISP (WISP) architectures customers share a point to multi-point connection with an access point. Service can be affected when too many customers are on an access point.
Latency	Minimal latency issues
Symmetric/Asymmetric	Symmetric
Effective Distance	The effective range of an access point depends on the frequency chosen.
Services Support	Internet, VoIP, and streaming video can be supported by WISP architectures. A multi-provider environment can be configured on a WISP network, but is less commonly found compared to fiber networks.
Typical per subscriber build cost	$370 to $550, and costs could be much higher if a pole has to be installed ($2000 to $7000). High operating costs should be considered as a factor because of the high failure rate for wireless equipment.

Cellular Data Wireless

Wireless access to the Internet and other mobile services like cellular telephone providers is a long term need that will not be replaced by fiber access. In fact, over the next five to seven years, the most common use for wireless Internet access will be for mobility--casual business, personal, and government access away from the home or office. In the rural areas of the region, fixed point cellular data services (e.g. "air card") can provide substantial improvements over DSL, satellite, or dial up.

Mobile wireless access to voice and data services is already widely available from multiple providers in most of the U.S. Nationwide, Verizon, Sprint, and AT&T have already begun an aggressive expansion and upgrade to LTE (the so-called 4G/5G networks). However, the bandwidth caps and bandwidth overage charges make cellular data services too expensive as a primary residential or small business connection.

Perhaps more alarming, some telephone companies, including Verizon and AT&T, are abandoning their copper line plant in many rural areas of the country, and are only offering cellular-based dial tone for home and small business use.

Cellular data plans, because of the bandwidth caps and overcharges that are included with typical plans, can be a poor solution for rural residents who may be trying to use it for business purposes, for K12 school assignments, and/or personal use. Households with children report that it is very difficult (and/or expensive) to keep within data caps.

CELLULAR DATA SERVICE CHARACTERISTICS	
Bandwidth	2Mbps-12Mbps and up, but actual bandwidth can vary widely.
Line sharing	In a mobile wireless broadband network the access point is in a point to multi-point configuration, meaning access is shared.
Latency	Latency is generally not an issue
Symmetric/Asymmetric	Symmetric
Effective Distance	The effective range of an access point depends on the frequency chosen.
Services Support	Internet, VoIP, and streaming video can be supported but service may degrade at peak times.
Typical per subscriber build cost	$80 and up, depending on data plan, bandwidth caps and overage charges.

Emerging Wireless Technologies

MIMO Wireless

MIMO (Multiple Input, Multiple Output) describes a variety of technologies that can be summarized as using more than one receive and transmit antenna for wireless data applications. Wireless protocols that are using the MIMO concept include IEEE 802.11n (Wi-Fi), IEEE 802.11ac (Wi-Fi), 4G, LTE (Long Term Evolution), and WiMAX. Each of these protocols use the MIMO technology to increase the amount of available bandwidth in a given section of radio frequency spectrum.

New hardware is required to make effective use of MIMO. While the technology increases wireless bandwidth, the typical amount of bandwidth being used by wireless devices is also increasing rapidly. Some applications where MIMO is likely to provide noticeable improvements are in home wireless routers, where the effective throughput will be able to better handle the demanding bandwidth requirements of HD and 4K video streams. MIMO is slowly being developed for use with cellular smartphones, but both the phones and the cell tower radios have to be upgraded to support MIMO.

LTE/4G/5G

LTE (Long Term Evolution) is a set of protocols and technologies designed to improve the performance of voice/data smartphones. Like MIMO, both the user phone and the cell tower radios have to be upgraded to support LTE improvements. In 2013, only 19% of U.S. smartphone users were able to take advantage of LTE speeds, although that percentage has been increasing rapidly since then, and more than 85% of the U.S. cellular towers are expected to be upgraded to LTE in the next two years. As noted previously, the actual bandwidth available to a smartphone user is highly variable and depends on distance from the cell tower, the number of smartphones accessing the same tower simultaneously, and the kinds of services and content being accessed by those users.

The primary purpose of cellular bandwidth caps is to keep cellular users from using too much bandwidth and degrading the overall service. While LTE and MIMO improvements will improve overall cellular service, these technologies are not going to replace fiber to the home and fiber to the business.

The 5G technical standard is not scheduled for release until 2020, so any promises of 5G systems eliminating the need for fiber services is just marketing promises without any substance.

The Path Forward

Community Broadband Assessment for Middlesex County Virginia

January 2017

CIT
CENTER FOR INNOVATIVE TECHNOLOGY

Topics

- Community Profile
- Current Reported Coverage
- Broadband Demand
- Local Assets
- Review of local policies & fees
- Broadband Needs
- Next Steps

Before We Begin

Positive impacts of broadband on household income:
- gaining 4 Mbps of broadband increases household income by $2,100 per year
- re-employment 25 percent faster than traditional searches
- higher employment rates in rural counties

Positive impacts of broadband on healthcare
- enables solutions that help manage chronic diseases, like diabetes and obesity.
- connecting health and broadband sectors is a path to a more connected, healthier locality.

Reasons for positive impacts
- boosts personal productivity,
- enables more flexible work arrangements
- enables home-based businesses as a replacement, or complement to an ordinary job.
- enables people to be more informed,
- better educated and socially and culturally enriched – fueling a faster career path.
- improves access to health and care

Source: The Appalachian Regional Commission (ARC) Broadband Planning Primer Toolkit
https://www.arc.gov/images/programs/telecom/ARCBroadbandPlanningPrimerToolkit.pdf
Connect2HealthFCC: https://www.fcc.gov.edgekey.net/health/maps

Remember the Broadband Economics?

Profit/Sustainability = Revenue - CapEx + OpEx

How do we make the math work for sustainability & future upgrades?
How do we entice the private sector to invest?

INCREASE REVENUES	LOWER COSTS
Adoption and Demand	**Local Assets/Infrastructure** What you have that might be shared
Population Density	**Policies & Fees** Reduce or eliminate fees for partners Streamline permitting
Community Anchor Institutions Residents, businesses, government facilities, healthcare	**Funding Options** Public & Private Investments
***Red indicates variables local governments can affect**	

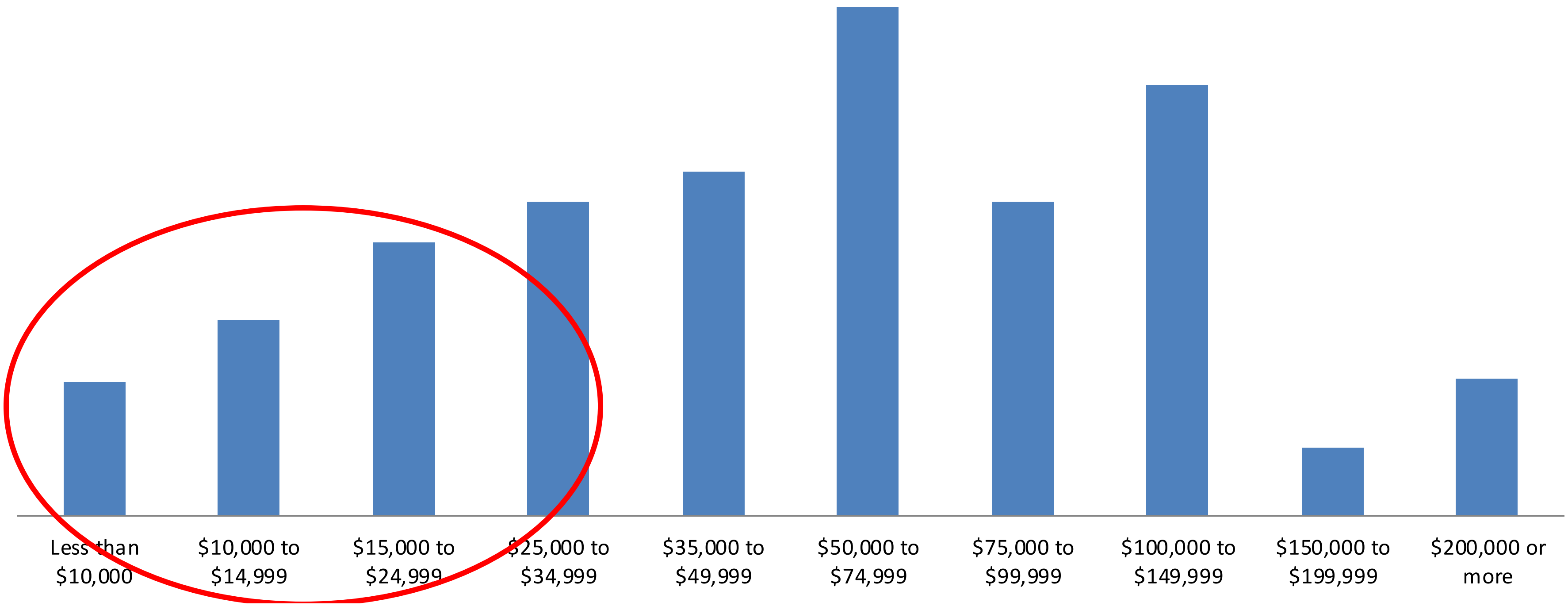
Broadband Perspective

COMMUNITY PROFILE

SOURCE: HTTPS://WWW.CENSUS.GOV/ACS/WWW/DATA/DATA-TABLES-AND-TOOLS/DATA-PROFILES/2014/

Middlesex Household Income

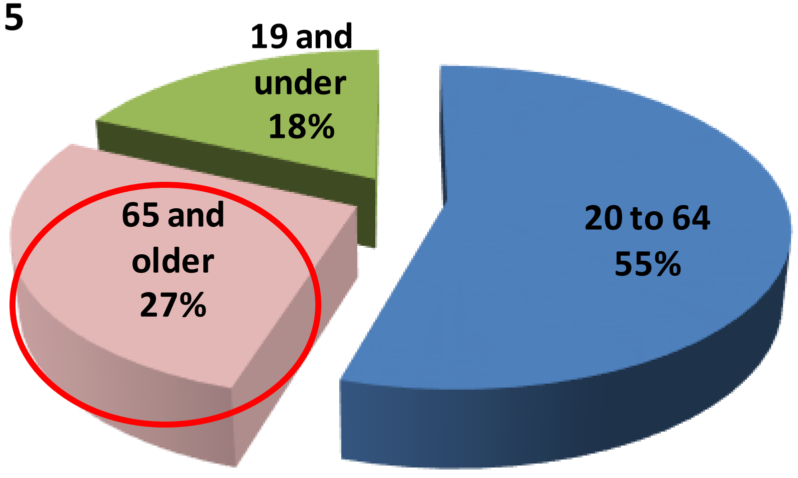
Total Occupied Households: 4,432
Median household income: $54,452



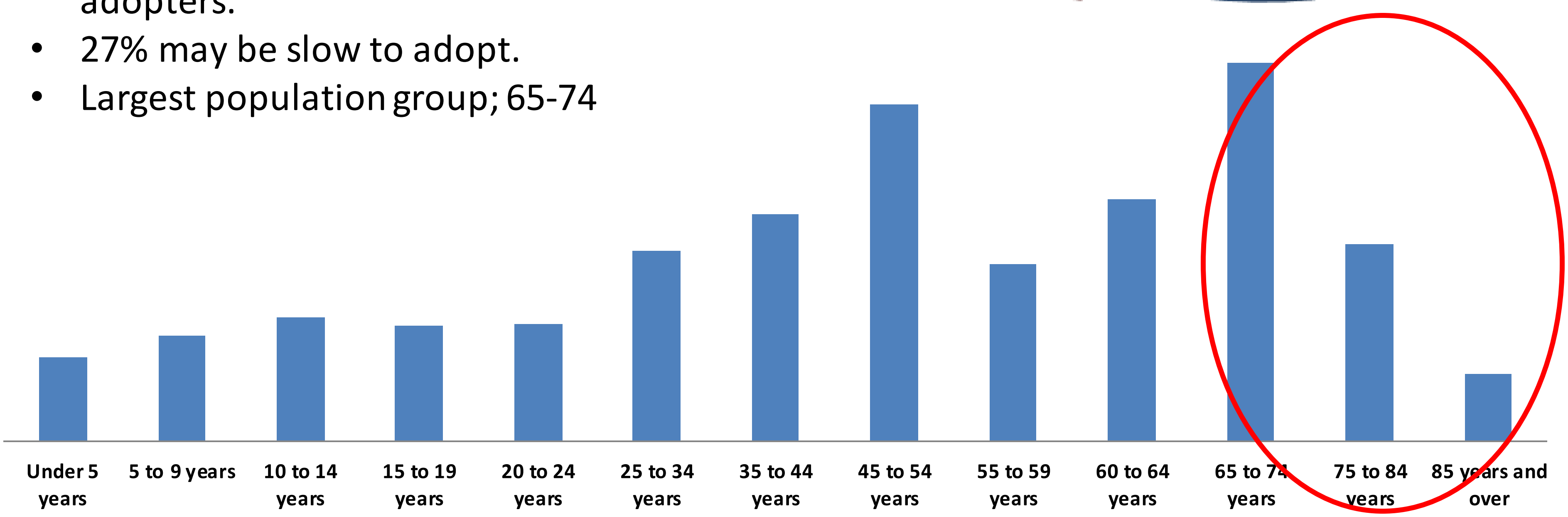
Take Away: Up to 30% may have affordability challenges

Middlesex Age and Population

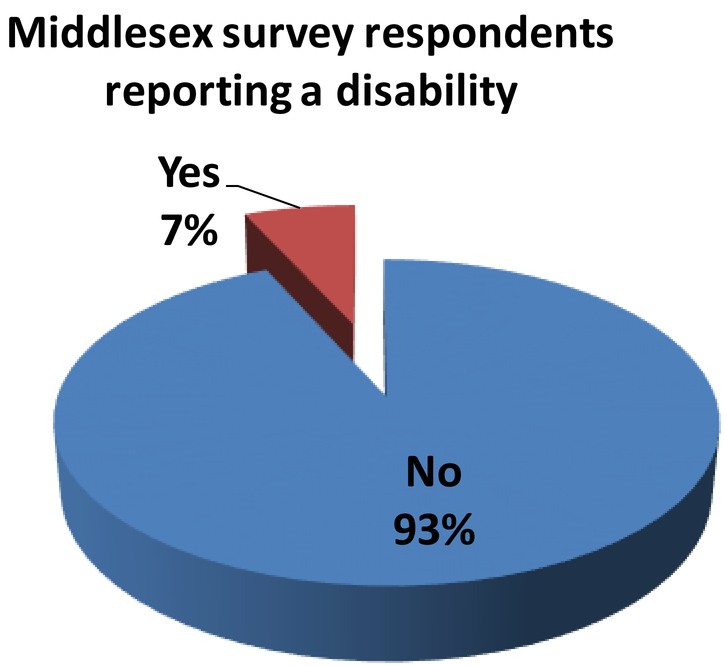
Total Population:10,817
Median Age: 51.5

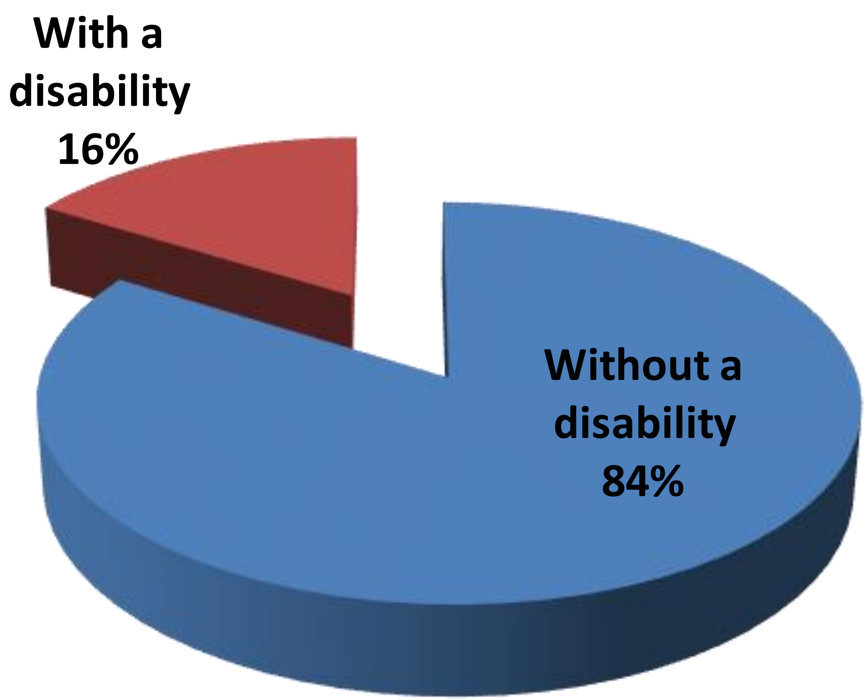


Take away:
- Majority of population considered technology adopters.
- 27% may be slow to adopt.
- Largest population group; 65-74



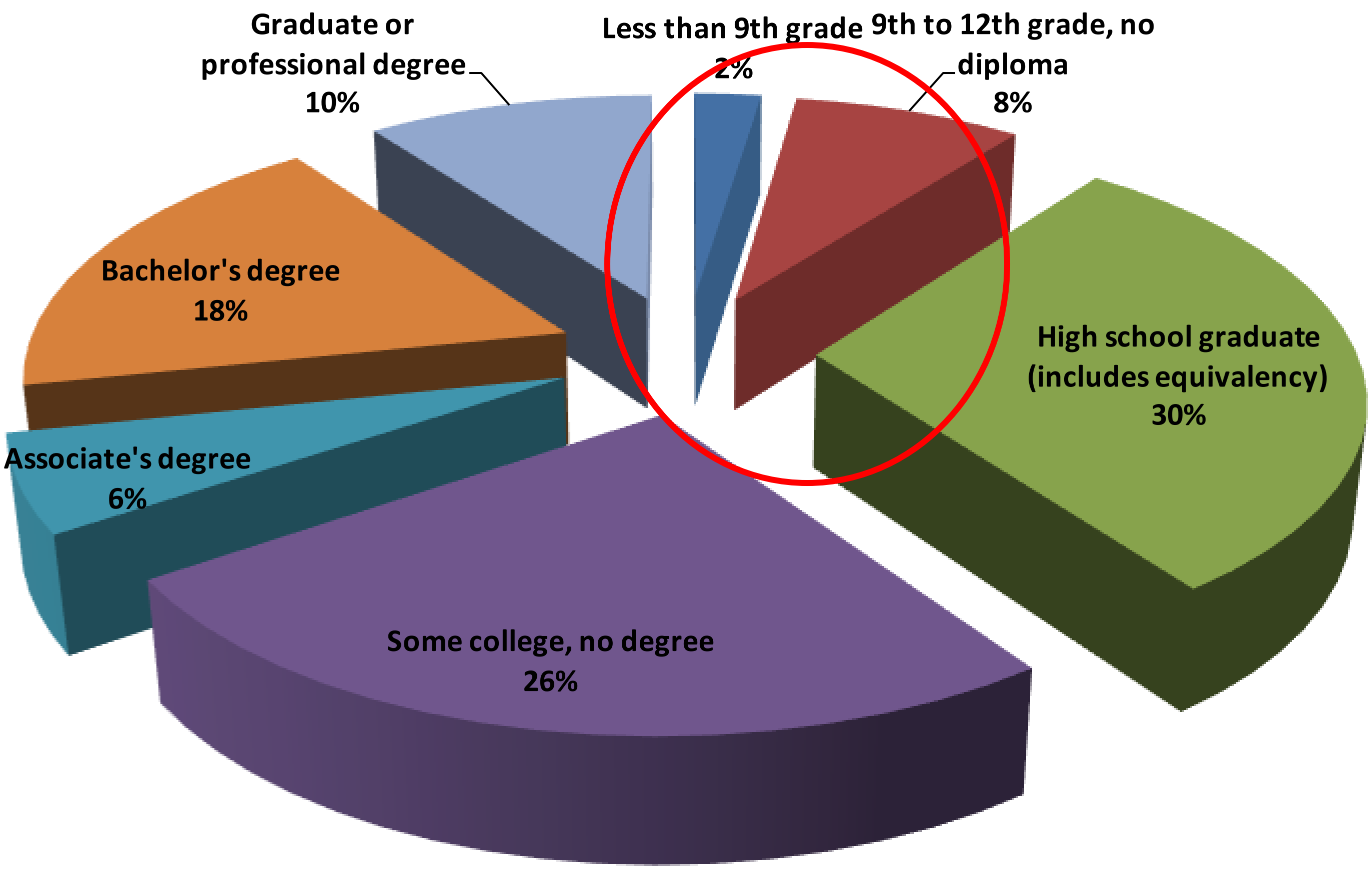
Middlesex Populations with Special Needs





Take Away: 16% may be slow to adopt technology or need special equipment

Middlesex Educational Attainment Profile

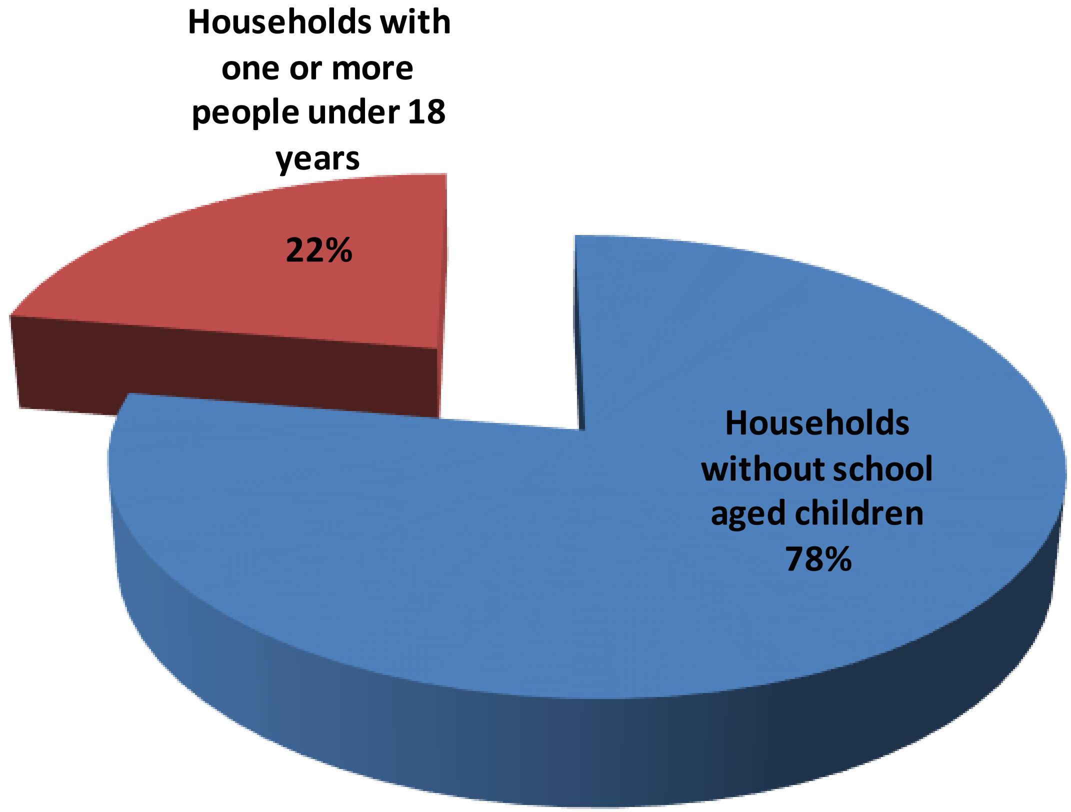


<u>Take Away</u>

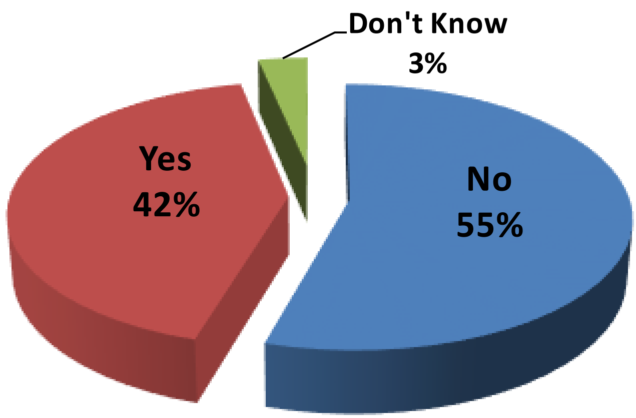
10% of the population may be slow to adopt and/or less likely to subscribe to new services.

From survey: 5% that report no Internet at home cite reason as digital literacy issues.

Middlesex Households with K-12 Children

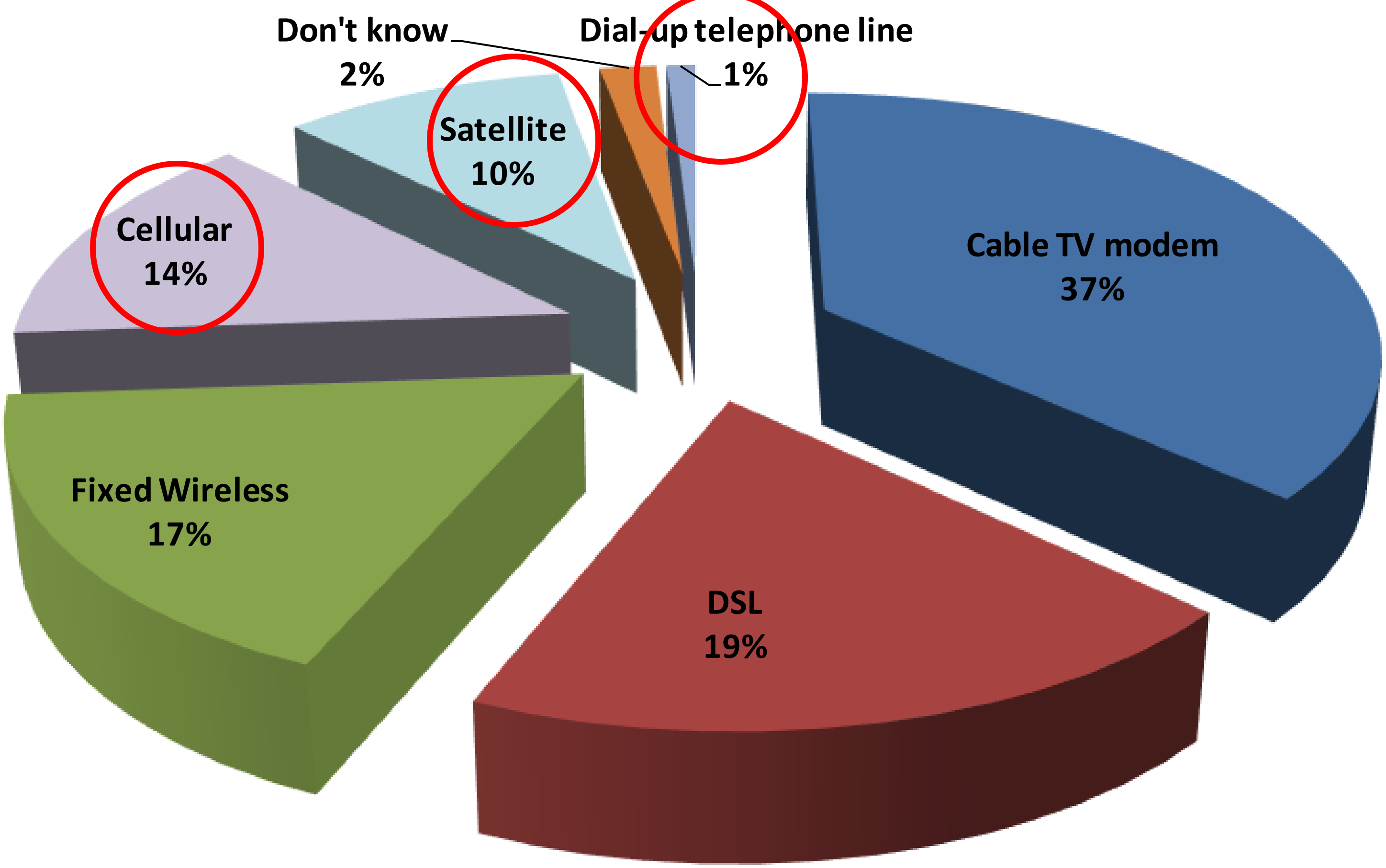


From Survey:
Does your child have Internet access outside of school



Take Away: 22% of households need broadband at home to support K-12 education. More than half of survey respondents report their school aged children have no Internet at home.

Middlesex Households with K-12 Children Connection Types

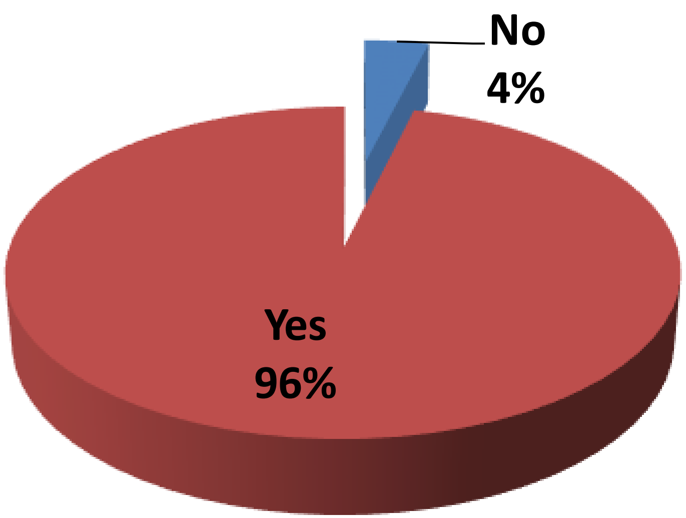


Take away: 25% of household with K12 students have inadequate connection types.

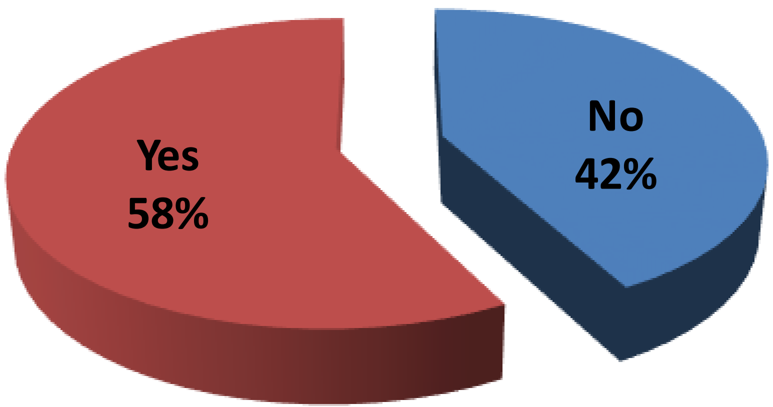
Educational Related Online Activities

(From Middlesex Survey)

Parents that Access School Websites



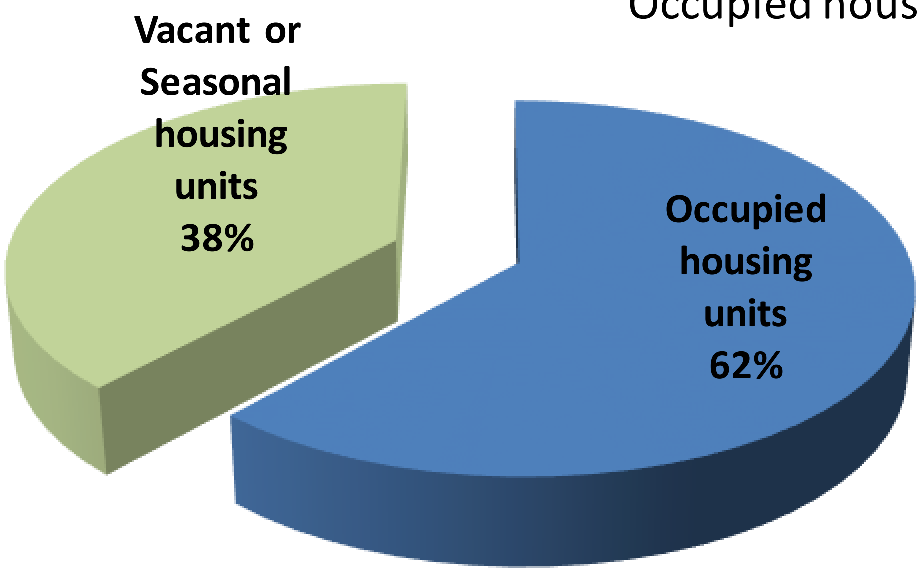
Respondents that use the Internet for school work or job training activities

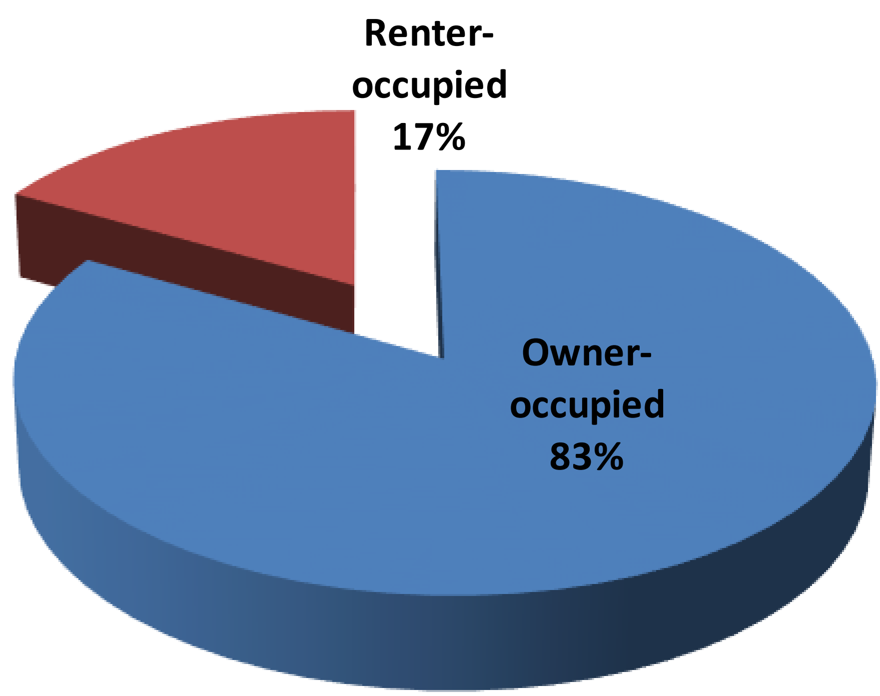


Take away:
58% of survey respondents report using the Internet for school or job training activities.
Most parents use the Internet to access their child's school website

Middlesex Housing

Total housing units: 7,188
Occupied housing units: 4,432

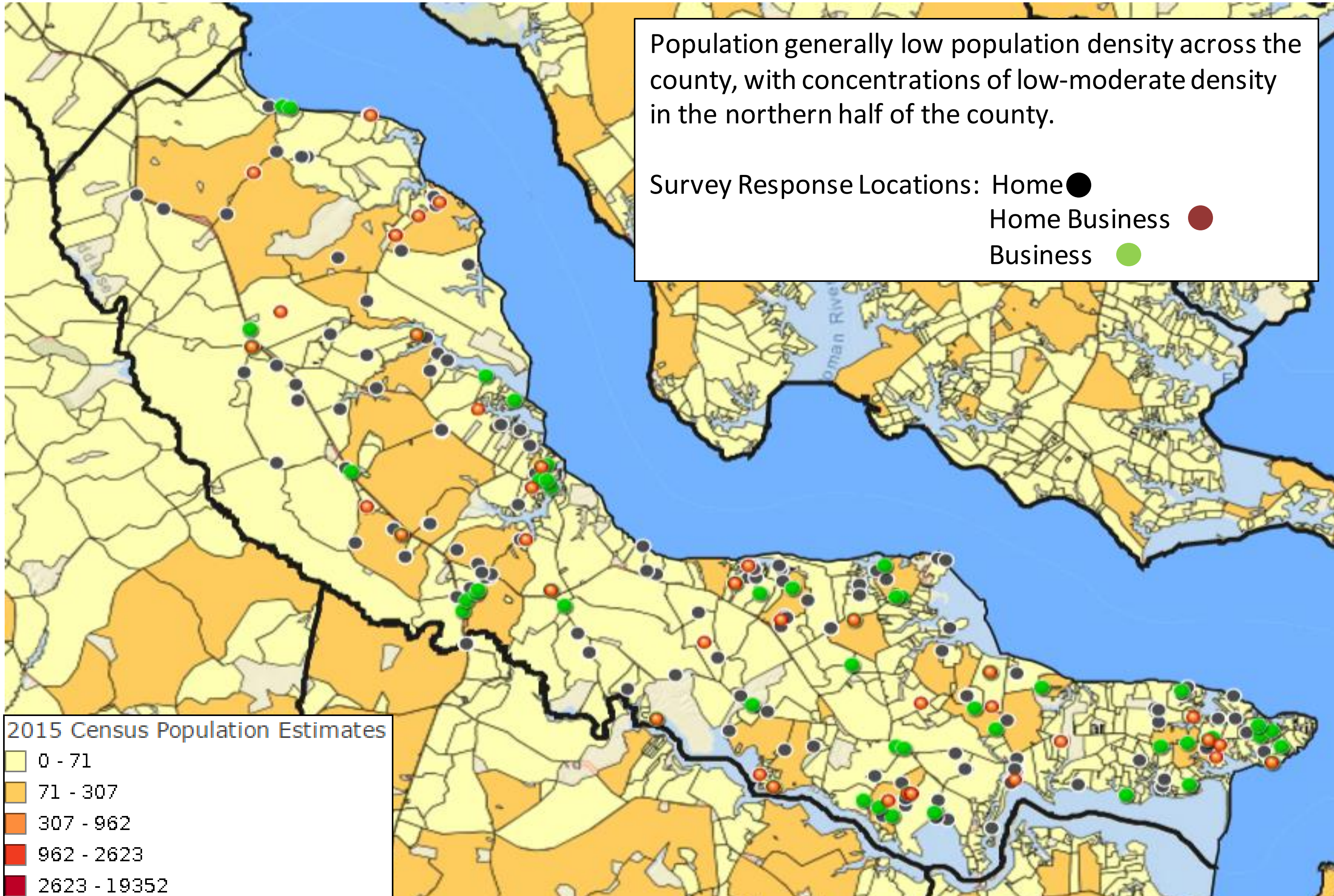




Take away: >1/3 of housing units are vacant or represent seasonal/weekend homes

*a vacant unit may be one which is entirely occupied by persons who have a usual residence elsewhere.
Source: https://www.census.gov/housing/hvs/definitions.pdf

Middlesex Population Density



FCC Provider Reported Data

REPORTED CURRENT COVERAGE

Seriously

Important note about FCC reported coverage

All facilities-based broadband providers* **are required** to file data with the FCC twice a year (Form 477) on where they offer Internet access service at speeds exceeding 200 kbps in at least one direction.

Fixed providers file lists of census blocks in which they **can or do offer service** to at least one location, …
Mobile providers file maps of their coverage areas for each broadband technology (e.g., EV-DO, HSPA, LTE).

Block-Level Deployment and Competition

A provider that reports deployment of a particular technology and bandwidth in a particular census block may not necessarily offer that particular service everywhere in the census block. Accordingly, a list of providers deployed in a census block does not necessarily reflect the number of choices available to any particular household or business location in that block, and the number of such providers in the census block does not purport to measure competition.

Source: Source: https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477
***A Facilities-based Broadband Provider** is an entity that provides broadband services over facilities it owns, provisions and/or equips.

Take away – 2015 data Coverage maps are overstated !

Middlesex DSL Coverage

Verizon

Middlesex Cable Coverage

Metrocast

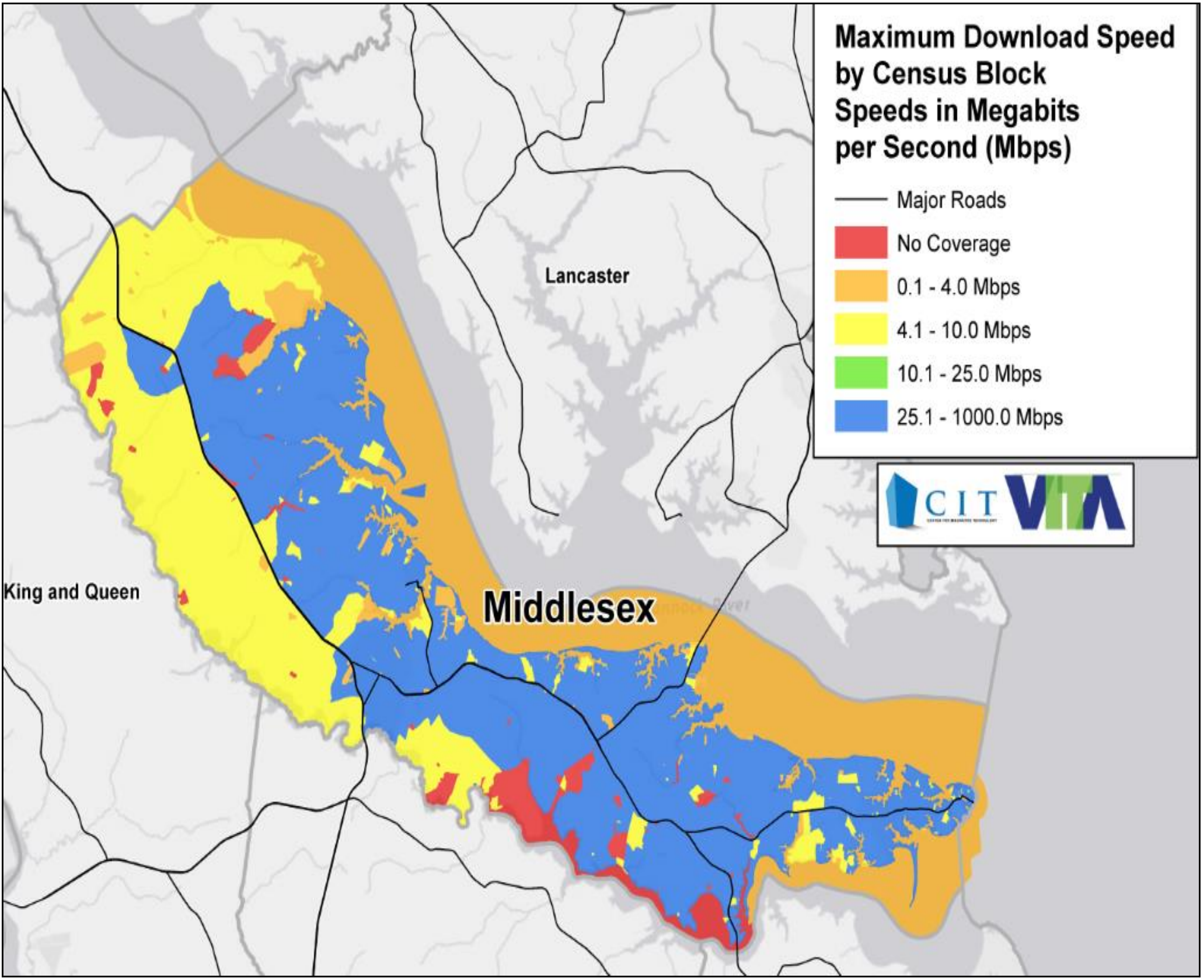
Fiber Service

Lightower

Fixed Wireless

Virginia Broadband, KQVA.Net

FCC Coverage Statistics



FCC
Consumer Fixed BB Stats

- >= 4 Mbps 96.9%*
- = 10 Mbps 91.4%
- >= 25 Mbps 88%

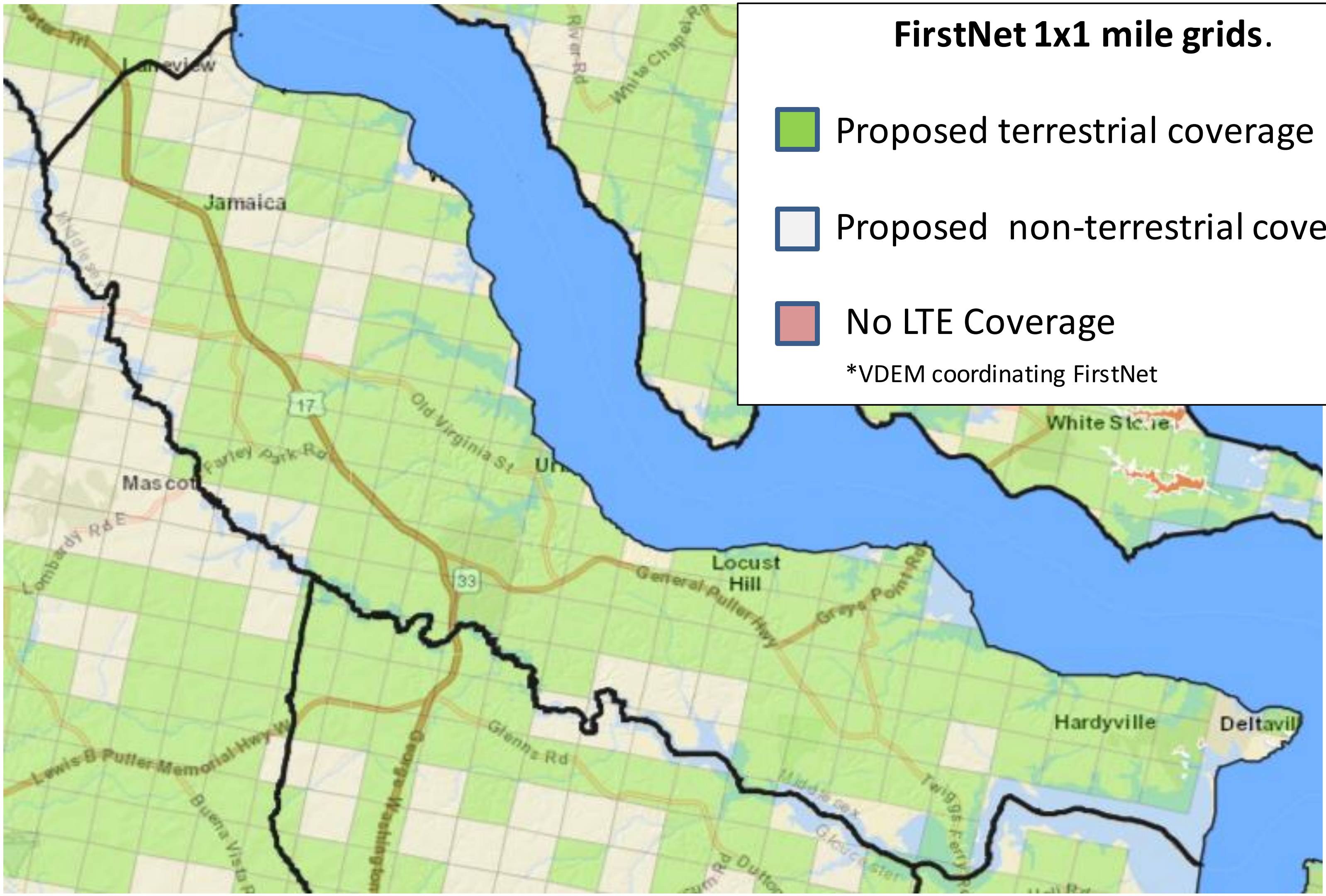
Source: FCC 477 data

*Percent of total households

Recall: A provider that reports deployment of a particular technology and bandwidth in a particular census block may not necessarily offer that particular service everywhere in the census block.

Public Safety

FirstNet and No-LTE

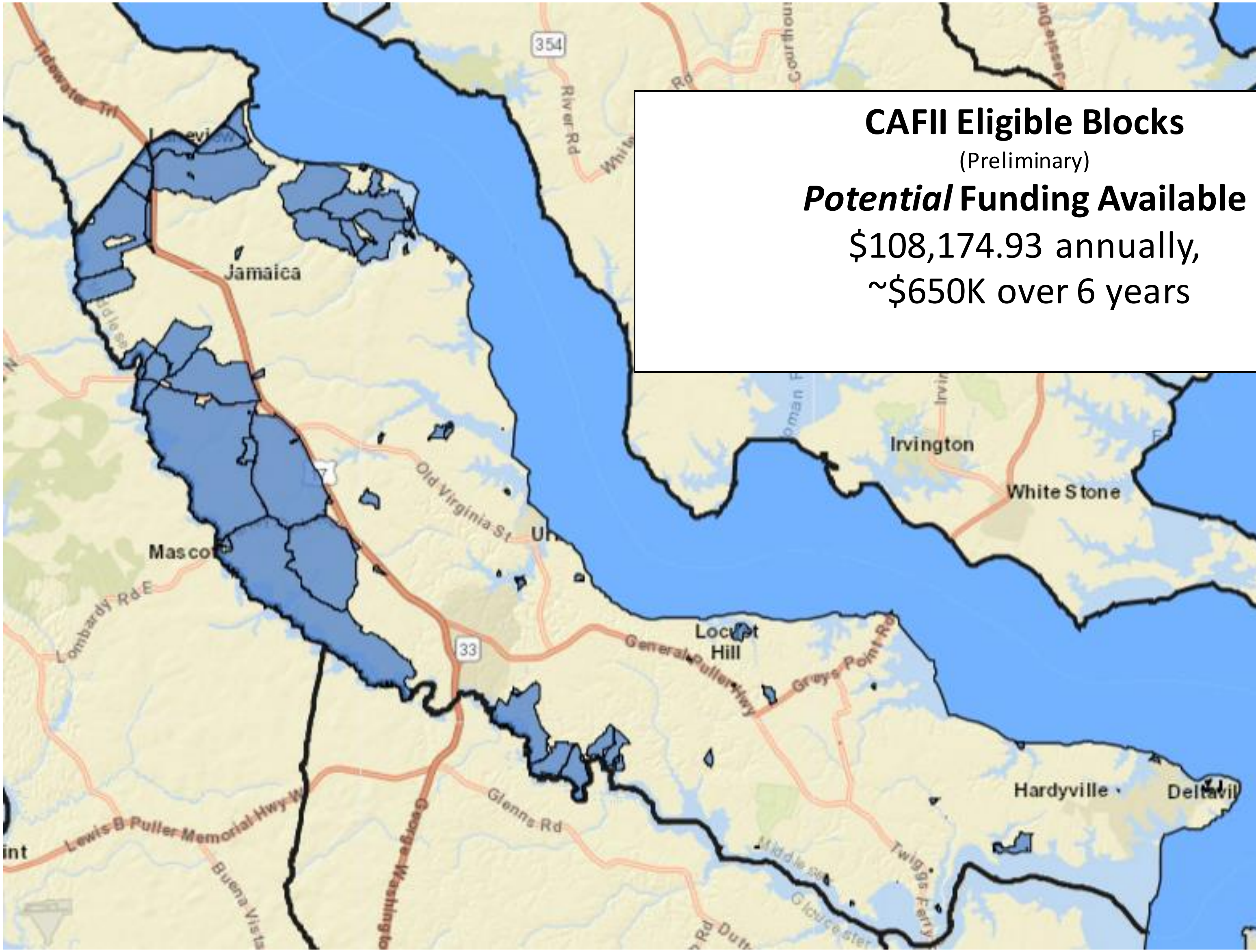


FirstNet 1x1 mile grids.

- Proposed terrestrial coverage
- Proposed non-terrestrial coverage
- No LTE Coverage

*VDEM coordinating FirstNet

Connect America Phase II



CAFII Eligible Blocks
(Preliminary)
***Potential* Funding Available**
$108,174.93 annually,
~$650K over 6 years

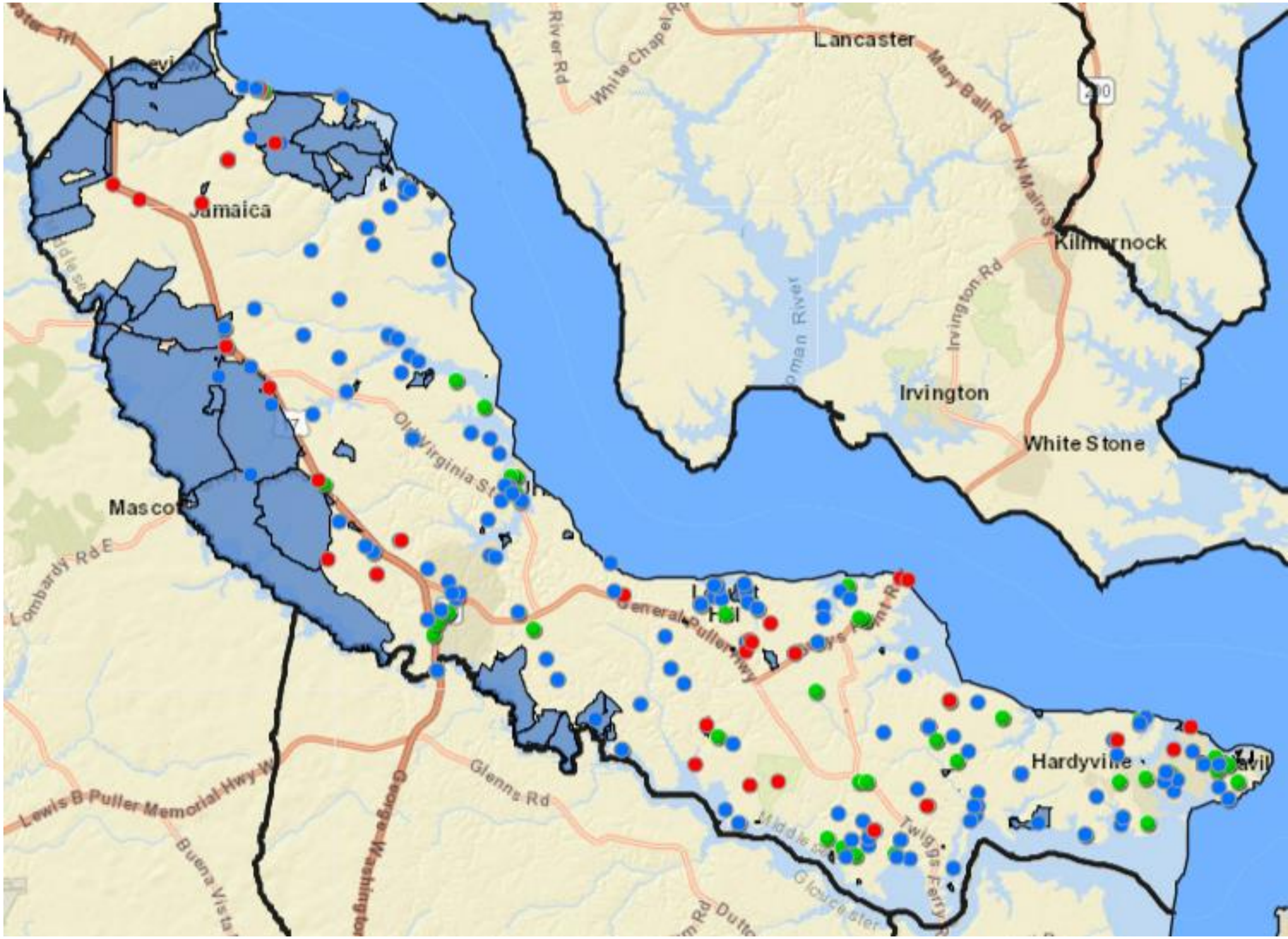
CAFII & Demand

Primary CAFII Areas

- Church View
- Jamaica
- Saluda

Do you have Internet at home

- Yes
- No
- Business



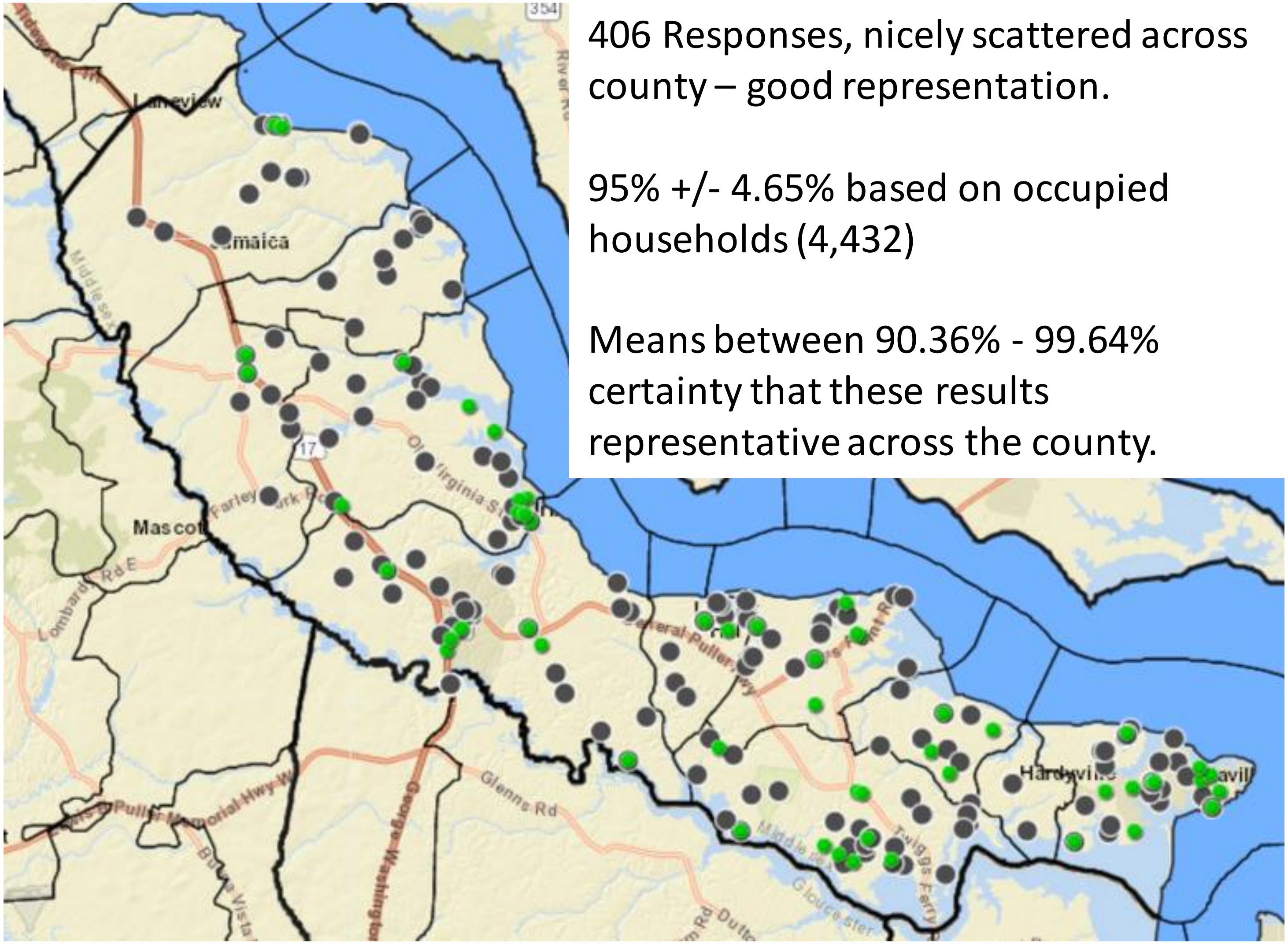
Now and Into the Future

BROADBAND DEMAND

Middlesex Survey Response Locations

Businesses

Residential

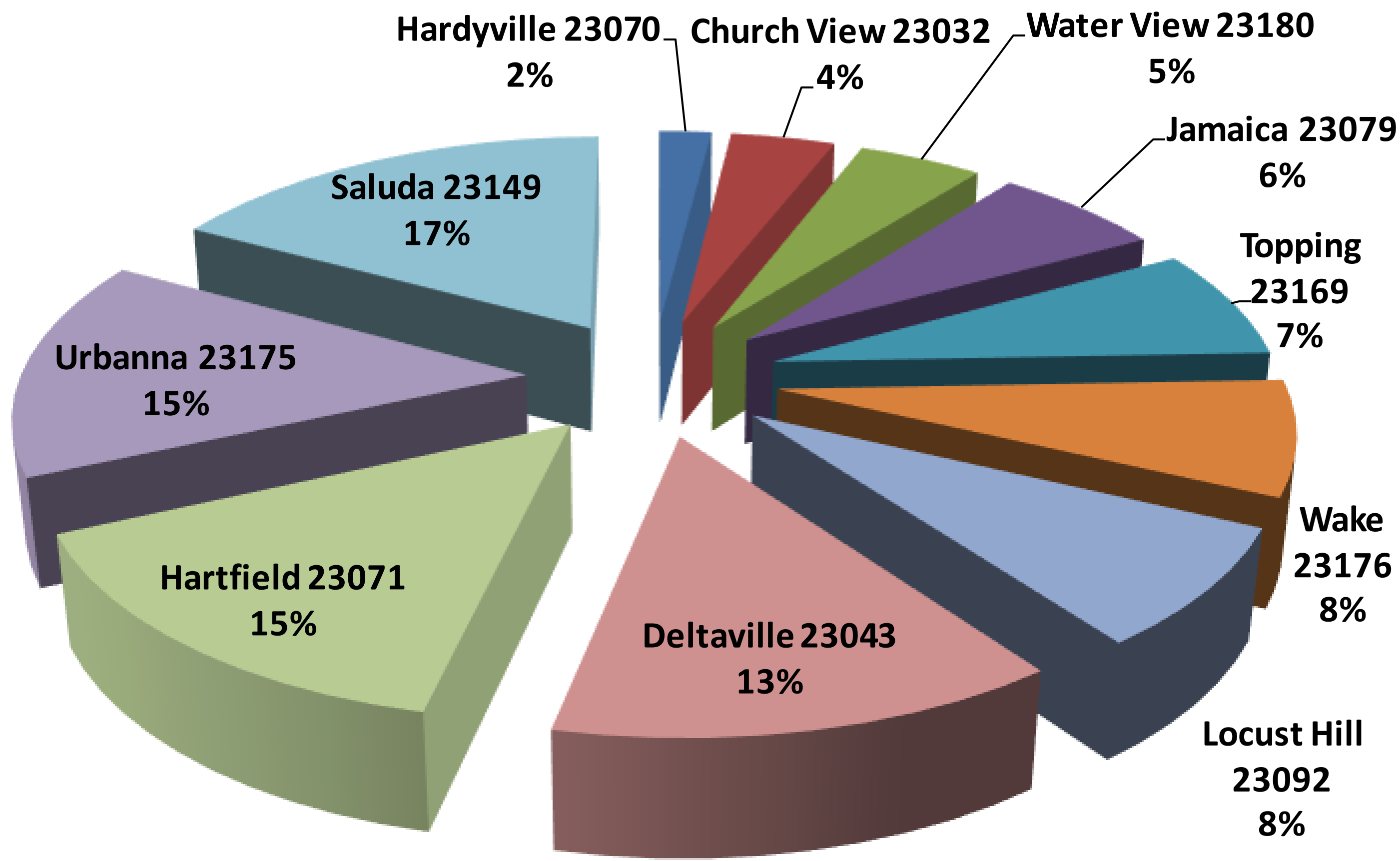


406 Responses, nicely scattered across county – good representation.

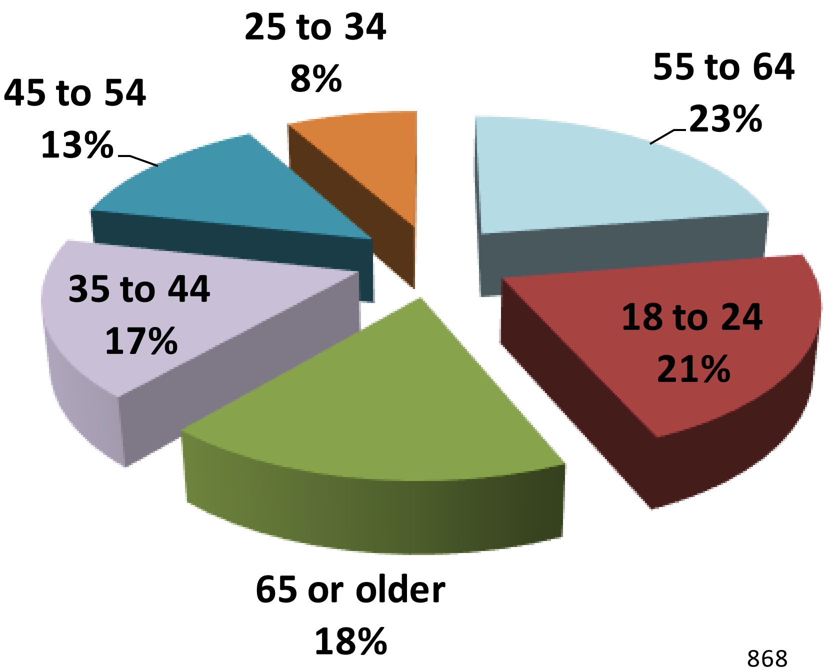
95% +/- 4.65% based on occupied households (4,432)

Means between 90.36% - 99.64% certainty that these results representative across the county.

Middlesex Survey responses by Zip Code



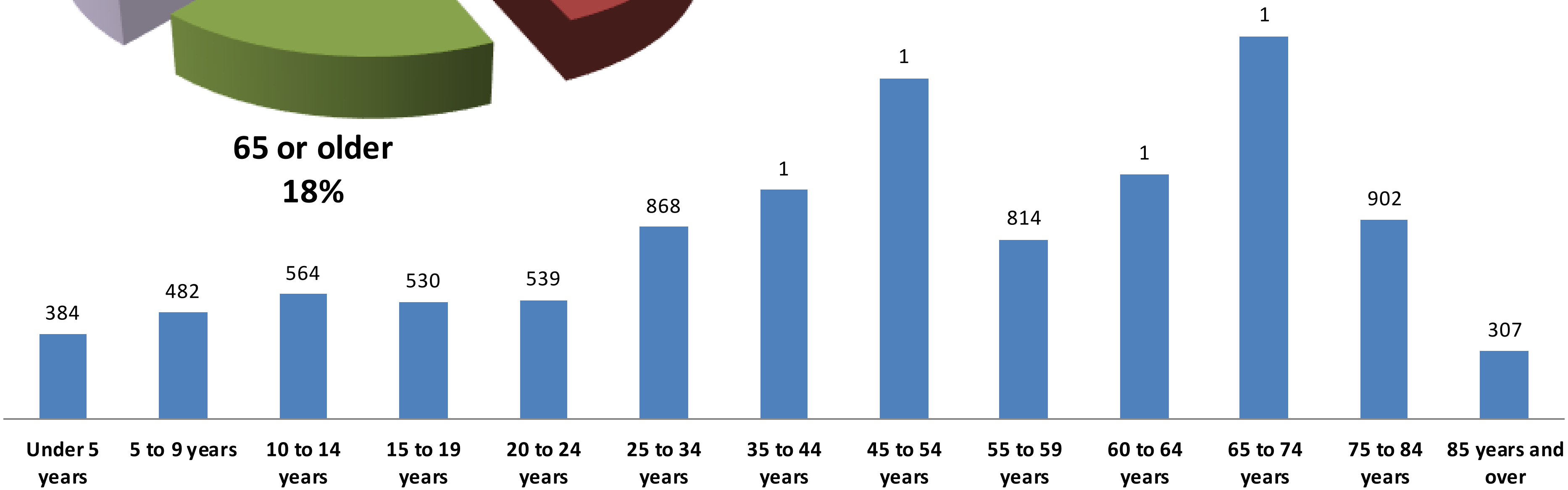
Middlesex Survey Respondents by Age



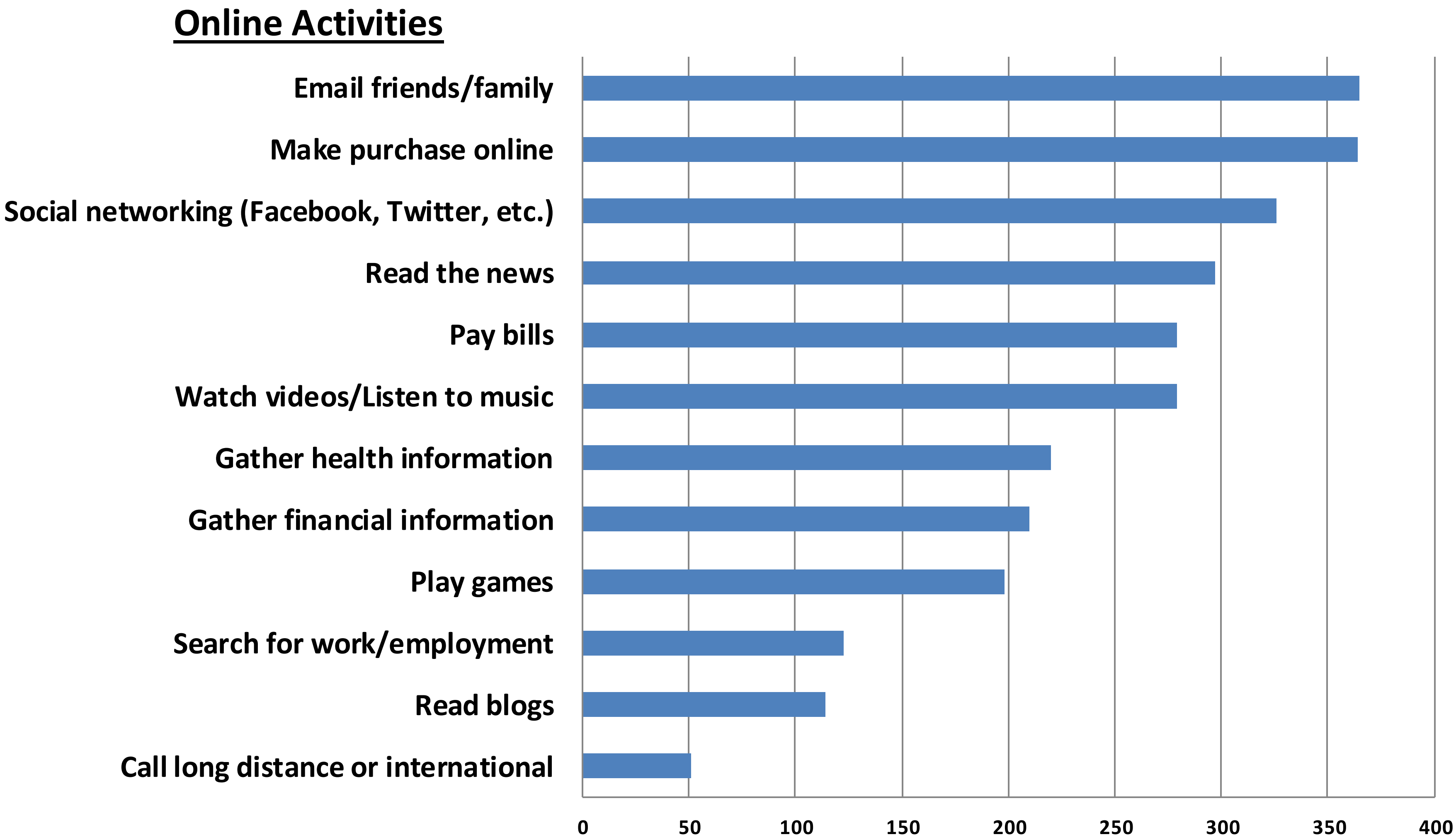
Recall median age: 51.5

Largest age group is 65-74

18-24 yrs ~ 5% of pop. contributed 1/5 of the responses.



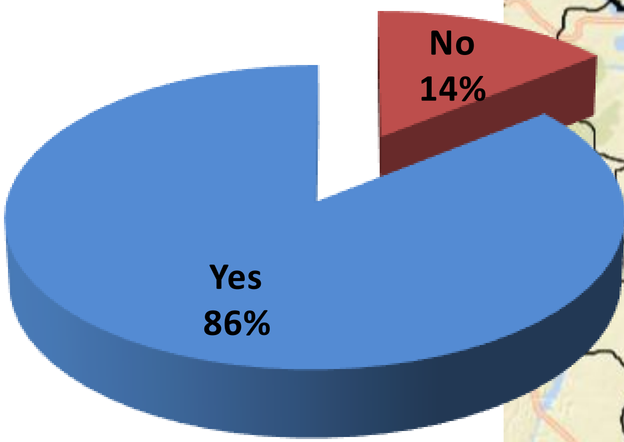
What are Middlesex citizen's doing online?

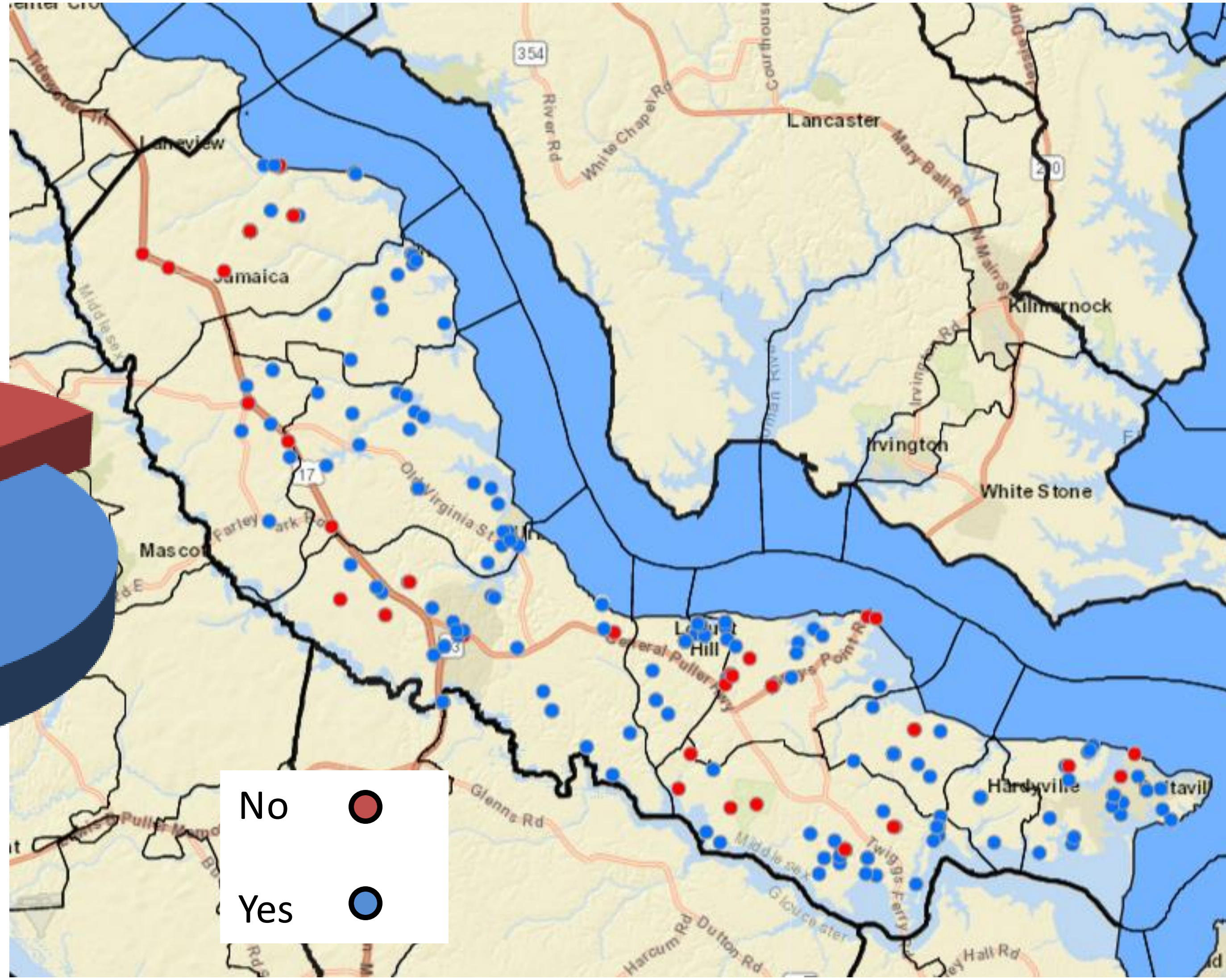


Take Away: Generally low bandwidth activities.

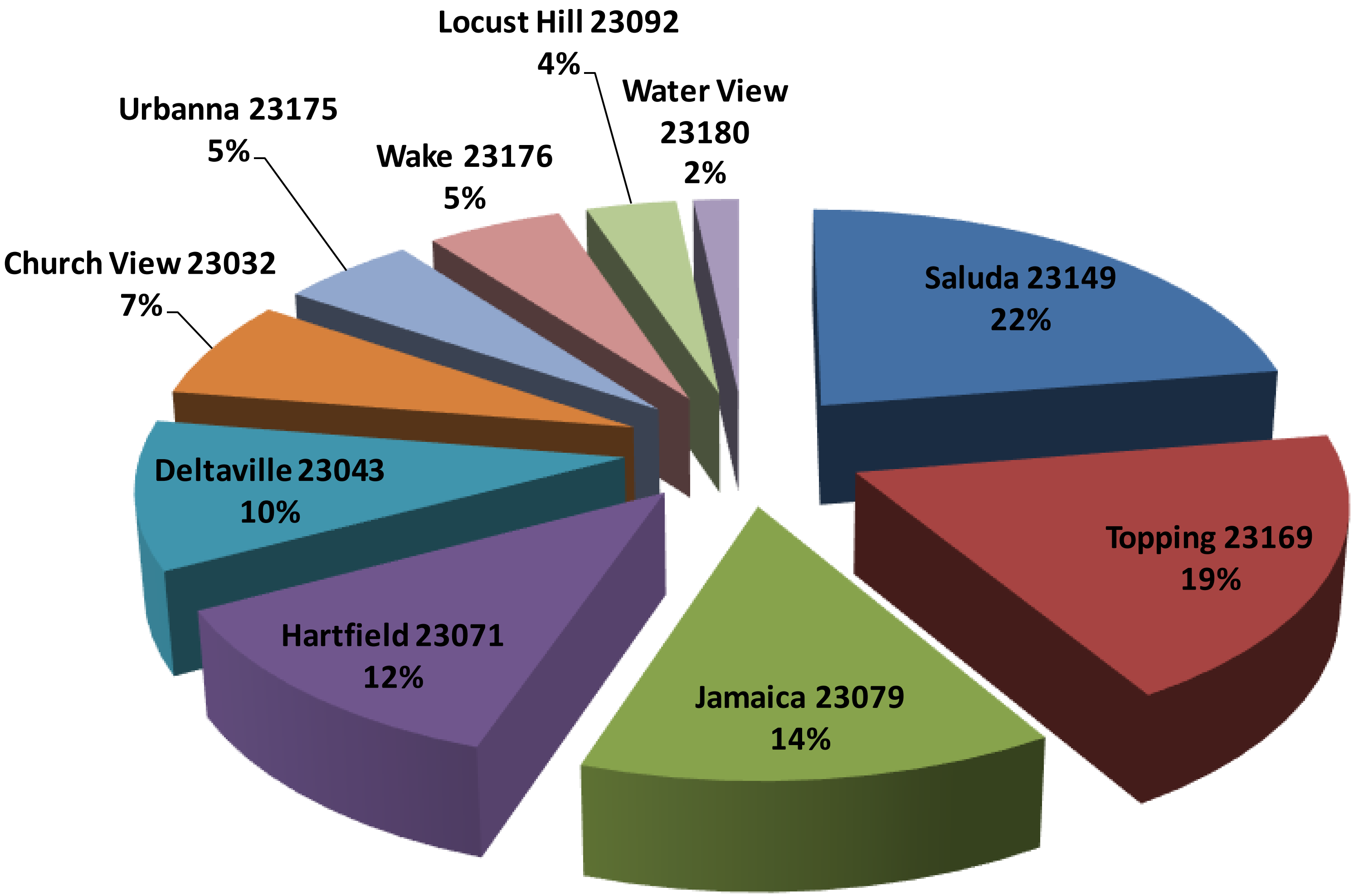
Middlesex Reported Residential Access

Do you have Internet access at home?

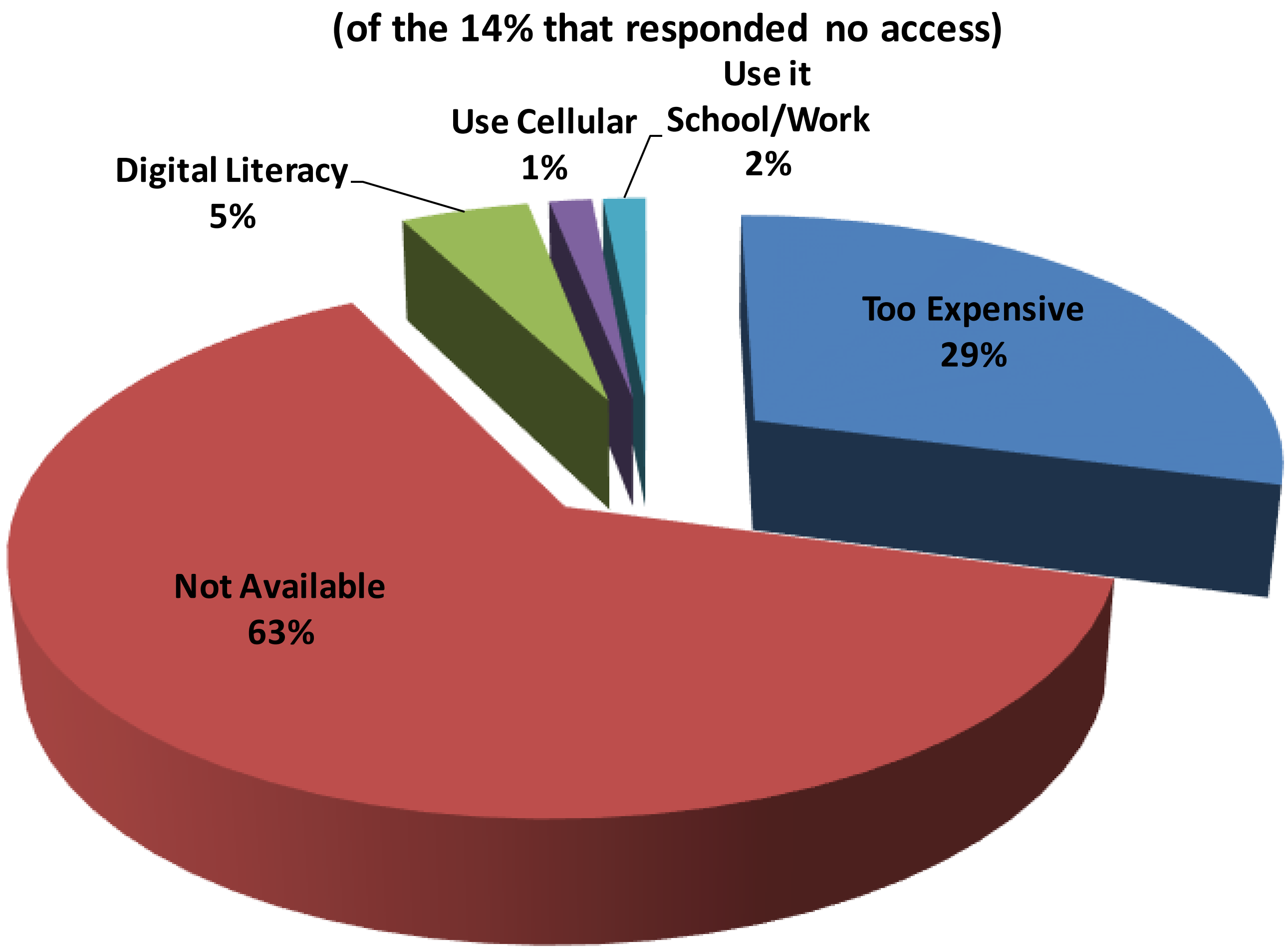




Middlesex No Internet at Home (14%)



Why No Internet Service at Home?

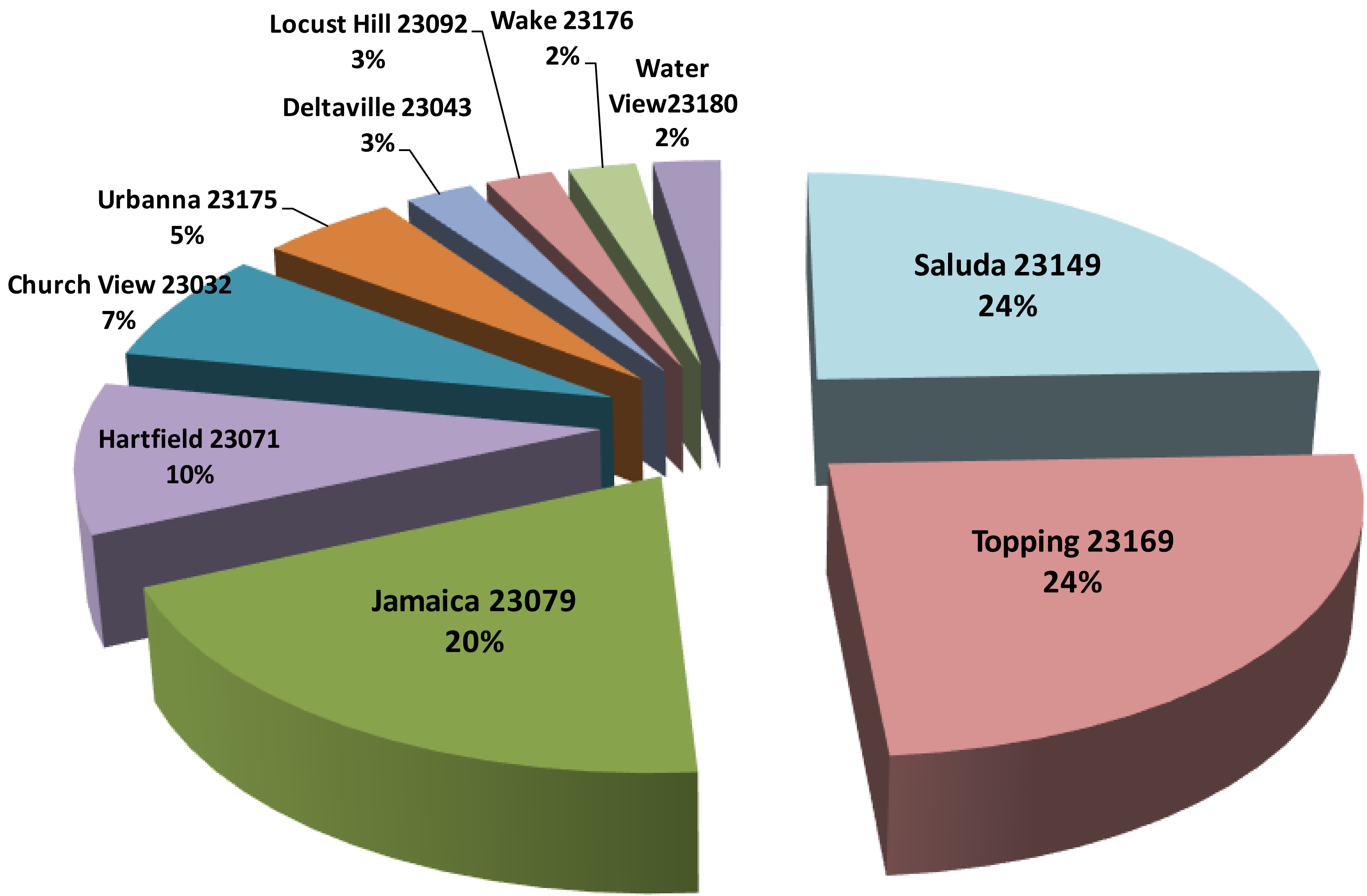


Take away: Most who don't have service say service is not available.
Too expensive for 29%

NOTE: 10 survey respondents stated they do not have a computer at home due to cost

Where No Internet at Home

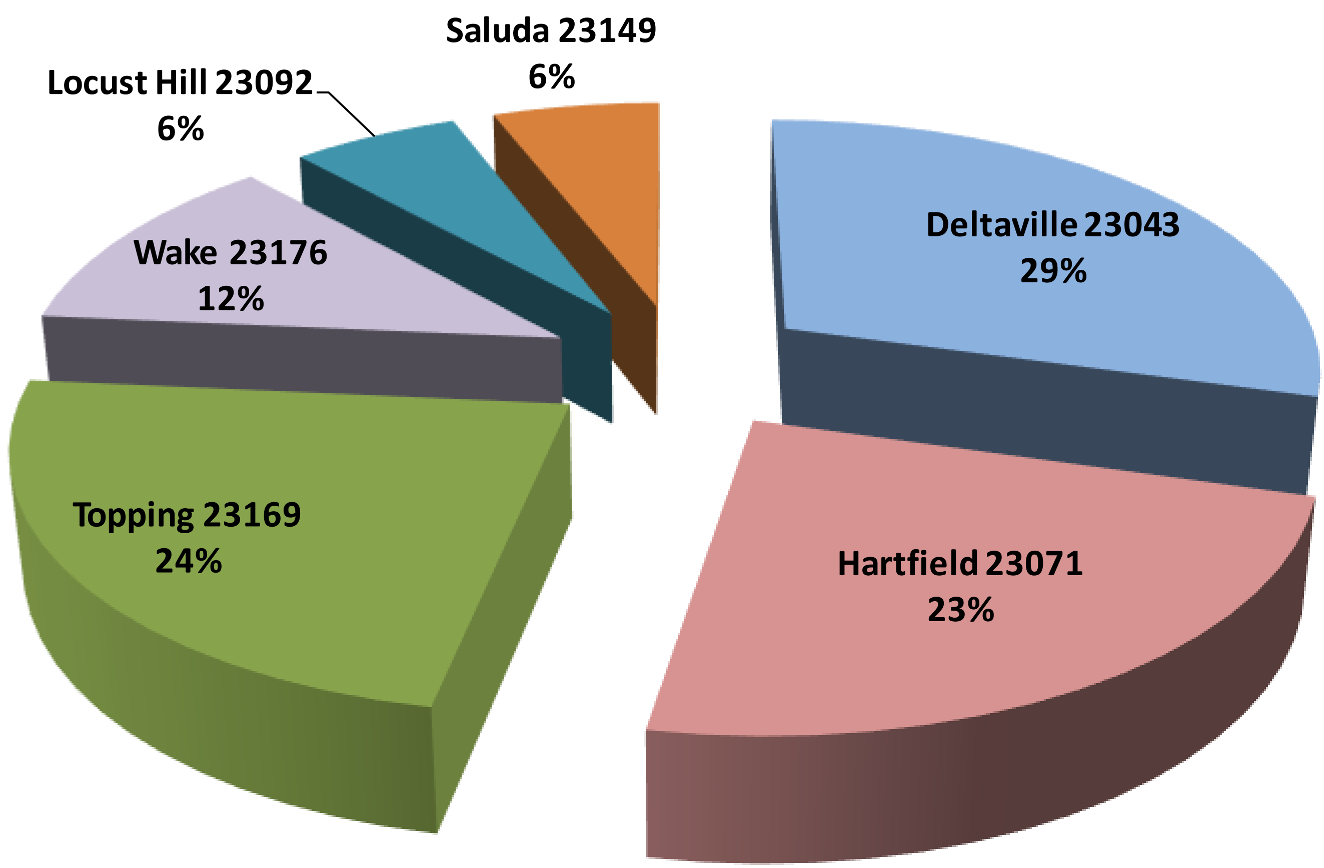
of the 14% that responded not available (63%)



Take away: Internet availability issues in Jamaica, Saluda, Topping

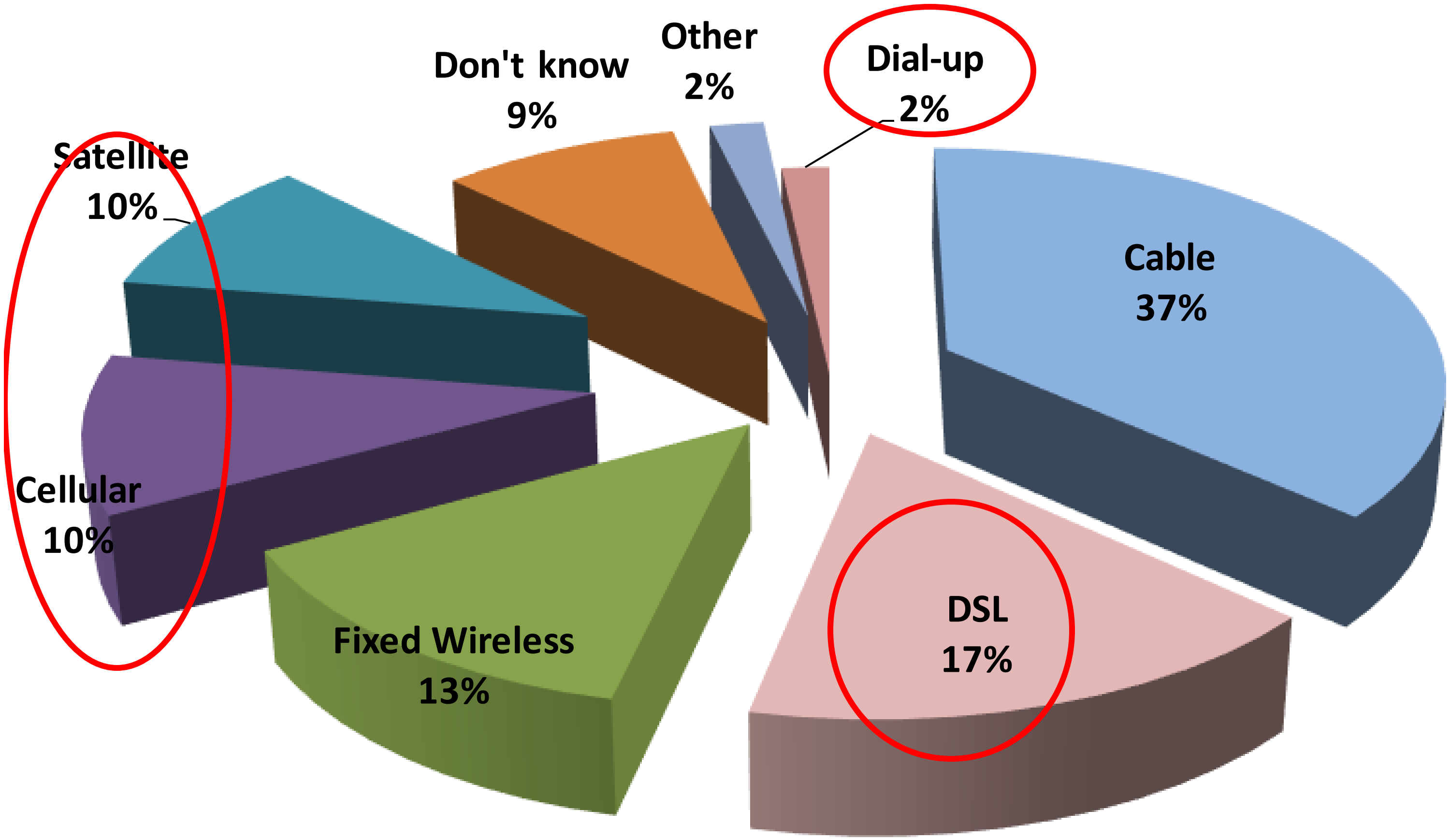
Where No Internet at Home

of the 14% that responded too expensive (29%)



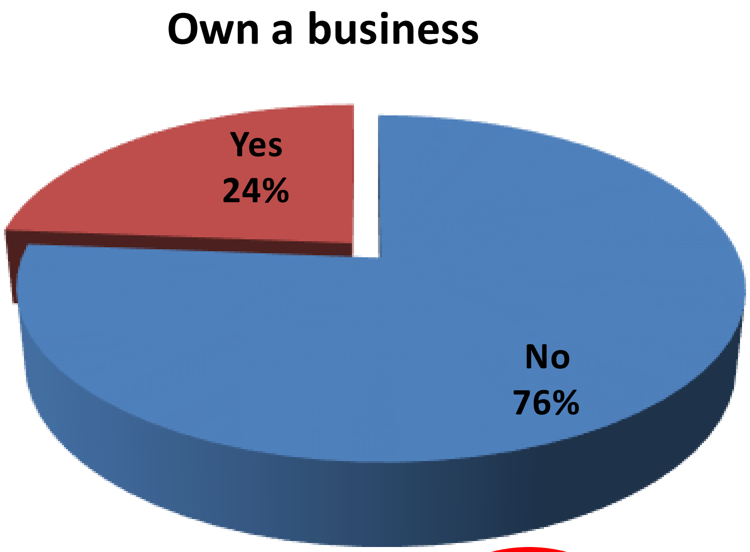
Take away: Internet pricing issues in Deltaville, Topping and Hartfield

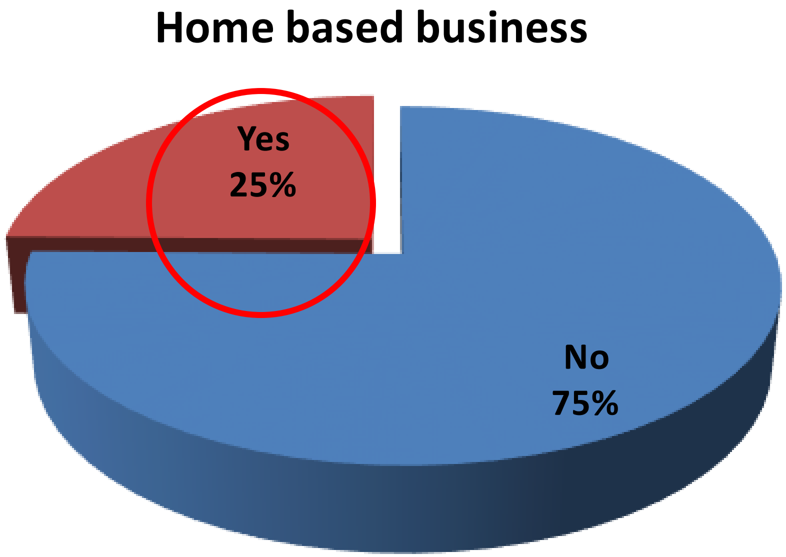
Home Internet Connections

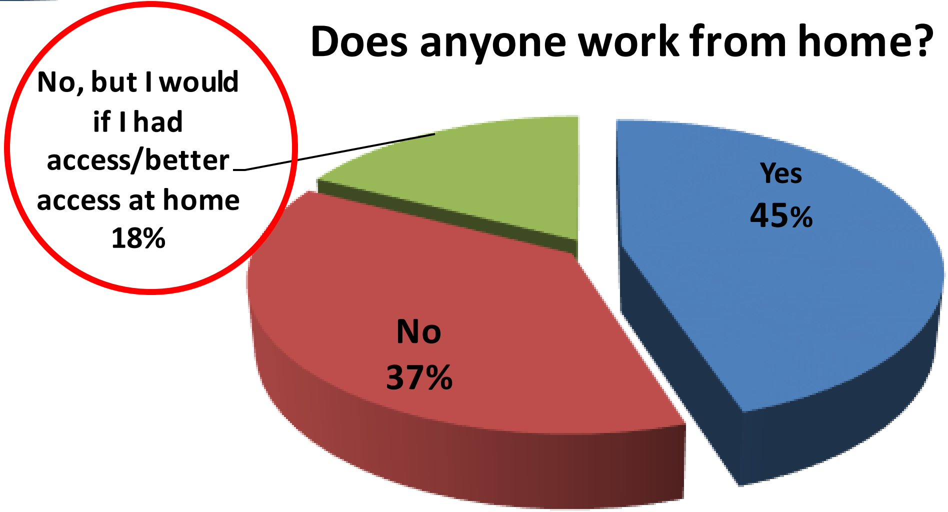


Take away: 39% of respondents depend on inadequate services
DSL may be oversubscribed so new service may not be available
20% depend on cost prohibitive services (data caps etc.)

Access for Work/Business

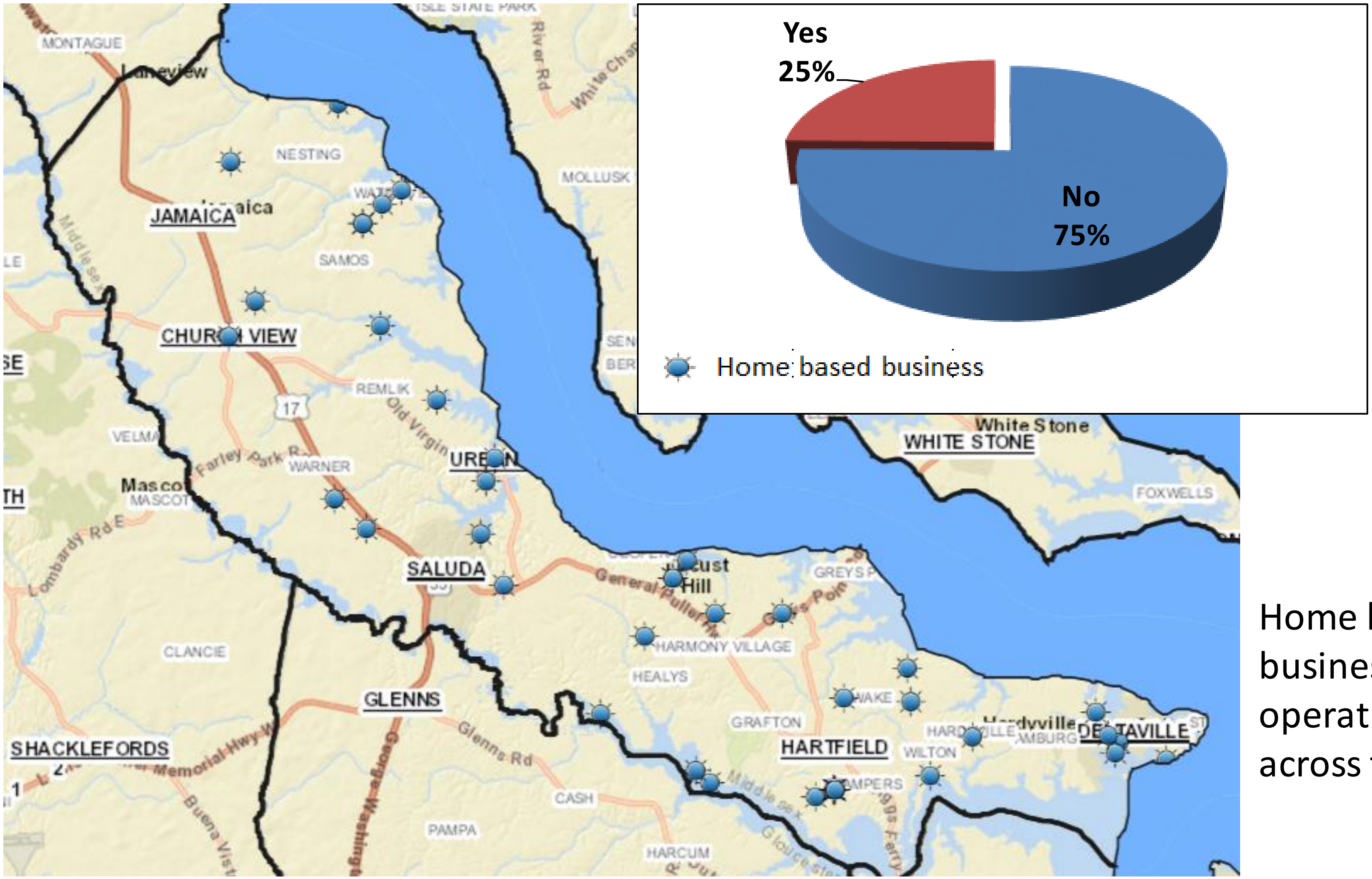






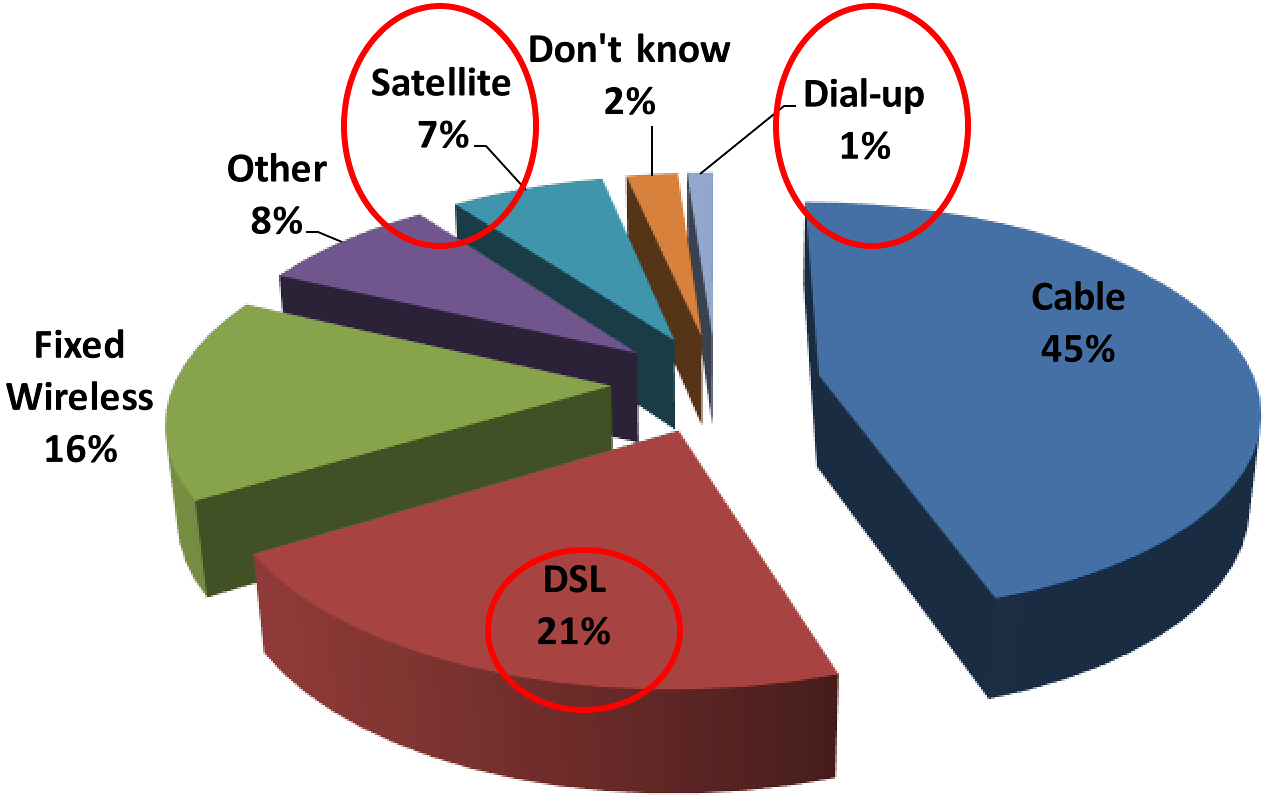
Take away – 18% would work from home if they could – remember the majority (39%) depend upon DSL, Cellular or Satellite services.

Home based businesses



Home based businesses operating all across the county

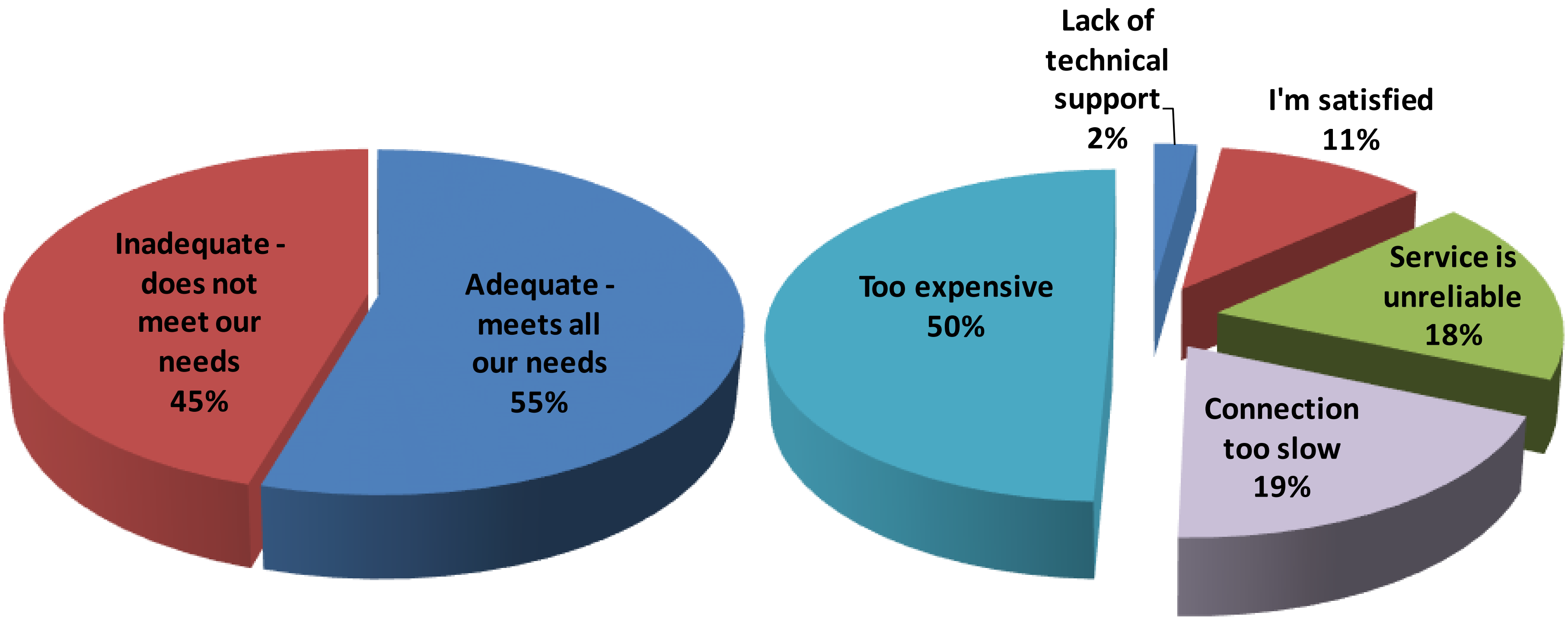
Business Internet Connections



Take Away: 29% of businesses rely on inadequate connection types.

From survey: 95% use the Internet to support their business.
95% report Internet is very important or critical to their businesses.

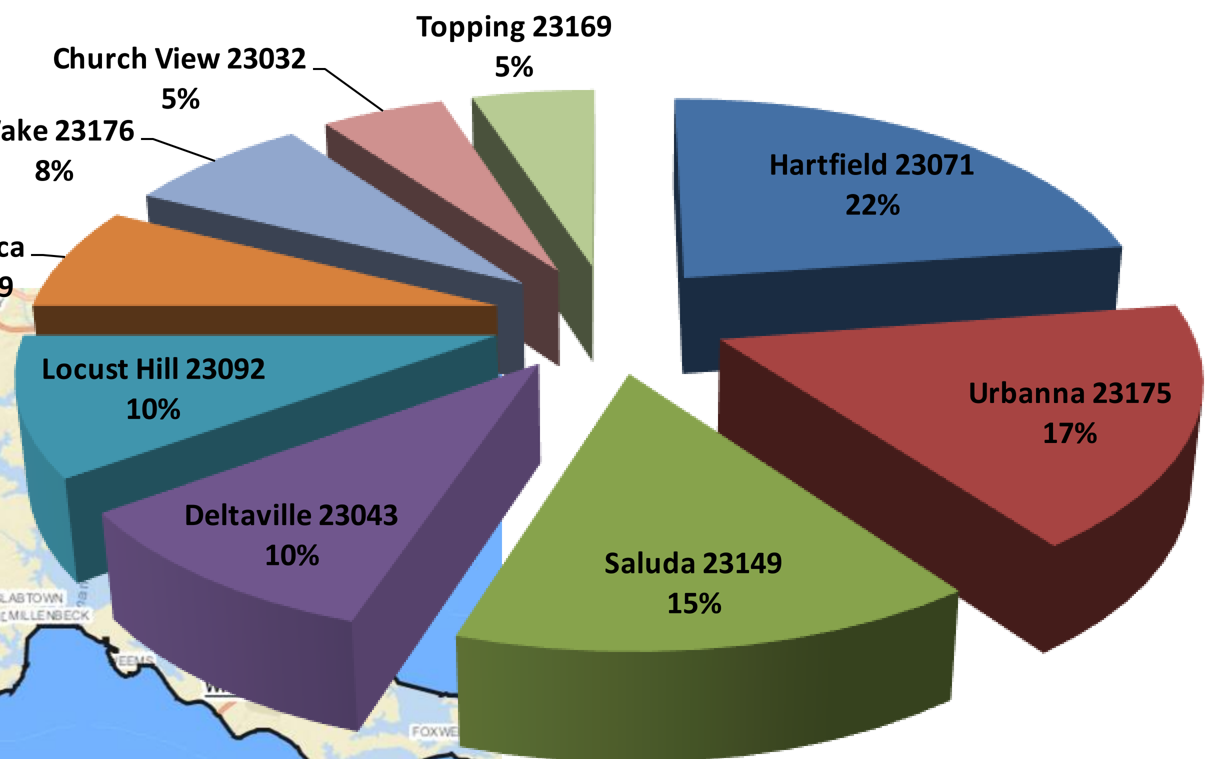
Quality of Business Connections

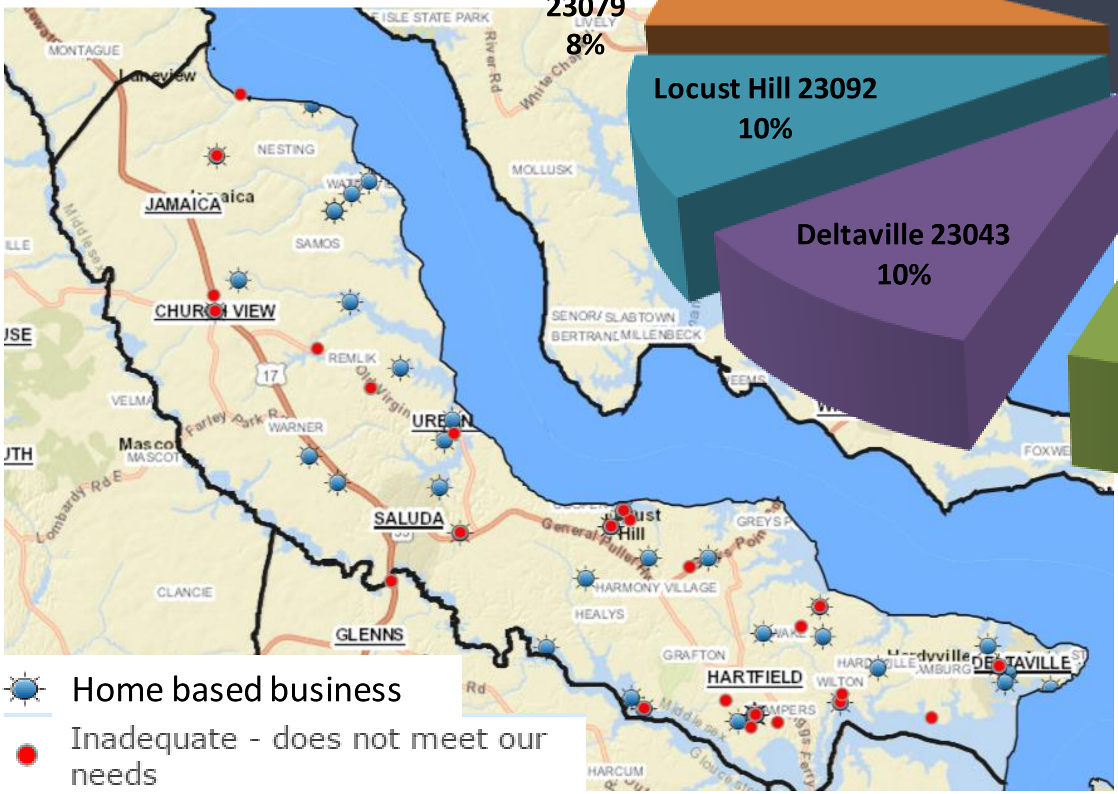


Take away:

45% of businesses rate their connections as inadequate
19% cite connection too slow
50% cite cost of service as primary reason for dissatisfaction

Business Locations Reporting Inadequate Connections

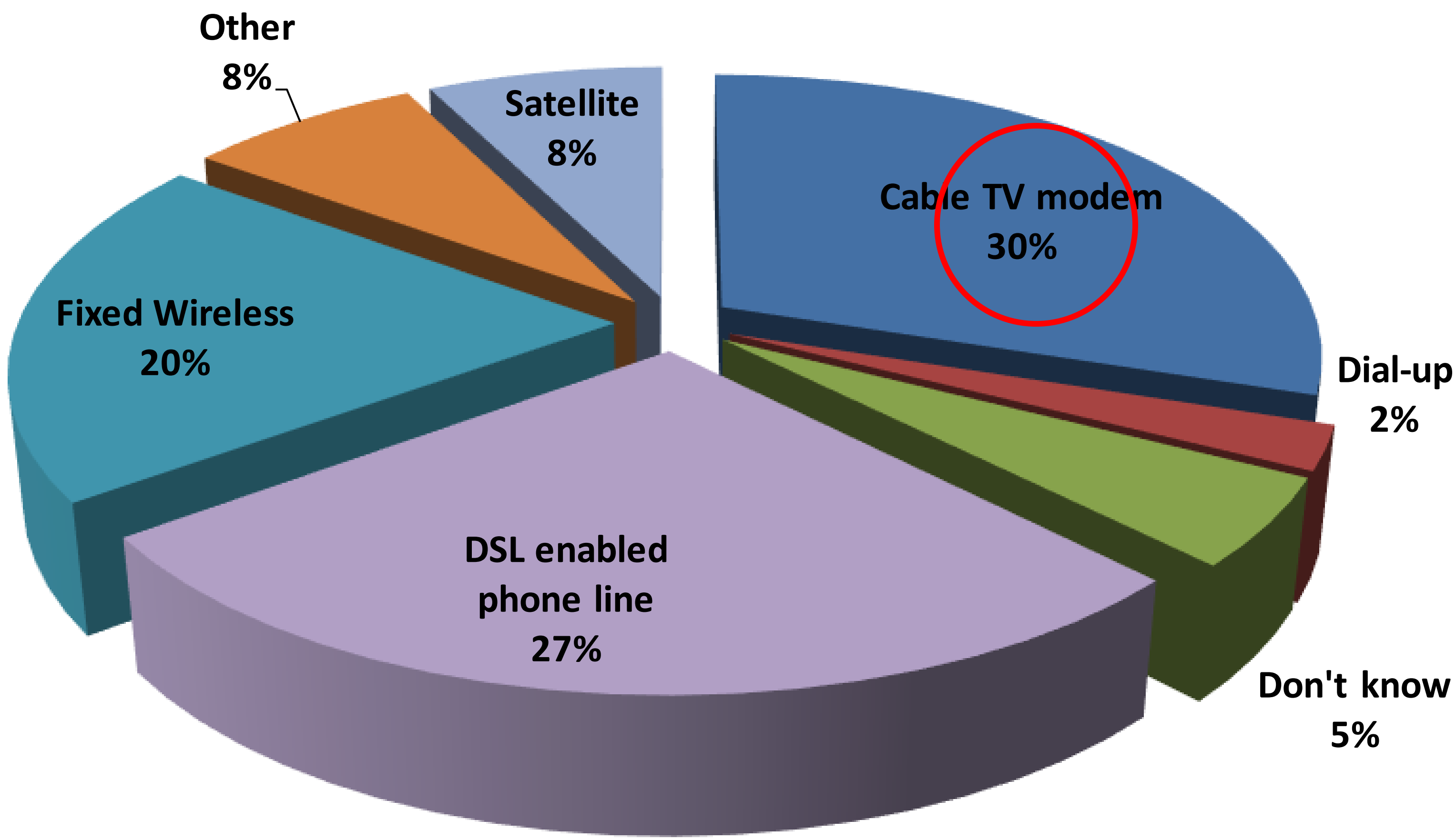




All but one respondent reported that the Internet was ***Very Important or Critical*** to their business.

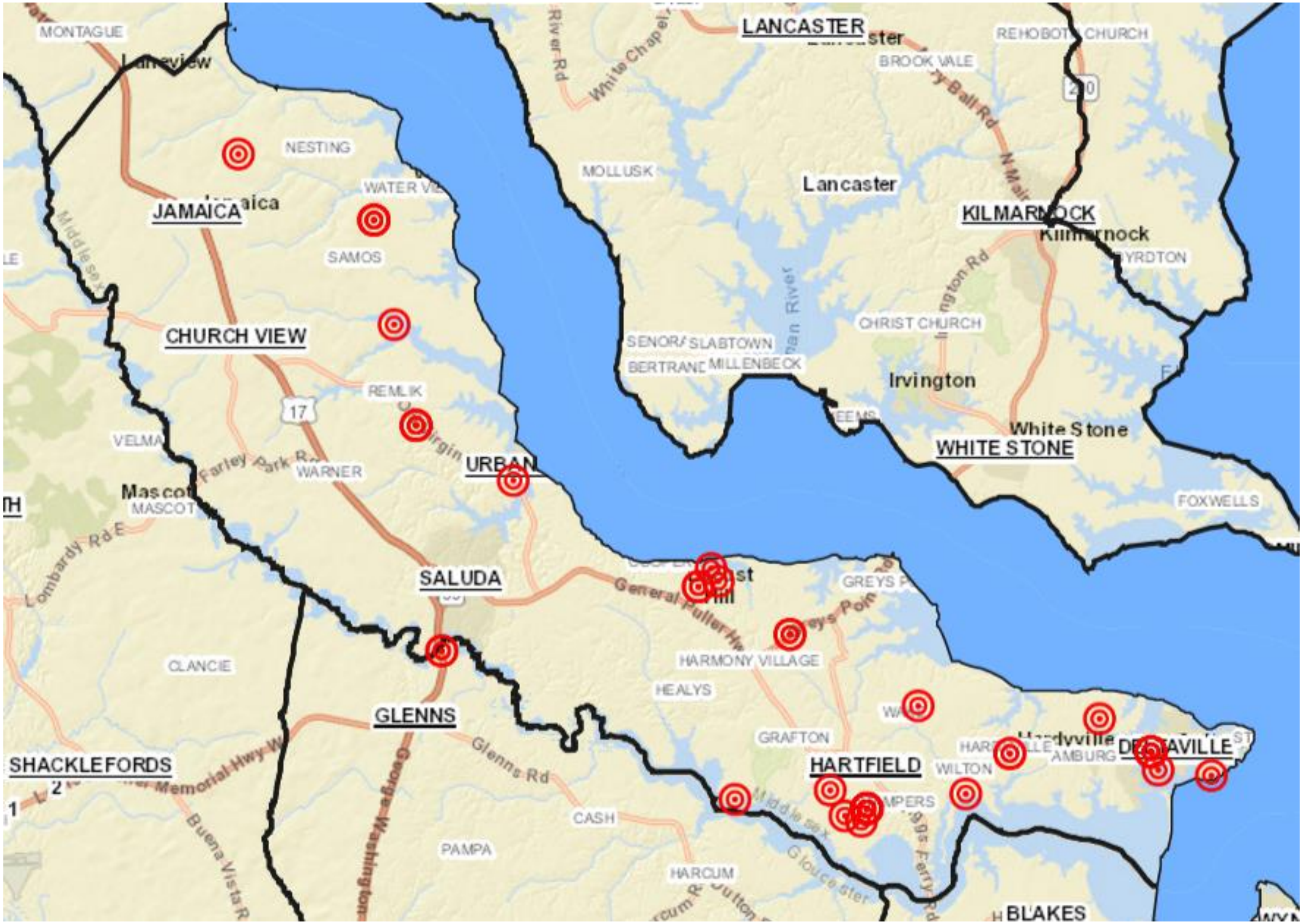
Businesses Inadequate Connections

Connection Types



Unexpected take away: 30% report cable is inadequate for their needs. Segments over subscribed and need fiber upgrades.

Inadequate Business Cable Connections

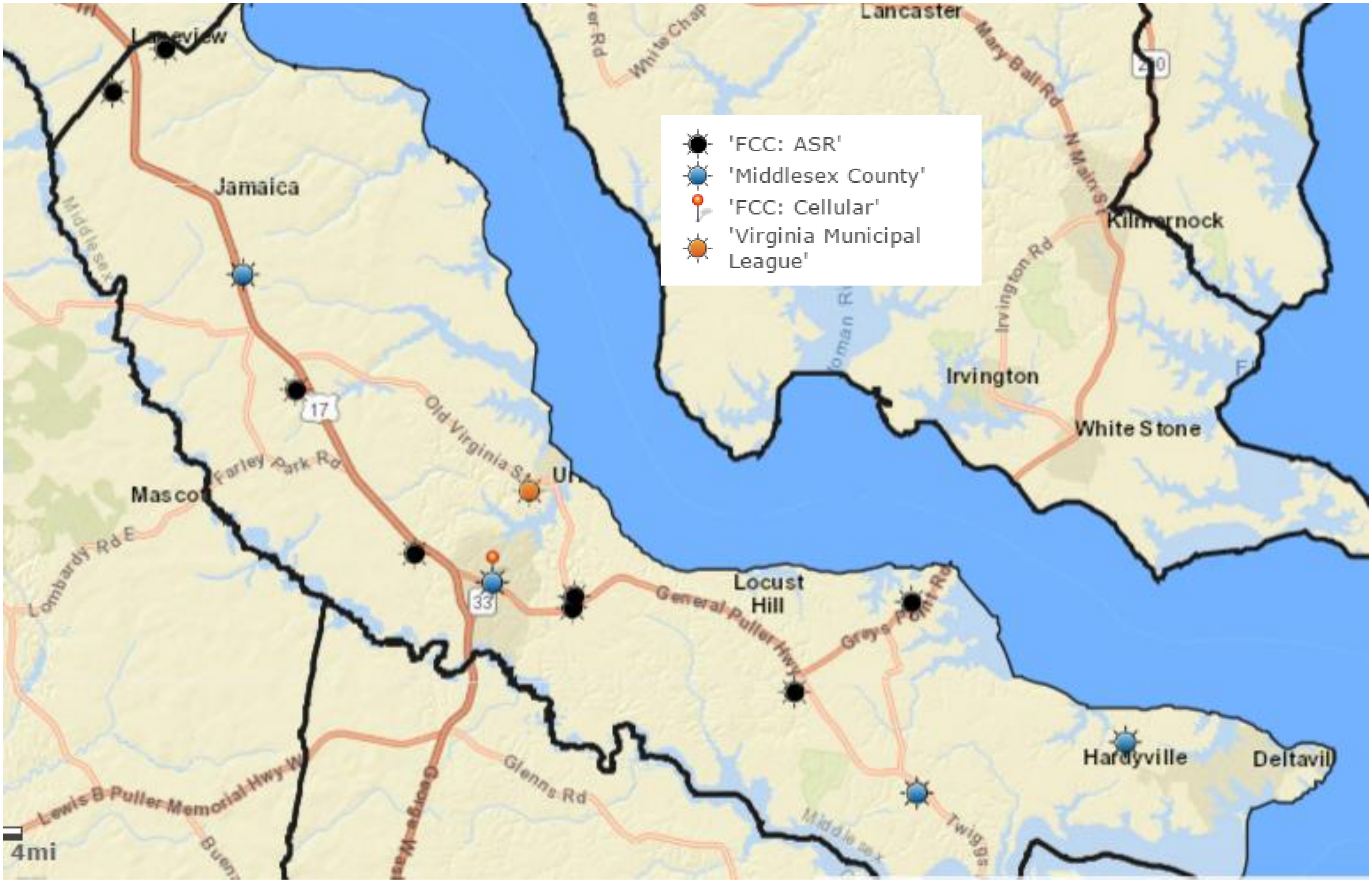


Take away: Hartfield, Locust Hill and Deltaville need cable upgrades.

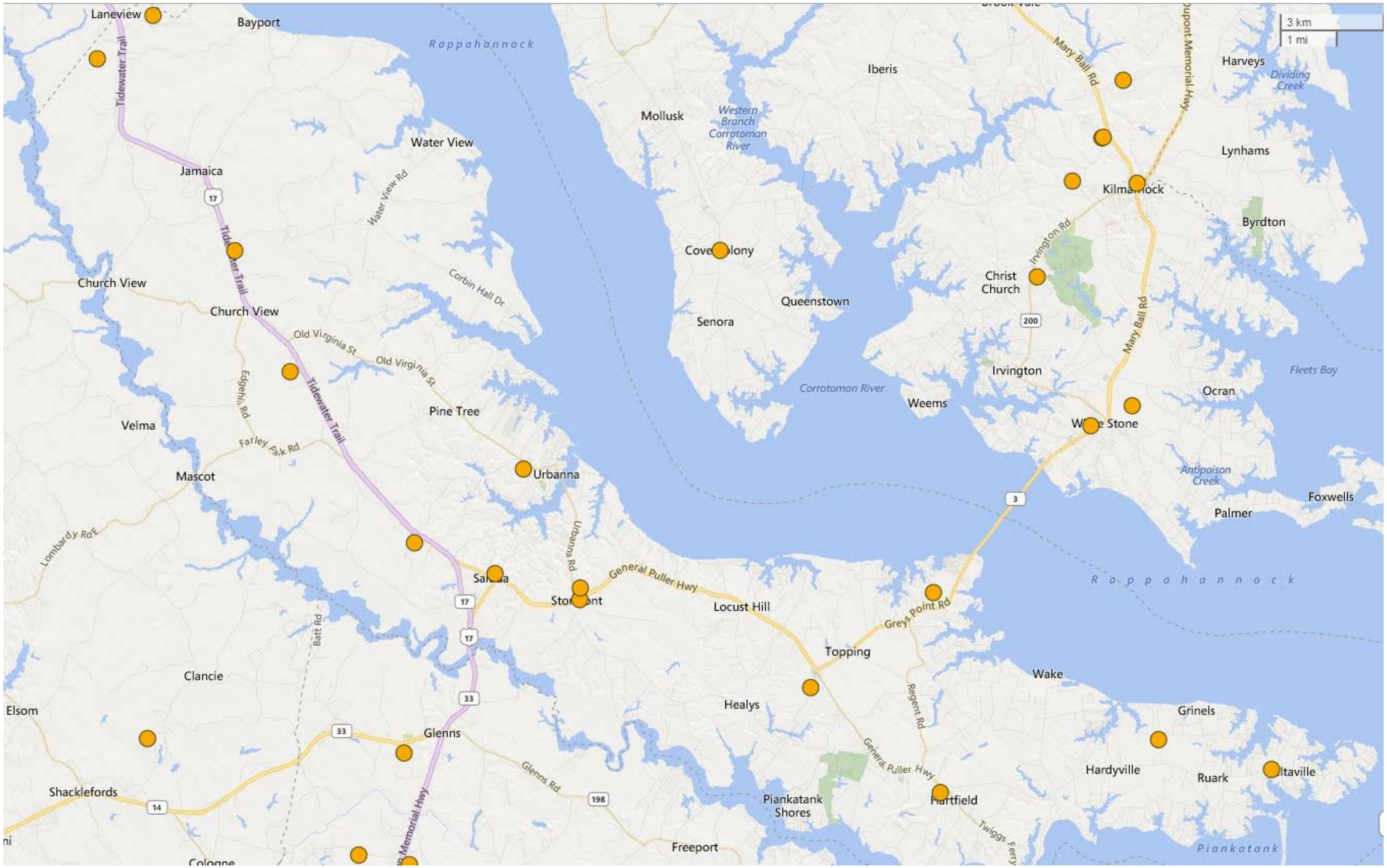
Vertical Assets, Fiber, Conduit and Community Anchors

LOCAL ASSETS

Middlesex Vertical Assets



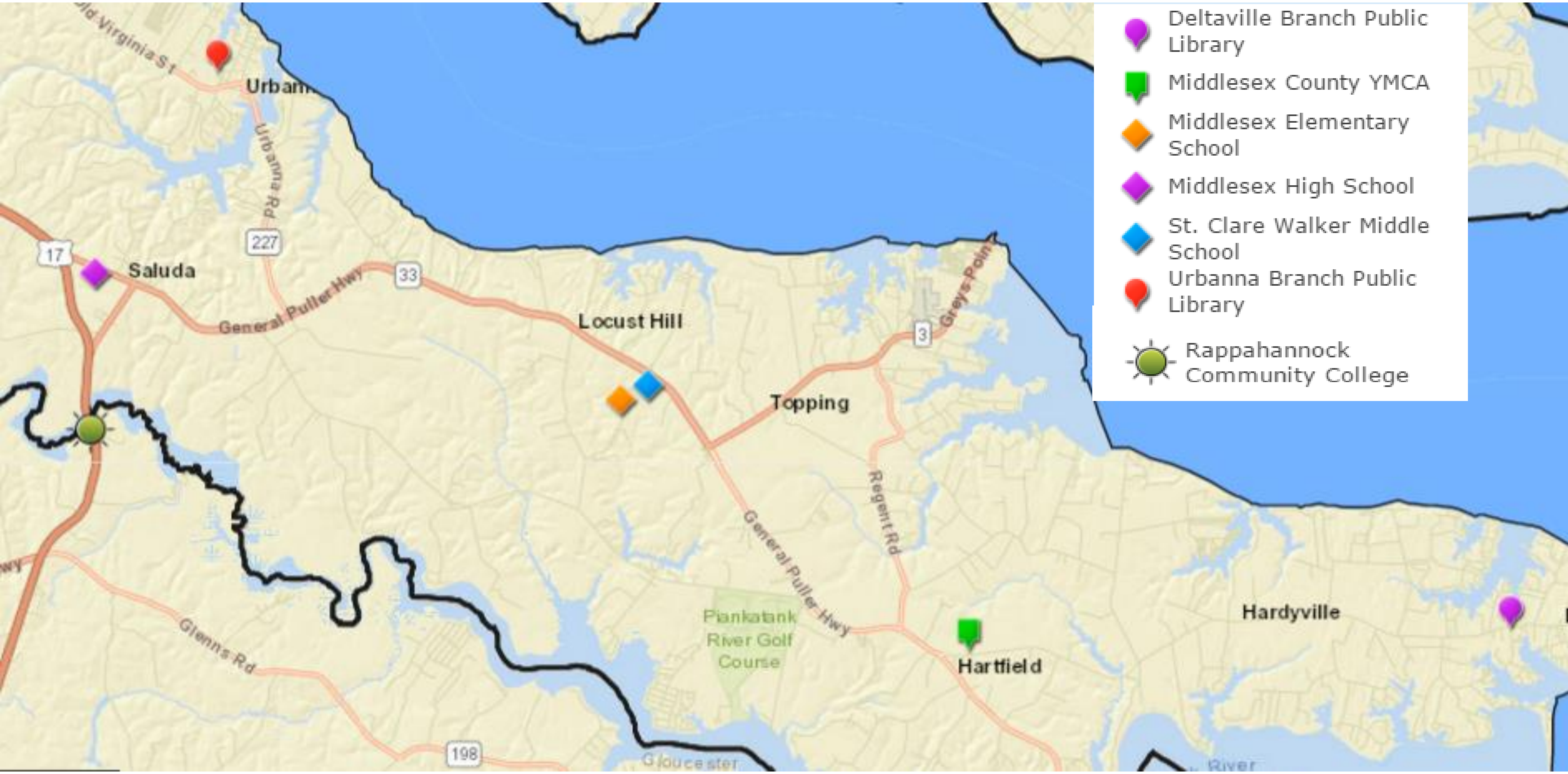
Middlesex Cellular Towers



Middlesex Emergency Services

Middlesex Schools and Libraries

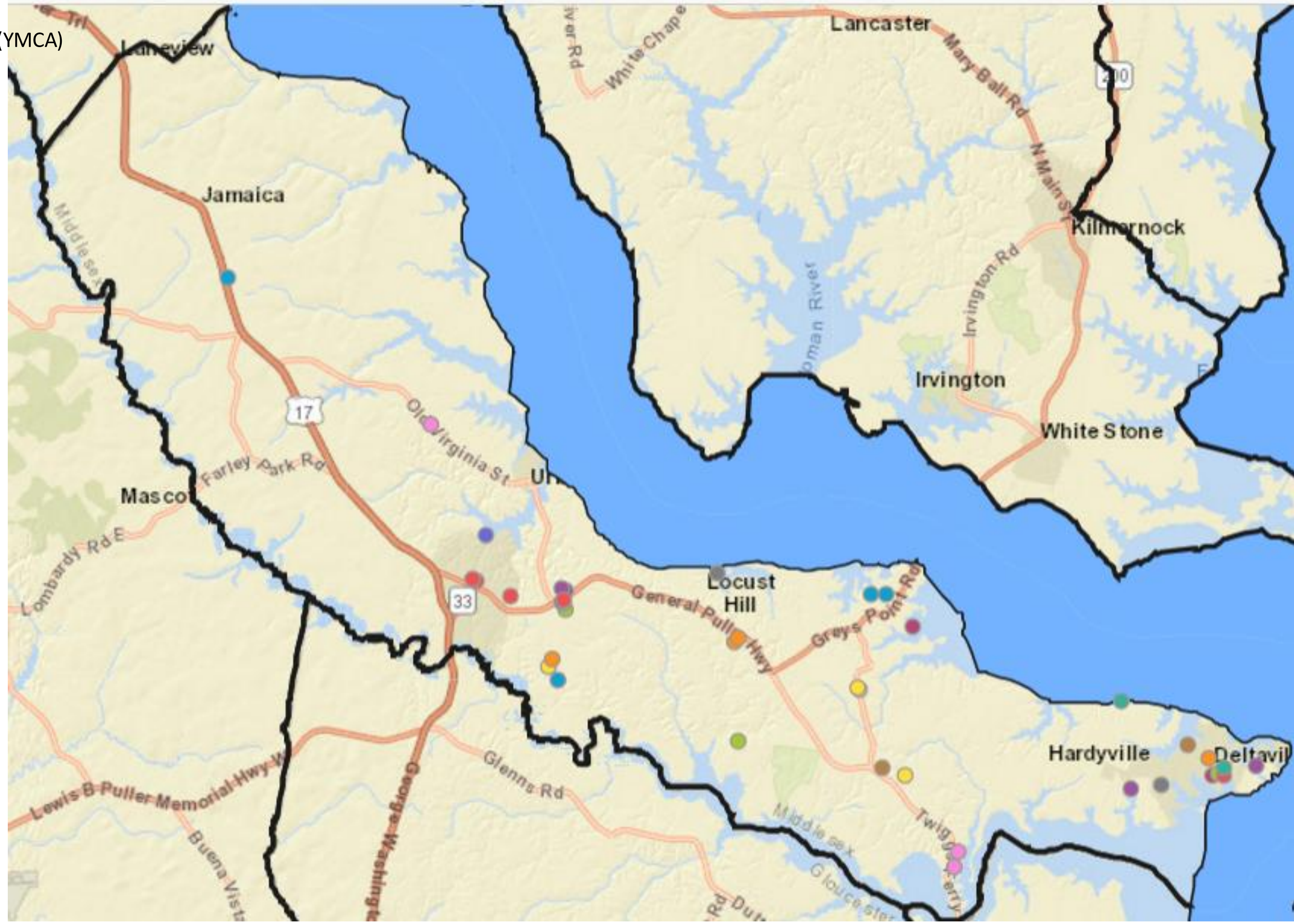
YMCA and CC



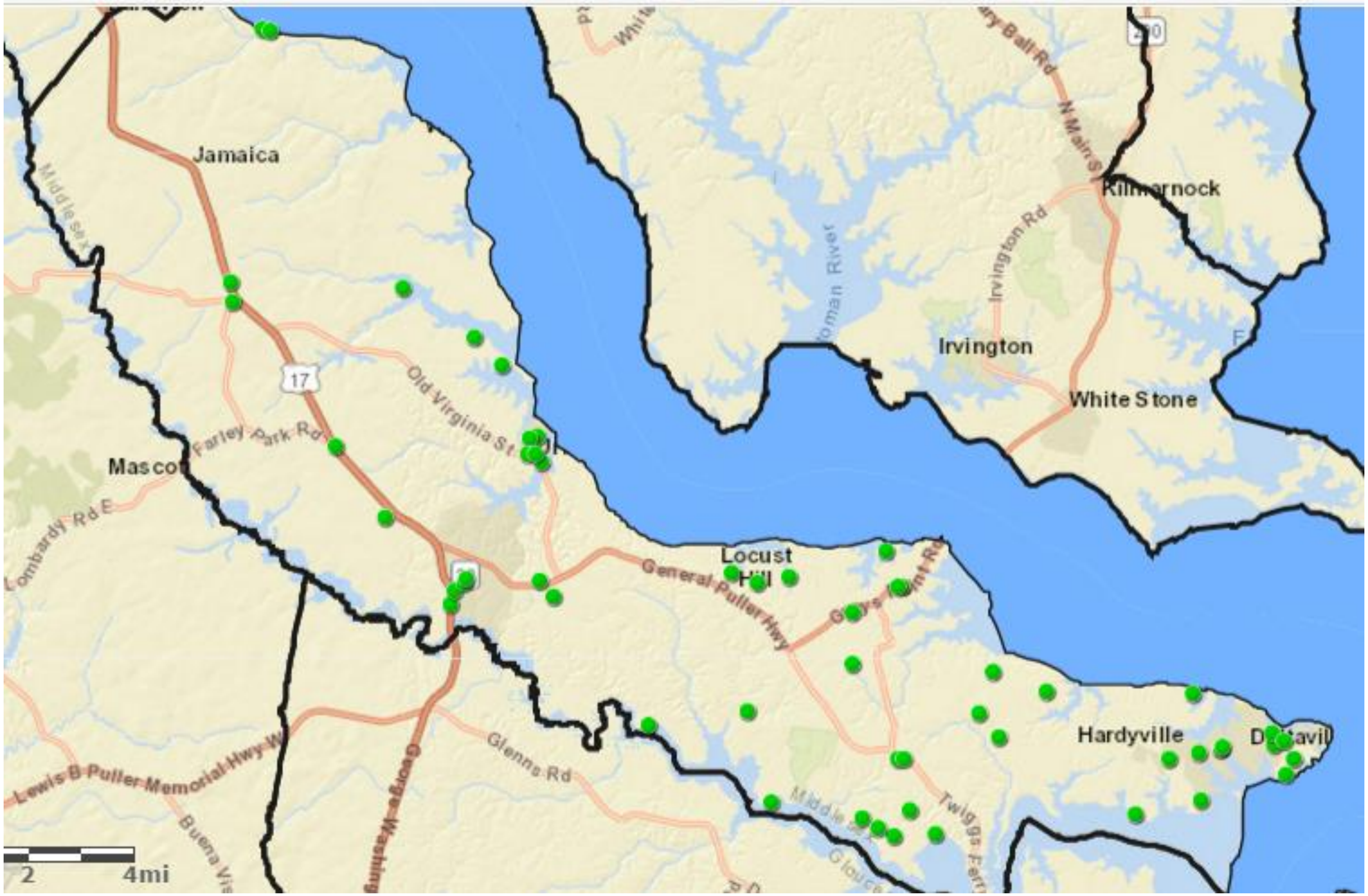
Concentrated in the southeastern portion of the county

Middlesex County Parcels

WILTON PARCEL A
WILTON PARCEL A
MOORES CREEK ESTATES
JACKSONS CREEK 40-9
WILTON ELEMENTARY SCHOOL (YMCA)
COUNTY OF MIDDLESEX
JACKSONS CREEK 41-7
JACKSONS CREEK 41-7
MILL CREEK 41-7
DELTAVILLE 41-7
STINGRAY-BROAD CRK DREDGE
TIMBER NECK 41-4
SHOOTERS HILL SEC II LOT 6A
PUBLIC LANDING 40-6
PUBLIC LANDING NORTH END
LANDFILL-MAINT BLDG
PIANKATANK
PARADISE
NOHEAD
NOHEAD
PUBLIC LANDING RT 621
COOKS CORNER-PULLER CNTR
COOKS CORNER-PULLER CNTR
HEALTH CENTER
MIDDLE SCHOOL
SALUDA
AIRPORT
Middlesex Co Court House
MIDDLE SCHOOL
SALUDA
PUBLIC LANDING RT 634
PUBLIC LANDING RT 617
PINE TREE
ROBERTSON DUMPSTER SITE
SALUDA
RAPPAHANNOCK CENTRAL
AIRPORT
SYRINGA
SYRINGA



Middlesex Business Locations



Businesses reported in all parts of the county but concentrated in the south east.

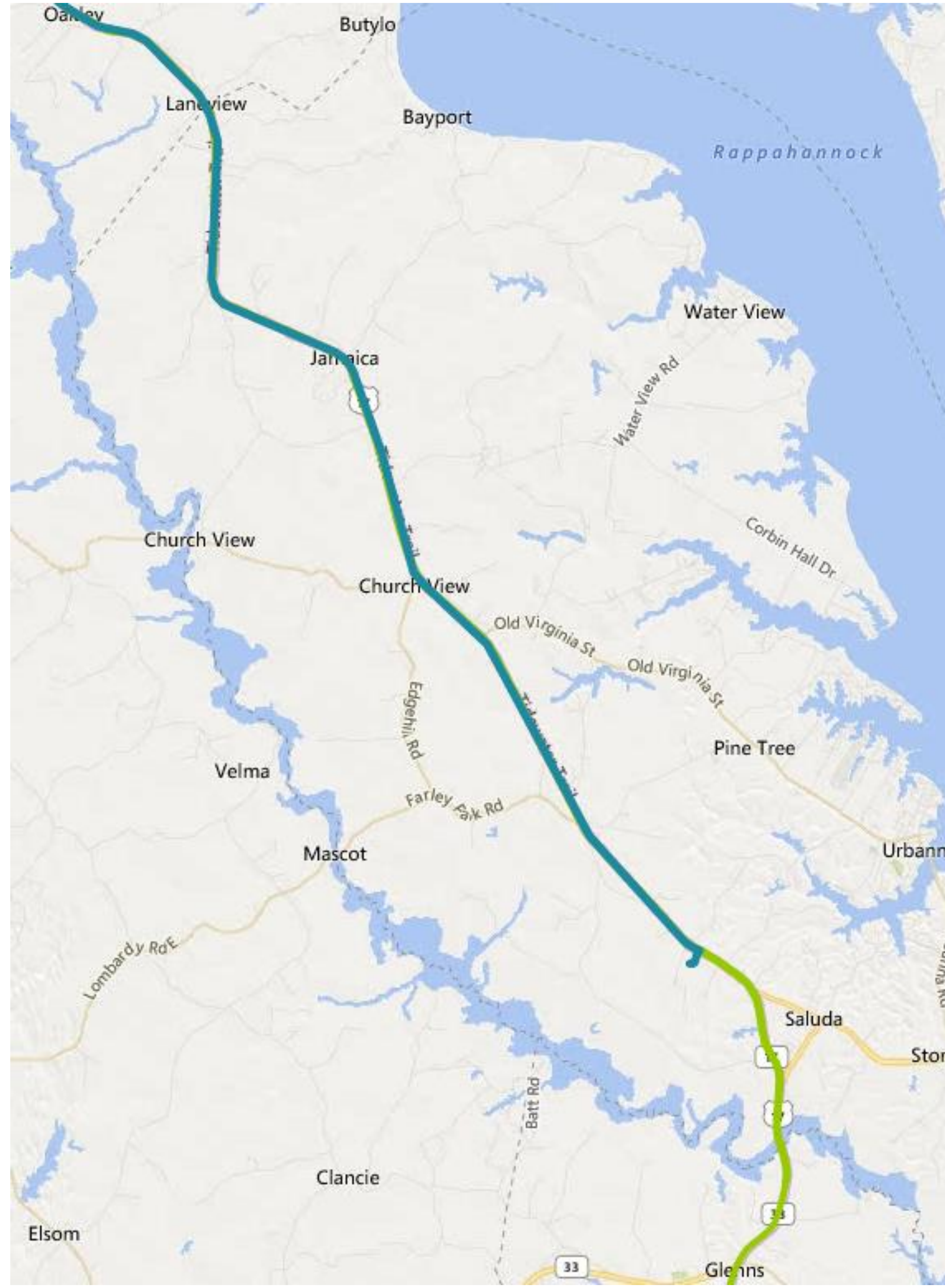
Middlesex Commercial Fiber

Lightower

Uniti Fiber

FTS (not shown)

All overlapping routes



Affect the Broadband Economics

REVIEW OF LOCAL POLICIES & FEES

Make sure your policies and procedures are "Broadband Friendly"

Review comprehensive plans, community zoning regulations and process, policies, fees, etc. must **encourage and enable broadband investment.**

Review local franchise agreements should be reviewed for **setback or long-drop** policy, and that information should be conveyed to all new homebuilders, and real estate developers.

Policy Considerations for Telecommunications Deployment
https://www.wired.virginia.gov/sites/default/files/Telecom%20Deployment%20Policy%20Recs.pdf

Policy Assessment - Areas to Consider
https://www.wired.virginia.gov/sites/default/files/Policy%20Assessment%20Tool%20Guide_0.pdf

Policy Assessment worksheet:
https://www.wired.virginia.gov/sites/default/files/Policy-Assessment-Tool.xlsx

Google Fiber Checklist:
https://fiber.storage.googleapis.com/legal/googlefibercitychecklist2-24-14.pdf

Remember: to make it "cheap, quick & easy"

Assessment Based

COMMUNITY BROADBAND NEEDS

Needs Identified

- **Technology Adoption**
  - Digital Literacy
    - 27% of population are 65 or over and 16% of population have a disability
    - OPTION: Implement and Promote library computer literacy classes - don't forget senior centers!
  - Affordability
    - 30% of population may have affordability challenges
    - OPTION: Consider a computer refurb/donation program such as Virginia Star - a state-wide Student Training and Refurbishment program; http://vastar.org/
- **Demand**
  - Residential
    - 20% rely upon cellular or satellite
    - 39% have inadequate services (DSL, dial up, cellular, satellite)
    - 14% report NO access at all
    - OPTION: Expand access and capacity to Saluda, Topping, Jamaica
    - OPTION: Negotiate pricing in Deltaville, Hartfield, Topping
  - Businesses
    - 45% state they need more than they have today (27% DSL, 30% Cable, 8% Satellite)
      - Cable segments may be exhausted, may need fiber upgrade in Deltaville, Hartfield, Locust Hill
    - 25% (of all respondents) have home based businesses
      - 17% DSL, 10% Cellular, 10% Satellite – better services might grow businesses
    - OPTION: Expand access and capacity - Hartfield stands out but home businesses are all over the county.

Needs Identified (Cont'd)

- ✓ **Schools**
  - USAC (e-Rate) / NCES
    - 3, 1 Gbps leased connections from Gans Communications, LP at $800 per connection, contract expires; 06/30/2021
    - 1, 650 Mbps Internet connection from Gans Communications, LP at $3,950 per month, ~$6. per Mb, contract expires; 06/30/2021
    - ✓ 497 Mbps per 1000 students/teachers – **Well above the FCC recommendation of 100Mb per 1000 Students + staff**

- **Libraries**
  - USAC, Library of Virginia speed test and survey
    - Purchasing 20 Mbps fiber (2) from Gans Communications, LP @ $501.02 (x2) per month, ~$25. per Mb (Median for rural libraries $21.65 per Mb) – **Below national recommendation of 100 Mbps for those libraries serving communities of 50,000 or less** (Middlesex estimated total pop 10,817)
      - **OPTION: Expand access and capacity to libraries (Deltaville and Urbanna,) negotiate pricing (currently on month-to-month contract) or use as leverage.**
    - ✓ **According to speed test, median download 76 Mbps, median latency 23 ms**
    - ✓ **Public computers and workforce development available at Urbanna Branch**
    - ✓ **Computer literacy/training classes offered at Urbanna Branch**
- Comprehensive Plan - **No broadband mentioned in Comprehensive Plan!**

Potential Funding

https://www.wired.virginia.gov/broadband/resources

Look Under Funding Options

E-Rate – already participating: February 3 - May 26 (Schools) or July 21 (Libraries and Consortia)

Lifeline Support http://www.lifelinesupport.org/ls/changes-to-lifeline.aspx - Open all year

USDA is ***NOW*** accepting applications for the Community Connect Grant Program for FY 2017. These grants may be used to provide broadband service in unserved, lower-income and extremely rural areas.

USDA Distance Learning and Telemedicine Program (DLT)
http://www.rurdev.usda.gov/UTP_DLT.html The application window is announced annually

USDA Telecommunications Infrastructure Loans & Loan Guarantees
http://www.rd.usda.gov/programs-services/farm-bill-broadband-loans-loan-guarantees **NOTE**: These loans are for local incumbent providers. Open annually around April

USDA Distance Learning and Telemedicine Program (DLT)
http://www.rurdev.usda.gov/UTP_DLT.html - The application window is announced annually

The Vibrant Community Initiative (VCI) http://www.dhcd.virginia.gov/index.php/community-partnerships-dhcd/vibrant-community-initiative.html Application Due: TBD (tentatively Feb 17)

Virginia Telecommunication Initiative http://www.dhcd.virginia.gov/ - depends on further funding. TBA

Next Steps

- Identify and Prioritize Goals Based on Needs
- Determine the role the local government will assume in achieving the goals; (Partnership model, decision points documents)
  - Review CIT Partnership Models Handout
  - Decisions need to be adopted by the COUNTY /Authority - county procurement needs to put out the RFP
- CIT will draft Requirements Document for potential RFP
- Seek private partner(s)

Questions? Comments?

Contact Information

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Jean.plymale@cit.org
540-250-2751

Sandie Terry, VP Broadband
Sandie.terry@cit.org
540-420-4929

Portobago Bay

Broadband Access Questionnaire

July 30, 2020

➢ **Used Survey Monkey to create a survey for capturing the requested metrics**

➢ **71 responses received:**

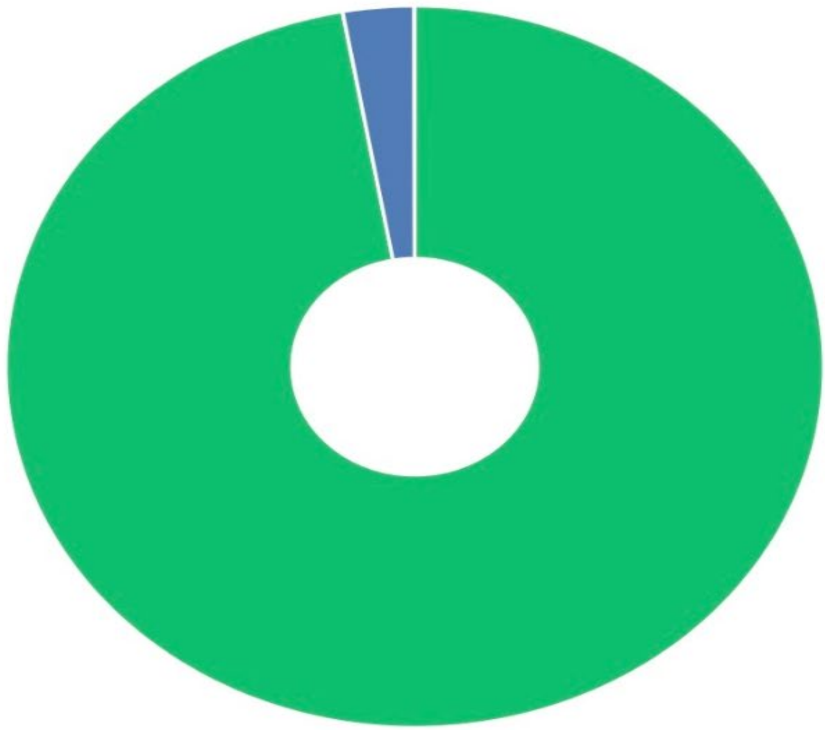
- 100% of the responses were from lot owners of Portobago Bay, 97% of which reside in Portobago Bay.
- 34% of the residents that responded have their own business
- 74% of the residents that responded are teleleworking from home
- 86% of the residents that responded require telemedicine visits
- 31% of the residents that responded are homeschooled
  - There are approximately 44 children being homeschooled
- 44% of the residents that responded are taking on-line courses
  - There are approximately 39 college students taking on-line courses

Actual results are presented in the following slides

Showing: 71 of 71 responses

PAGE 1

1. I live in Portobago Bay



Answered: 71 Skipped: 0

Yes	97.18%	69
No	2.82%	2

2. What is your a Address? (Optional)

Responses 47

29463 Goose Point Court, Port Royal Va 22535
29475 Goose Point Court, Port Royal Va 22535
30019 Goose Point Court Port Royal Va 22535
30079 Goose Point Court, Port Royal Va 22535
30081 Goose Point Court, Port Royal Va 22535
30139 Goose Point Court, Port Royal Va 22535
30228 Portobago Trail, Port Royal Va 22535
30258 Portobago Trail, Port Royal Va 22535
30286 Portobago Trail, Port Royal Va 22535
30286 Portobago Trail, Port Royal Va 22535
30321 Portobago Trail Port Royal, Va 22535
30418 Portobago Trail, Port Royal Va 22535
30418 Portobago Trail, Port Royal Va 22535
30436 Portobago Trail, Port Royal Va 22535
30552 Portobago Trail, Port Royal Va 22535
30557 Portobago Trail, Port Royal Va 22535
30567 Portobago Trail, Port Royal Va 22535
30578 Portobago Trail, Port Royal Va 22535
30603 Portobago Trail, Port Royal Va 22535
30603 Portobago Trail, Port Royal, Va. 22535
30739 Portobago Trail, Port Royal Va 22535
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30807 Portobago Trail, Port Royal Va 22535
30862 Portobago Trail, Port Royal Va 22535
30862 Portobago Trail, Port Royal Va 22535
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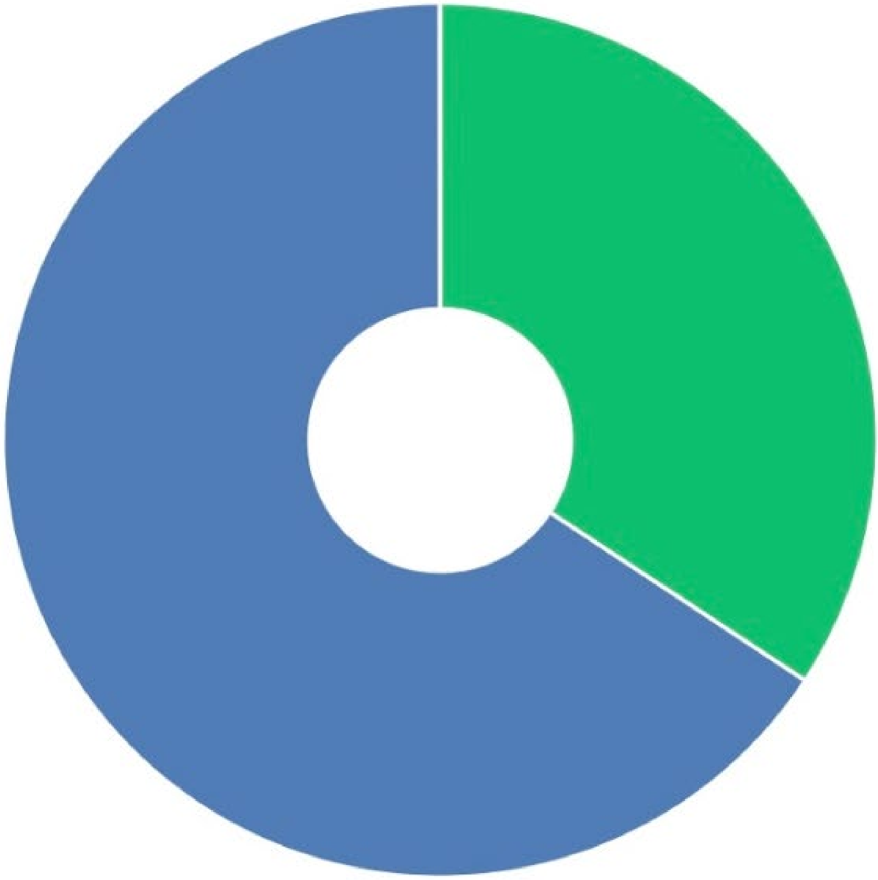
30865 Portobago Trail, Port Royal Va 22535
30888 Portobago Trail, Port Royal Va 22535
30911 Portobago Trail, Port Royal Va 22535
30911 Portobago Trail, Port Royal Va 22535
30939 Portobago Trail, Port Royal Va 22535
30961 Portobago Trail, Port Royal, Va 22535
31050 Portobago Trail, Port Royal Va 22535
31050 Portobago Trail, Port Royal Va 22535
31188 Portobago Trail, Port Royal Va 22535
9325 Canvasback Court, Port Royal Va 22535
9332 Canvasback Court, Port Royal Va 22535
9341 Bay Meadow Court, Port Royal, Ba. 22535
9345 Canvasback Court, Port Royal Va 22535
9380 Canvasback Court, Port Royal Va 22535
9380 Canvasback Court, Port Royal Va 22535
9392 Baybreeze Court, Port Royal, Va 22535
9418 Baybreeze Court, Port Royal Va 22535
Bay Breeze Court, Port Royal Va 22535
Brattleboro, Vt. But Own Lot # 38 Goose Point Court
xxxxx Portobago Trail, Port Royal Va 22535
xxxxx Portobago Trail, Port Royal Va 22535

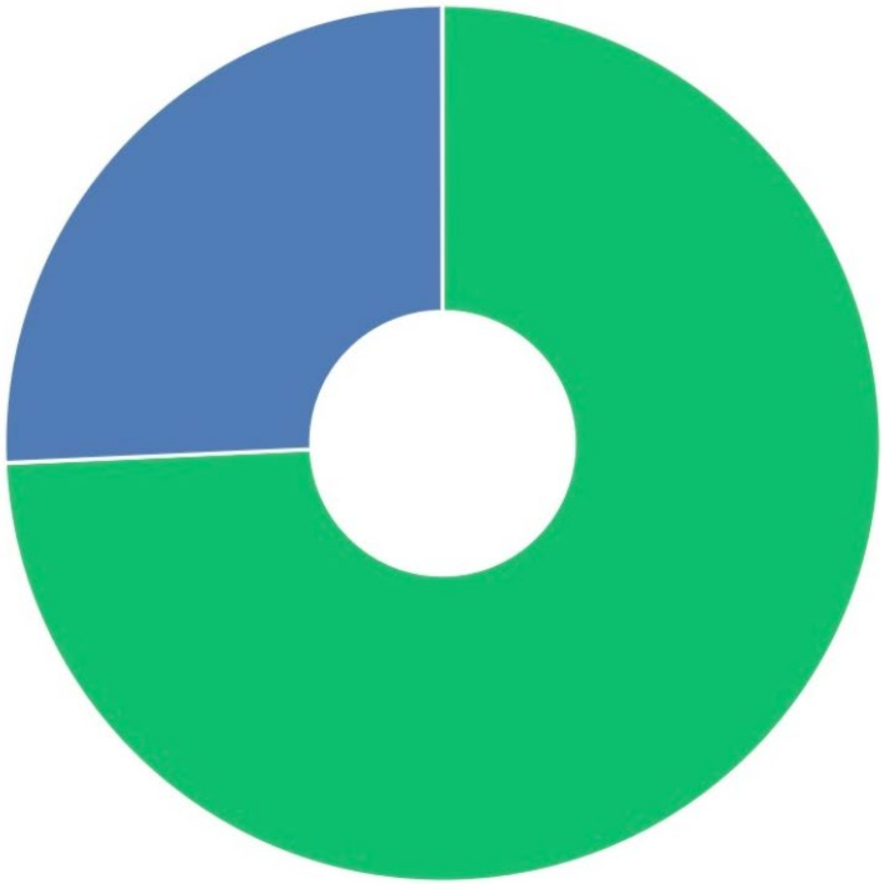
3. Do you have a home business(es)?



Answered: 70 Skipped: 1

Yes	34.29%	24
No	65.71%	46

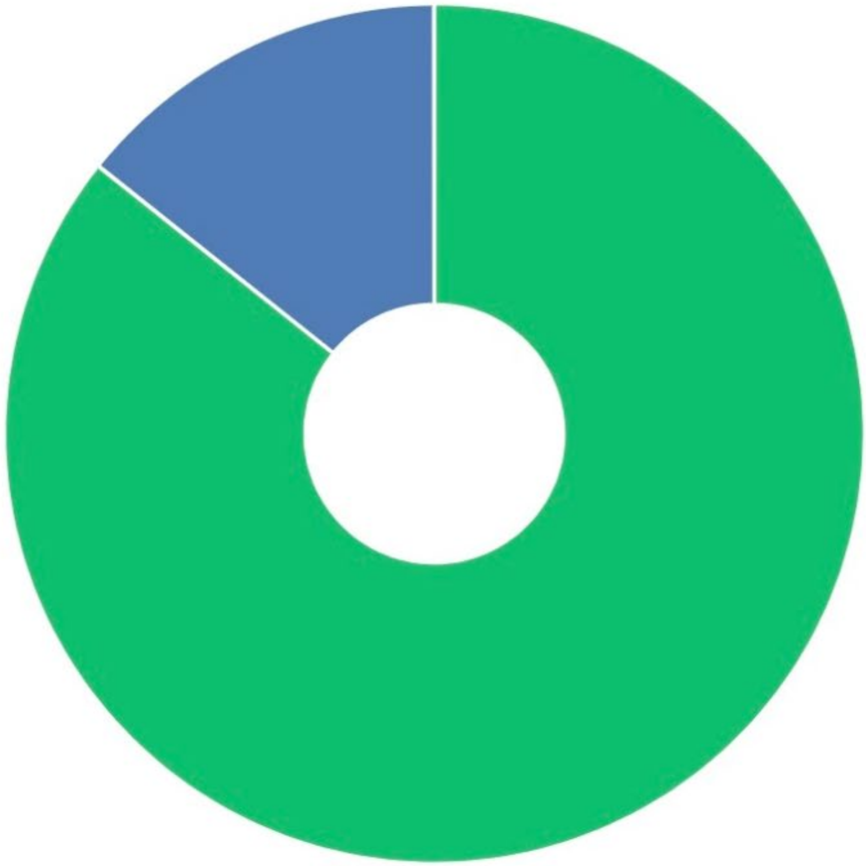
4. Do you need to Telework from home?



Answered: 70 Skipped: 1

Yes	74.29%	52
No	25.71%	18

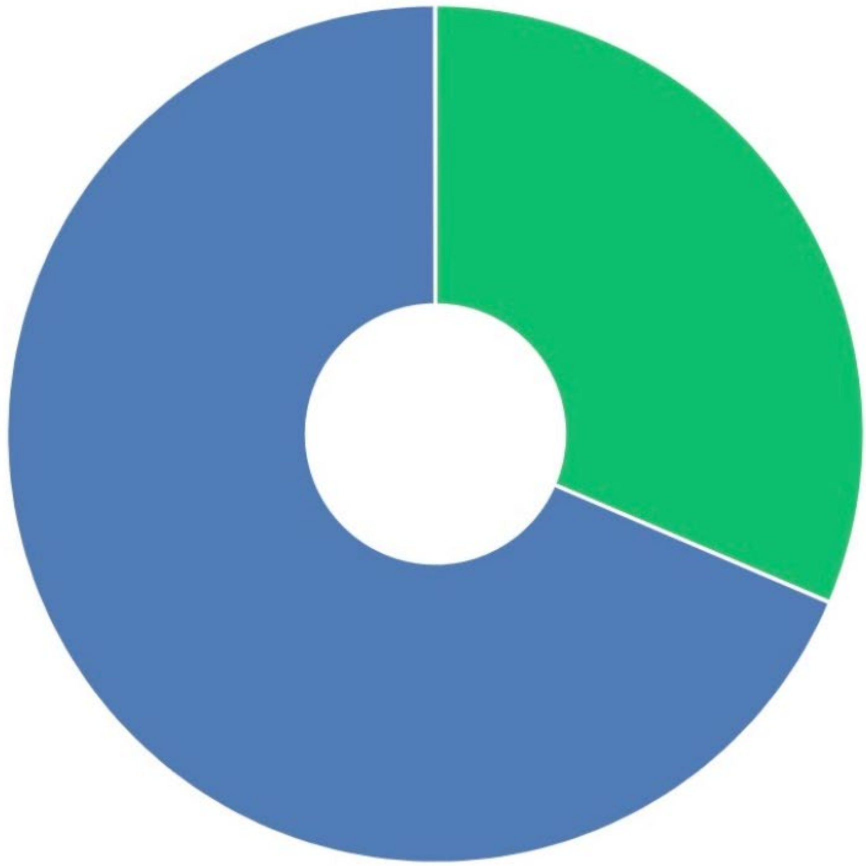
5. Would you have a need for or use Telemedicine visits?



Answered: 70 Skipped: 1

Yes	85.71%	60
No	14.29%	10

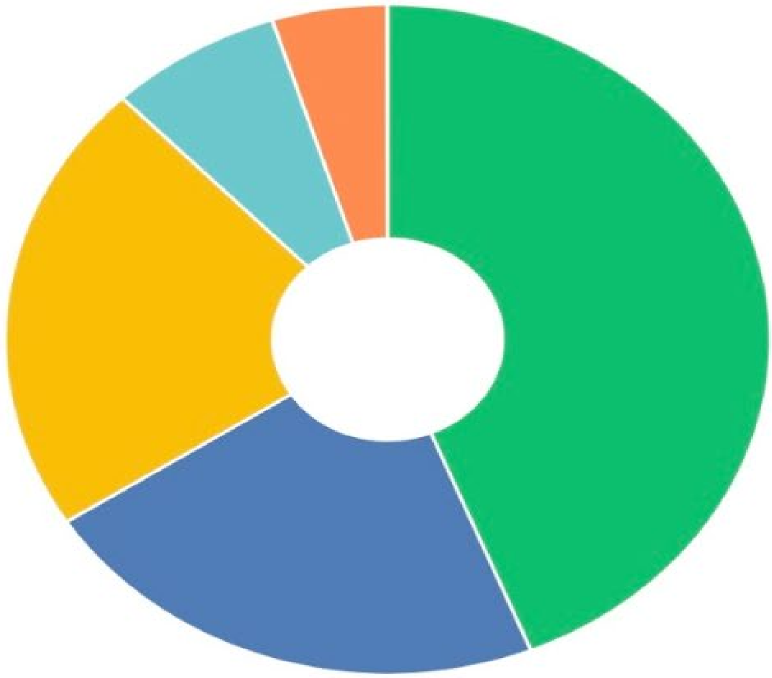
6. Are there children/adults that are home schooled?



Answered: 70 Skipped: 1

Yes	31.43%	22
No	68.57%	48

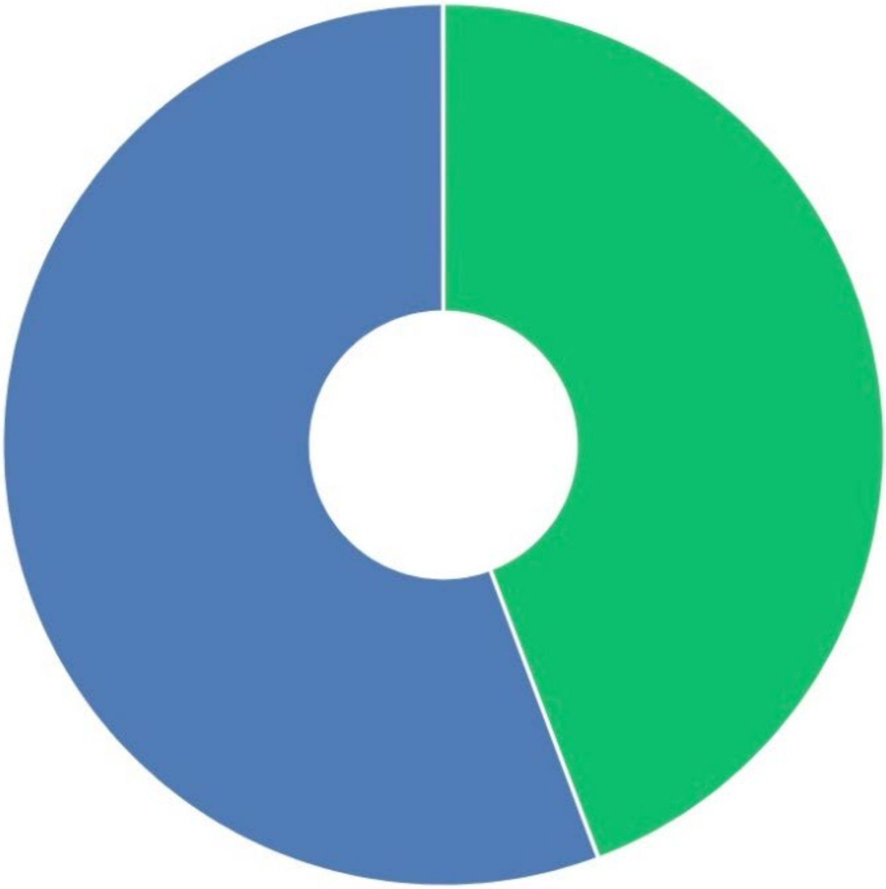
7. How many children/adults are being home schooled?



Answered: 41 Skipped: 30

0	43.9%	18
1	21.95%	9
2	21.95%	9
3	7.32%	3
4	4.88%	2
5	0%	0

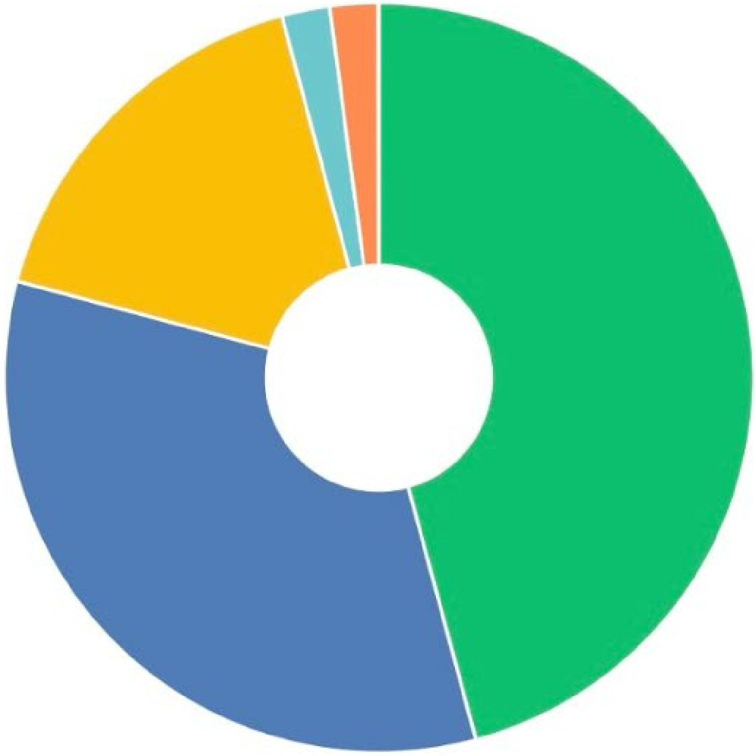
8. Are there children/adults that are taking on-line college classes?



Answered: 70   Skipped: 1

Yes	44.29%	31
No	55.71%	39

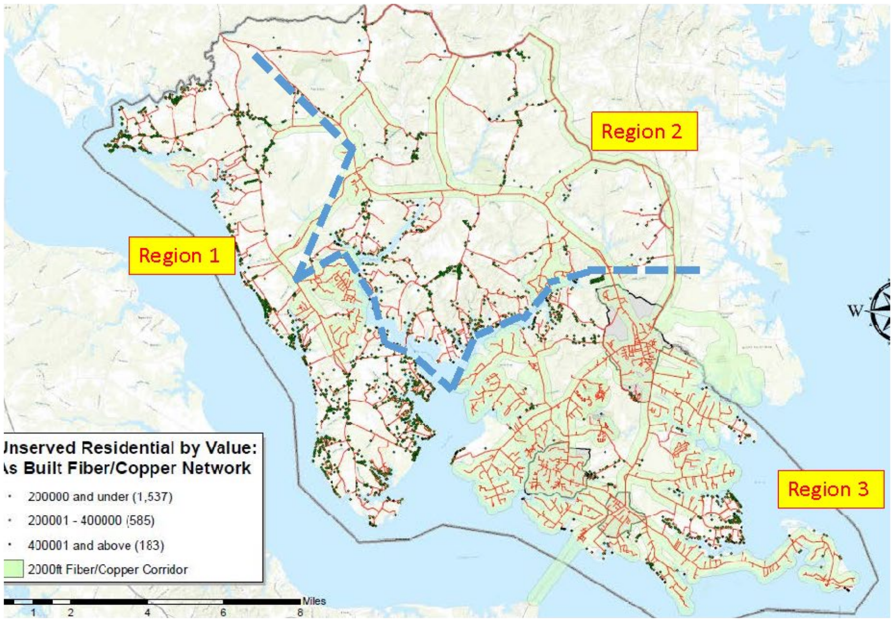
9. How many college students are taking on-line classes?



Answered: 48 Skipped: 23

0	45.83%	22
1	33.33%	16
2	16.67%	8
3	2.08%	1
4	2.08%	1

Figure 1



Confidential to Lancaster County Broadband Authority

Figure 2

Figure 3

Lancaster County Opportunity Zone

The Federal Tax Cuts and Jobs Act of 2017 included provisions for a new revitalization tool, the Opportunity Zone and Opportunity Fund. The Zones and Funds will allow investors to receive tax benefits on currently unrealized capital gains by investing those gains in qualified census tracts (Opportunity Zones).

Qualified Opportunity Zones (QOZs) allow keen investors and developers to turn redevelopment opportunities into tax savings while fulfilling a need for community reinvestment and renewal.

Take away: County, local providers, others should consider if/how the QOZ can aid in broadband expansion efforts.

Lancaster County Providers that Report to the FCC via From 477

DBA Name	Technology Name	Total Blocks	Covered Blocks	Percentage of Blocks	Covered Households	Percentage of Households	Max Consumer Download	Max Consumer Upload	Max Business Download	Max Business Upload
COMCAST*	CABLE	1,490	3	0.20%	12	0.16%	987	35	0	0
COX COMMUNICATIONS*	CABLE	1,490	1	0.07%	12	0.16%	0	0	300	30
MCI	DSL or COPPER	1,490	1	0.07%	77	1.04%	0	0	4	4
METROCAST/ABB	CABLE – Tech code: 42– DOCSIS 3.0, Max 200 Mbps	1,490	409	27.45%	5,030	67.95%	105	10	150	10
VERIZON VIRGINIA LLC	DSL or COPPER	1,490	342	22.95%	4,150	56.07%	15	1	0	0
VIRGINIA BROADBAND, LLC	FIXED WIRELESS	1,490	441	29.60%	2,692	36.37%	25	25	0	0

Source: FCC Form 477, December 2017
Households from 2010 census. 2010 is the last time households were reported by census block.

Comcast & COX reported coverage is erroneous. ABB is the only cable operator in Lancaster County.
NOTE: SignaWave LLC formerly Northern Neck WiFi serves some unknown amount of households but not reporting to FCC.

Figure 2. CIT Map of Claimed Virginia Broadband Service Area

Lancaster County
Fixed Wireless Coverage

Virginia Broadband LLC

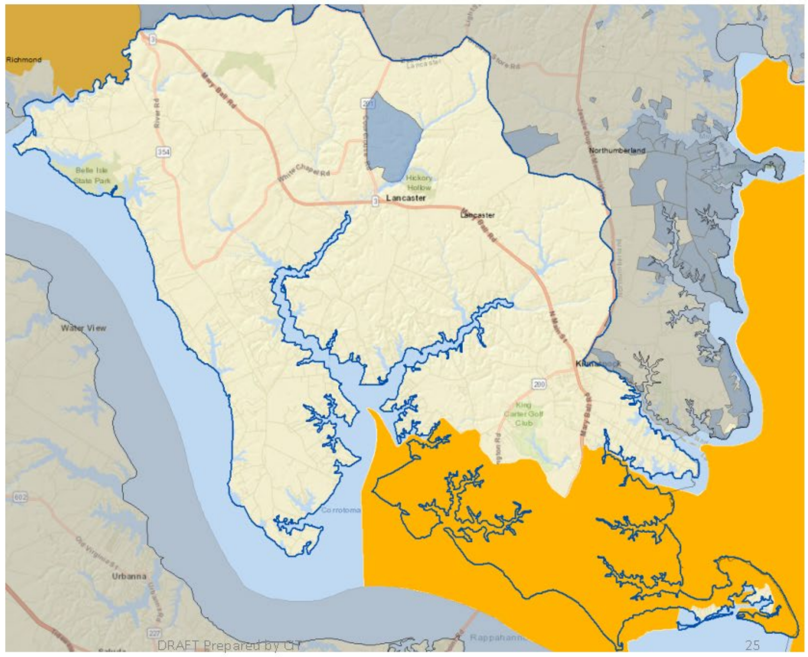
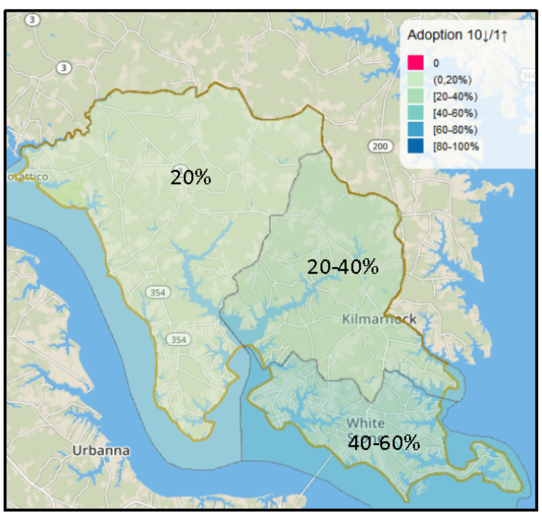


Figure 3

Lancaster County Adoption Rate



Take away: Data from the Purdue Center for Regional Development suggests that if a rural area has widely available and adopted broadband, it can start to successfully attract or retain millennials.

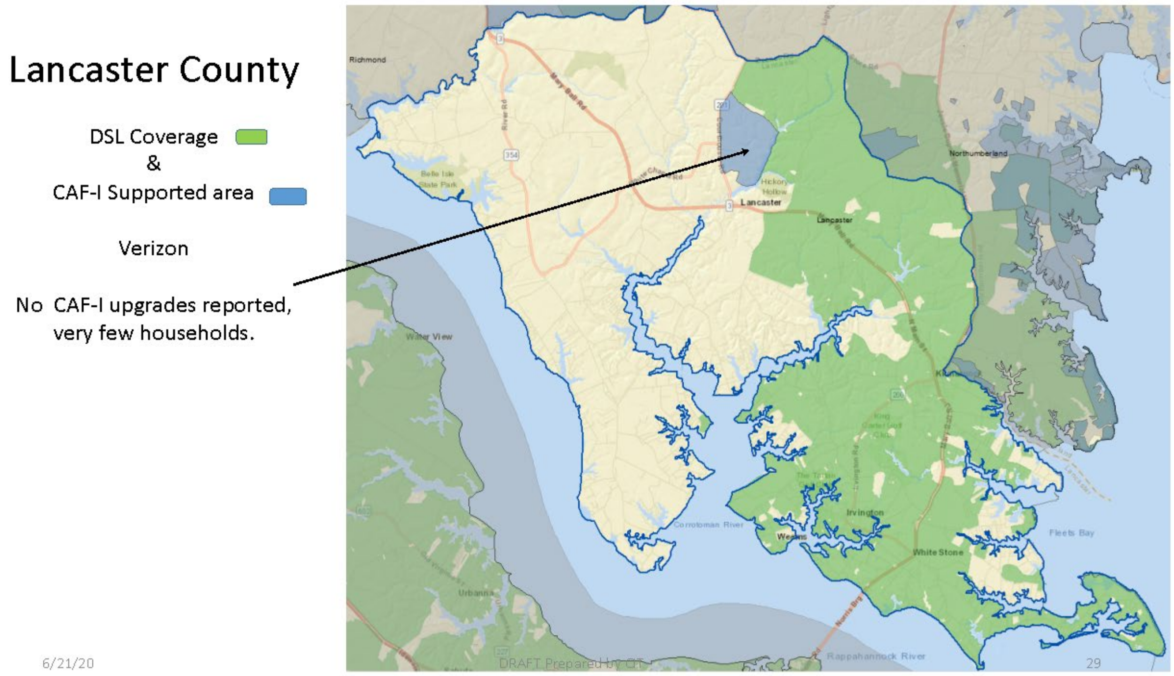
Internet Adoption: ~20-60%

*Adoption rate is the number of residential fixed connections to the Internet per 1000 households. Adoption metrics are provided at the census tract level.

Lancaster County Health Behavior Estimates		National Estimates
Obesity	30%	27.80%
Diabetes	14%	9.90%

Take away: Lancaster County health indicators exceed national estimates. Connecting healthcare and broadband sectors while increasing adoption rates is a path to a more connected, healthier community.

Source: https://www.fcc.gov/reports-research/maps/connect2health/data.html



No federal funds have been provided to Lancaster County for telecommunications projects.

Attachment 15 – CDBG Planning Grant Application – Economic and Demographic Analysis

Lancaster County Broadband Authority Application for CDBG Telecommunications Planning Grant Submitted to Virginia Department of Housing and Community Development February 14, 2018

Introductory Statement

The Lancaster County Broadband Authority has prepared this grant application to request a CDBG-funded Telecommunications Planning Grant that will allow the Authority to carry forward an ambitious project to bring high speed internet service to large areas of Lancaster County that are currently unserved. The most critical unserved areas are inland, with widely dispersed homes, and where the residents are predominantly low-income families. These are areas where the local CATV franchisee, which provides internet service in our three incorporated towns and selected adjacent areas, has zero interest in expanding its customer base. Residents in these areas who wish to have internet service in their homes have very limited options to get it. Consequently, it falls to the County to take measures to bring these otherwise forgotten residents the capacity to improve their prospects with access to the online world. In July 2018, the County responded by forming the Authority, an independent corporation chartered under the Virginia

Wireless Service Authorities Act.[1] To maximize the chances of success, the County took the bold step of selecting 5 citizen members to serve on the Authority. All were chosen for their expertise and commitment to fulfilling the mission of expanding internet service to their neighbors who currently lack service.

Some demographic information about Lancaster County will provide background for our application. The County comprises 133.25 square miles. Latest US census[2] data shows our total population is 10,768. Population has been slowly but steadily declining, since the 2010 Census, which counted 11,390. The age distribution of persons in our County is heavily weighted to senior citizens. 35.6% of County residents are over the age of 65. The population of young adults has been hollowed out by migration to larger towns and cities, but 15.4% of current residents are children under the age of 18. Geographic dispersion is also a challenge for the county. Waterfront homes are strung out along the banks of our rivers and creeks. These are mostly the second homes of affluent city dwellers and the retirement dream homes of our older residents. Inland residents concentrate in and around our three incorporated towns, or are widely dispersed in the less developed areas in the North and East of the County (maps included as attachments will detail). Kilmarnock is the largest of the three incorporated towns with a population of 1,440 living within the town limits. Irvington and White Stone have 403 and 457 residents respectively.[3]

Income levels in the county largely correspond to the demographic and geographic characteristics described above. Median income in Kilmarnock is $31,303; in White Stone, it is $40,875. Irvington, an enclave of high-end real estate, shopping and luxury accommodations, is the outlier with median income of $70,000. Poverty levels somewhat match the income profiles of the three communities. In Kilmarnock, 15.1% of residents live at or below the poverty line. In White Stone 21.2% are impoverished, whereas Irvington's poverty rate is 3.23%. Overall the County is rated as "transitional" with median income level of $51,495 and an overall poverty level of 12.9%,[4] but medians and averages tend to mask the real story of our low-income neighbors whose needs are chronically neglected or ignored. The substantially higher incomes of our County's retirees cause a recognizable, but as yet unquantified, distortion in median income levels. For example, Richmond and Westmoreland Counties, situated to our North and East, each reported that less than 20% of their population was over the age of 65 as of the 2010 Census. They also have substantially lower median income levels, and Richmond County is classified for CDBG purposes as "Distressed." Another indicator of economic stress in Lancaster County is the fact that 73% of the children in the County public schools are eligible for free or reduced cost school lunch. There are two food pantries in the County, both of which operate to capacity 1 day per month to distribute food to the needy.

Employment opportunity is similarly depressed in Lancaster County. Our region's most recent Comprehensive Economic Development Strategy report, NNCEDS, was produced for the US Department of Commerce in 2013.[5] While that report covered all four counties on the Northern

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[1] Virginia Code § 15.2-5431.1, *et seq.*

[2] Unless otherwise noted, county side data is from the US Ceusus Bureau, Quick Facts, Lancaster County Viriginia, and represent the data set compiled on July 1, 2017.

[3] Population, income and employment data on our three incorporated towns is from Data USA, a web service compiled by Deloitte.

[4] 2017 CDBG Program Design, VDHDC, pp. 73-74.

[5] The Northern Neck Comprehensive Economic Development Strategy, "NNCEDS," Compiled in 2013.

Neck, we believe it was generally representative of Lancaster as far as employment is concerned. The report showed gradual workforce decline in nearly every standard occupation (i.e., manufacturing, food service, etc.) and it measured little or no presence of employment in the "information economy." Since 2013, the downward trend has continued and perhaps even accelerated. More recent data compiled in 2015-2016 by Deloitte[6] has Kilmarnock posting a 6.5% decline in employment over the period. At the same time, Irvington employment declined by 34.6% and White Stone by 8.7% . According to figures obtained from the Federal Reserve's FRED database, Lancaster County's overall unemployment rate varies seasonally. For the 2017 calendar year, it ranged from a high of 9.3% to a low of 3.0%. This compares to statewide rates from 4.4 to 3.3% for the same period. [7]

The 2013 NNCEDS report included a SWOT (Strengths Weaknesses Opportunities and Threats) analysis that cited that lack of broadband internet as the largest contributor to our unfavorable economic condition.[8] That same report estimated that 215 of every 1000 households in the region had access to internet (compared to a national average of 700/1000).[9] The report prioritized improving our telecommunications infrastructure[10] and spoke hopefully about improved fixed wireless services that regrettably have not materialized. Meanwhile, our CATV franchisee expanded its reach from 2013 to 2017, to the point that the more densely populated areas of the County are now mostly covered. However, the CATV service map reproduced later in this application package shows large areas of the County where population is poor and spread out and where no CATV service and no fixed internet service is available. The most recent US Census data estimates that 69.9% of Lancaster County households have a subscription of some kind that allows them to access the internet. By no means, however, does this indicate that all needs are satisfied. It is clear that some service offered in the County does not meet FCC minimum standards because several providers advertise speeds "up to" 10 mbps download and 1 mbps upload." As far as wired service to the home, only the CATV franchisee provides that, and it is only willing to expand its service areas if the potential customers pay 100% of its recruitment and installation costs. It currently estimates installation cost at $36,000 per mile of cable/fiber laid.

The Lancaster County Board of Supervisors recognized the stagnation in internet expansion outside the more densely populated areas and the vital importance of bringing internet to our citizens. The Supervisors were particularly concerned for the low- and middle-income citizens who have no other practical means of obtaining internet service. To rectify this situation, the Supervisors created the Lancaster County Broadband Authority on July 28, 2018, with the support of a group of concerned citizens, 5 of whom were appointed as the first members. The members were specifically chosen for their expertise and their dedication to getting the job done. The Chair, Ocassa ("Cassie") Thompson, is a retired federal government executive with vital management experience and impeccable credentials in the community as a leader. The Vice Chair, David Pere, is a retired Colonel in the US Marines, with heavy contracting experience and strong organizing skills. The other three members are no less impressive. Margie Armen is an

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[6] This information is contained in the Data USA database, cited above.

[7] www.fred.stlouisfed.org

[8] NNCEDS 2013 Report, p. 24

[9] *Id.* The analysis used a methodology developed by Purdue University, the Innovation Index

[10] *Id.*, at 29. Improving the region's telecommunications infrastructure was the number 1 goal identified by the report.

attorney with over 40 years' experience in funds management, audit and evaluation, and a lifelong volunteer leader. Dr. Gary Silverman, a PhD chemist and small business owner, has wide experience in grant administration and is a tireless researcher of new technologies and an envoy for the future. Kevin Bean, a long-time resident of Lancaster County and an active employee of the Lancaster County Public School District, has hands-on technical expertise in computer networks, practical experience in government procurement and administration and deep connections in the community. This group of highly skilled professionals has taken on the urgent task of building support in the wider community, designing a project that does the most good for the most people, and securing the funding to get the job done.

Creation of the Broadband Authority is the single most important indicator of the County's sense of urgency and commitment to bringing its low-income deeply rural residents the economic opportunity offered by high speed internet. The County knows that the foremost benefit will be to the education of our children in the public schools. At present, the public library and a local McDonalds in Kilmarnock are the main places parents take their children to do homework assignments that require internet access. These both have serious limitations as a regular option to use the internet, and they are a 20 to 30-minute drive from the deeply rural and completely unserved areas where our greatest concern is focused. Younger adults in particular will benefit from the ability to connect with distance learning and make the most of continued training and skills development offered by our community college system. Importantly, they won't have to migrate to cities to take advantage of these opportunities. Families will be able to use online commercial services like banking and shopping, and they will be able to access patient portals available for medical records and services.

The Authority recognizes that following the project development path outlined in and supported by the Telecommunications Planning Grant process will help us refine and reinforce our capacity to fulfill this mission, and we very much want to pursue that course. Our application follows and presents as much detail as we have available at this time.