Broadband Infrastructure Inventory Study
For
St. Lawrence County, NY

August 4, 2021

ECC Technologies
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The information in this report was gathered for the exclusive use of St. Lawrence County and the Development Authority of the North Country for the purposes of analysis and planning.

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1. Introduction

Broadband access has become one of the foundational resources that allows a community to compete and thrive in the 21st century. Infused into all aspects of our social and economic life, broadband connects computers, cell phones, television, and most modern communications.

Broadband powers emails, Internet searches, social media, online shopping, and information management. It enables business, education, medicine, government, and public safety to perform their functions efficiently. It is a critical component of economic development and a community's ability to attract and retain industry. Recent surveys show high-speed broadband is now as important to job creation and business locations as good transportation and skilled labor.

Telecommunications infrastructure and broadband service have transformed the way people, public organizations, and companies communicate, educate, work, and live. Broadband, and the fiber optic backbones that support it, has undeniably become the "interstate highway" of the 21st century.

The use of broadband service is becoming ubiquitous. By 2023, North America will have 345 million Internet users (92 percent of regional population), up from 328 million (90 percent of regional population) in 2018.

Broadband is today considered infrastructure as critical as roads, electricity, and water. Inadequate broadband has become a barrier to community growth, competitiveness, and economic development. This has led to something called "The Digital Divide."

The Development Authority of the North Country ("DANC"), in partnership with St. Lawrence County, has commissioned this study in part to understand its rural area broadband capacity, and explore opportunities for possible broadband expansion to help the County overcome this Digital Divide.

1.1 THE DIGITAL DIVIDE

On Feb 8, 1996, the Federal Communications Commission (FCC) created the Telecommunications Act to establish competition and facilitate growth in the telecommunications industry, which previously had been a government-regulated monopoly.

After the Telecommunications Act, telephone companies called Competitive Local Exchange Carriers ("CLECs") emerged and were able to provide consumers with a choice of services. During this period other non-traditional telecommunications companies such as cable TV providers, network providers, and wireless providers (both cellular and fixed wireless) began to offer competitive broadband services to participate in the explosive growth of the Internet.

DIGITIAL DIVIDE. Over twenty-five years have passed since the 1996 Telecommunications Act which succeeded in creating competition and increased availability of broadband access. Despite that success, a technology gap has occurred between communities that have access to affordable broadband service and those that do not. This division, known as the Digital Divide, has split communities into broadband "haves" and "have nots."

Many rural areas are characterized by lower population density and lower household incomes. These areas often have poor accessibility to broadband. Local counties and cities want to develop future potential but unfortunately do not show a return on investment for broadband providers.

In many instances, the difference between a household that has access to broadband service and one that does not can be less than a mile, but the cost to overcome this short distance can be more than a resident or business can afford.

OLDER INFRASTRUCTURE. Despite the increased need for broadband service, rural areas of the country still rely largely on copper-based infrastructure such as the incumbent telephone companies' unshielded twisted pair copper wire or satellite connections for broadband connectivity.

Unfortunately upgrading copper's limited bandwidth to the high bandwidth capacity of fiber has not been an area of focus for the telecommunications industry. This is due mainly to the high cost of installing fiber and the low population densities of rural areas that create lengthy return on investment models. Furthermore, the incumbent broadband providers are reluctant to invest in expensive telecommunications infrastructure upgrades, which do not show profitability.

Much of the infrastructure in place today in these areas has been in operation for more than 50 years. Most of the telecommunication's industry is focusing elsewhere, with investment dollars being spent in high growth areas such as tier 1 and tier 2 cities, where fiber cable is densely installed. Comparable to the lack of electricity in rural areas of this country before the National Rural Electrification Act of 1936, many areas in New York State are being rapidly left behind.

1.2 EFFORTS TO CLOSE THE DIGITAL DIVIDE

There are federally subsidized programs to expand local incumbent provider broadband such as the Connect America Fund (also known as CAF), Rural Digital Opportunities Fund (RDOF) and the USDA ReConnect program. However, as broadband is not a publicly regulated service, like telephone service, there are no obligations for the provider to make new broadband investments in unprofitable areas.

Two of the initiatives driving broadband expansion into the rural communities of New York State include the 2016 Charter Communications/Time Warner Cable merger and the "New NY Broadband (grant) Program".

As part of the approval of the Charter Communications/Time Warner Cable merger, New York State required the newly merged company, doing business as Spectrum, to expand services to 145,000 households statewide by 2020. Ultimately, delays in Spectrum construction resulted in a revised schedule requiring the network expansion to be completed by September 30, 2021.

This requirement, intended to help expand the availability of broadband service in the state, will reach many homes but not all.

Over the past few years and coincidental with the Charter/Time Warner merger, New York State has offered three rounds of grant funding to support the deployment of broadband to unserved and underserved residences and businesses of New York State.

To date, over $43.1M have been invested in broadband expansion in St. Lawrence County through the New NY Broadband Program. Since 2015, five broadband providers have been awarded grants in St. Lawrence County, these include Citizens of Hammond, Hughes Network Systems, SLIC Network Solutions, TDS Telecom and Verizon. Their respective investment and grant awards are listed in Table 1.

Awardee	State Grant	Total Investment	Locations	Pct. of Locations	Pct. of Investment
Citizens of Hammond	$4,654,041	$5,817,551	2226	24.6	13.5
Hughes Network Systems	$475,647	$954,270	2163	24	2.2
SLIC Network Solutions	$6,796,450	$10,825,558	1475	16.3	25
TDS Telecom	$5,752,585	$8,392,778	1531	17	19.5
Verizon	$9,891,990	$17,150,893	1634	18.1	39.8
Total	**$27,570,713**	**$43,141,050**	**9029**		

TABLE 1 NEW NY BROADBAND GRANT AWARDS (ROUNDS 1, 2 &3) IN ST. LAWRENCE COUNTY

A graphical representation of the census blocks awarded grant funding by the New NY Broadband Grant program is shown in Figure 1 below. The census blocks awarded also represent the blocks to which

Spectrum did not commit to expand its service as part of the merger agreement approved by New York State.

Of the 9,029 locations in St. Lawrence County covered by the New NY Broadband Grant, 24% of the locations are being addressed via satellite service. Unfortunately, satellite service can be impacted by weather and has high latency, which can be detrimental to the following types of service Voice Over IP, gaming, and video services. Further, satellite service is relatively expensive with capped data usage. Once the cap is surpassed for a given month, speeds are significantly lowered or throttled down.

Communities today increasingly compete to become a "Gigabit Community," which is the new standard for areas that want to attract the people, jobs, businesses, and the investments of the future.

Community involvement towards this goal enables the development of mutually beneficial partnerships involving organizations such as counties, cities, electric companies, alternative broadband providers, and more, enabling new investments in broadband infrastructure.

These organizations can make long-term investments to improve their communities, and the Digital Divide is being bridged by communities that are willing to plan and cooperate to reach their growing broadband needs.

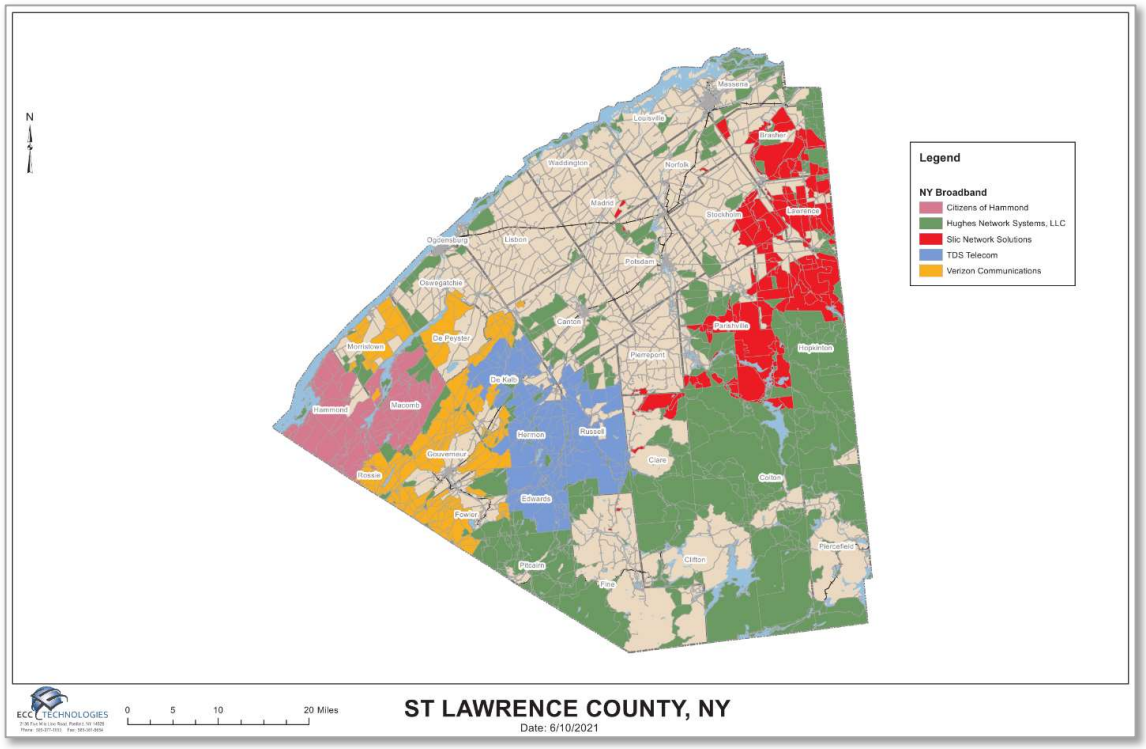

FIGURE 1 ST. LAWRENCE COUNTY - NEW NY BROADBAND GRANT FUNDING AREAS

According to NYS the entire County is now served by sufficient broadband. However, the federal government does not recognize the current generation of satellite service as sufficient to be considered served. With that said, the FCC is awarding next generation satellite service to satellite companies through its RDOF Grant program.

As documented in this report, St. Lawrence County is underserved in many rural areas that have been awarded a grant to satellite providers. A map of the County's broadband supporting infrastructure illustrating this statement is contained later in this report.

COVID-19. The world moved into lockdown to protect against the spread of the COVID-19 virus. This caused a major shift in the way we perform critical tasks including work from home (video conferencing and collaboration, virtual private network access to company systems), learning from home (video conferencing and collaboration and access to e-learning platforms), and telemedicine (video conference with healthcare professionals and access to healthcare systems).

Covid also had impacts on daily activities including shopping (ordering food and items for delivery or curbside pickup) and entertainment (video streaming, online gaming, social media). As a result, fixed broadband traffic increased up to 60%, voice traffic increased up to 130% and Wi-Fi calling increased up to 80%.

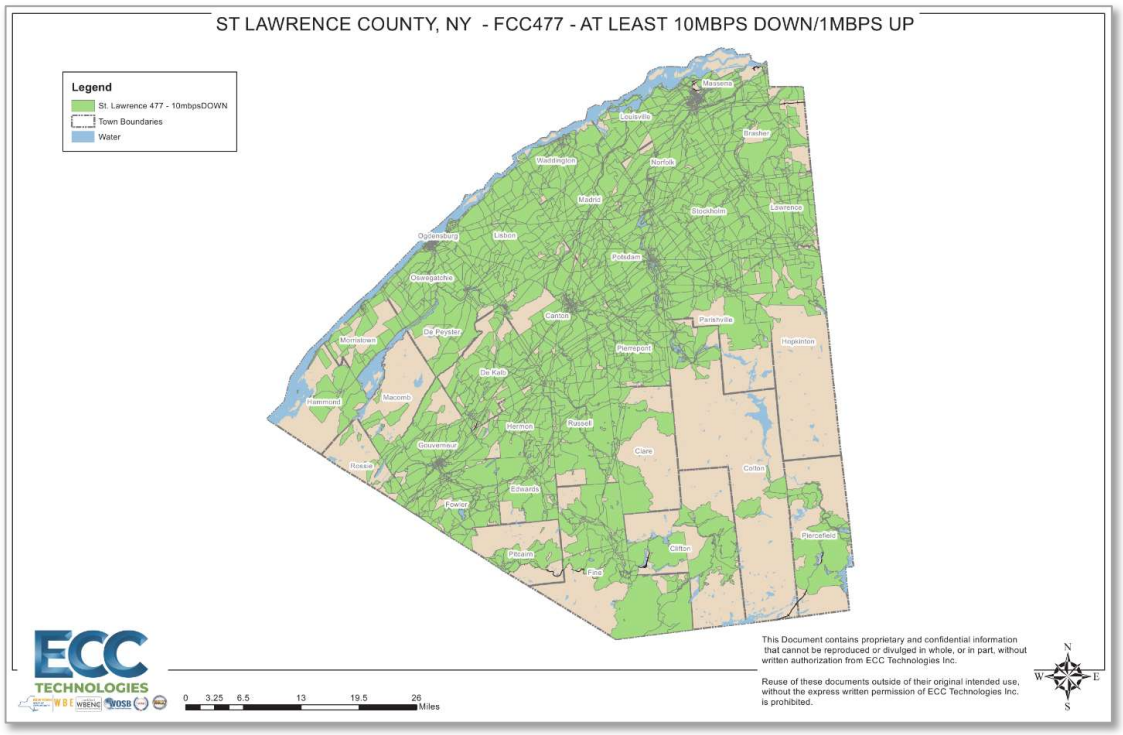

FIGURE 2 FCC 477 DATA OF CENSUS BLOCKS REPORTING AT LEAST 10MBPS/1MBPS

As discussed throughout this document, broadband service is lacking in many areas of the county. The situation has brought to light the importance of remote healthcare, remote learning, and remote work. The COVID-19 pandemic has exposed the nation's persistent broadband issues including availability, affordability, and speed of service exponentially.

As many people have been quarantined in their homes, lack of access in rural areas is getting unprecedented attention with newly announced grant programs from both federal and state agencies. These grant programs define underserved and unserved by the availability of set download and upload speeds.

In 2015, the FCC set the standard for broadband access at 25Mb/s download by 3Mb/s upload. A new standard of 100Mbps download is being discussed among industry analysts. Four US Senators called upon the Biden Administration to establish a "21st century definition of high-speed broadband" of 100Mb/s both download and upload. The FCC is likewise supporting a new standard above the current one.

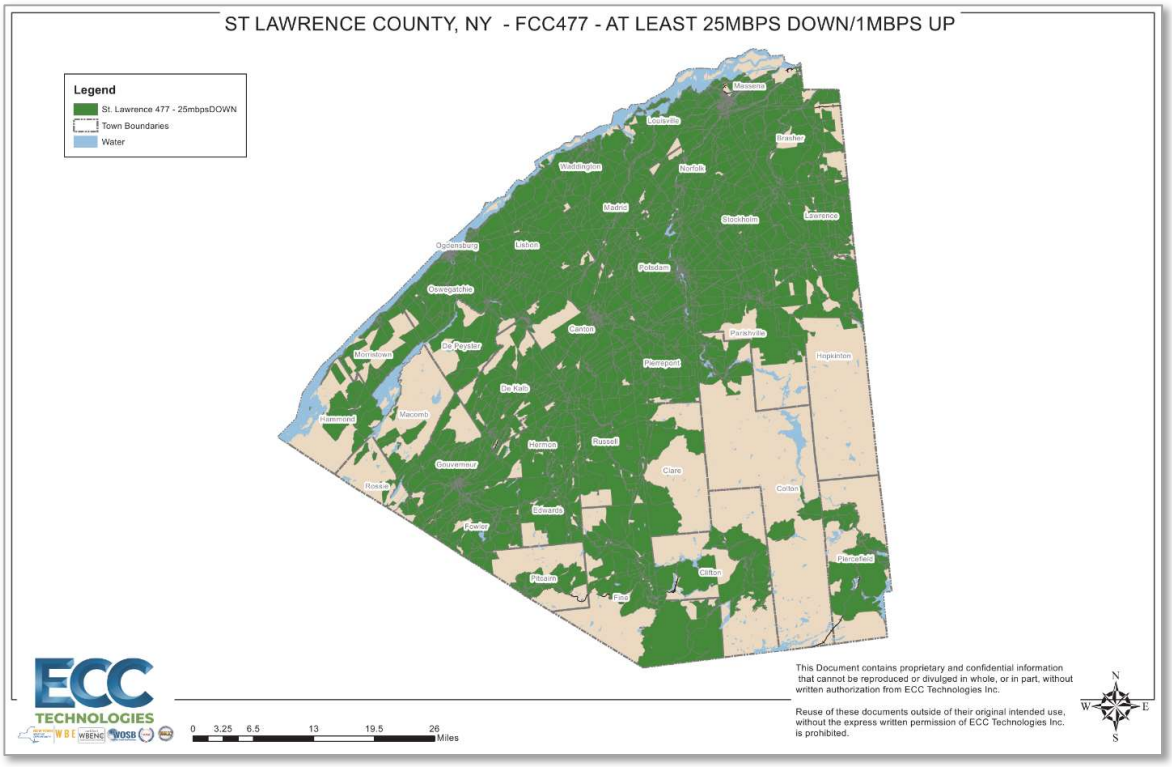

FIGURE 3 FCC 477 DATA OF CENSUS BLOCKS REPORTING AT LEAST 25MBPS/3MBPS

Also, as shown in the study's mapping information, pockets of areas across the County would benefit from additional service and competition. Information in this report can be used to help St. Lawrence County lessen the Digital Divide.

Figure 2 represents the FCC 477 data set that identifies those census blocks reporting at least 10 Mb/s download and 1Mb/s upload speeds and Figure 3 identifies those areas with at least 25Mb/s download by 3Mb/s upload speeds.

In both maps the census blocks in beige color are under the 10Mb/s by 1Mb/s threshold. (Since the 477 data is at best 12 months old, the New NY grant award winners may or may not be represented in the maps but need to be considered when going after additional grant funds).

The cross referencing of field study data with the results of a Broadband Availability & Adoption Tool (BAAT) campaign will further help define areas of need in a more granular manner and provide a basis from which to obtain partners and funding. This will be discussed in the summary BAAT campaign information at the project closeout.

Regional Digital Opportunity Fund (RDOF).

Early in 2021, the FCC RDOF program replaced the FCC CAF program. This new $20.4B grant program is based on two separate reverse or "lowest bid wins" auctions. The first auction was held in October of 2020 and targeted census blocks that are wholly unserved with fixed broadband at speeds of at least 25/3 Mbps.

The three award winners in St. Lawrence County were Citizens Vermont Acquisition Corporation, a holding company of Citizens of Hammond, SLIC Networks and Space Exploration Technologies Corporation, or as it is better known SpaceX. The second auction date has not been set.

RDOF Awarded areas are shown in Figure 4. The pink areas represent Citizens of Hammond awarded area and the red represents SLIC awarded areas, both will be installing fiber to the home to provide a gigabit solution.

The blue areas represent awarded areas to SpaceX. SpaceX will be launching and utilizing next generation low earth orbit satellites to provide at least 25/3 Mbps service. This new service is called Starlink and is currently in beta testing.

The Starlink website claims speeds available will be between 50Mb/s and 150Mb/s. However, a clear line of sight ("LOS") between the Starlink receiver dish and the satellite needs to be available. Unlike terrestrial fixed wireless services, weather can impact the performance of the connection.

The RDOF grant award amount is paid out to the winning bidder as annual installments over a 10-year period. Under the RDOF rules the service provider winning the award has three years to complete 40 percent of their build and six years to complete the full build out.

According to the posted award information, Citizens Vermont Acquisition Corporation has committed to bring Fiber to the Home (FTTH) service to 83 locations in the County. SLIC Network Solutions is committed

to connect 333 locations with FTTH service while Space Exploration Technologies Corporation will service 517 locations via their low earth orbit satellite broadband service.

Awardee	Assigned Support (10 years)	Locations	Pct of Locations	Pct of Investment
Citizens Vermont Acquisition Corporation	$145,038	83	8.9%	8.1%
SLIC Network Solutions, Inc.	$99,716	333	35.7%	5.6%
Space Exploration Technologies Corp.	$1,547,789	517	55.4%	86.3%
Total	**$1,792,543**	**933**		

TABLE 2 RURAL DIGITAL OPPORTUNITY FUND GRANT AWARDS (PHASE 1) IN ST. LAWRENCE COUNTY

There is concern, because the program allowed competitors to continuously underbid each other (to maintain or gain market share) that many areas saw a "race to the bottom" that will potentially produce unstainable business models.

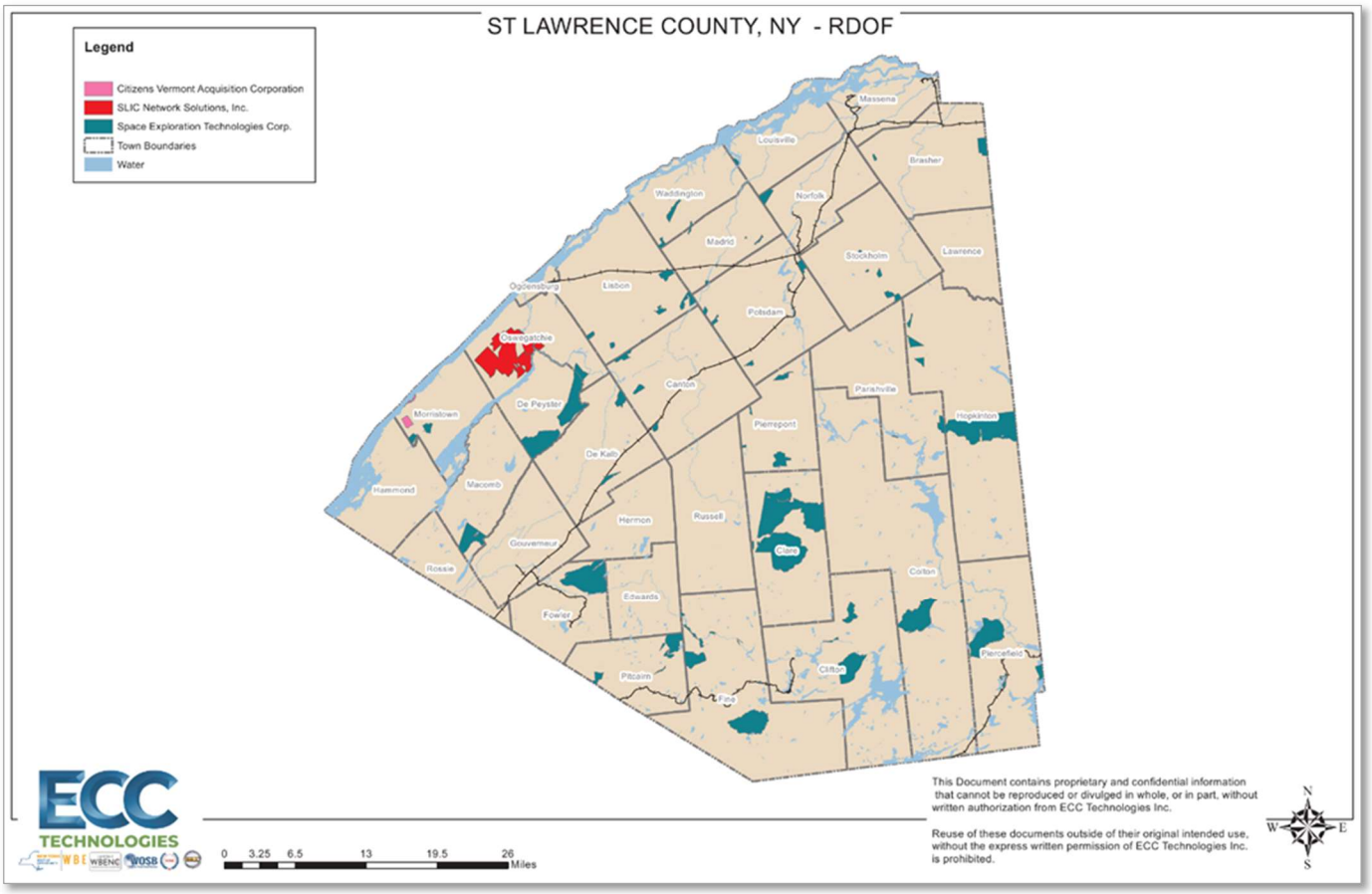

FIGURE 4 RDOF AWARDED CENSUS BLOCKS

Many fear that some of the companies that will take the money will not be able to construct the system they have committed to build. In January of this year, a letter signed by 160 Senators and House Representatives urged the FCC to be fastidious with its review and confirm that the winners can deliver on their respective system build out commitments.

1.3 AREAS OF POTENTIAL ELIGIBILITY FOR RECONNECT GRANT

The past rules of Round 1 and 2 of the United States Department of Agriculture ("USDA") ReConnect grant program were examined. Grants awarded to HughesNet satellite under the NYS Broadband program appear to be eligible for Reconnect Funding.

Per the USDA Reconnect Funding Opportunity Announcement: "Sufficient access to broadband means any rural area in which household have fixed, terrestrial broadband service delivering at least 10 Mbps downstream and 1 Mbps upstream. Mobile and satellite services will not be considered in making the determination of sufficient access to broadband.

Therefore, if future ReConnect Grant rounds are consistent with the first two rounds, areas in St. Lawrence County that were awarded to HughesNet by New York State could be eligible for grant consideration. Like the RUS based USDA ReConnect grant program, the RDOF grant program also did not consider census blocks served by current satellite service as being served.

The Federal RUS programs consider satellite-based broadband as a potential solution "…if the proposed project is proposing to fund terrestrial-based facilities for satellite broadband services, the plans offered to subscribers may not cap bandwidth usage. Furthermore, RUS must determine that the service plans offered to subscribers within the service area are reasonable."

RDOF grant awards were made to SpaceX through their Starlink satellite broadband service in small areas of St. Lawrence County. It is expected that these areas will no longer be eligible for Federal grant dollars. However, there are still many rural areas of the County that may qualify for the federal ReConnect grant program if the requirements of the program remain the same in future rounds.

The map indicated in Figure 5, represents the RDOF award areas overlaid on the NYS Broadband grant award areas. The sections colored green representing the HughesNet awarded areas are the first areas to investigate for potential funding opportunities.

All areas that were considered served before the grants (beige area) and all areas that have new FTTH services (Citizens of Hammond, SLIC, TDS and Verizon) are not eligible for ReConnect or other types of grants. Also, the census blocks where RDOF grants were awarded counts as served by the USDA ReConnect program.

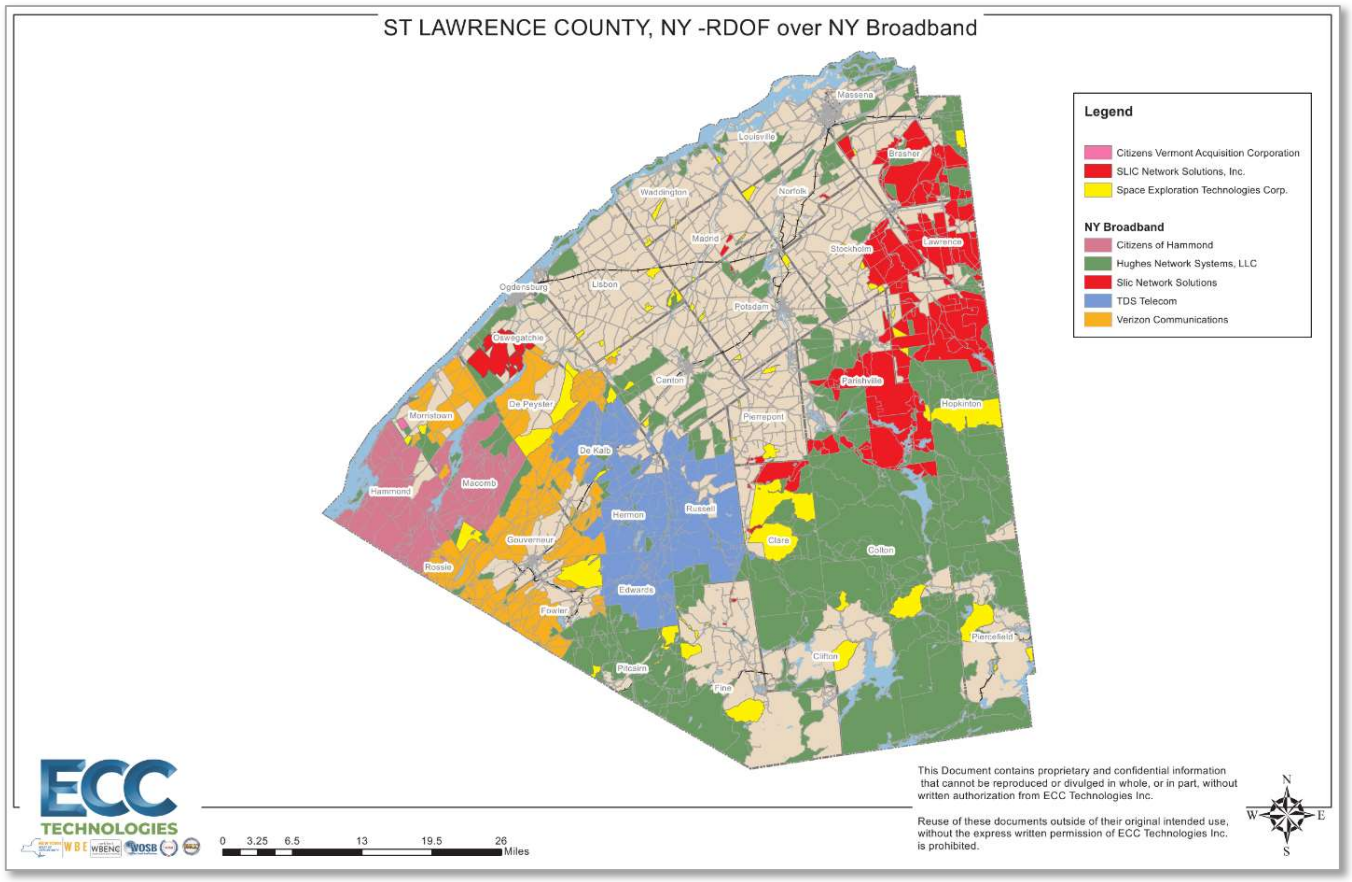

FIGURE 5 FCC RDOF AWARDED AREAS OVERLAID ON NYS BROADBAND GRANT AWARDED AREAS

1.4 PURPOSE OF THE PROJECT.

In December of 2020, the Development Authority of the North Country (DANC) contracted with ECC Technologies, Inc. (ECC) to perform a telecommunications study by conducting an inventory of existing fiber optic, coaxial assets and other broadband supporting infrastructure within St. Lawrence County, New York.

The purpose of the study is to accurately identify areas of the County that are lacking in broadband infrastructure. In addition, the data collected from this effort will be able to be used in the next steps to develop a technological solution to address the lack of broadband in unserved and underserved areas of the County, obtain partners and funding to address these issues.

The inventory project included a field inventory of the County's existing broadband infrastructure, namely the fiber optic, coaxial cable, and tower infrastructure. ECC's OSP team drove the roads in the County and to the extent possible, physically identified and documented the County's existing broadband infrastructure.

As per the agreed upon scope of work, ECC did not drive the city and villages in the County including areas of Canton, Massena, and Ogdensburg, as our focus was on the rural areas of the County. The ECC team obtained County maps from the County's GIS Department, and along with the field data gathered, created maps of the County's infrastructure into an ESRI GIS database.

This general infrastructure report documents our findings. The County is described in terms of existing fiber, coaxial and tower infrastructure, and potential fiber and wireless based broadband access. ECC has identified the different broadband providers in the area and describes their current levels of fiber infrastructure. ECC has created maps documenting, to the extent possible, the fiber, coax, and tower infrastructure in the County.

These maps consist of the following information, and will serve as the foundation to overlay future County Initiatives:

1. Fiber optic cabling
2. Coaxial cabling
3. Central Office and remote terminals
4. Wireline boundaries
5. Wireless tower and water tower sites

The inventory and accompanying maps created not only show where fiber-based broadband exists today but provide insight into areas that need additional infrastructure for the expansion of broadband services. Critical broadband access/telecommunications infrastructure information is disclosed that can lay the foundation for broadband improvement plans.

The information compiled by ECC Technologies is presented in the following pages of this report. Much of this information has also been placed into an interactive electronic geographic information system (GIS) database and provided to DANC.

This database tool consists of interactive mapping elements that can be used to identify and locate the major telecommunications resources within the area for economic development and County planning purposes.

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2. Research and Project Methodology.

2.1 RESEARCH METHODOLOGY

To gather the information required for the study, ECC researched the major telecommunications providers listed below and performed field surveys, whereby an ECC engineer travelled the rural (outside towns and the city) roads in the County to identify and document outside plant (OSP) infrastructure. The following were identified:

1. Wireline Providers
2. Incumbent Local Exchange Carriers (ILECs)
3. CATV Cable TV/Modem Service Providers
4. Competitive Local Exchange Carriers (CLECs)
5. Network Services and Dark Fiber Providers
6. Communications Towers and Owners

Secondary research utilized publicly available databases managed by federal and state agencies and information purchased from telecom industry database research organizations.

Primary research was conducted by outside plant personnel field surveys for fiber optic and coax route identification via aerial and underground markers, networking equipment and tower locations.

The towers in the County were visited and digitally documented. ECC also obtained telecommunications industry data publicly available from the following federal, state, and local organizations: the FCC, PSC, and St. Lawrence County.

Other resources included certain databases to which ECC has access, telecommunications industry research companies, telecommunications provider websites, and telecommunications industry professionals.

During the field study it was noted that ILEC's are no longer marking their buried fiber cables as "Buried Fiber Cable." All new installations are simply being marked as "Caution: Buried Cable." This is being done to avoid giving competitors the locations where the ILECs are expanding/deploying new fiber services.

2.2 GIS MAPPING/DATABASE

All infrastructure information discovered in the inventory phase has been integrated into a GIS model developed for and provided to DANC. This GIS database will be administered, stored, and updated by DANC staff to ensure security and continuity of the resource.

The GIS database of information was developed to support broadband and economic development initiatives. This information will be used by DANC and the St. Lawrence County Planning Department for County and local level use. The maps included in this report represent the area's fiber optic cable, coaxial cable and vertical asset infrastructure documented in this study.

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3. Broadband Infrastructure Overview

This section is an introduction to the major providers and different types of infrastructure used in the County to deliver broadband service. A summary map that shows the available and important infrastructure is also included.

The broadband providers in St. Lawrence County are delivering service to homes, businesses, and other organizations at varying degrees of access, performance, and cost. The infrastructure in use by the industry include landlines consisting of copper, coaxial, fiber optic, or wireless based technology utilizing strategically placed towers and satellite.

3.1 WIRELINE INFRASTRUCTURE – COPPER, COAXIAL, AND FIBER OPTIC

Wireline infrastructure includes telephone and cable TV cables, which are either buried in the ground or attached aerially to utility poles. Wireline cables can be twisted pairs of copper wire, coaxial, or fiber optic cable.

The wireline infrastructure for the County is primarily owned and operated by incumbent local exchange carriers which include Citizens Telephone of Hammond, Nicholville Telephone Company, TDS Telecom Corp (Edwards Telephone Co) and Verizon and cable providers are Spectrum Communications (Charter Com) and Castle Cable TV.

Others include FirstLight Fiber, SLIC Network Solutions Inc., Mohawk Networks (in small areas of Norwood and Russell only) and Windstream who are fiber-based providers per the FCC 477 report.

Digital Subscriber Line (DSL) Service.

Traditional telephone copper cable is still the most used infrastructure serving homes and businesses across the County. Copper cable is used by the telephone companies to connect Central Offices to end users for the purpose of providing traditional voice and data services, typically referred to as broadband.

Copper cable has a very limited capacity for broadband service and is usually the reason why advanced telecommunications services are not available in certain areas. The limitations of copper based providing

broadband is a direct result of distance from the home to the Central Office or Remote Terminal, the age, and the restrictive performance qualities inherent to the wire itself.

The majority of residential telephone service in St. Lawrence County is supplied by copper cable that consists of numerous pairs of unshielded twisted pair (UTP) copper wires. In an effort to provide a faster service over existing copper lines, the telephone carriers have developed digital services called DSL, or "digital subscriber line" technology, which is considered by some a low-end form of broadband.

ADSL (Asynchronous Digital Subscriber Line) is a form of DSL Service that provides download speeds that are different and typically greater than the upload speeds. ADSL uses an ordinary UTP line to deliver bandwidth services of up to 24Mbps service (and sometimes more), depending on the type of ADSL and the distance from the point of equipment.

Since its introduction into the telecommunications industry, ADSL has become a very popular service for the incumbents because it requires only the addition of new end equipment and not the replacement of cable, which is very expensive.

Another type of DSL being deployed is very high-speed digital subscriber line 2 (VDSL2) which can provide a sum of downstream and upstream speeds of up to 200Mbps. A drawback of the technology, however, is that it requires customers be within three cable miles of the DSL equipment, and even that is no guarantee of service for a number of reasons.

CATV/ Coaxial Cable

The cable TV (CATV) providers Castle Cable TV and Spectrum (Charter Com) utilize Data Over Cable Service Interface Specification (DOCSIS) over a hybrid fiber optic/coaxial cable network to provide high quality video, high speed data, and voice services to their customers.

In most cases the fiber provides a connection from the signal origination, referred to as the headend, to a node which converts optical signals to electric. From the node, the signal is sent to the customer site via coaxial cable. The high-performance characteristic of coaxial cable supports the transmission of telephone, video, and data.

The CATV provider utilizes cable modem technology, which uses a single coaxial cable TV connection to a customer location to support the simultaneous transmission of voice, TV programing, and Internet. In St. Lawrence County broadband access is available in centrally populated areas via this hybrid fiber/coaxial infrastructure installed by the incumbent cable TV providers.

Dark Fiber

Dark fiber is the term used in the industry to describe fiber optic strands (in the cable) that are leased or sold to the customer or end user without services delivered over them. Unlike fiber from a service provider, the end user must light and operate the fiber strands with their own electronics.

This type of fiber is typically used to connect multiple locations together over an end user's private network. The advantage of dark fiber is that the end user has control over the type of technology and network used. However, the end user is also responsible for operation and maintenance of the infrastructure.

3.2 CENTRAL OFFICES (COS)

The Central Office is a building, typically made of brick or concrete block, that the incumbent telephone company uses to place and operate voice, data, and video switching equipment. The equipment used in the local Central Office determines the level and availability of services within a certain area or "wire boundary" which is the extent to which the wires leaving the CO can reach.

Citizens Telephone of Hammond, Nicholville Telephone Company, and TDS Telcom each have two COs. These COs are located within the County boundary. Verizon has 13 central offices in the County and three more that are located outside of the County but are providing service to small border areas in the northeast and south region.

3.3 UTILITY POLES

Utility poles and telephone poles are generally owned by one of the following organizations: the local power companies, the incumbent telephone companies, or the municipal entities including villages and cities. Utility poles are used to carry electric power lines and telecommunications cables. The electrical power lines are generally located at the top of the pole and the telecommunication lines are attached on the sides.

To be compliant with the National Electric Safety Code (NESC) there must be 40" of separation between a telecommunication line and a power line on the pole. The area on the pole where the telecommunication cable resides is known as the communications space or "comm space." Usually, aerially mounted fiber cable is tagged with an orange, blue, or yellow label so it is easily identified for maintenance or repair.

All poles have a limited number of telecommunications lines they can carry. These lines are attached on the pole one on top of the other. Therefore, a taller pole can accept more lines than a shorter one. Once lines are installed on a pole, adding a new line can require moving existing lines to make space for the new one.

In the construction process of adding a new cable moving the existing lines or replacing a pole to make room for another is called "Make Ready" work.

The majority of poles in St. Lawrence County are owned by the utility companies National Grid and Massena Electric and the ILEC's Citizens Telephone of Hammond, Nicholville Telephone Co, Verizon, TDS Telcom. Others include Spectrum and SLIC.

3.4 WATER & WIRELESS TOWER STRUCTURES IN THE COUNTY

Wireless technologies are the fastest growing segment of the telecommunications industry. Wireless infrastructure supports cell phones, pagers, personal digital assistants (PDAs), mobile data terminals, messaging, and Internet services. Wireless antennas or access points are located on wireless towers, tall buildings, and even water towers throughout the County. In some instances, the wireless infrastructure installed can offer connectivity in areas where landline infrastructure cannot.

Wireless bandwidth technologies are developing at a rapid pace. Hybrid solutions that are using fiber as the backhaul and wireless as the "last mile" are being tested and installed across the country. Using fiber cable to get close to the customer, new and emerging wireless technologies are bridging the gap by providing high bandwidth service over the last mile costly link to the customer home.

These new hybrid systems can provide speeds of 50Mbps and more. Cellular companies and wireless Internet service providers (WISPs) are beefing up their networks in preparation for new wireless technologies that will allow them to connect to customers in rural environments.

The key to wireless providers accessing rural areas is the availability of fiber infrastructure and vertical assets where the provider can place their antennas. Even the incumbent telephone companies are beginning to take notice. AT&T is now using wireless technologies as a way to bring high bandwidth to homes in rural areas.

Their Fixed Wireless Internet promises to bring speeds in excess of 10Mbps down and 1Mbps up. However, based on the current FCC definition of broadband access, which is 25Mbps downstream and 3Mbps upstream, this would not be considered ideal.

5G Mobile / Cellular Technology

Fifth generation cellular technology (5G) promises high speed data rates (promising over 100mbps in very short distances) that are supported by a large number of antennas covering a given area. On October 27, 2020, the FCC established the 5G Fund for Rural America which will make up to $9 billion available to bring 5G mobile broadband service to rural areas.

The federal government plans to auction off $9 billion in 2 phases in the coming years.[14] Since 5G is dependent on many vertical assets to mount antennas on, it will be interesting to see the types of solutions the cellular companies will have for rural areas.

Many of the wireless towers in St. Lawrence County have cellular equipment installed on them to provide cell phone-based coverage. The service coverage of a typical cellular equipped tower can be anywhere from one to ten miles, depending on the equipment in use, how the equipment is set up, terrain, and the height of the towers.

Cellular service is limited in bandwidth and is charged on a "data cap" rate. This pricing limits the Mbps used per month - which equates to very expensive data plans for Internet usage. Because of these two factors, it is generally not considered a viable small business and home form of Internet access at this time.

There are 52 wireless tower structures and 5 water towers identified either through field inspection, GIS database research, registered with the FCC data base or through data provided by the County.

The majority of the towers are located in the northern half of the county near and in the population centers, with the highest concentration of towers installed in and around Gouverneur, Massena, Ogdensburg, and Potsdam. Based on the FCC information, the County has registered four towers which it owns in Massena, Ogdensburg, Richfield, and Waddington.

The height of the registered towers range of 9 to 231 meters with the majority being in the 60-to-110-meter range. Owners of the FCC registered wireless towers in the County are shown in Table 3.

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FCC Registered Towers in St Lawrence, NY	
Owner Name	**Towers**
American Towers LLC	3
CCATT LLC	1
Clarkson University	1
Mimaroglu,Sinan	2
Morgan, Tri County Comm Systems	1
National Grid USA Service Company, Inc	1
New Cingular Wireless PCS, LLC	1
New York Power Authority	1
Ogdensburg Bridge and Airport Authority	1
Ogdensburg Bridge and Port Authority	1
Ogdensburg Volunteer Rescue Squad Inc.	1
Pinnacle Towers LLC	1
Potsdam, Village of	1
Power Authority of the State of NY	2
St Lawrence Lewis County BOCES district	1
SBA Properties, LLC	3
SBC Tower Holdings LLC	4
SLG Communications Corp.	1
Spectrum Northeast, LLC	3
St Lawrence University DBA = North County Public Radio	1
St. Lawrence Seaway RSA Cellular Partnership	6
St. Lawrence Valley Educational TV Council	1
St. Lawrence, County of	4
State of New York, Division of State Police	1
Stephens Media Group - Massena, LLC	2
Svendsen, Erling DBA = North Country Repeaters	1
Verizon New York Inc.	2
Vertical Bridge Towers III, LLC	2
Wade Comm Inc.	1
Wireless Works Inc.	1

TABLE 3 VERTICAL ASSETS REGISTERED WITH THE FCC IN ST. LAWRENCE COUNTY

A map showing the locations of wireless towers in the County appears in Figure 6. Fiber optic transport is important as a high bandwidth backhaul to wireless last mile services.

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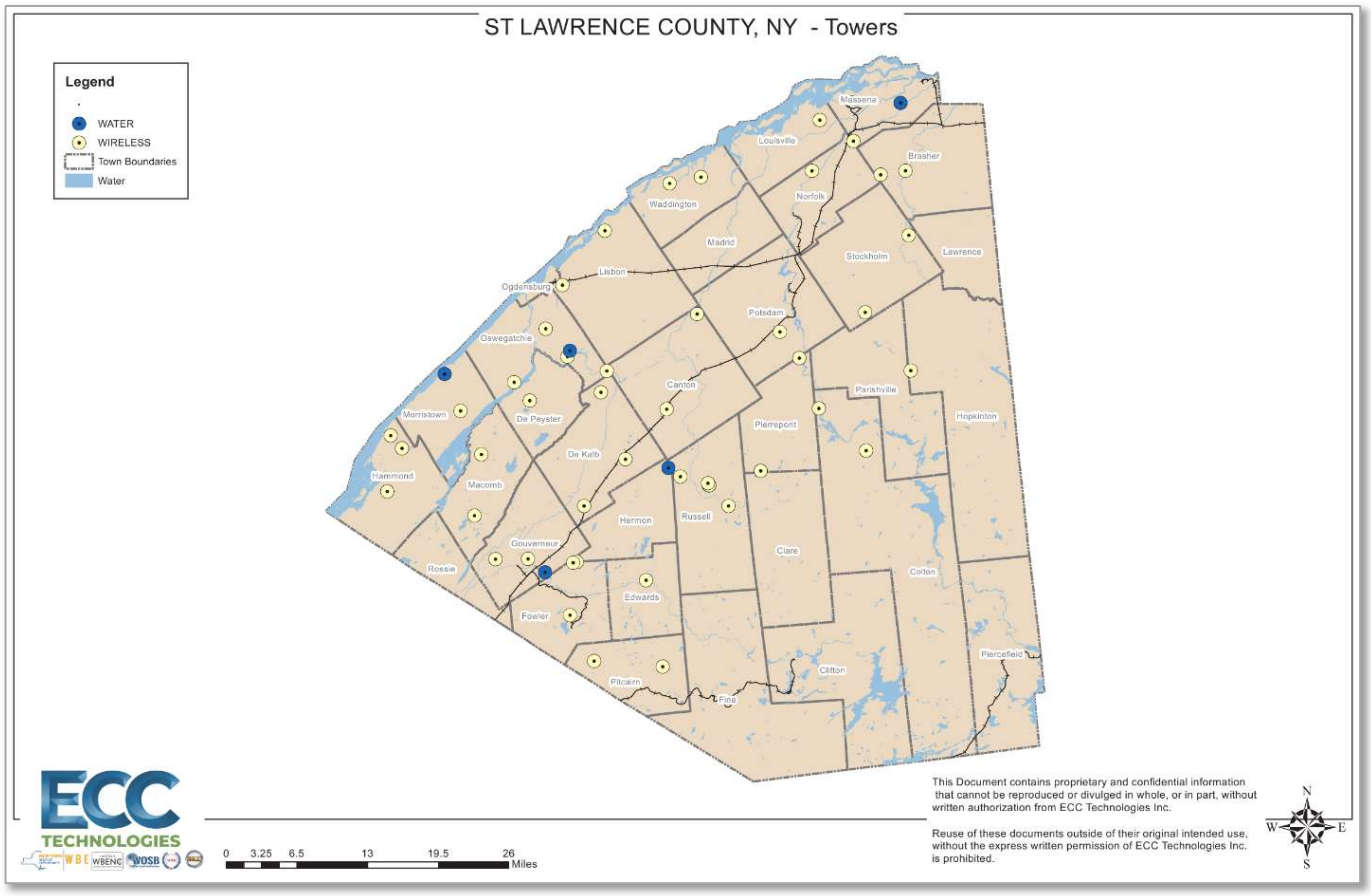

FIGURE 6 ST. LAWRENCE COUNTY TOWERS

As part of the field study ECC OSP personnel took pictures of towers in the County. Below are examples of two vertical structures in St. Lawrence County. These pictures are linked to the GIS mapping information and are important to Wireless Internet Service Providers (WISPs) and others as they highlight availability of vertical assets that could support the installation of access point equipment. This information will be provided electronically to DANC by ECC.

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FIGURE 7 LATTICE TOWER

FIGURE 8 LATTICE TOWER WITH TWO LEVELS OF CELLULAR ANTENNAS.

4. Telecommunications Inventory

This section of the report is an inventory of the telecommunications service providers and their supporting landline and wireless infrastructure in St. Lawrence County. The data collected includes all the relevant service providers including the incumbent service providers, the competitive service providers, the wide area network providers, and others.

Additional information is included on specific provider infrastructure including fiber, coaxial cable, wireline boundaries, Central Office locations, and wireless towers.

4.1 TELECOMMUNICATIONS SERVICE PROVIDERS IN THE COUNTY

Voice, video, and data services are provided to the County residents and businesses by a variety of companies using a range of technologies and infrastructures. As previously discussed, services can be provided over copper wire, coaxial cable, fiber optic cable, wireless technologies, and via satellite.

The incumbent telephone companies, or ILECs (incumbent local exchange carrier) and the incumbent cable TV providers are the primary owners of telecommunications infrastructure within the County. There are also a few CLECs (Competitive Local Exchange Carriers), one fixed wireless Internet provider, three satellite providers, and several cellular companies.

Each of these providers uses different methods of delivering services to their customers, resulting in varying speeds and reliability. Typically, fiber and coax cable provide the fastest, most reliable speeds, while copper wire, wireless, and satellite provide the lowest and least reliable.

Copper wire is an older technology with limitations inherent to its structure; wireless speed and reliability is dependent on distance from the infrastructure and clear line of site; and satellite can be compromised by weather or obstacles like foliage. These factors are important to bear in mind when determining whether businesses and residents truly have adequate access to effective Internet services.

4.2 ILECS, CLECS, AND REGION WIDE AREA NETWORKS

A local telephone company or incumbent local exchange carrier (ILEC) is responsible for development and maintenance of the cabling and switching equipment needed to deliver local telephone and other telecom

related services to the communities. The ILECs providing service within the County are Citizens Telephone of Hammond, Nicholville Telephone Company, TDS Telcom (Edwards Telephone Co) and Verizon.

A map showing the four ILEC providers, their service territory, central office locations and remote terminals in the County is shown in Figure 9. Central Offices, or COs as they are better known, are typically structurally robust buildings that house the telephone company switching and local network equipment.

Remote Terminals are telecommunications equipment geographically located at a distance from the Central Office used to extend voice and data services from a public switched telephone network or PTSN.

As with all the outside plant (OSP) field generated maps, careful consideration should be given before this map is copied or distributed.

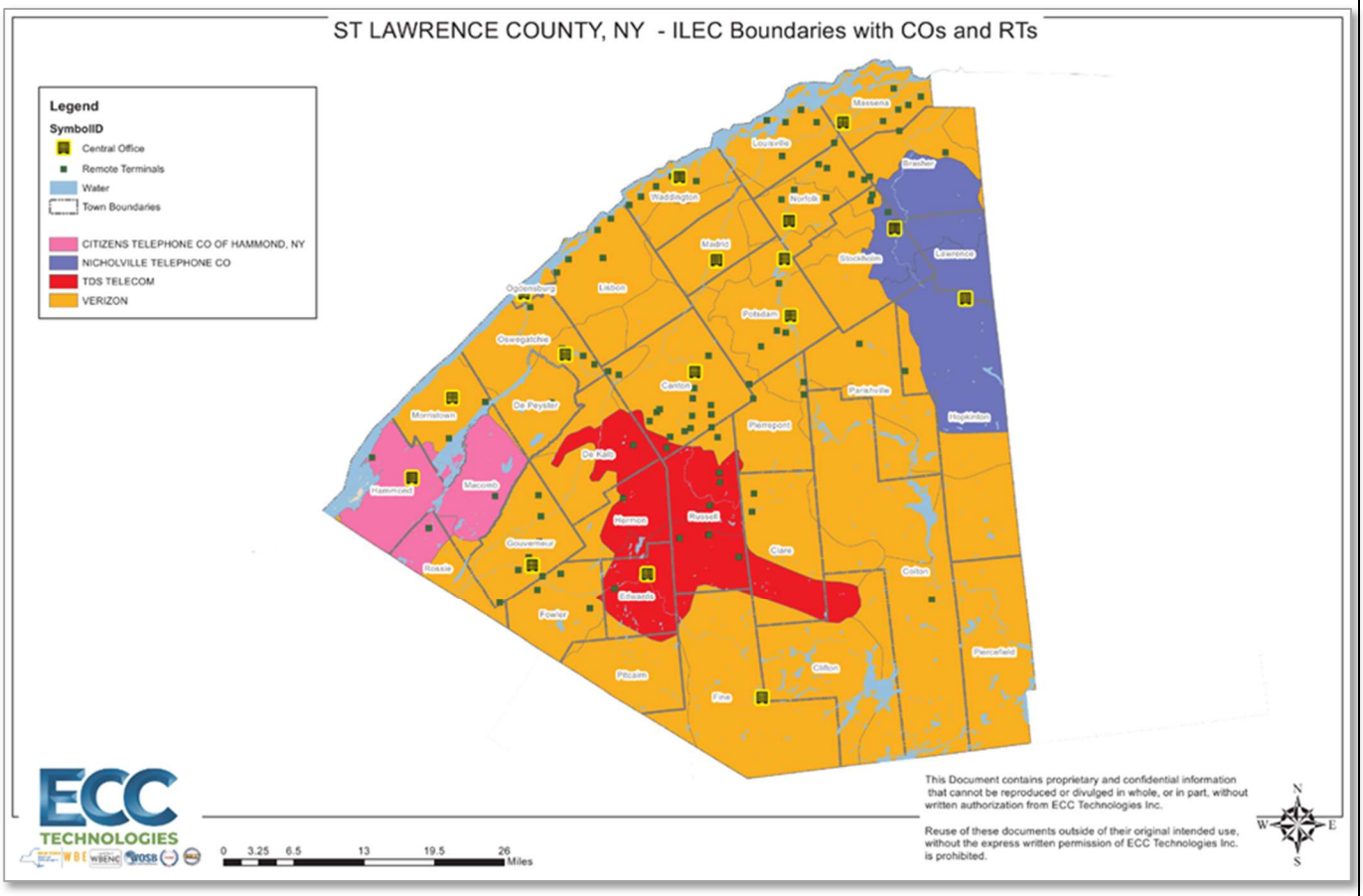

FIGURE 9 ST. LAWRENCE COUNTY ILEC MAP WITH CO'S AND REMOTE TERMINALS

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Citizens Telephone Company of Hammond, NY.

Citizens Telephone Company of Hammond, NY was founded 117 years ago and has a business office in Hammond, NY. According to the company website Citizens Telephone has over 1,800 end users. The company provides Internet via DSL and some FTTH service as well as telephone service and cable TV to its residential and business customers.

As can be seen on the territory map Citizens Telephone occupies a small area; approximately less than 10% in the western tip section of the County. It has a Central Office located in both the village of Hammond, and the hamlet of Macomb, providing service to this area.

Below, Table 4 shows funds awarded to Citizens of Hammond through the New NY Grant. The table shows the Citizens of Hammond's committed investment and the number of homes to be serviced via FTTH.

New NY Grant Awards to Citizens of Hammond by Township			
Location	**State Grant**	**Total Investment**	**Locations Addressed**
Hammond (Town)	$2,224,584	$2,780,730	1,108
Hammond (Village)	$296,016	$370,020	166
Macomb	$1,741,130	$2,176,412	732
Rossie	$392,311	$490,389	220

TABLE 4 NEW NY GRANT AWARDS TO CITIZENS OF HAMMOND BY TOWNSHIP

Nicholville Telephone Company

Nicholville Telephone Company is headquartered in Nicholville, NY and is a subsidiary of Atlas Connectivity, LLC. Nicholville Telephone is the incumbent telephone company along some of the northeastern border areas of the County which represents about 15% of the County.

Nicholville Telephone has two COs that serve the County in Nicholville and Winthrop, NY. According to their website and the FCC 477 database, Nicholville Telephone can provide DSL and fiber based Internet service that ranges from 1 to 115 Mbps down and 0.128 to 5 Mbps up depending on customer location. In addition, the company offers phone and TV service (DISH).

Providers' business level of service is based on tariffed rates, Individual Case Basis pricing (ICB) and Service Level Agreements (SLAs) and are not reflective of what is shown on their website. Also, installation of services charges may apply and can be a one-time charge or bundled into the monthly recurring cost.

TDS Telecom (Edwards Telephone).

Telephone and Data Systems, or as it is more commonly known TDS, began in 1969. TDS is headquartered in Madison, WI, employs nearly 2,700 people, has territory in 33 states and is a subsidiary of Telephone

and Data Systems, Inc. TDS offers Internet, Dish TV and traditional and VOIP phone service to residents and businesses in its territory.

TDS operates two COs along the central western region of the County, in an area that represents approximately 15% percent of the County. According to their FCC 477 form submission they provide services including residential based DSL between 15 and 100 Mbps depending on area and fiber-based services up to 1 Gbps.

TDS received over $5.7M in state grant funds to provide new FTTH based service. As part of the grant funded build out, TDS installed many miles of fiber-optic cable in St. Lawrence County. In 2019 TDS completed a broadband expansion in the Edwards and Hermon area with FTTH to 1,758 homes. The new fiber infrastructure allows them to deliver Internet speeds from 25Mbps to 100 Mbps.

Table 5 below lists the grant award, total investment, and number of homes to be served by TDS in St. Lawrence County.

New NY Grant Awards to TDS by Township			
Location	**State Grant**	**Total Investment**	**Locations Addressed**
Canton (Town)	$23,951	$31,934	8
Clare	$14,459	$19,279	3
De Kalb	$1,005,213	$1,340,284	206
Edwards	$1,392,251	$2,579,002	596
Fine	$7,718	$10,290	3
Fowler	$11,887	$15,849	2
Hermon	$1,152,376	$1,536,501	237
Pierrepont	$5,145	$6,860	2
Russell	$2,139,585	$2,852,779	474

TABLE 5 NEW NY GRANT AWARDS TO TDS BY TOWNSHIP

Verizon.

Verizon's corporate headquarters is in New York City with a regional business office located in Syracuse, NY. Verizon offers voice, data services, DSL, cloud services and managed network services to the businesses and residents in their area of the County.

The Verizon territory covers over half of the area in the County. They offer services from their 16 Central Offices (CO's). According to their FCC report, Verizon offers DSL services of 15 Mbps in most areas and faster speeds in the areas listed below where it has received state funding to offer fiber to the home. Lastly, Verizon is providing limited copper-based services under the MCI name according to its 477 filing.

Funds awarded to Verizon through the New NY Grant, which in total were over $9.8M are shown in Table 6. The table shows Verizon's committed investment and the number of homes to be serviced.

New NY Grant Awards to Verizon by Township			
Location	**State Grant**	**Total Investment**	**Locations Addressed**
Canton	$18,182	$22,728	6
DeKalb	$1,482,715	$2,686,511	284
DePeyster	$848,035	$1,691,413	133
Edwards	$12,122	$15,152	4
Fowler	$1,950,644	$3,209,613	356
Gouverneur	$1,792,935	$3,228,504	265
Hammond (Town)	$3,030	$3,788	1
Hermon	$316,526	$613,050	58
Macomb	$101,455	$193,900	14
Morristown	$1,135,718	$1,922,575	165
Oswegatchie	$113,586	$192,338	21
Rossie	$2,117,042	$3,371,321	327

TABLE 6 NEW NY GRANT AWARD TO VERIZON BY TOWNSHIP

Table 7 describes the telecommunications services currently available at each of the ILEC's Central Offices. These services are supported by the switch technology at the location of the Central Office and may or may not be available to a customer within the exchange.

The service is dependent upon the cabling infrastructure available and the distance from the serving Central Office. The service information is based on the provider's 477 reporting as of June 2020.

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Central Office	Copper	Fiber	Future RDOF Awarded Fiber
Citizens of Hammond, NY	**DSL**	**FTTH**	**FTTH**
Hammond	5 Mbps	Up to 1 Gbps	Up to 1 Gbps
Macomb	5 Mbps	Up to 1 Gbps	
Nicholville Telephone	**DSL**	**FTTH**	
Nicholville	6 Mbps	100 Mbps	
Winthrop	6 Mbps	100 Mbps	
TDS (Edwards Telephone)	**DSL**	**FTTH**	
Edwards	100 Mbps	Up to 1 Gbps	
Hermon		Up to 1 Gbps	
Verizon	**DSL**	**FTTH**	
Canton	15 Mbps	Up to 1 Gbps	
Colton			
Fort Covington (out of County)			
Gouverneur	15 Mbps	Up to 1 Gbps	
Harrisville (out of County)			
Heuvelton	15 Mbps	Up to 1 Gbps	
Madrid	15 Mbps	n/a	
Massena			
Morristown	15 Mbps	Up to 1 Gbps	
Norfolk	15 Mbps	n/a	
Norwood			
Ogdensburg	15 Mbps	n/a	
Potsdam	15 Mbps	n/a	
Star Lake	15 Mbps	Up to 1 Gbps	
Tupper Lake (out of County)	15 Mbps	n/a	
Waddington	15 Mbps	n/a	

TABLE 7 CENTRAL OFFICE AND SERVICES IN ST. LAWRENCE COUNTY

FCC Form 477 based services information was reported by carriers prior to the award of the fiber to the home grants. Since the providers have committed to 1 Gigbit service, that bandwidth speed is either already available or will be available in the future in those select awarded areas.

The RDOF award winner, Citizens of Hammond, has up to six years to complete their construction. Further information regarding services in the area are listed at the end of this section.

Telephone Company Fiber Routes and Fiber to the Home Areas.

Based on the recent grant awards to Citizens of Hammond, SLIC, TDS and Verizon, Figure 10 illustrates the fiber to the home installs identified in a number of areas in the County. These were primarily in the northern half of the County where SLIC and the incumbents have built supporting fiber routes. For these areas, fiber based last mile infrastructure allows for any future level bandwidth service the end user might require.

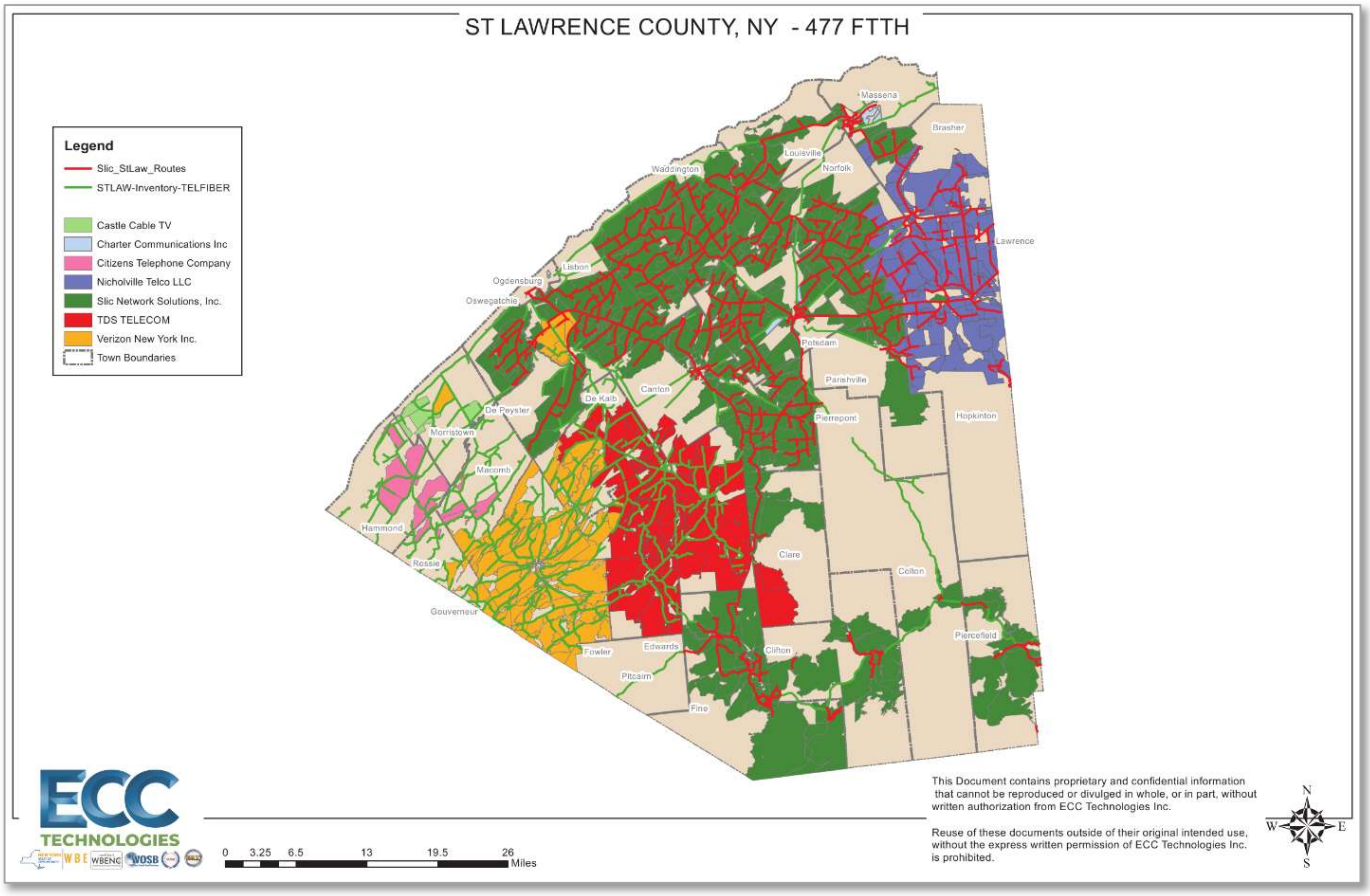

FIGURE 10 TELEPHONE COMPANY FTTH AREAS IN ST. LAWRENCE COUNTY

Competitive Local Exchange Carriers (CLECs) .

CLECs are telephone companies created to compete with the Incumbent Local Exchange Carriers (ILECs). CLECs arose as a result of the Telecommunication Act of 1996, which was intended to promote competition among long distance and local phone service providers. The term is used to differentiate between new or potential competitors and established local exchange carriers. ECC identified four CLEC

companies with facilities in St. Lawrence County, NY. These CLECs include CenturyLink/Level3, Mohawk Networks, SLIC and Windstream.

A CLEC that provides regional wide area network services is a company that either owns or leases fiber infrastructure in each area to connect customers to provide customer point to point internal communications or Internet access.

These companies typically target customers such as school districts or healthcare organizations that have multiple locations in a spread-out area. This type of provider can also provide access to another service provider, which is referred to as middle mile access or wholesale backhaul.

CenturyLink/Level 3.

CenturyLink, a national ILEC and CLEC purchased carrier Level 3 a number of years ago. Their presence in St. Lawrence is limited to fiber-based services in just four census blocks. According to their 477 filing, CenturyLink has business customers in the Potsdam, Massena, Brasher and Lawrence areas.

North Country Broadband – Mohawk Networks LLC.

The Saint Regis Mohawk Tribe owns Mohawk Networks LLC and the corporate office is located in Bombay, NY and is also part of the company called Akwesasne TV. Mohawk Networks is focused on fiber based high speed Internet service to Akwesasne (which is federally recognized St. Regis Mohawk Reservation) and the surrounding communities**.**

North Country Broadband, LLC, is an off-territory subsidiary company of Mohawk Networks LLC serving customers in the North Country through their wireless network.

In small areas of St. Lawrence County both fiber and wireless based services are offered for business and residential customers. According to their FCC 477 filing they have very limited locations in which they offer fiber-based services at 100/50 Mbps in Massena, Norwood and Russel and fixed wireless at 50/20 Mbps to residential customers in the Massena and Pitcairn areas.

SLIC Network Solutions/ Atlas Connectivity, LLC.

SLIC Network Solutions is a regional provider of fiber-based services located in Nicholville, NY. SLIC is owned by Atlas Connectivity, LLC. According to their FCC 477 information they have a large presence in St Lawrence County with service in the following areas: Childwold, Nicholville, North Lawrence, Piercefield, Brasher Falls, Canton, Chase Mills, Colton, DePeyster, Fine, Hannawa Falls, Hermon, Heuvelton, Lisbon, Madrid, Massena, Newton Falls, Norfolk, Norwood, Ogdensburg, Oswegatchie, Parishville, Potsdam, Rensselaer Falls, Russell, Star Lake, Waddington, Wanakena, West Stockholm and Winthrop.

According to their website SLIC Network Solutions offers voice, video, and Internet services to residents. They also have business class service which consists of business phone, Internet, and hosted PBX.

In 2010 SLIC was awarded $21M from the USDA Rural Utility Services (RUS) program to provide new service in St Lawrence County. According to their grant application, as part of this broadband initiative they constructed 660 miles of fiber and connected 4,557 unserved households.

According to the New NY Grant website SLIC received over $6.7M in New NY grant funds to provide FTTH to service 1,475 locations in the County. Below is a chart that lists the amount received for the different areas in the County and number of homes to be served.

According to the June 2020 FCC 477 filing, SLIC is providing 1,491 census blocks with 100/100 Mbps fiber to the home.

New NY Grant Awards to SLIC by Township			
Location	**State Grant**	**Total Investment**	**Locations Addressed**
Brasher	$979,617	$1,224,790	198
Clare	$136,390	$453,993	34
Colton	$561,607	$1,291,703	140
Fine	$24,069	$71,785	6
Hopkinton	$1,191,992	$1,523,170	305
Lawrence	$1,048,948	$1,311,540	180
Madrid	$20,057	$49,723	5
Norfolk	$4,011	$15,999	1
Parishville	$1,707,973	$3,433,059	426
Pierrepont	$12,034	$35,006	3
Potsdam	$16,046	$47,257	4
Stockholm	$1,093,706	$1,367,533	173

TABLE 8 NEW NY GRANT AWARDS TO SLIC BY TOWNSHIP

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Windstream (Earthlink and Paetec).

Windstream Communications' headquarters is in Little Rock, Arkansas and has a business location in Fulton, NY. Windstream is a national incumbent telephone company that provides competitive service (CLEC) in some marketplaces.

According to their FCC 477 filing report, Windstream provides copper-based and fiber service to a few business customers, equating to less than 1% coverage in the Potsdam and Canton areas respectively.

The map below represents the Competitive Local Exchange Carriers' fiber routes identified in the county during the field study.

DANC is a regional owner of fiber and has a significant amount of fiber in the County. DANC will be discussed at length later in the section titled regional wide area networks.

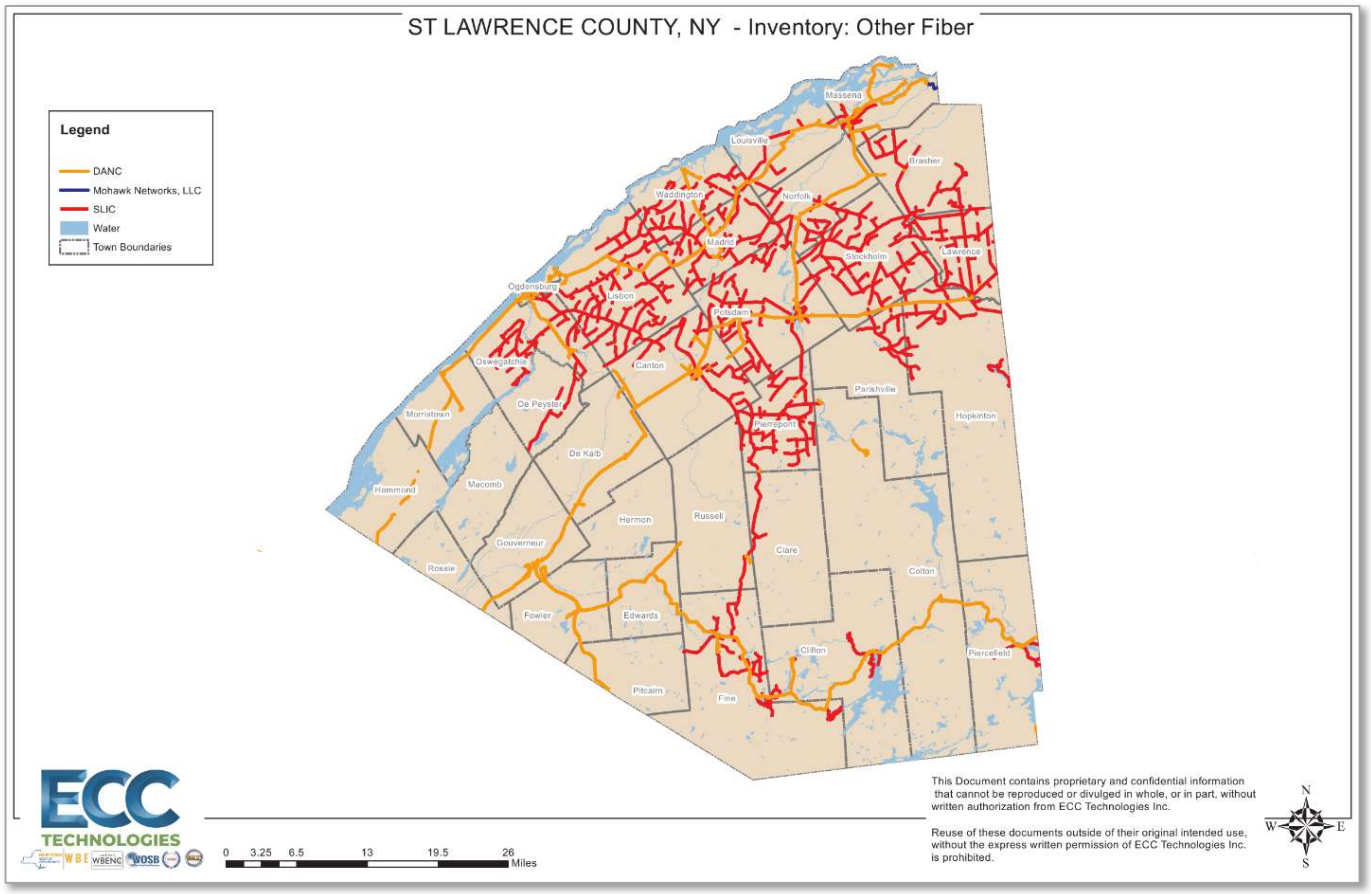

FIGURE 11 CLEC AND OTHER FIBER MAP IN ST. LAWRENCE COUNTY

4.3 CABLE PROVIDER.

Cable providers, like all service providers, will typically build and provide new service where they deem it profitable. Should a company or residential customer purchase a service in an outlying area, and is willing to pay for the installation, the cable provider will expand access, providing service along that new route to businesses and residents. Cable providers offer their service via fiber optic or coaxial cable. Charter-Spectrum Communications and Castle Cable TV are the two cable TV providers in the County.

Spectrum Communications

Spectrum Communications provides competitive services to the incumbent's DSL service in areas that it has fiber and coaxial cable infrastructure. Spectrum operates a hybrid fiber/coaxial-based network system in the County, which gives them the capability to provide dedicated business-based fiber services of ethernet, voice, video, managed services, and high bandwidth residential service over coaxial cable.

According to their FCC filing, Spectrum provides residential triple play services of voice, Internet and cable TV at prices starting at $49 in the area. Speeds of 940Mbps down and 35 Mbps up are offered to both residential and business customers. Business service packages start at 200Mps and include business voice services with no contracts.

Castle Cable TV, Inc.

Castle Cable TV, Inc. is located at 26 South Main Street, Hammond, NY. Castle Cable TV is a subsidiary of Citizens Telephone Company of Hammond, NY and was acquired by Citizens Telephone Company in 2000. They provide phone, Internet, cable TV and security systems service to their customers. According to their FCC filing, they provide Internet service at 50 Mbps down and 50 Mbps up over fiber connections in a small region of St. Lawrence County in the Morristown and Hammond areas.

Figure 12 and Figure 13 on the following pages show fiber optic and coaxial infrastructure of Castle Cable TV and Spectrum respectively. Both fiber and coax can be used to provide broadband service. Based on Figure 13, the general availability and level of Internet service provided by the Cable Television (CATV) providers can be observed.

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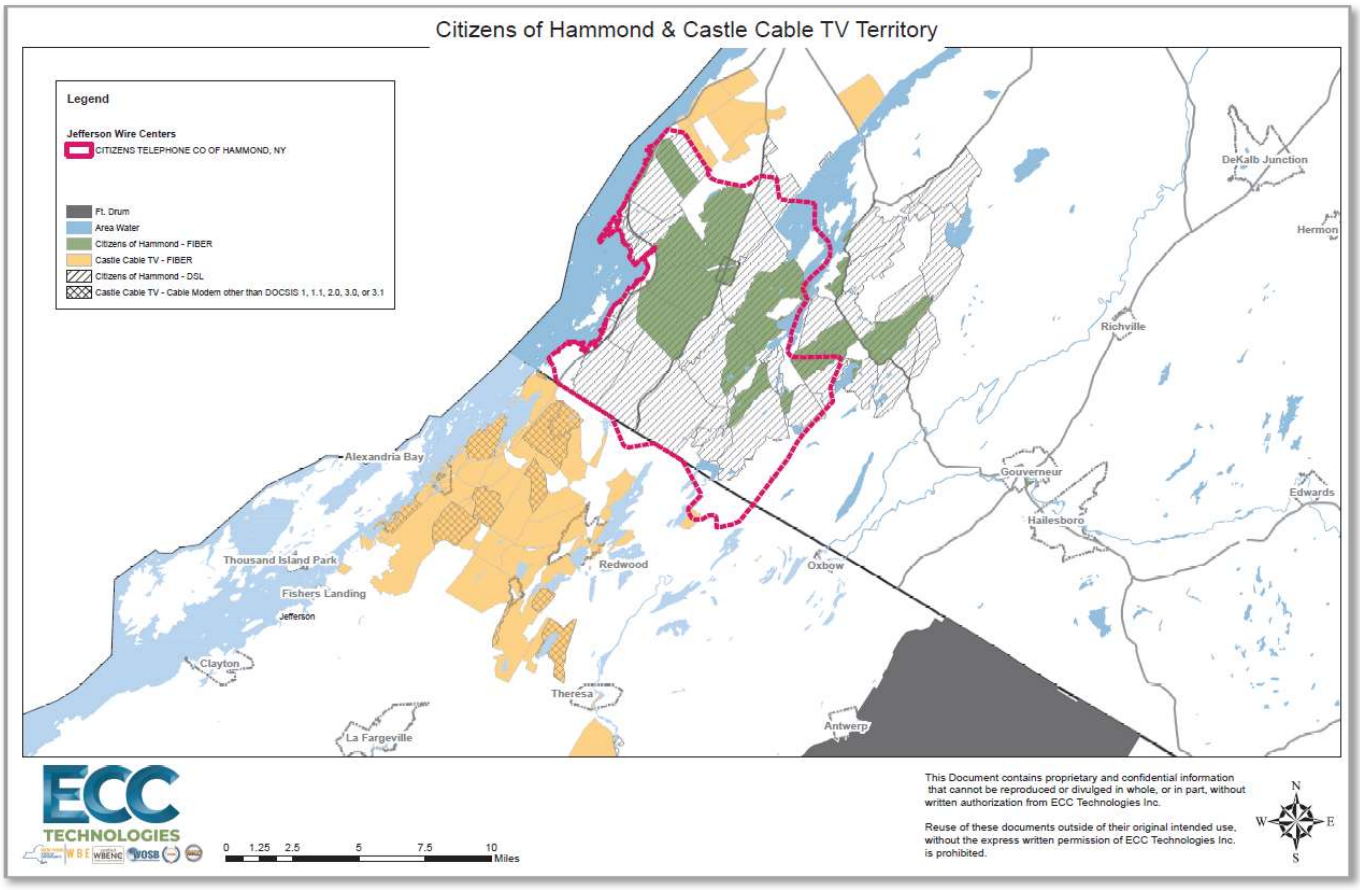

FIGURE 12 CITIZENS OF HAMMOND & CASTLE CABLE TV TERRITORY

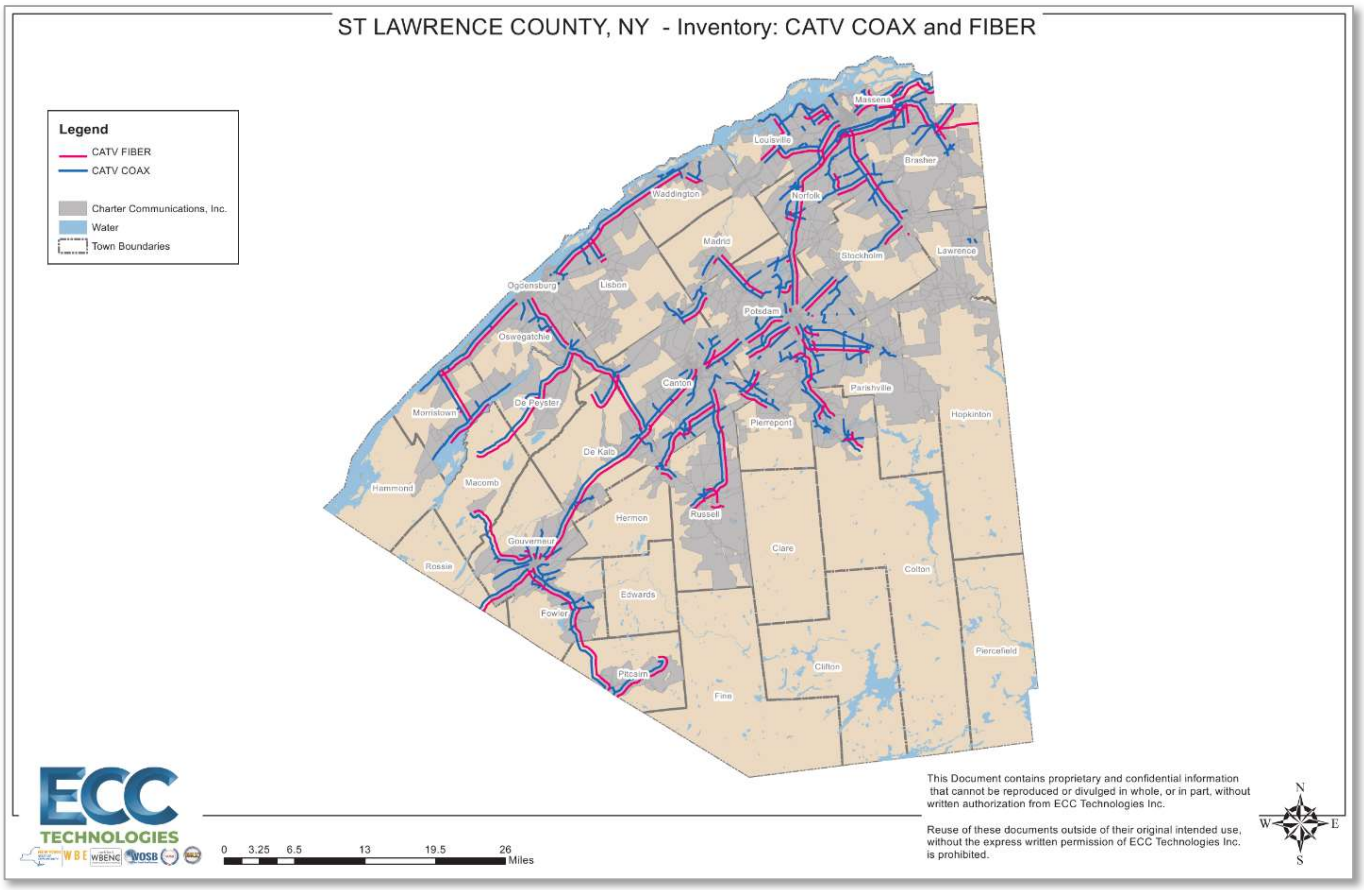

FIGURE 13 INVENTORY OF CATV COAX AND FIBER

As discussed earlier, as part of the Charter Communications/Time Warner Cable merger that formed Spectrum, New York State required Spectrum to expand its network to pass 145,000 unserved and underserved homes in rural areas of the State.

As of July 19, 2019, Spectrum has expanded its service area to 65,000 of the required 145,000 homes. Though not made publicly available, Spectrum has been given until September 2021 to complete its expansion by the State of New York.

As with all the outside plant (OSP) field generated maps, this map is considered highly confidential information and should not be copied or distributed.

4.4 WIRELESS INTERNET SERVICE PROVIDERS (WISPS).

Mohawk Networks.

Previously documented in the CLEC section of this report, Mohawk Networks through its subsidiary, North Country Broadband, provides wireless Internet service to residents. According to their 477-form

submission, they provide service in the Pitcairn and Rooseveltown areas. According to their website these services include up to 25 Mbps down and 10 Mbps up for $69.98 per month, and a dedicated IP address is available for $16.20.

Kings Street Wireless.

King Street Wireless, L.P. is the only other fixed wireless provider identified in this study. They are located in Alexandria, VA and they have an advertised 1 Mbps 700 Mhz based service with coverage throughout most the County. Due to its very limited bandwidth offering, King Street is not considered a viable option for the businesses and residents in the County at this time.

Table 9 below lists all of the land line and fixed wireless providers that reported service, and the type of service by number of census blocks to the FCC in June 2020. For reference purposes there are 7,057 census blocks in the county.

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477 Types of Reported Services by No. of Census Blocks (subject to rounding by FCC)										
Type of Org.	**Business Only**	**Provider Name**	**10 - DSL**	**11 - DSL**	**12 - DSL**	**30 - other copper**	**43 - Coax**	**50 - Fiber**	**70 - Fixed Wireless**	**Total Blocks**
CATV		Castle Cable TV						11		11
CATV		Spectrum (Charter Com)					3,434	36		3470
ILEC		Citizens Tel of Hammond	81					19		100
CLEC	X	EarthLink (Windstream)	1							1
CLEC	X	FirstLight Fiber						31		31
CLEC	X	Level 3 Com (CenturyLink)				5				5
CLEC	X	MCI Com (Verizon)				8				8
CLEC/ WISP		Mohawk Networks						12	8	20
ILEC		Nicholville Telco LLC	65					230		295
CLEC	X	Paetec Com (Windstream)		30				11		41
CLEC	X	PrimeLink						2		2
CLEC		SLIC Network Solutions, Inc.						1,489		1489
ILEC		TDS Telecom Corp	84	105	46			307		542
ILEC		Verizon New York Inc.	2,142					367		2509
		Total	**2,373**	**135**	**46**	**13**	**3,434**	**2,515**	**8**	**8524**
		Pct of Total	**27.8%**	**1.6%**	**0.5%**	**0.2%**	**40.3%**	**29.5%**	**0.1%**	

TABLE 9 REPORTED SERVICES BY CENSUS BLOCKS - FCC FROM 477

4.5 SATELLITE.

Satellite providers use geostationary satellites orbiting the Earth at the same speed of the Earth's rotation, allowing them for all intents and purposes to maintain "fixed" position, to transmit signals from the Network Operations Center (NOC) to a satellite dish mounted at a business or residence.

According to their 477 reports, two satellite providers claim one hundred percent residential coverage to St. Lawrence County. HughesNet advertises speeds of 25Mbps by 3Mbps. Viasat lists speeds of up to 30 Mbps. As with all satellite providers, one of the greatest issues with service is latency, which is typically

New NY Grant Awards to HughesNet by Township			
Location	**State Grant**	**Total Investment**	**Locations Addressed**
Brasher	$16,380	$40,897	100
Canton (Town)	$20,160	$36,028	77
Canton (Village)	$158	$225	1
Clare	$6,300	$17,429	23
Clifton	$34,965	$89,928	118
Colton	$82,845	$206,245	324
DeKalb	$5,670	$8,462	34
Edwards	$2,520	$3,626	16
Fine	$30,397	$64,284	99
Fowler	$19,373	$28,452	120
Gouverneur	$1,890	$4,373	8
Hammond (Town)	$21,735	$31,050	138
Hermon	$1,890	$3,223	8
Hopkinton	$40,950	$82,718	213
Lawrence	$2,835	$4,050	18
Lisbon	$2,362	$3,493	14
Louisville	$2,205	$4,428	9
Macomb	$25,200	$36,000	160
Massena	$3,622	$6,943	20
Morristown	$11,340	$18,200	60
Norfolk	$2,992	$4,352	16
Oswegatchie	$5,512	$8,630	23
Parishville	$11,812	$17,009	73
Piercefield	$23,782	$46,184	92
Pitcairn	$85,365	$166,903	320
Potsdam	$3,150	$4,846	19
Rossie	$788	$1,755	3
Russell	$5,670	$8,100	36
Stockholm	$1,102	$1,575	7
Waddington (Town)	$1,890	$3,737	9
Waddington (Village)	$787	$1,125	5

TABLE 10 NEW NY GRANT AWARD TO HUGHESNET

0.5 seconds in length. This can prove problematic with VPN connections or when users are engaging in time sensitive activities, such as live online gaming.

Current NY Broadband Program funding will enable HughesNet to deploy its new Gen5 satellite broadband service offering download speeds of at least 25 Mbps to the awarded Census Blocks. The grant-supported service area will offer a monthly rate not to exceed $60 with an installation fee not to exceed $49.

These rates are lower than the providers current price offerings. The HughesNet service plan has a monthly usage allowance. Exceeding the monthly allowance can result in slower service. But the service will not have additional charges.

In the the New York program, HughesNet has committed to the state to use its best efforts to deliver download speeds of 3 Mbps when a user's data plan has been exceeded, but with no guarrantees. Table 10 shows the NYS New NY Broadband grant to HughesNet and total investment. Also shown are the numer of locations addressed or to be served by village of township.

4.6 CELLULAR SERVICE PROVIDERS.

There are three national cellular service providers with complete or partial coverage in St. Lawrence County with varying connection speeds. The providers' website coverage maps for AT&T Wireless, T-Mobile and Verizon Wireless show they provide 4G LTE coverage.

Cellular providers use radio frequencies to complete phone calls, send text messages, and transmit data from the nearest cell tower to the phone in use. Antennas on the towers both transmit and receive signals from mobile phones. Cellular signals can be impacted by distance of the phone from the tower, building wall thickness, hills, or other structures. Clear line-of-sight is not necessary for cellular service to work, but it will increase call clarity and data transmission speed.

In addition to these traditional providers, Spectrum Mobile is a new cellular provider that uses Verizon's towers and relies on a network of Wi-Fi hotspots to keep costs low. However, to qualify for Spectrum Mobile the customer must have Spectrum internet service. Lastly US Cellular offers data and voice coverage in the County through a national partner and is therefore not considered in the marketplace.

AT&T.

AT&T has 5G or 4G LTE coverage in the northern half of the county with some 5G in the central to northern areas. In the southern areas of the County, AT&T is providing lower service levels, such as 3G and has many areas of non-coverage.

Figure 13 shows the areas of coverage for the various service levels available by AT&T. This information was obtained directly from AT&T's website.

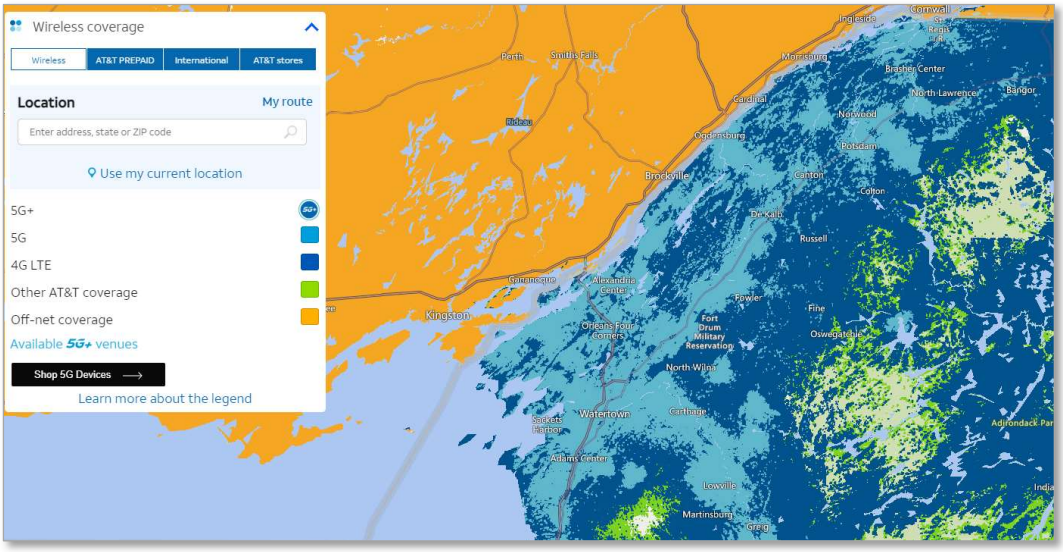

FIGURE 14 AT&T 4G AND 5G COVERAGE MAP

T-Mobile.

T-Mobile has 5G coverage in the top half of the County and partner based 3G spotty coverage in the lower half of the County Figure 14 below, from T-Mobile's website shows the various coverage areas within St. Lawrence County.

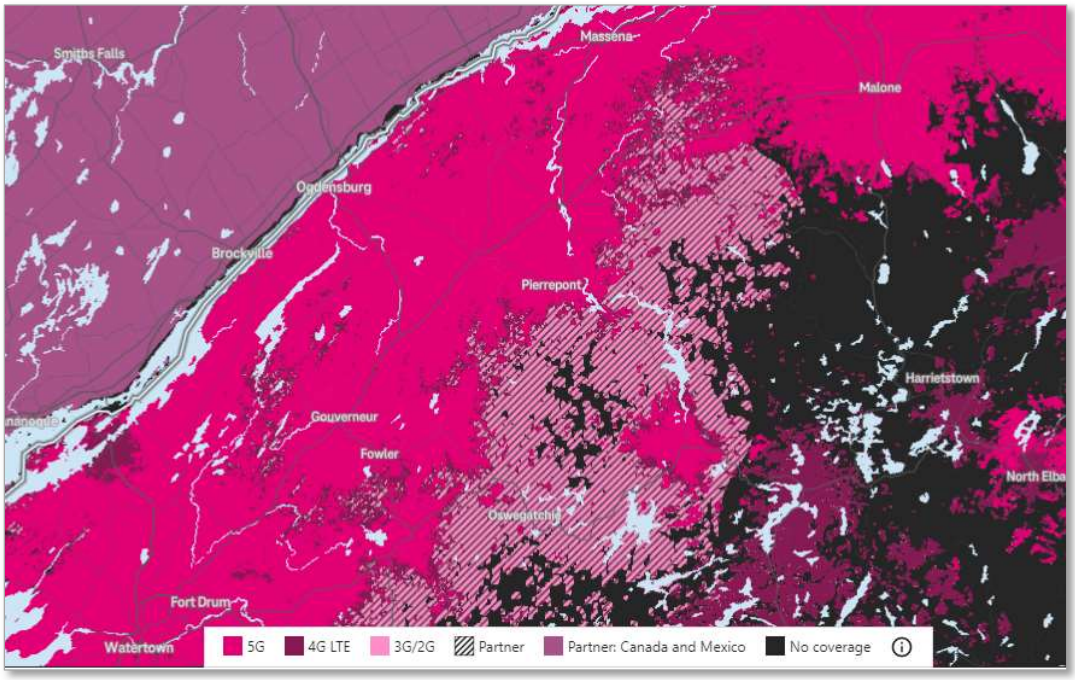

FIGURE 15 T-MOBILE 4G AND 5G COVERAGE MAP

Verizon Wireless

Verizon has 4G LTE coverage in northern area the county and large areas of non-coverage in the southern half of the County. Figure 15 is from Verizon Wireless website showing no 5G coverage in St. Lawrence County.

FIGURE 16 - VERIZON WIRELESS 4G AND 5G COVERAGE MAP

4.7 REGIONAL WIDE AREA NETWORKS – DANC.

Development Authority of the North Country.

In 1985 the Development Authority was created by the New York State Legislature to develop and manage the infrastructure needed to help support Fort Drum, and the shared interests of St. Lawrence, Jefferson, and Lewis counties. The Authority operates as a revenue-based public benefit corporation and is independent of state funding. DANC's main office is in the Dulles State Office Building in Watertown, NY.

In 2003, DANC completed the initial build of what would become a large regional fiber system. This system connects school districts and colleges across the areas north of the NYS Thruway, to the Internet. The DANC fiber system is a carrier-class telecommunications network that connects this region to carrier collocation facilities in Albany, Syracuse, and New York City.

As can be seen in the map below, the fiber system consists of over 1,800 miles fiber and 31 Central Offices (COs). These CO are locations for cross connection of networks and provider equipment.

In addition to connecting the educational institutions, the fiber is also being made available to any type of service provider and end user. The DANC fiber was built on an open access model and is available to any viable service provider or other entity that wishes to use it.

According to its website, DANC provides lit services and dark fiber services including: TDM Services, Ethernet Services, Wavelength Services and Private Networks. DANC connects many anchor institutions across the region including over 100 healthcare facilities, approximately 70 schools, 40 libraries as part of the North Country Library System and more than 150 cell towers.

Category	TDM Services	Ethernet Services	Wavelength Services	Private Networks
Description	Traditional SONET based transport service including DS-1, DS-3, and OC-X service. Multiplexing and cross-connect service also available.	Ethernet transport service including 10 Mbps, 100 Mbps, 1Gbps, and 10 Gbps. Higher bandwidth available if required. Includes Virtual LAN service.	Offerings include 2.5 Gbps, 10 Gbps and 100 Gbps wavelengths.	Private networks are high-speed networks connecting multiple locations. Examples include FDRHPO telemedicine network, Jeff-St. Lawrence BOCES, and St. Lawrence-Lewis BOCES.
Availability	Throughout the entire network.	Throughout the entire network.	Throughout the entire network.	Private networks are available anywhere and are based on the requirements of each customer.

TABLE 11 DANC SERVICES

Although DANC limits its service offerings to those found in Table 11, DANC is willing to consider build out and maintenance of wireless or GPON infrastructure in partnership with other firms providing the Internet access, customer billing and support.

The current fiber system was completed years ago, with laterals, extensions, and new builds ongoing. In the map on the following page the DANC fiber system is represented by the red line and the central offices are the yellow dots.

As shown in Figure 16, DANC has a high strand count Open Access backbone fiber cable that routes in a sub ring topology (part of 2 multi county rings) throughout St. Lawrence County, with a number of lateral spurs to local customers.

DANC's regional upstate NY fiber system has a number of service providers using it, including CLECs, FTTH providers, and long-haul carriers such as Verizon Wireless, AT&T, SLIC and Westelcom. DANC has seven central offices or colocations, one in each of the following municipalities: Canton, Gouverneur, Massena, Ogdensburg, Potsdam, Russell, and Star Lake, NY.

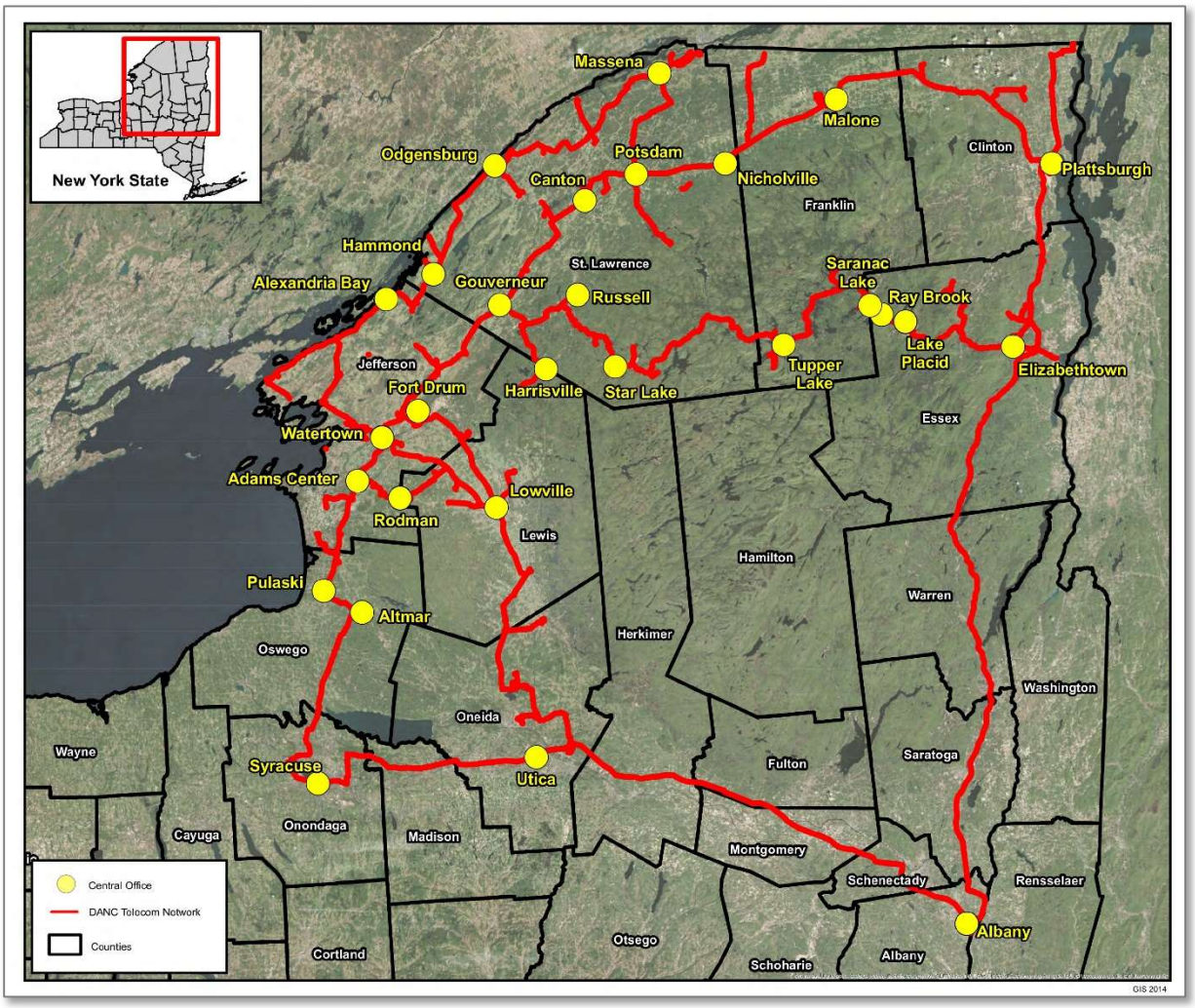

FIGURE 17 DANC NETWORK

4.8 BROADBAND AVAILABILITY & SERVICE GAPS.

Broadband providers must submit data to the FCC twice per year on broadband deployments. Form 477 is the FCC nomenclature which establishes the format of the data submitted. This FCC data is only granular to the census block level; meaning that if one household within a block is served by that provider, the whole block is reported as being served.

Throughput on Form 477 is reported within speed tiers/ranges and reflects the maximum advertised download and upload speeds within that block, by that provider. Said differently, the information by its very nature is overstated by the providers.

This data provides an accurate though dated foundation of general broadband availability in a region or county and can be utilized as a planning tool by capturing which providers are active in which areas or census blocks. However, the Form 477 data does not capture the exact service available to each home within a block.

Figures 17 and 18 are maps were created by ECC using the publicly available FCC Form 477 datasets. The different colors represent various speeds of service, ranging from no service up to 1 Gigabit per second. The different colors designate the different speeds offered according to their website. This information will be used to make comparisons to the field inventory study.

The map in Figure 17 shows availability for fixed landline broadband services at the maximum available speeds within the County boundaries provided Verizon, TDS Telecom, Nicholville Telephone and Citizens Telephone of Hammond. Figure 16 displays a map showing the same criteria from Spectrum.

The Form 477 information is at least 18 months old and as new network expansions in the county are "turned up," many of the areas below shown at less than 10 Mb/s speeds will get changed accordingly. The FCC data is often inconsistent with data from private reporting sources and sometimes, even the providers websites.

In Figure 19, ECC overlaid the CATV fiber and coaxial data layer onto the FCC served census blocks data. Upon closer inspection, it becomes apparent as to where the coaxial cable ends while the entire census block is counted as being served. That said, there are partial census block areas that remain unserved but not eligible for grant funding under the current grant program rules.

Figure 20 following shows the fiber optic cable and coax cable discovered and documented in the County field survey with the housing and then the population numbers added.

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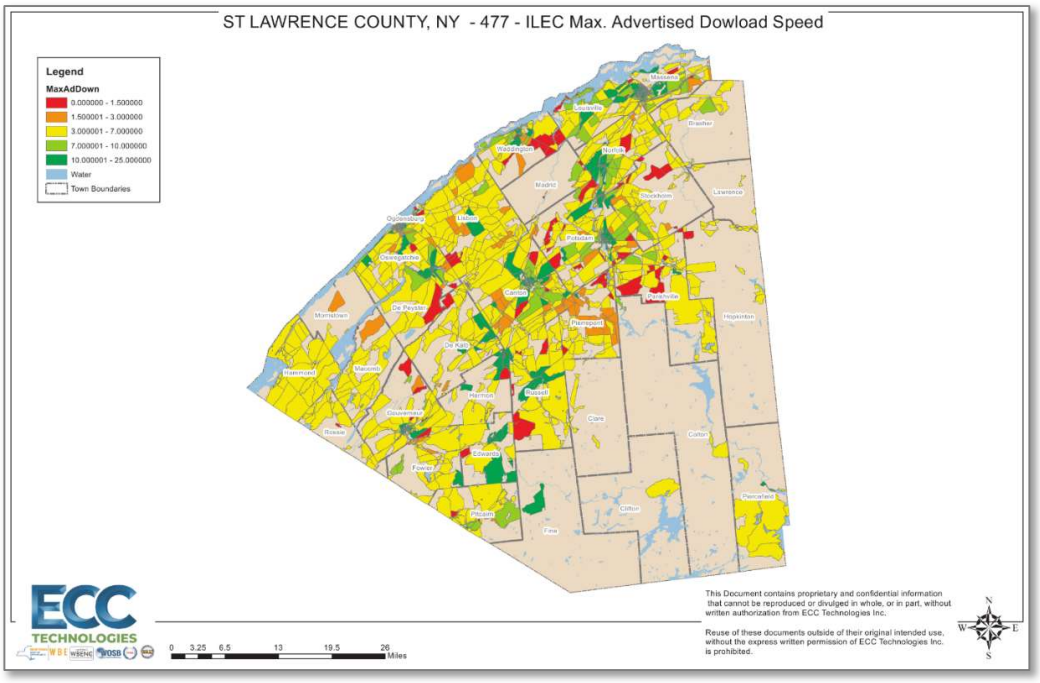

FIGURE 18 FCC 477 DATA - ILEC MAXIMUM ADVERTISED DOWNLOAD SPEED

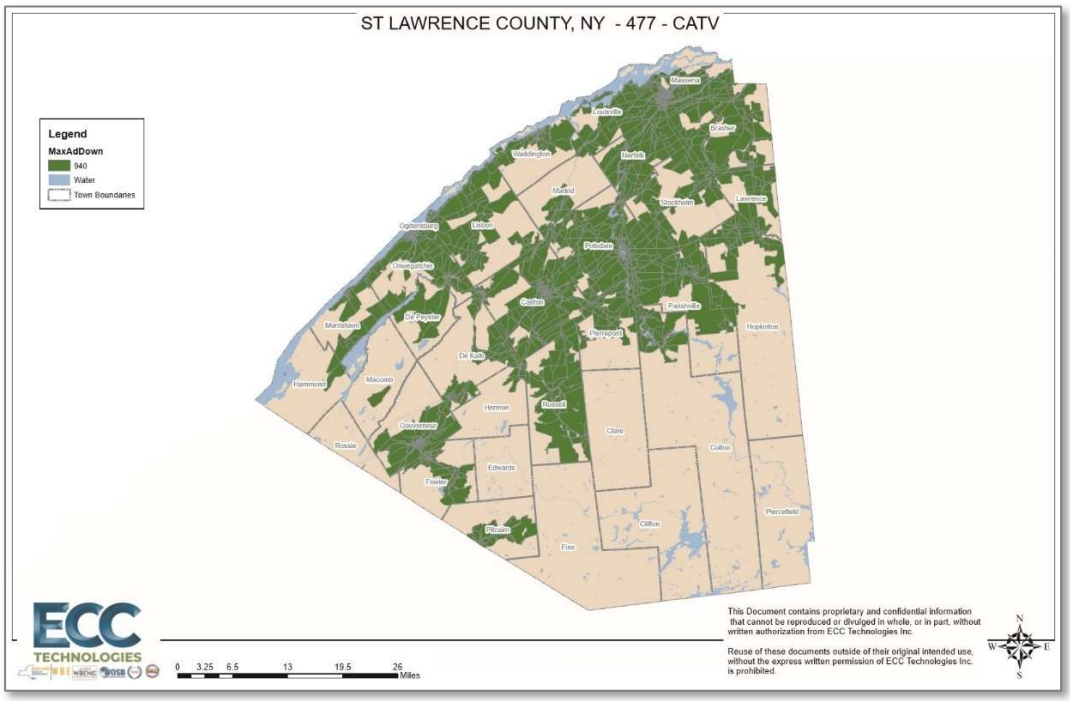

FIGURE 19 FCC 477 DATA - CATV MAXIMUM ADVERTISED DOWNLOAD SPEED

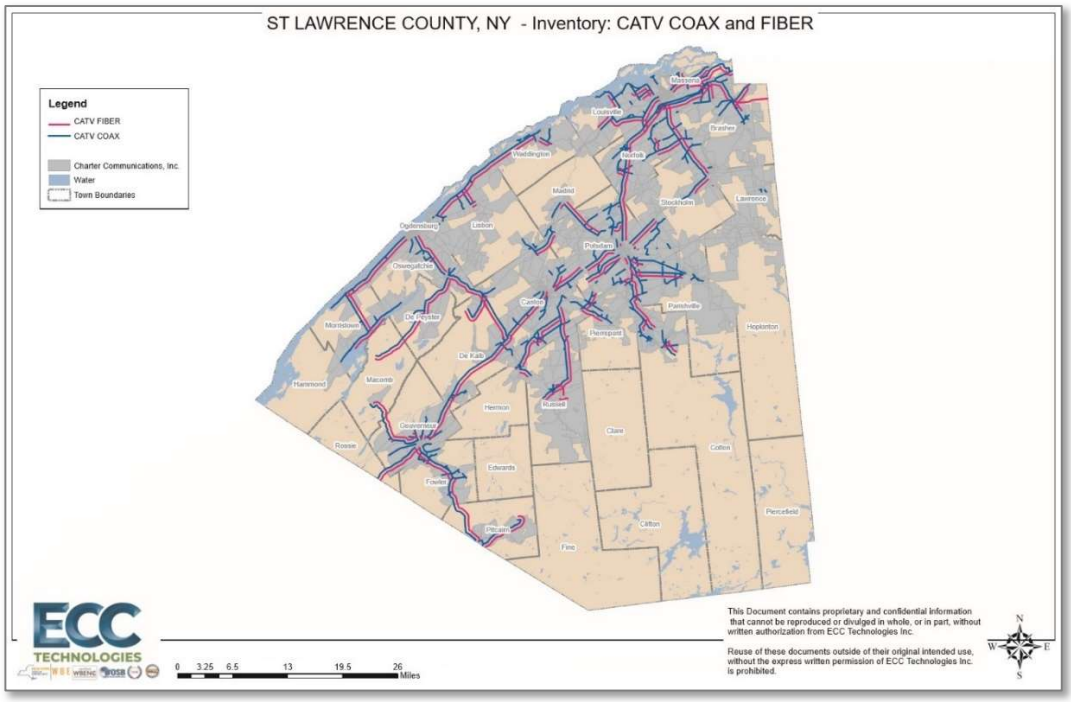

FIGURE 20 CATV COAX AND FIBER OVER 477 CATV MAXIMUM ADVERTISED DOWNLOAD SPEEDS

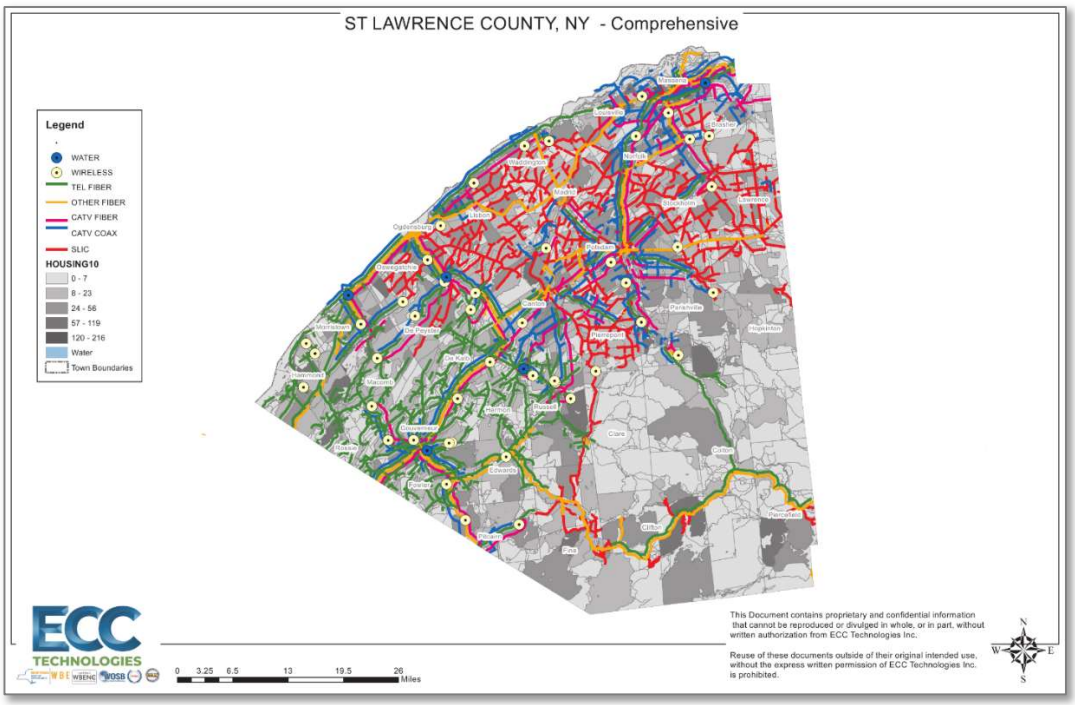

FIGURE 21 INFRASTRUCTURE OVER CENSUS BLOCKS WITH HOUSING DENSITY

Service Gaps - Initial Target Areas to Consider for Expansion.

St. Lawrence County has seen investment in broadband through providers, three rounds of NY State broadband grants and FCC RDOF grants. In the County, New York State awarded broadband grants to HughesNet in an attempt to expand broadband coverage to areas that were costly to serve by terrestrial broadband services.

Neither the FCC or the USDA consider current generation satellite broadband service as being sufficient for minimal broadband requirements. Latency is very high, and the service is typically capped based upon the amount of data used. Once the amount of data used reaches the preset limit, speeds are throttled down to below minimum broadband thresholds set by the FCC.

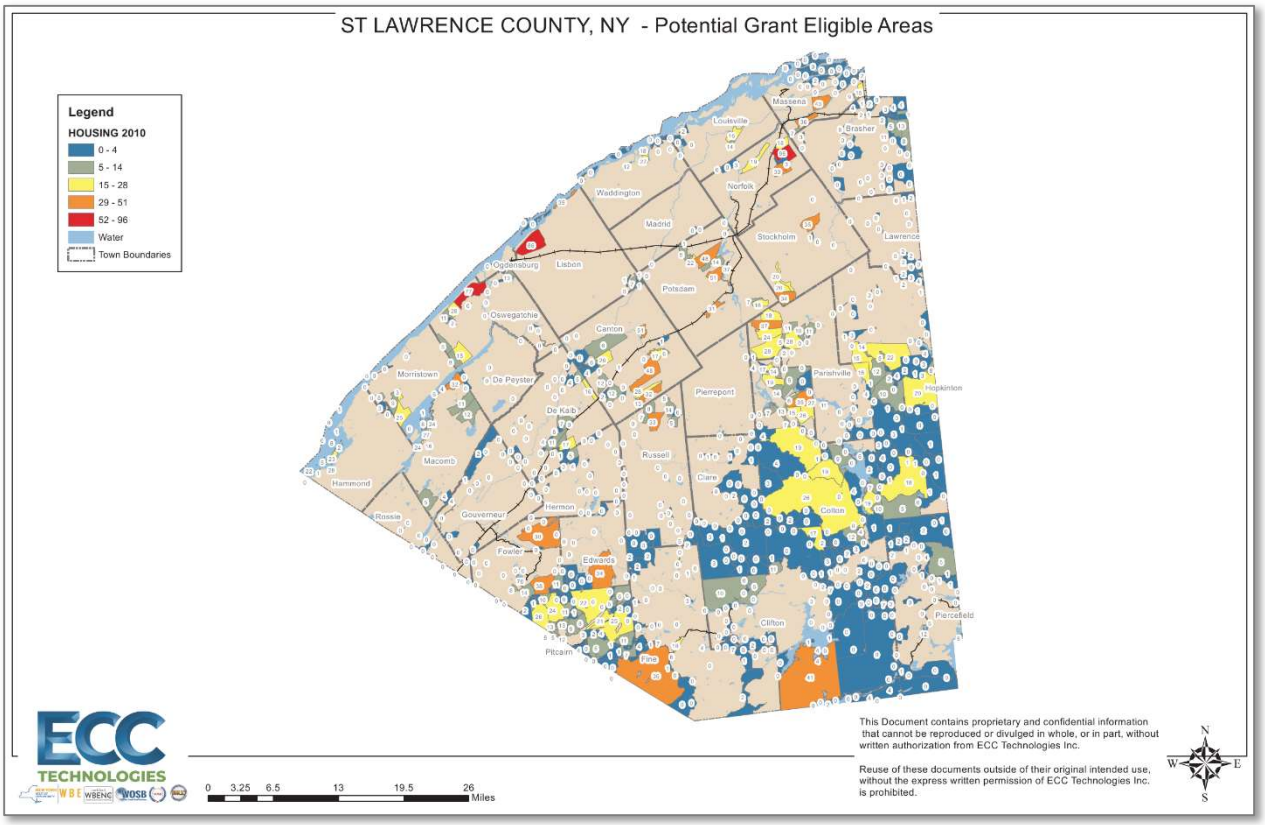

FIGURE 22 POTENTIAL GRANT ELIGIBLE AREAS

The RDOF program allowed for applications in areas previously awarded to HughesNet through the New NY Broadband program. There are census blocks in the County that were awarded through the New NY program to HughesNet and through the RDOF program to Citizens, SLIC and SpaceX.

The first two rounds of the ReConnect grant program likewise allowed for applications in census blocks previously awarded to HughesNet by the NYS grant program. If the third round of ReConnect is consistent

with the first two rounds, applications for grant/loans in census blocks that were previously awarded to HughesNet by NYS may also be available. The third round of the USDA ReConnect program is anticipated to be available by the end of 2021.

Therefore, to narrow our focus, ECC selected areas needing broadband improvement while maximizing the effectiveness of possible local investment. This was accomplished by first identifying census blocks in St. Lawrence County that New York State awarded grants to HughesNet.

We then removed the RDOF awarded areas from this list. The resulting map previously shown in Figure 22 shows these potential grant eligible areas, with housing numbers, to consider focusing efforts and resources for future broadband initiatives.

4.9 BROADBAND PROVIDERS AND SPEEDS BY TOWN AND ZIP CODE.

The following pages list internet providers, type of service offered, coverage area and the maximum speed advertised for St. Lawrence County by municipality. This information was gathered by keying in zip codes from an online database that utilizes the FCC 477 information.

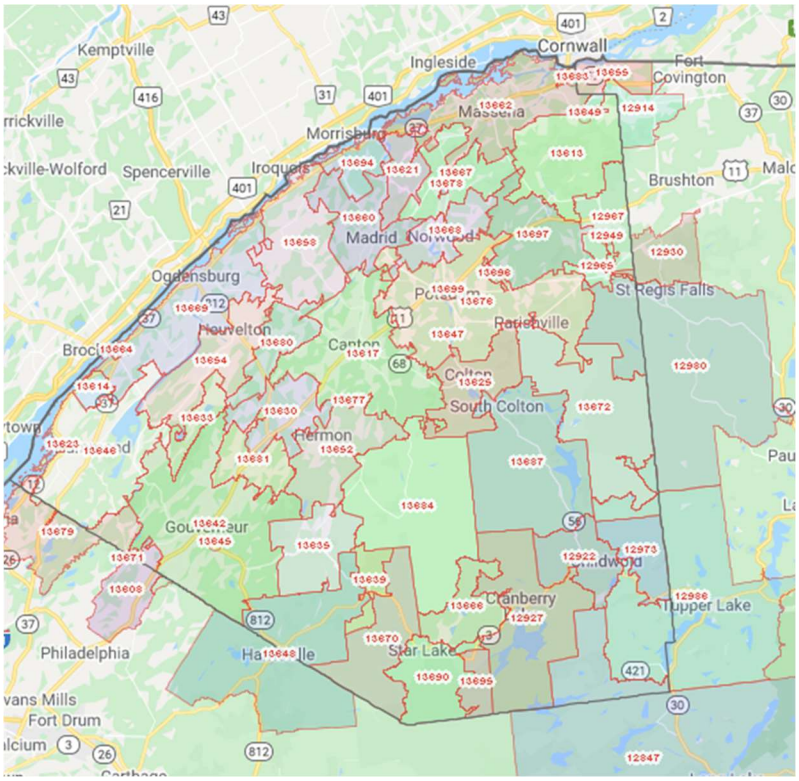

FIGURE 23 ST. LAWRENCE COUNTY ZIP CODES

There are a number of towns and villages listed that are outside the County but have zip code-based areas in the County. The zip code map is shown below for illustrative purposes and can be used as a key to assist with identifying provider service.

TABLE 12 SUMMARY OF INTERNET PROVIDERS BY LOCATION

St. Lawrence County Locations			Zip Code
Summary of Internet Providers in Childwold			**12922**
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	93.9%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Verizon	DSL	35.4%	15 Mbps

Summary of Internet Providers in Cranberry Lake			12927
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	98.7%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Verizon	DSL	13.8%	15 Mbps

Summary of Internet Providers in Nicholville			12965
Provider	**Type**	**Coverage**	**Speed**
King Street Wireless	Fixed Wireless	98.6%+	1 Mbps
Charter Spectrum	Cable	96.9%+	940 Mbps
Nicholville Telephone Company	Fiber	50.4%+	100 Mbps
Nicholville Telephone Company	DSL	45.5%	6 Mbps
Slic Network Solutions	Fiber	48.1%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps

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Summary of Internet Providers in North Lawrence			12967
Provider	**Type**	**Coverage**	**Speed**
King Street Wireless	Fixed Wireless	100%	1.0 Mbps
Nicholville Telephone Company	Fiber	78.7%+	100 Mbps
Nicholville Telephone Company	DSL	15.3%	6 Mbps
Charter Spectrum	Cable	78.7%+	940 Mbps
Slic Network Solutions	Fiber	14.4%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	82.8%+	940 Mbps
CenturyLink Business	Copper	1.7%+	45 Mbps

Summary of Internet Providers in Piercefield			12973
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	98.9%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Verizon	DSL	78.6%	15 Mbps

Summary of Internet Providers in Brasher Falls			13613
Provider	**Type**	**Coverage**	**Speed**
King Street Wireless	Fixed Wireless	100%	1.0 Mbps
Charter Spectrum	Cable	86.3%+	940 Mbps
Nicholville Telephone Company	Fiber	44.1%+	100 Mbps
Nicholville Telephone Company	DSL	14.5%	6 Mbps
Slic Network Solutions	Fiber	17.9%+	100 Mbps
Mohawk Networks	Fiber	2.5%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps
Mohawk Networks	Fiber	4.3%+	100 Mbps
GTT Communications	Cable	0.3%+	-- Mbps
Verizon	DSL	22.7%	15 Mbps

Summary of Internet Providers in Brier Hill			13614
Provider	**Type**	**Coverage**	**Speed**
Castle Cable TV	Fiber	79.3%+	50 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Castle Cable TV Business	Fiber	100%	50 Mbps

Summary of Internet Providers in Canton			13617
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	92.2%+	940 Mbps
Slic Network Solutions	Fiber	50.9%+	100 Mbps
King Street Wireless	Fixed Wireless	16.5%+	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable and Fiber	88.8%+	940 Mbps
Windstream	Fiber	1.0%+	100 Mbps
Verizon	DSL	78.6%	15 Mbps

Summary of Internet Providers in Chase Mills			13621
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	100%	100 Mbps
Charter Spectrum	Cable	58.5%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	43.3%+	940 Mbps
Verizon	DSL	55.5%	15 Mbps

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Summary of Internet Providers in Chippewa Bay			13623
Provider	**Type**	**Coverage**	**Speed**
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Colton			13625
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	79.3%+	940 Mbps
Slic Network Solutions	Fiber	38.1%+	100 Mbps
King Street Wireless	Fixed Wireless	7.2%+	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable and Fiber	100%	940 Mbps
Verizon	DSL	44.7%	15 Mbps

Summary of Internet Providers in DeKalb Junction			13630
Provider	**Type**	**Coverage**	**Speed**
TDS Telecom	DSL	75.6%+	100 Mbps
TDS Telecom	Fiber	70.6%	1,000 Mbps
King Street Wireless	Fixed Wireless	100%	1.0 Mbps
Charter Spectrum	Cable	67.0%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps
TDS Business	Fiber	13.8%+	1,000 Mbps
Uniti Fiber	Fiber	10.1%+	-- Mbps
Verizon	DSL	12.8%	15 Mbps

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Summary of Internet Providers in DePeyster			13633
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	74.8%+	100 Mbps
Charter Spectrum	Cable	59.7%+	940 Mbps
Citizens Telephone of Hammond	DSL	9.9%+	5 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	52.9%+	940 Mbps
Citizens Telephone of Hammond Business	DSL	29.6%+	5 Mbps
Verizon	DSL	59.1%	15 Mbps

Summary of Internet Providers in Edwards			13635
Provider	**Type**	**Coverage**	**Speed**
TDS Telecom	Fiber	98.7%+	1,000 Mbps
TDS Telecom	DSL	69.2%	100 Mbps
King Street Wireless	Fixed Wireless	99.0%+	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
TDS Business	Fiber	100%	1,000 Mbps

Summary of Internet Providers in Fine			13639
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	100%	100 Mbps
King Street Wireless	Fixed Wireless	72.8%+	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Verizon	DSL	10.3%	15 Mbps

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Summary of Internet Providers in Gouverneur			13642
Provider	**Type**	**Coverage**	**Speed**
King Street Wireless	Fixed Wireless	96.9%+	1.0 Mbps
Charter Spectrum	Cable	79.1%+	940 Mbps
Citizens Telephone of Hammond	DSL	1.8%+	5 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable and Fiber	57.6%+	940 Mbps
Citizens Telephone of Hammond Business	DSL	9.9%+	5 Mbps
Verizon	DSL	82.8%	15 Mbps

Summary of Internet Providers in Hammond			13646
Provider	**Type**	**Coverage**	**Speed**
Citizens Telephone of Hammond	DSL	70.8%+	5 Mbps
Castle Cable TV	Fiber	35.6%+	100 Mbps
Charter Spectrum	Cable	24.3%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Citizens Telephone of Hammond	DSL	100%	5 Mbps
Castle Cable TV	Fiber	37.2%+	100 Mbps
Spectrum Business	Cable	19.5%+	940 Mbps
Uniti Fiber	Fiber	4.3%+	-- Mbps
Verizon	DSL	4.3%	15 Mbps

Summary of Internet Providers in Hannawa Falls			13647
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	100%	940 Mbps
Slic Network Solutions	Fiber	100%	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps
Verizon	DSL	100%	15 Mbps

Summary of Internet Providers in Hermon			13652
Provider	**Type**	**Coverage**	**Speed**
TDS Telecom	DSL and Fiber	66.0%+	1,000 Mbps
King Street Wireless	Fixed Wireless	88.9%+	1.0 Mbps
Charter Spectrum	Cable	59.4%+	940 Mbps
Slic Network Solutions	Fiber	3.1%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps
TDS Business	Fiber	0.0%+	1,000 Mbps
Verizon	DSL	11.3%	15 Mbps

Summary of Internet Providers in Heuvelton			13654
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	72.5%+	940 Mbps
Slic Network Solutions	Fiber	41.2%+	100 Mbps
Citizens Telephone of Hammond	DSL	2.4%+	5 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	68.0%+	940 Mbps
Citizens Telephone of Hammond	DSL	6.5%+	5 Mbps
Verizon	DSL	78.4%	15 Mbps

Summary of Internet Providers in Lisbon			13658
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	82.1%+	100 Mbps
Charter Spectrum	Cable	60.6%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	54.7%+	940 Mbps
Verizon	DSL	83.7%	15 Mbps

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Summary of Internet Providers in Madrid			13660
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	93.0%+	100 Mbps
Charter Spectrum	Cable	50.5%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	20.8%+	940 Mbps
Verizon	DSL	19.7%	15 Mbps

Summary of Internet Providers in Massena			13662
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	99.6%+	940 Mbps
Slic Network Solutions	Fiber	41.7%+	100 Mbps
King Street Wireless	Fixed Wireless	9.9%+	1.0 Mbps
Mohawk Networks	Fiber	2.3%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable and Fiber	100%	940 Mbps
Verizon Business	Copper	3.7%+	1.5 Mbps
Mohawk Networks Business	Fiber	1.8%+	100 Mbps
Uniti Fiber	Fiber	0.1%+	-- Mbps
Verizon	DSL	95.4%	15 Mbps

Summary of Internet Providers in Morristown			13664
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	100%	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps
Verizon	DSL	26.6%	15 Mbps

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Summary of Internet Providers in Newton Falls			13666
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	100%	100 Mbps
King Street Wireless	Fixed Wireless	43.6%+	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Norfolk			13667
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	94.4%+	940 Mbps
Slic Network Solutions	Fiber	51.8%+	100 Mbps
King Street Wireless	Fixed Wireless	7.5%+	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps
Verizon	DSL	91.2%	15 Mbps

Summary of Internet Providers in Norwood			13668
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	89.7%+	940 Mbps
Slic Network Solutions	Fiber	33.3%+	100 Mbps
Mohawk Networks	Fiber	1.1%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable and Fiber	90.6%+	940 Mbps
Mohawk Networks Business	Fiber	0.5%+	100 Mbps
Verizon	DSL	93.3%	15 Mbps

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Summary of Internet Providers in Ogdensburg			13669
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	94.0%+	940 Mbps
Slic Network Solutions	Fiber	26.4%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable and Fiber	93.8%+	940 Mbps
Verizon	DSL	93.2%	15 Mbps

Summary of Internet Providers in Oswegatchie			13670
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	95.6%+	100 Mbps
King Street Wireless	Fixed Wireless	39.5%+	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Parishville			13672
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	90.5%+	940 Mbps
Slic Network Solutions	Fiber	26.9%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	88.5%+	940 Mbps
Verizon	DSL	70.40%	15 Mbps

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Summary of Internet Providers in Potsdam			13676
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	97.2%+	940 Mbps
Slic Network Solutions	Fiber	59.9%+	100 Mbps
Nicholville Telephone Company	Fiber	1.8%+	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
Spectrum Business	Cable and Fiber	100%	940 Mbps
Windstream Business	Fiber	0.1%+	100 Mbps
Verizon	DSL	69.9%	15 Mbps

Summary of Internet Providers in Pyrites			13677
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	100%	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps
Verizon	DSL	94.6%	15 Mbps

Summary of Internet Providers in Raymondville			13678
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	100%	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps
Verizon	DSL	100%	15 Mbps

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Summary of Internet Providers in Rensselaer Falls			13680
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	64.6%+	940 Mbps
Slic Network Solutions	Fiber	37.2%+	100 Mbps
King Street Wireless	Fixed Wireless	27.7%+	1.0 Mbps
TDS Telecom	Fiber	3.2%+	1,000 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	51.5%+	940 Mbps
TDS Business	Fiber	0.0%+	1,000 Mbps
Verizon	DSL	86.1%	15 Mbps

Summary of Internet Providers in Richville			13681
Provider	**Type**	**Coverage**	**Speed**
King Street Wireless	Fixed Wireless	100%	1.0 Mbps
Charter Spectrum	Cable	53.1%+	940 Mbps
TDS Telecom	Fiber and DSL	15.8%+	1,000 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	78.6%+	940 Mbps
TDS Business	Fiber	0.0%+	1,000 Mbps
Verizon	DSL	54.7%	15 Mbps

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Summary of Internet Providers in Russell			13684
Provider	**Type**	**Coverage**	**Speed**
TDS Telecom	Fiber and DSL	78.9%+	1,000 Mbps
Charter Spectrum	Cable	84.5%+	940 Mbps
King Street Wireless	Fixed Wireless	66.3%+	1.0 Mbps
Slic Network Solutions	Fiber	38.2%+	100 Mbps
Mohawk Networks	Fiber	1.8%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps
TDS Business	Fiber	37.0%+	1,000 Mbps
Mohawk Networks Business	Fiber	0.9%+	100 Mbps
Verizon	DSL	2.8%	15 Mbps

Summary of Internet Providers in South Colton			13687
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	82.1%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps

Summary of Internet Providers in Star Lake			13690
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	99.4%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

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Summary of Internet Providers in Waddington			13694
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	93.2%+	940 Mbps
Slic Network Solutions	Fiber	24.2%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	92.8%+	940 Mbps
Verizon	DSL	93.4%	15 Mbps

Summary of Internet Providers in Wanakena			13695
Provider	**Type**	**Coverage**	**Speed**
Slic Network Solutions	Fiber	100%	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Verizon	N/A	N/A	N/A

Summary of Internet Providers in West Stockholm			13696
Provider	**Type**	**Coverage**	**Speed**
Charter Spectrum	Cable	100%	940 Mbps
Slic Network Solutions	Fiber	100%	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	100%	940 Mbps
Verizon	DSL	100%	15 Mbps

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Summary of Internet Providers in Winthrop			13697
Provider	**Type**	**Coverage**	**Speed**
King Street Wireless	Fixed Wireless	88.4%+	1.0 Mbps
Nicholville Telephone Company	Fiber	53.8%+	100 Mbps
Nicholville Telephone Company	DSL	19.2%	6 Mbps
Charter Spectrum	Cable	61.3%+	940 Mbps
Slic Network Solutions	Fiber	37.0%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	35 Mbps
HughesNet	Satellite	100%	25 Mbps
Spectrum Business	Cable	74.9%+	940 Mbps
Verizon	DSL	13.4%	15 Mbps

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5. County Telecommunications Summary

5.1 SUMMARY OF FINDINGS.

In summary, based on the information gathered in this study, St. Lawrence County has a fair amount of incumbent broadband infrastructure within populated areas of the northern two thirds of the County.

The business areas of the County have broadband access through incumbent local exchange carriers, cable company, SLIC Network Services and DANC. The investments in fiber infrastructure made by DANC and others also provide access to diverse fiber infrastructure.

In the northern two thirds of the County, there are several pockets of rural areas which are limited to HughesNet as their only broadband option. These pockets of limited access can be found in the towns of Brasher, Stockholm, Norfolk, Canton, Louisville, Hopkinton, Parishville, DeKalb, Oswegatchie, Morristown, and Pitcairn. The southern third of the County resides in the Adirondack Park, a 6-million-acre State Park which is regulated by the Adirondack Park Agency.

The very rural areas in the southern and eastern section of the County, specifically in the towns of Pitcairn, Fine, Clare, Clifton, Colton, Parishville, Hopkinton, and Piercefield have limited access. These areas all reside in the Adirondack Park region. While many of the census blocks in this area indicate a number of households, the population count is very low or zero. This is indicative of the housing units in these areas being used as secondary residences used as vacation homes and camps.

Local Providers.

In terms of providers there are four Incumbent Local Exchange Carriers (ILEC), two cable TV providers, and four Competitive Local Exchange Carriers (CLEC) that were identified. Additionally, one alternative fiber provider, two fixed wireless providers (though limited in offerings), and four cellular phone service providers were identified.

Infrastructure.

From an infrastructure standpoint there are 22 Central Offices (including 3 outside the County) and numerous remote terminals providing service to residents and businesses.

There are 52 FCC registered towers, with the majority of these located near developed areas to the north of the Adirondack Park. In addition, there are miles of fiber infrastructure installed along the major transportation corridors linking towns, communities, and many remote areas.

Since 2015, through recent state and federal grant funding more than $45M has been invested to extend broadband to 9,962 unserved and underserved homes and businesses in the County.

More than $43M of the $45M was committed to expand broadband in St. Lawrence County through the New NY Broadband Grant program. The state's New NY Broadband Grant program including funds from the awardees has provided investment in broadband in the amount of $5,827,552 for Citizens of Hammond to connect 2,226 locations.

Further investments include $10,825,558 for SLIC to connect 1,475 locations, $8,392,778 for TDS Telecom to connect to 1,531 locations, and $17,141,050 for Verizon to connect 1,634 homes. Virtually all of this investment is to implement fiber to the home. The people living and working in these areas will have access to very high bandwidth service.

The remaining census blocks were awarded to HughesNet representing access to 2,163 homes. These blocks received grant funding for Hughes Network satellite service which is stated to have a bandwidth of at least 25/3 Mbps.

Of the $45M invested, the recent federal RDOF program accounts for investment of $1,792,543 to bring high speed broadband service to 933 households.

Citizens of Hammond and SLIC Network Solutions will provide fiber to the home service to 416 homes with speeds in excess of 100 Mbps up to 1 Gbps. SpaceX will provide at least 25/3 Mbps service to 517 homes. However, with this program, the providers have up to 6 years to complete their construction.

The study found that infrastructure supporting DSL based Internet access in the County is available in the populated areas and some of the rural areas. DSL based Internet is available to businesses and residents located within three miles of the local incumbent telephone company Central Offices or remote terminals.

Spectrum.

Broadband services provided by Spectrum, identified by reviewing their fiber and coaxial routes, are available in and around population centers in the north eastern portion of the County. Areas served include Massena, Potsdam, Colton, Canton Russell, Gouverneur, Morristown and along the St. Lawrence River.

As part of the Charter/Time Warner Cable merger, Spectrum is required by the State to expand its service to 145,000 unserved homes. We can deduce where these areas are by looking at where New

York State awarded grant funding as part of the New NY Broadband Grants. These grants were awarded in areas where Spectrum will not be expanding service.

Alternative Providers.

Up to 27% of the households in the awarded grant areas were awarded to satellite providers. In these areas of St. Lawrence County users will have access to the mimimum broadband service level of 25Mbps download and 3Mbps upload. In many of these areas of the County, satellite and DSL will be the only choice.

SLIC Network Solutions is extending its FTTH service to 1,808 homes in St. Lawrence County. In many instances, they will be competing head-to-head with Spectrum to provide broadband service. Residents and businesses in these areas will have the benefit of choosing between two providers of very high-speed Internet. The competition should result in improved service and lower costs to users in those areas.

DANC has open access fiber throughout the central and western areas of St. Lawrence County. This fiber allows CLECs and others that want to compete in the County low-cost marketplace entry. Since the DANC fiber is already in place, the competitive provider will only need to build a lateral off the backbone to access customer locations to provide service.

Cellular Providers.

The cellular providers in the County are AT&T Wireless, Verizon Wireless, T-Mobile and Spectrum. All of these cellular companies have equipment on towers strategically placed in the County to provide mobile wireless service to the maximum number of customers. Not surprisingly most investment in 5G cellular-based infrastructure is located in the northern part of the County where it is more densely populated.

County Infrastructure.

The County owns four Public Safety towers for its communications radio system. Based on the FCC information, the County has registered the four towers in Massena, Ogdensburg, Richville and Waddington.

5.2 BROADBAND AVAILABILITY AND ADOPTION TOOL (BAAT) RESULTS.

The broadband inventory data as collected, confirmed the findings of the Broadband Availability and Adoption Tool Survey administered concurrently with the field Inventory. In general, County is well served except for isolated areas with limited to no service.

A common theme in the respondent data from the BAAT program is the importance of competitive choice for broadband service. Further, over 83% of the respondents indicated a choice in providers was important or very important. In many areas of the County, the residents have access to CATV based broadband.

However, the competitive service available is either DSL which provides a fraction of the speed or satellite based service which is impacted by line of sight issues caused by heavy rain or snow as well as latency problems. In the open-ended responses, many complained about service quality and the inability to choose another broadband provider.

The next two pages in this report show Figures 23 and 24. These figures represent data collected from the BAAT survey program implemented in St. Lawrence County from February 2021 through May 2021.

Figure 23 shows a breakdown of the type of service subscribed. CATV based broadband is the most prevalent across the County with 40% of respondents subscribing to CATV service. Fiber is the broadband of choice for 13% of respondents.

The remaining 47% of respondents either had DSL, Cellular hot-spot, satellite, Dialup or fixed wireless with 11% having no Internet Access. The results show areas needing broadband upgrades in Parishville, Brasher, Pitcairn, Canton and Oswegatchie.

Figure 24 shows where respondents have indicated they cannot purchase the speed they need. Again, the results show areas in Parishville, Brasher, Pitcairn, Canton and Oswegatchie.

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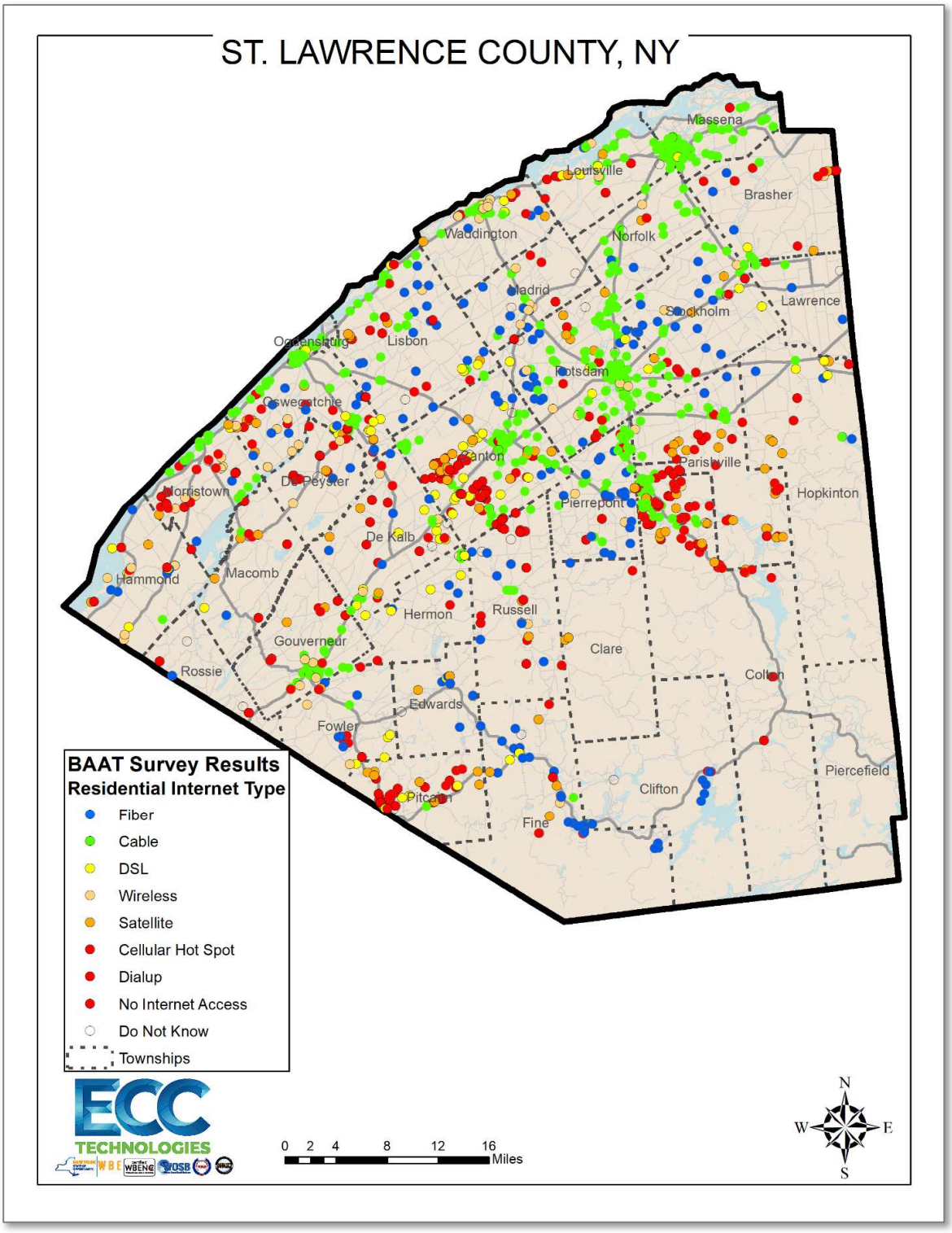

FIGURE 24 BAAT SURVEY RESULTS – TYPE OF SERVICE SUBSCRIBED

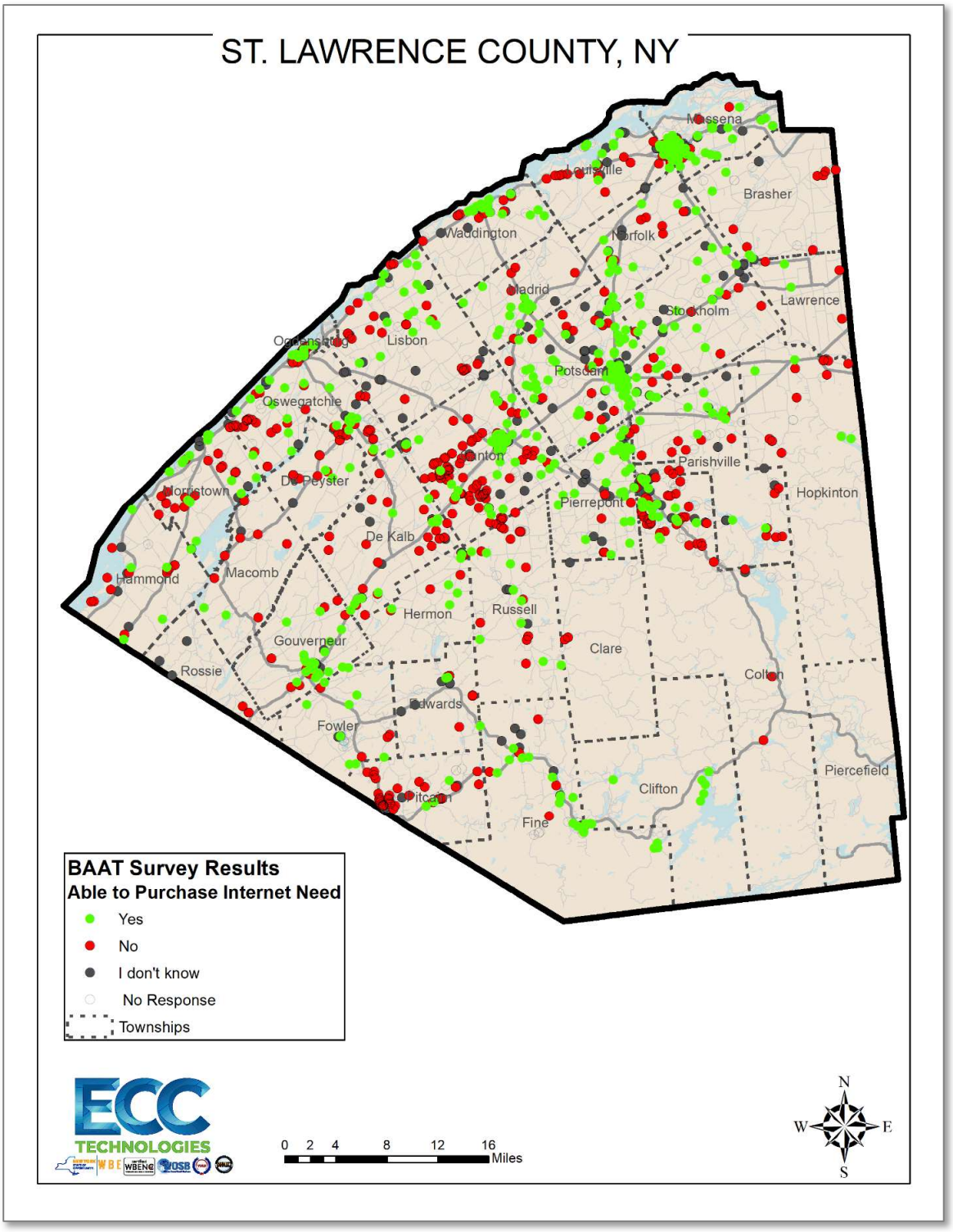

FIGURE 25 BAAT SURVEY RESULTS - ABILITY TO PURCHASE NEEDED SPEED

6. Next Steps

6.1 SUMMARY OF ACTIONS.

BROADBAND GRANT OPPORTUNITIES. Pursue broadband grant opportunities for rural area broadband access, such as those periodically provided by the USDA, NTIA, New York State, Public Safety, Northern Border Regional Commission grants and others. A helpful website, https://broadbandusa.ntia.doc.gov/new-fund-search references the NTIA database of all federal grant programs that have to do with broadband. These types of funding opportunities are often overlooked but can be very helpful in spurring local efforts.

SERVICE PROVIDER INTERACTIONS. Meet with the incumbent and alternative service providers on a semi regular basis to develop a sense of partnership and discuss possible mutual interests. Identify opportunities with these organizations to expand broadband and develop desired solutions within the County.

INCENTIVES. Develop incentives to entice expansion of services. Providers will typically build to a certain number of homes per mile. Each provider will have a different number based upon their operational costs and expected revenues.

For example, cable providers will consider expanding their network to areas of roughly 12 homes per mile or greater. In many of these areas the density of homes per mile could be 6 or less. If the County has a desire to address these low-density areas, the County could offer to fund the difference in capital cost between the 12 homes per mile and the density of the area to be addressed.

COUNTY SUPPORT. Through the use of grants, tax programs, right of way, franchise agreements and County assets such as tall building and tower space, DANC and the County can work with the service providers to promote access and competitive services throughout the County. Also, the American Rescue Plan Act of 2021 has provided funds to Counties and municipalities which could be used to fund broadband expansion.

PUBLIC PRIVATE PARTNERSHIPS. The County should consider the creation of public/private partnerships to fill in the holes within the County. Data from this inventory combined with the results of the Broadband

Availability and Adoption Tool survey can be an effective way to draw in additional carriers to compete for services or partner with the County to apply for grant funding.

An example of the use of the Inventory and BAAT tools can be seen recently with Madison County, NY. The County identified areas of the county that needed broadband expansion and investment through conducting a broadband inventory and BAAT campaign similar to that done in St. Lawrence County.

The County leveraged the information to team with Empire Access to apply for a USDA ReConnect grant to offer a fiber to the premise solution offering high speed data, TV, and phone services to the unserved and underserved areas. The solution would make fiber based broadband available to 970 homes that currently do not have access to adequate broadband in the County.

The total project is estimated to require over $16M. The County will contribute $3.4M, the USDA Grant would contribute $10.2M and Empire Access will contribute $2.5M.

The County will own the infrastructure. Empire will use the infrastructure to offer services, invoice and service clients and maintain the network. The USDA recently announced a successful grant award to Madison County.

6.2 ANALYSIS.

Following our evaluation of the infrastructure within the County, understanding the grant award investments that have been made and the resulting plans to expand broadband within the County, we can clearly begin to see areas of the County that need additional help in the expansion of broadband availability.

We next selected the census blocks served only by HughesNet and not by any other provider. In so doing, a limited set of Census Blocks are revealed which can be prioritized and targeted for funding.

Public/private partnerships between the County, DANC and other carriers can focus on technical solutions and funding for these areas. There are many grant and investment options which could be brought to bear to fund these solutions.

After removing the infrastructure from the map shown in Figure 27, we are left with the image found in Figure 26 which includes only the census blocks and respective households with which to prioritize potential broadband expansion.

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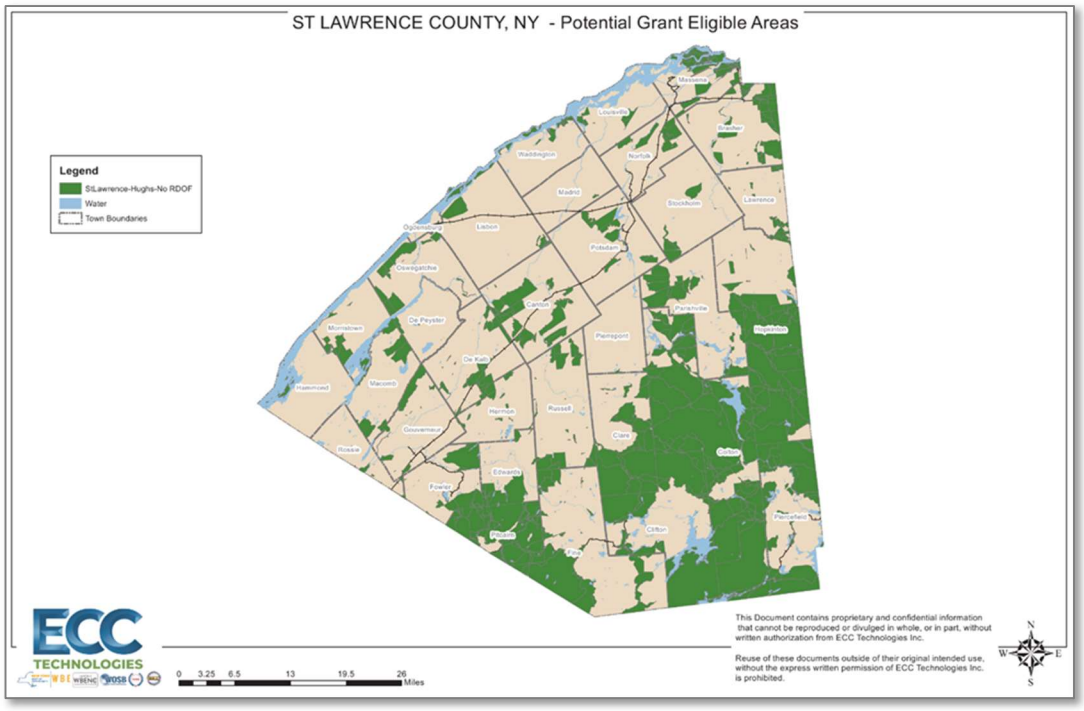

FIGURE 26 POTENTIAL GRANT ELIGIBLE AREAS

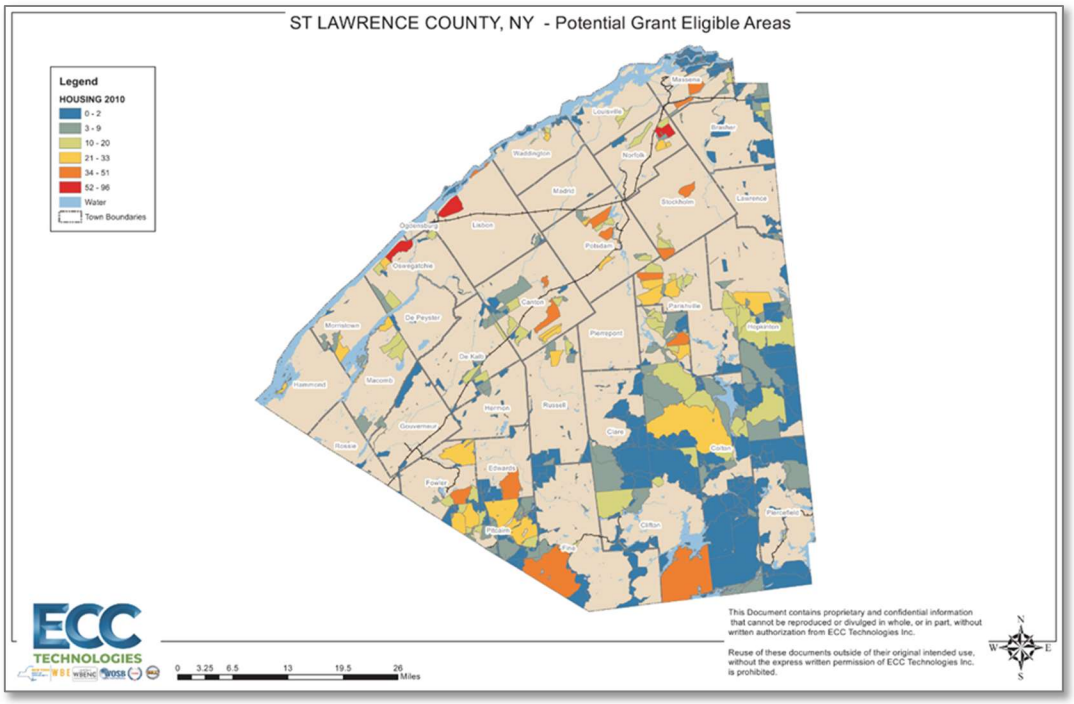

FIGURE 27 POTENTIAL GRANT ELIGIBLE AREAS WITH HOUSING DENSITY

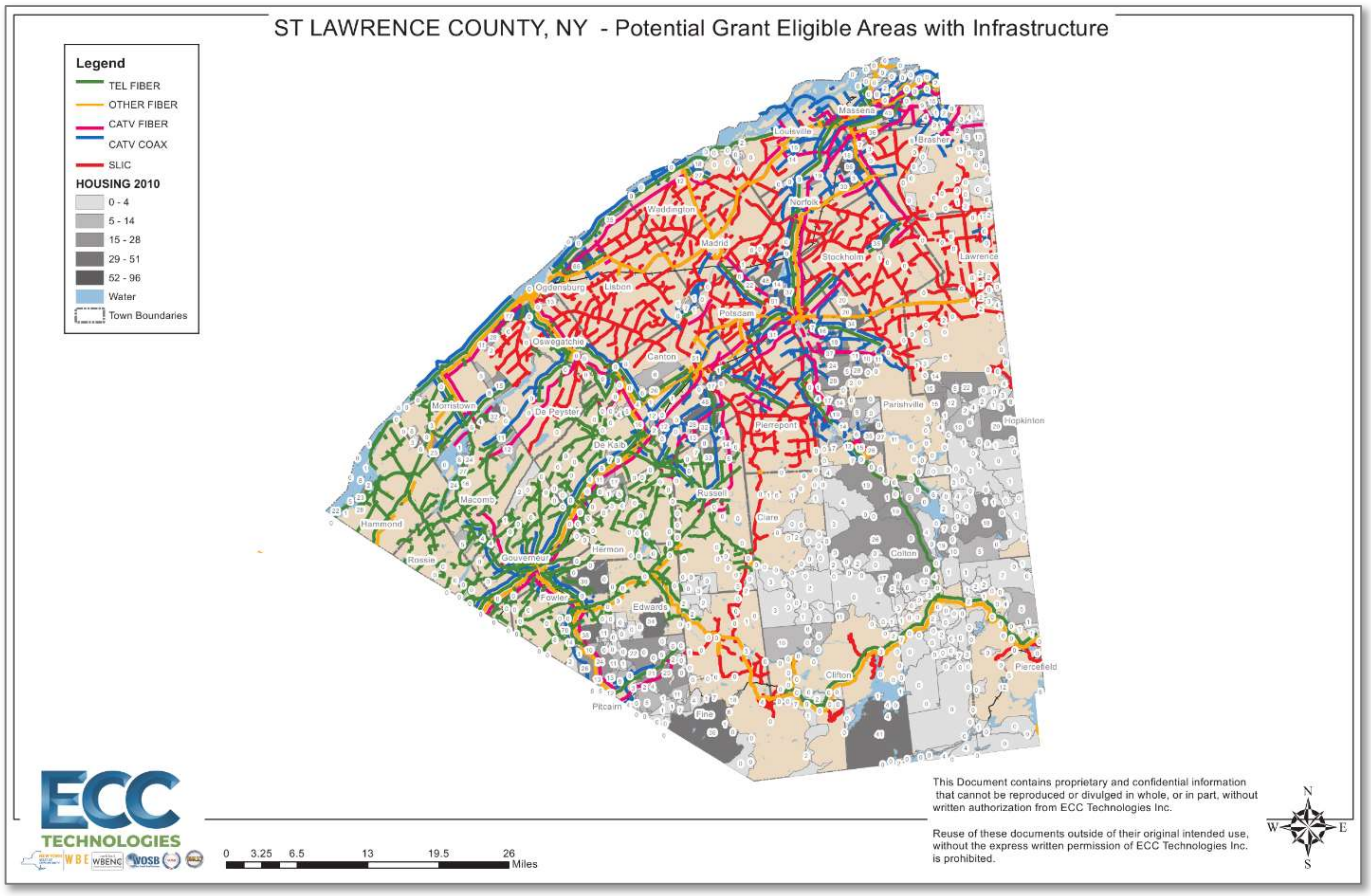

FIGURE 28 INFRASTRUCTURE OVER POTENTIAL GRANT ELIGIBLE AREAS

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6.3 TARGET AREAS

Based upon Figures 25, 26 and 27 we have defined five potential areas to target for broadband expansion and possible grant funding. The areas have been defined into the following geographic areas which are covered on the following individual pages.

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Parishville.

This area consists of 379 households served by basic telephone and DSL service and HughesNet. This area has fiber infrastructure near each of the census blocks identified.

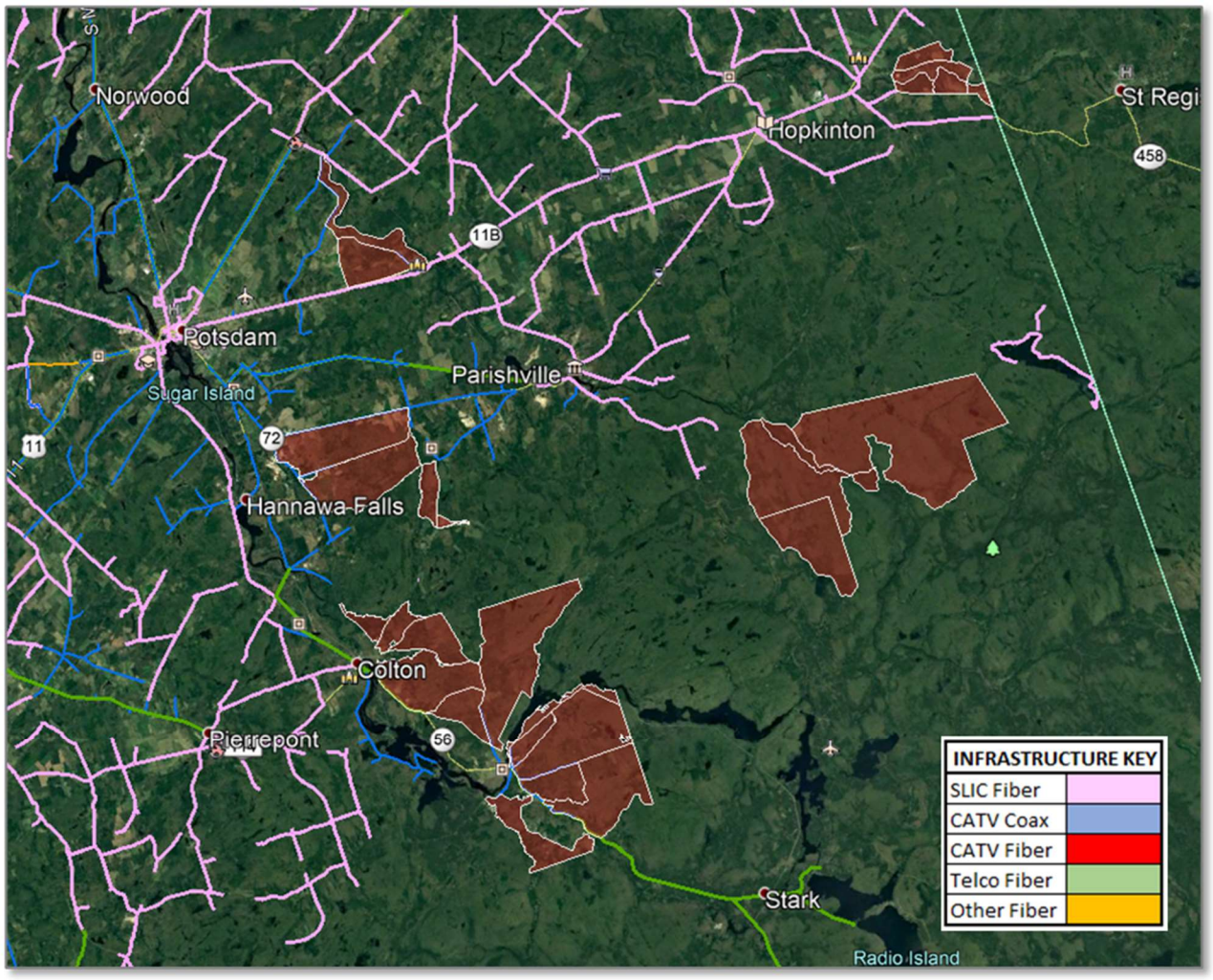

FIGURE 29 PARISHVILLE CENSUS BLOCKS TO BE ADDRESSED

Spectrum, SLIC and Verizon each have fiber infrastructure near selected census blocks This could be an ideal area for SLIC, Spectrum or Verizon to leverage their fiber infrastructure to provide either coaxial or fiber to the home-based services. Another option could be to deploy a fiber fed fixed wireless solution for the area. This area could also prove to be ideal for a Northern Border Regional Commission Grant, ReConnect Grant or ARPA funds.

Brasher.

There are 203 households in Brasher as a potential market in three relatively small areas. It has a number of respondents unable to obtain the speed they require and are near Spectrum and SLIC infrastructure. These areas could be a good fit for a ReConnect Grant.

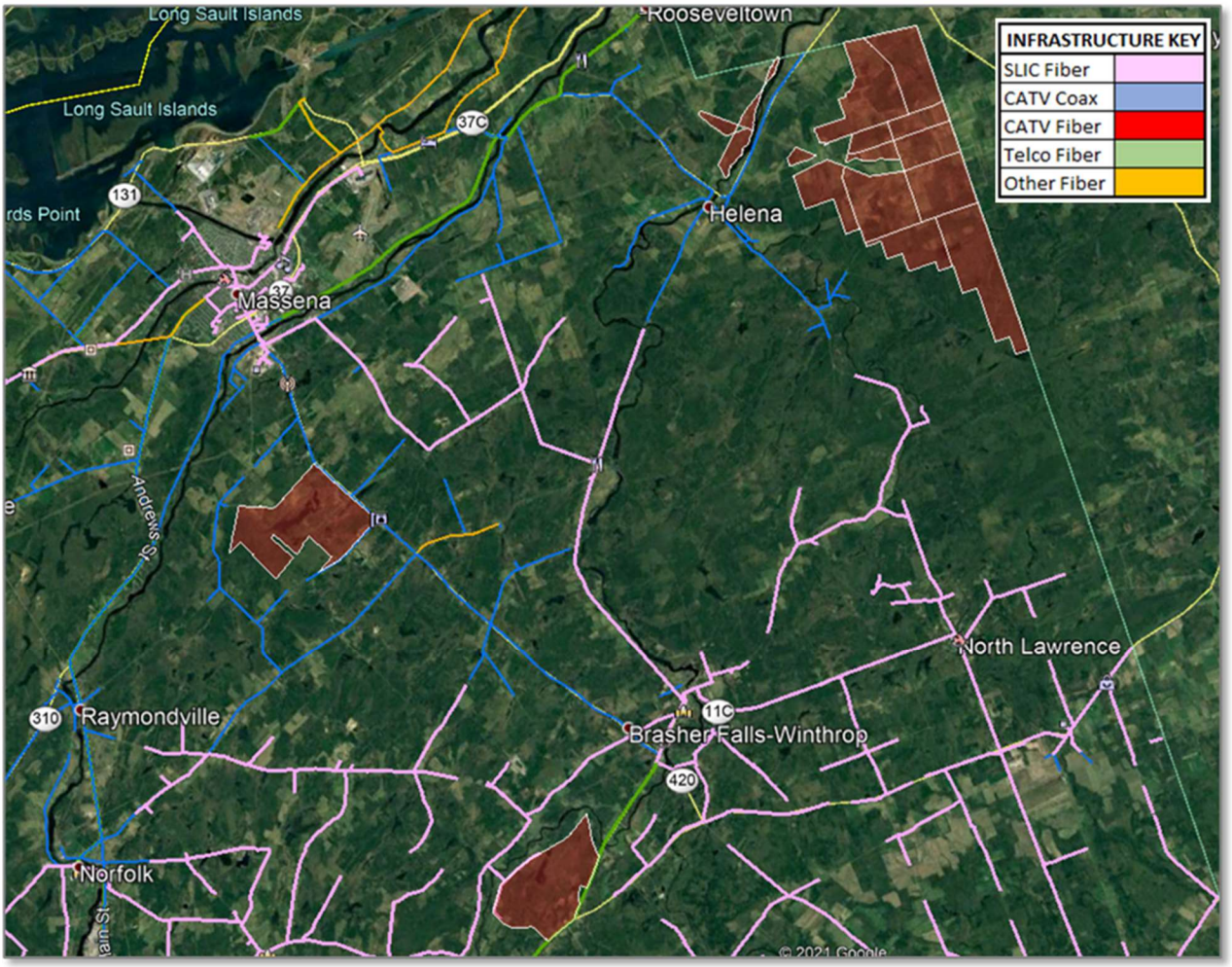

FIGURE 30 BRASHER CENSUS BLOCKS TO BE ADDRESSED

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Pitcairn.

Pitcairn Includes 185 households with some respondents indicating they cannot obtain the speed they need. Spectrum SLIC and Verizon have fiber optic infrastructure nearby. Although Infrastructure is nearby, these census blocks are prime for a ReConnect Grant.

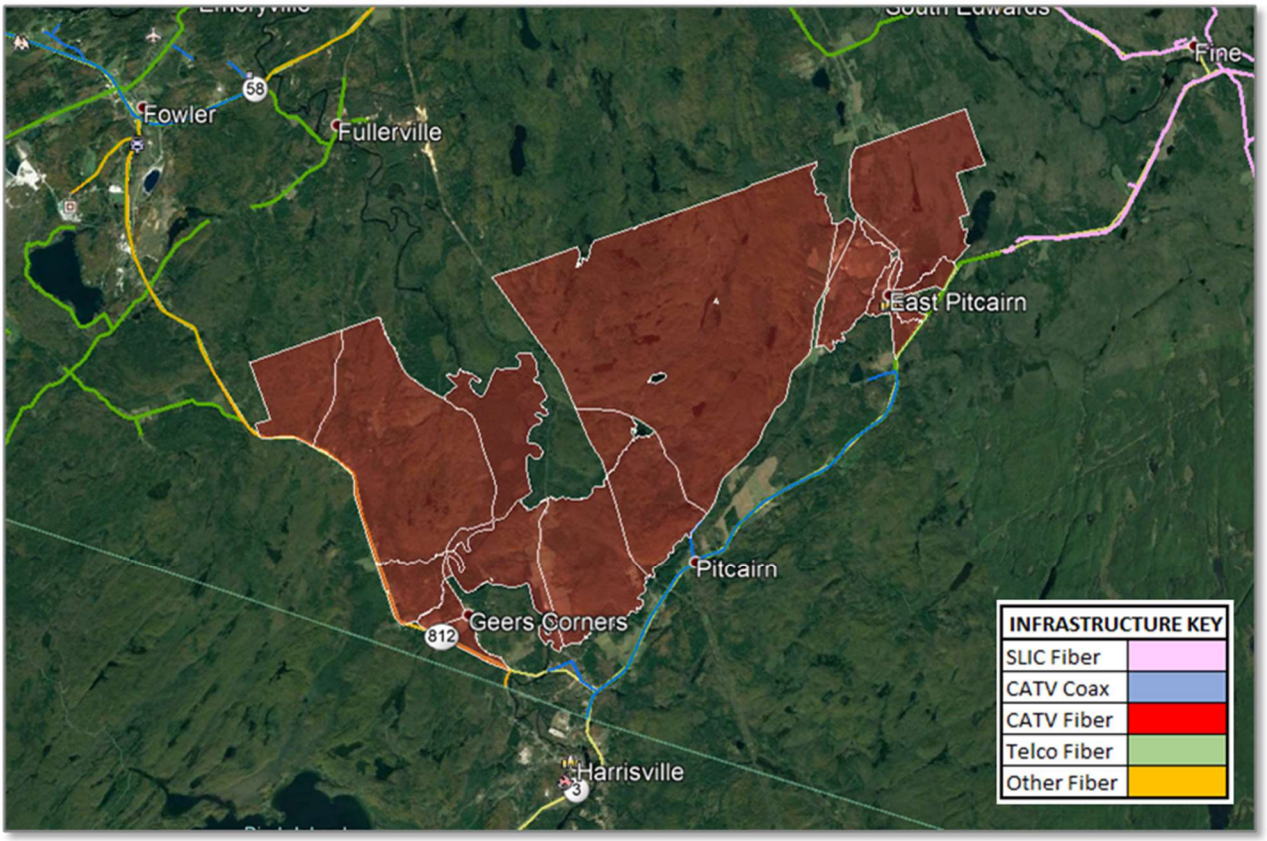

FIGURE 31 PITCAIRN CENSUS BLOCKS TO BE ADDRESSED

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Canton.

In Canton, there are 185 potential households to serve in 6 zones over a 200 square mile area. Spectrum, SLIC, Verizon and TDS all have fiber infrastructure near these 6 zones.

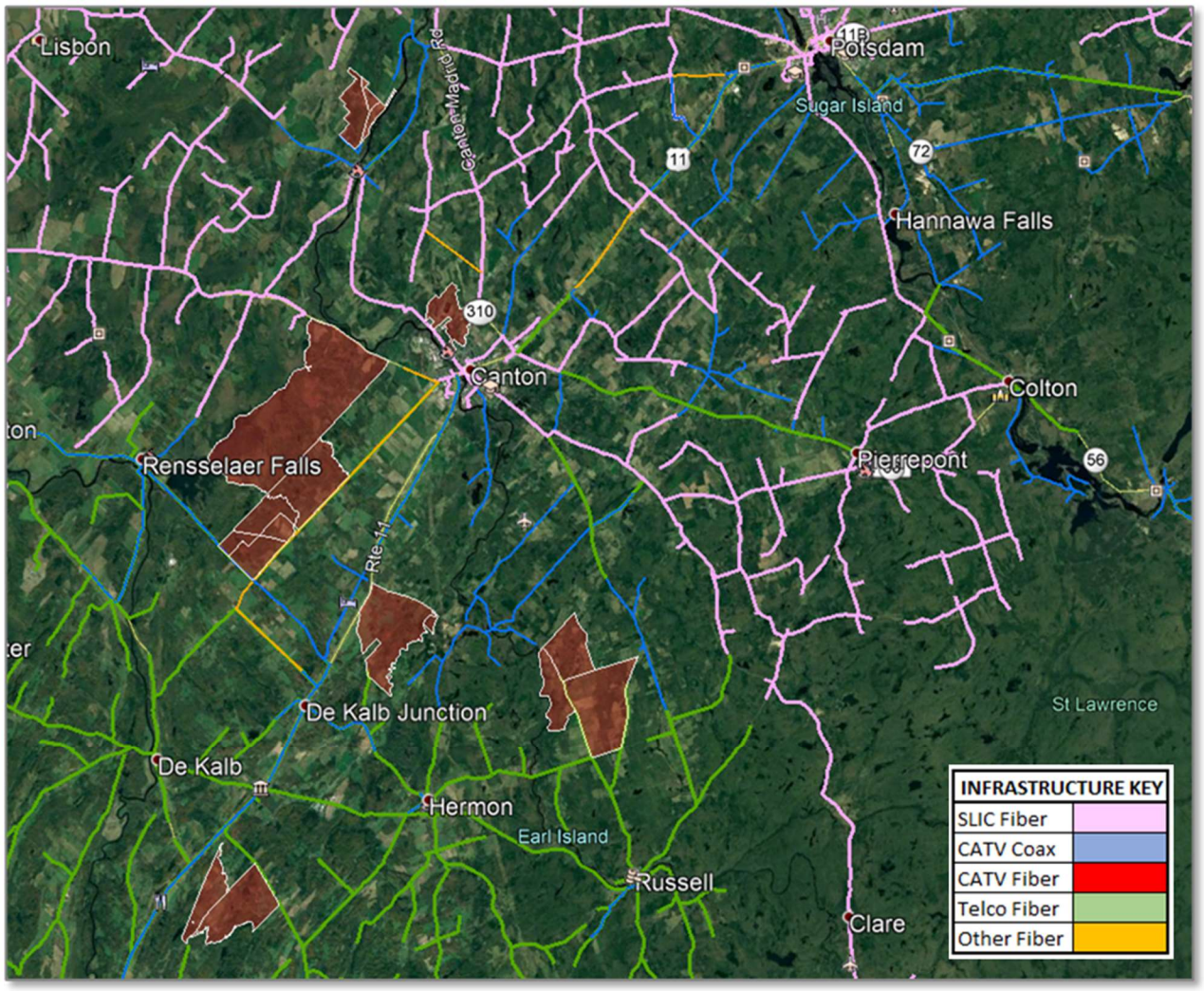

FIGURE 32 CANTON CENSUS BLOCKS TO BE ADDRESSED

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Oswegatchie.

Oswegatchie – has 67 households in 3 small zones which need to be addressed. These zones have Spectrum, SLIC, Verizon and Citizens of Hammond fiber nearby. The County should approach the providers and determine what they would need to expand service to these households.

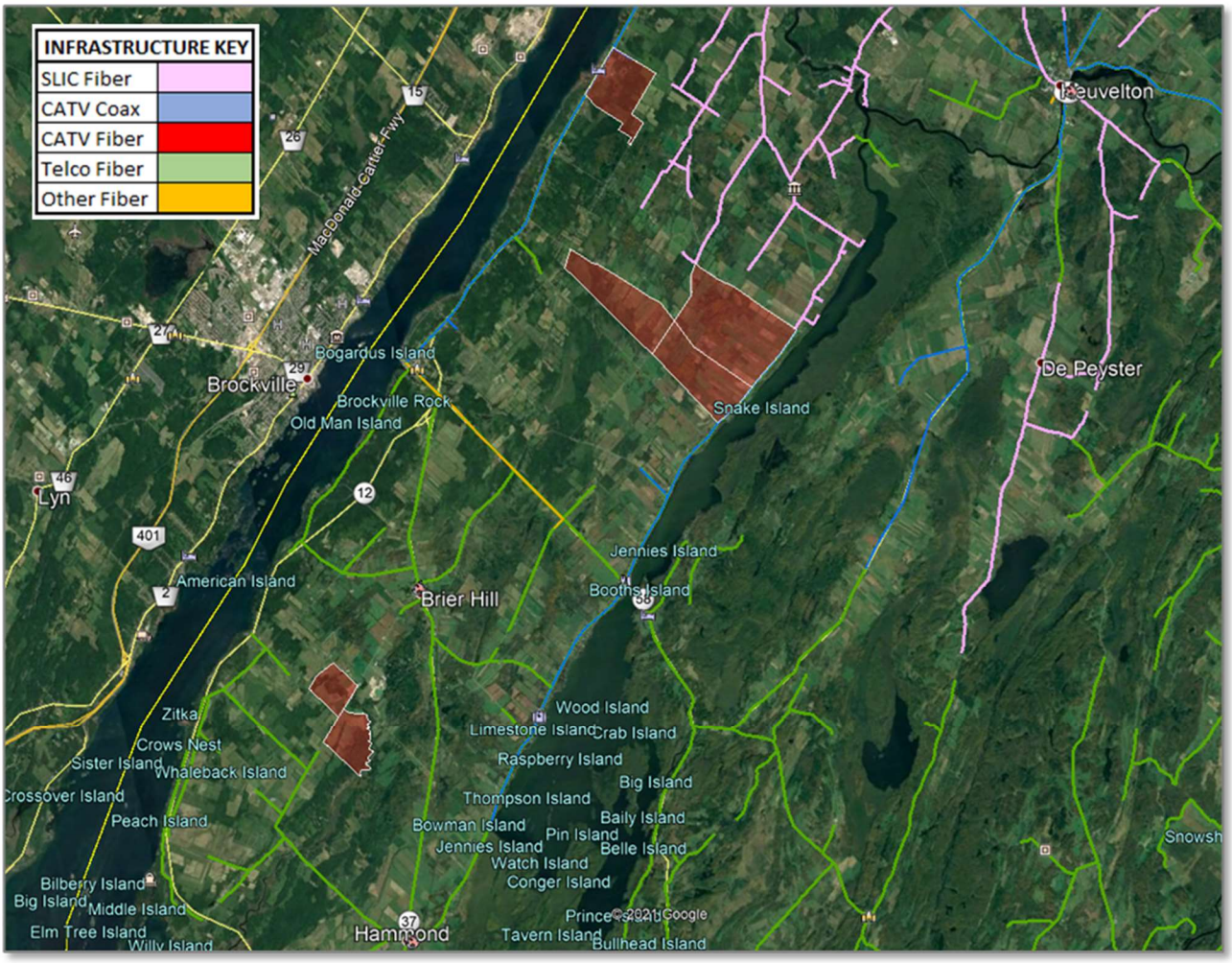

FIGURE 33 OSWEGATCHIE CENSUS BLOCKS TO BE ADDRESSED

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Appendix

Appendix A - Provider Service, Speeds and Costs

NICHOLVILLE TELEPHONE COMPANY

13 Port Kent Rd Nicholville, NY 12965

Nicholville Telephone Company - 50.4% Available in 12965

Fiber Internet

Speeds up to: 100mbps

Pricing starts at: Unlisted

Plans: 0

Nicholville Telephone - 45.5% Available in 12965

DSL Internet

Speeds up to: 6mbps

Pricing starts at: Unlisted

Plans: 0

SLIC

SLIC Broadband Internet

13 Port Kent Rd Nicholville, NY 12965

Residential

INTERNET

Standard $68.85
25M Download / 25M upload (Best for 1-3 light Users)
*** Includes managed WiFi & 8 hour battery backup

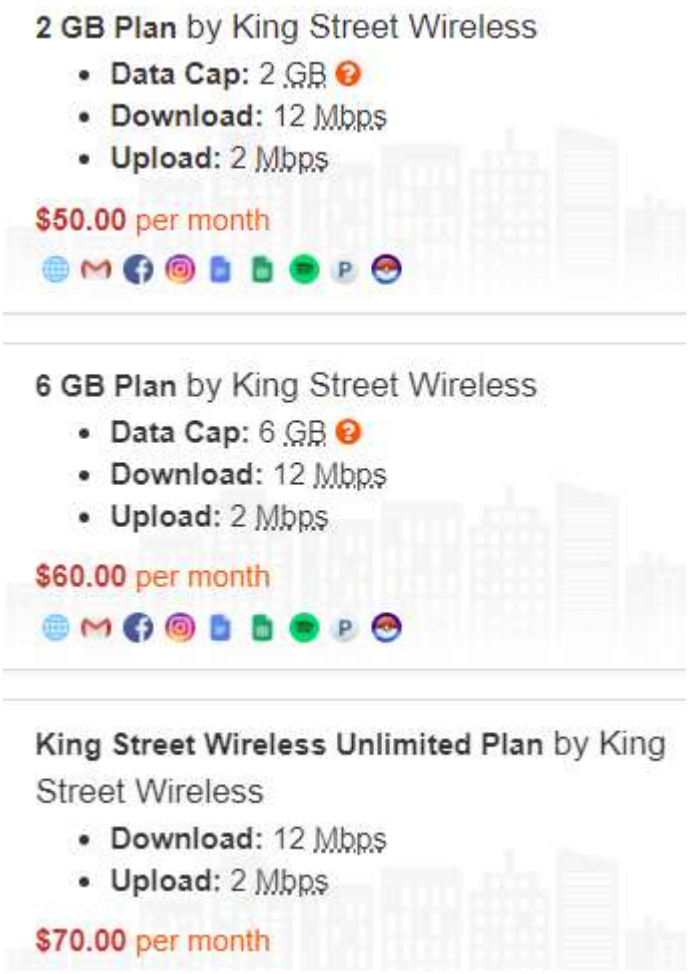
Extreme $88.85
50M Download / 50M upload (Best for 3-6 moderate Users)
*** Includes managed WiFi & 8 hour battery backup

Ultimate $108.85
100M Download / 100M Upload (Best for 6+ Heavy Users, or just because you deserve it.)
*** Includes managed WiFi & 8 hour battery backup

*** Managed WiFi billed at $4.95/mo & Optional 8 hour battery maintenance at $3.95/mo

KING STREET WIRELESS

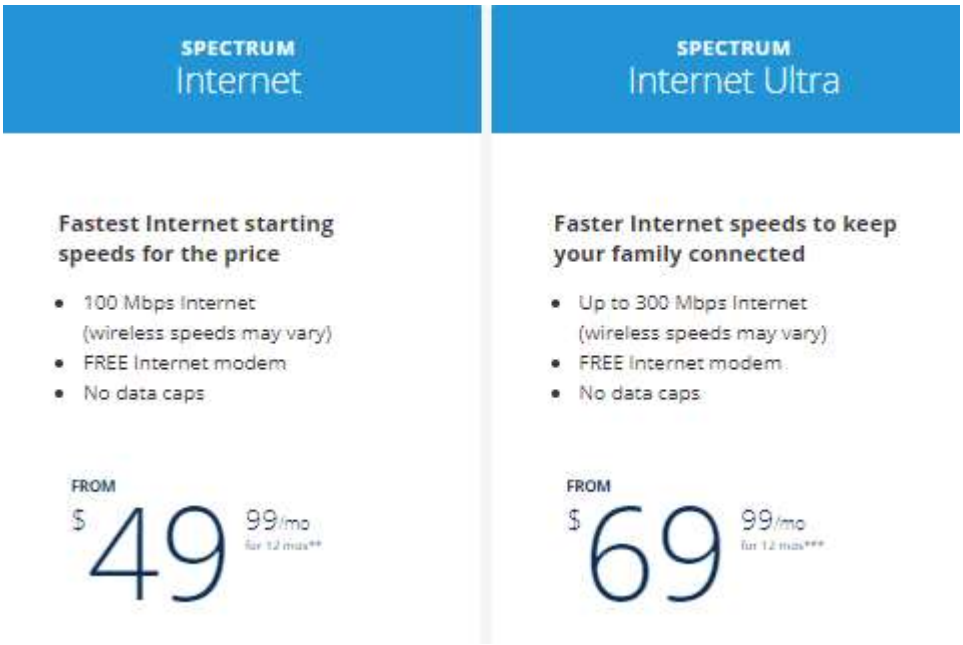
13 Port Kent Rd Nicholville, NY 12965



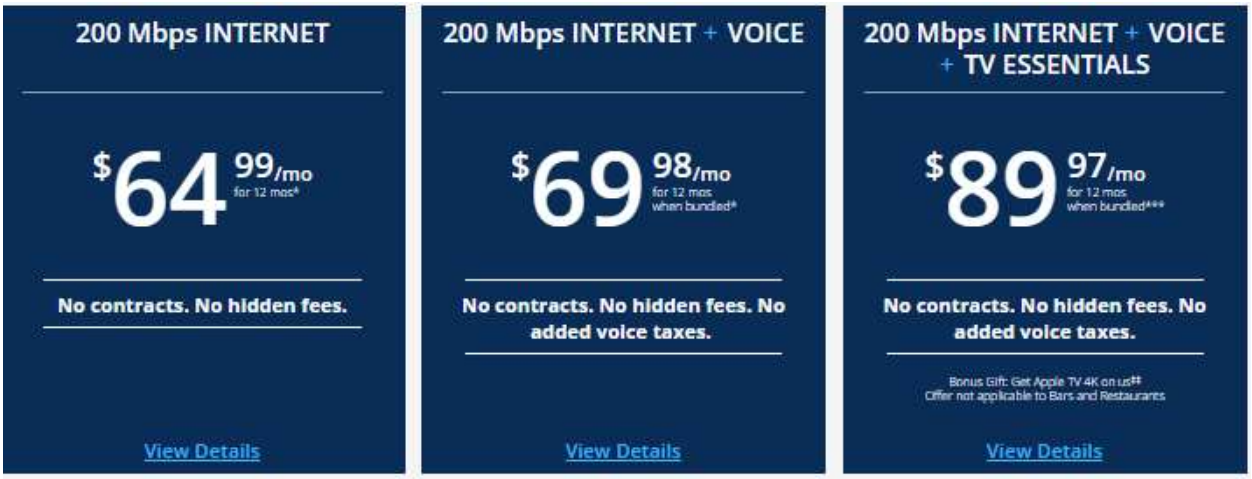
SPECTRUM

13 Port Kent Rd Nicholville, NY 12965

Residential



Business



CASTLE CABLE TV

Castle Cable TV, INC.

1304 S Hammond Rd, Hammond NY

Residential

Business

512k.....$27.45
1Mbps.....$40.65
3 Mbps.....$53.95
5Mbps.....$65.95
10Mbps.....$109.95
20Mbps.....$149.95
30 Mbps $169.95
50 Mbps $189.95

CITIZENS OF HAMMOND

1304 S Hammond Rd, Hammond NY

Residential DSL
Speed 512K $40.95 per month
Speed 1MB $57.95 per month
Speed 2 MB $89.95 per month

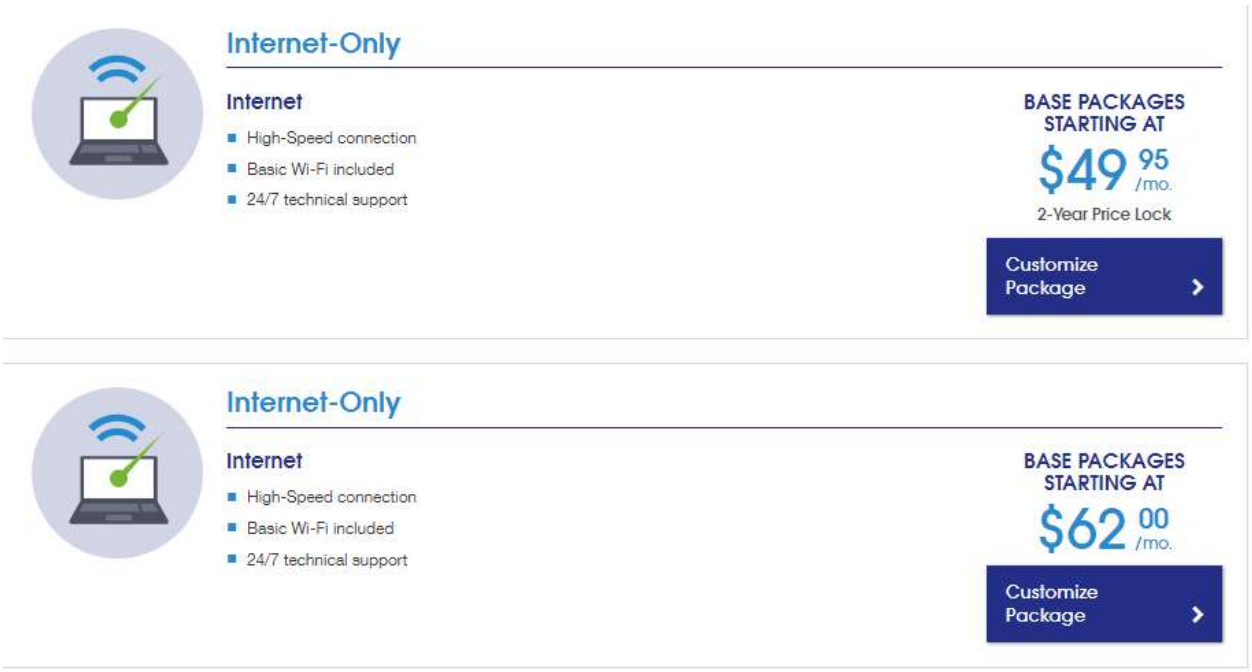
Business DSL
512 K $58.95 per month
1MB $79.95 per month
(OTHER CHARGES MAY APPLY)

DSL INTERNET INSTALLATION COST?
Installation $52.95
Service Fee Charge $70.00
(prices are subject to change)
HIGH SPEED INTERNET INSTALLATION DOES NOT INCLUDE:
Materials or labor to install Category 5 inside wiring within your home.

TDS

256 Main St Edwards, NY 13635

Residential



TDS

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Internet, DISH TV & Phone

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- High-Speed connection
- Basic Wi-Fi included
- 24/7 technical support

DISH TV
- 290+ channels available
- Watch TV everywhere with DISH Anywhere
- Video On Demand

Phone
- Unlimited local calling
- Long distance options
- Feature options like Caller ID, Voice Mail, and more

BASE PACKAGES STARTING AT
$119.93/mo.
2 Years of Savings

Customize Package >

Internet-Only

Internet
- High-Speed connection
- Basic Wi-Fi included
- 24/7 technical support

BASE PACKAGES STARTING AT
$67.95/mo.

Customize Package >

Appendix B - USDA Reconnect

APPENDIX B - USDA RECONNECT

The scope of the ReConnect grant is extensive, in-depth, and complex. ECC will be happy to work closely with and support DANC and the County on the development of any grant application.

Below is an example of the information required from the Round 2 ReConnect Grant application.

USDA Round 2 ReConnect Application Tasks:

SECTION A - GENERAL INFO ON THE APPLICANT AND THE PROJECT

- General Info on the Applicant
- A description of the project (which will be made public)
- The estimated dollar amount of the Funding Request

SECTION B - AN EXECUTIVE SUMMARY OF THE PROPOSED PROJECT

- Description of Existing Operation
- Key Management
- Description of Workforce
- Interaction between Parent and Affiliate or Subsidiary
- Detailed description of the proposed Project

SECTION C - DESCRIPTION OF THE PROPOSED FUNDED SERVICE AREA

- Description of the Proposed Funded Service Area including Homes Passed

SECTION D - SUBSCRIBER PROJECTIONS

- No. of Subscribers for BB, Video and Voice -- and other services
- Description of the Proposed Service and the Pricing Plan
- Explanation of Service Affordability

SECTION E - MAP OF THE PROPOSED FUNDED SERVICE AREA (PFSA)

- Create Map from RUS Mapping Tool -- reconnect.usda.gov
- Identify and Prove Areas without BB and non-funded service areas of the applicant*
    - Assessment of Current BB in Project Area
    - Description of data source or methodology to capture data

- Unserved Areas - Identify Eligible Areas
- Map of Unserved area
- BAAT data
- Census Block Overlay

*Donut Holes are allowed in PFSA and MM Fiber can route through noneligible area

SECTION F - DESCRIPTION OF ADVERTISED PRICES BY COMPETITORS IN THE SAME AREA

- Description of Advertised Prices by Competitors in the Same Area
- Description of Existing Services and Speeds

SECTION G - NETWORK DESIGN

- Description of Proposed Technology Used
  - Narrative explaining design of deployment
  - Explanation of current networks and equipment to be leveraged
  - Explanation of tying the number of users - for new service
  - Fixed Wireless providers explain frequency to be used and other info
  - Explanation of Scalability
- Demonstrate that all premises can be served
- A Network Diagram
- Buildout Timeline and Milestone
- Network Information Certified by Professional Engineer
- Certify 100Mbps both ways? Y or N
- List all Required Licenses and Regulatory approvals needed for project
- List how much Applicant will rely on contractors and vendors to deploy network

SECTION H - RESUMES, READINESS AND ORG CHART

- Resumes of Key Management
- Description of org's readiness to manage BB network
- Org Chart showing all Parent orgs and subsidiaries and affiliates

SECTION I - LEGAL OPINION (Client legal team provides)

- Ability to enter Award Documents
- Describe all pending litigation matters
- Pledge Security
- Ability to Provide BB under State Law

SECTION J - INFRASTRUCTURE COSTS

- Summarize and itemize Budget of infrastructure costs
  - Narrative

- Budget Detail
- Describe Ratio of Loans to Grant, and any other outside funding

SECTION K - WORKING CAPITAL

- Description of Working Capital requirements and Source of Funds

SECTION L - HISTORICAL FINANCIAL STATEMENTS

- Last 4 years or since startup --including income statement, balance sheet, cash flow

SECTION M - AUDITED FINANCIAL STATEMENT

- 2 Previous Years of Operation from Each of the Partners

SECTION N - PROJECT PRO FORMA -- PER US GAAP ACCOUNTING PER GOV'T WEBSITE

- As per http://www.rd.usda.gov/files/accounting/guidance10.PDF
- Subscriber estimates, annual financial projections with balance sheets, income statements, and cash flow, depreciation schedule
    - Narrative
    - Budget Detail
    - Financial Model
    - Definition
    - Creation
    - Review
- Committed Resources of Capital Funding and Include Bridge Year

SECTION O - RUS APPLICATION SYSTEM ATTACHMENTS

- Download forms below from USDA website and fill out the ones that apply
    - Closing Instructions
    - Legal Opinion
    - Mortgage-Co-Lender
    - Mortgage-Existing Borrower
    - Mortgage- New Borrower
    - ReConnect Agreement – Loan/Grant and Security Agreement
    - Farm or Business Pre-Subscription Form
    - Network Design Certification

SECTION P - SCORING SHEET

- Create Scoring Sheet set forth in FOA

SECTION Q - OBLIGATIONS

- List of Obligations, security agreements, service agreements etc.

SECTION R - ENVIRONMENTAL INFORMATION

- Required to certify construction meets the NEPA and Endangered Species
- Use Online system and after the fact info

SECTION S - CERTIFY AGREEMENTS TO INVESTORS

- Certification that agreements or obligations with investors do not breach government draft award

SECTION T - TRIBAL LAND

- Certification from Tribal Official that they support the project
- Include land that will be part of project, owned or held in trust, ID landowners

SECTION U - OTHER MATERIAL REQUESTED IN THE ONLINE APPLICATION SYSTEM

ECC will be happy to work closely with DANC and the County to project manage, develop, and submit grant applications. Once it is determined which grant application(s) will be required, ECC develops a detailed project plan with action items for the DANC and the County. ECC staff, DANC and County representatives compile data and responses to be entered into the respective grant portal.

Appendix C - Notes

APPENDIX C - NOTES

1. https://www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.html
2. https://arstechnica.com/tech-policy/2019/04/charter-avoids-getting-kicked-out-of-new-york-agrees-to-new-merger-conditions/
3. https://nysbroadband.ny.gov/all-phases-municipality
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5. https://www.nokia.com/blog/redoing-the-math-the-impact-of-covid-19-on-broadband-networks/
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7. https://www. fcc.gov/general/broadband-deployment-data-fcc-form-477
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9. https://www.starlink.com/faq
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11. Federal Register / Vol. 84, No. 239 / Thursday, December 12, 2019 / Notices 67913
12. https://www.rd.usda.gov/files/ReConnect_Program_Application_Guide.pdf
13. http://about.att.com/content/csr/home/issue-brief-builder/people/deployment-to-rural-and-underserved-areas.html
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15. https://nysbroadband.ny.gov/all-phases-municipality
16. https://nysbroadband.ny.gov/all-phases-municipality
17. https://www.govtech.com/network/lewis-county-ny-broadband-contractor-pulls-out-citing-costs.html
18. https://www.bizjournals.com/albany/news/2019/07/11/charter-communications-spectrum-new-york.html
19. https://nysbroadband.ny.gov/accordion/faq/how-will-grant-funded-service-provided-hughes-network-systems-differ-company%E2%80%99s-current
20. https://www.danc.org/telecommunications.
21. Data obtained from FCC 477
22. Field data collected by ECC engineers during Aug and Sept 2020

Appendix D - Glossary

APPENDIX D - GLOSSARY (SELECTED TERMS)

BACKBONE. Backbone, in the context of networking, refers to the highest speed and widest bandwidth point of a communications circuit or path. In most cases, all information central to the users is connected to the backbone (e.g., shared databases or servers).

BANDWIDTH. Bandwidth is the amount of data that can be carried by a circuit between two points of a network. Bandwidth is typically measured in Hertz (cycles per second), bits per second or kilobits per second (shortened to Bps or Kbps). The top speed of today's modems is 56,000Bps or 56Kbps.

The wire connecting a private home to the telephone company carries up to 128,000Bps while one strand of fiber optics can carry 20,000,000,000 (20 Gigabits). A 20Gbps fiber optic strand can interconnect 357,000 telephone calls.

8 bits equal one byte of data – a byte is generally the same as one character – for example the letter "a."

BROADBAND. Broadband is a descriptive term for evolving digital technologies that provide consumers a signal switched facility offering integrated access to voice, high-speed data service, video-demand services, and interactive delivery services.

CATV (Cable Television System). A broadband communications system capable of delivering multiple channels of programming from a set of centralized satellite and off-air antennae, generally by coaxial cable, to a community. Many cable-television designs integrate fiber-optic and microwave links.

A service through which subscribers pay to have local television stations and additional programs brought into their homes from an antenna via a coaxial cable.

CENTRAL OFFICE (CO). A CO is a major equipment center designed to serve the communications traffic of a specific geographic area. CO coordinates are used in mileage calculations for local and interexchange service rates. A Central Office usually has less than 100,000 telephone lines within its wire boundary. COs are usually owned and operated by LECs.

CLEC (Competitive Local Exchange Carrier). A CLEC is a telephone company that competes with the incumbent telephone company. The formation of these organizations is a direct result of the Telecommunications Act of 1996.

COAXIAL CABLE. A type of cable used for broadband data and cable systems. Also known as "coax." Coaxial cable is composed of an insulated central conducting wire wrapped in another cylindrical conducting wire. It is usually wrapped in another layer and an outer protective layer and has the capacity to carry great quantities of information.

DARK FIBER. Dark Fiber is fiber optic cable, typically between end user locations, that the end user owns, lights, and operates.

DSL (Digital Subscriber Line). DSL is technology that allows for the simultaneous transmission of voice and Internet data over a single telephone line. Central Offices that have DSL technology can support DSL services to customers within approximately 18,000 feet of the Central Office.

DSL is delivered either asymmetrically (ADSL) or symmetrically (SDSL). ADSL lines have download transmission rates higher than upload rates and are typical for residential or business users that receive much more Internet content than they send. SDSL are for businesses that generate and receive large amounts of Internet data.

DOWNLOAD SPEED. The rate at which data is transferred from the Internet to the user's computer is termed download speed. This speed is typically stated in Megabits (1,000,000 bits) per second or Gigabits (1,000 Megabits) per second.

FIBER OPTICS. The technology of guiding and projecting light for use as a communications medium. Hair-thin glass fibers that allow light beams to be bent and reflected with low levels of loss and interference are known as "glass optical wave guides" or simply "optical fibers."

This cable comes in two types, single mode and multimode, each with its own unique place in communications. Single mode FO cable is typically used where long distances and very high speeds are required, while multimode is used for intra-building communications and places where lower bandwidths are required.

FIBER-OPTIC CABLE. A cable containing one or more optical fibers.

INCUMBENT LOCAL EXCHANGE CARRIER (ILEC). An ILEC is the local telephone company that provides service to business, organizations, and residences within the LATA. The ILEC is responsible for the development, maintenance, and support of cabling infrastructure necessary to provide telecommunications services within the LATA.

INTERNET. A widely used public computer network, initially developed by the U.S. military that links smaller computer networks and allows users on different electronic-mail systems to communicate with one another on a global scale.

INTERNET PROTOCOL (IP). In TCP/IP, a connection Internet layer protocol that provides a best-efforts datagram delivery service. Note the functional layer (TCP/IP) corresponds to the OSI model network layer.

The Internet layer provides routing and relaying functions that are used when data must be passed from a host to some other network in the Internet. It operates in the source and destination hosts and in all the routers along the path between the hosts.

ISP (Internet Service Provider). A company that provides access to the Internet to individuals or companies. Some ISPs lease connections from Internet backbone providers.

LANDLINE. Traditional wired phone service.

LAST-MILE. Last Mile is used to describe the final connection to a building, as differentiated from the high-capacity circuits extending across a city or County. The connection from the cable television trunk cable to your house is considered a "last-mile" connection.

NETWORK. Any connection of two or more computers that enables them to communicate. Networks may include transmission devices, servers, cables, routers, and satellites. The phone network is the total infrastructure for transmitting phone messages.

RF (Radio Frequency). RF refers to the electromagnetic waves operating between 10KHz and 3MHz propagated without guide (wire or cable) in free space.

RIGHT-OF-WAY. Right of Way (ROW) refers to a designated space alongside a street or other access (such as a railroad line). An entity wishing to install fiber optic cable between various sites/locations must first obtain the rights to a path along those routes. As the cable may be installed underground or on poles, right-of-way access may be granted by a city, a private landowner, or the owner of poles such a cable company, a telephone company or power company. Cities typically require written permits— usually for a fee.

SERVICE PROVIDER. A telecommunications provider that owns circuit switching equipment.

UPLOAD SPEED. The rate at which data is transferred from the user's computer to the Internet is termed upload speed. This speed is typically stated in Megabits (1,000,000 bits) per second or Gigabits (1,000 Megabits) per second.

WAN (Wide Area Network. WAN is used to extend LAN connectivity beyond a city or County, usually through common carrier facilities.

WIRELESS. Wireless describes a means of sending signals (voice, video, or data) "over the air" rather than using cables. To date, wireless bandwidth rates (capacities) are significantly lower than wire rates. There are significant new developments in wireless, many of which will come to market in 2014 and beyond.

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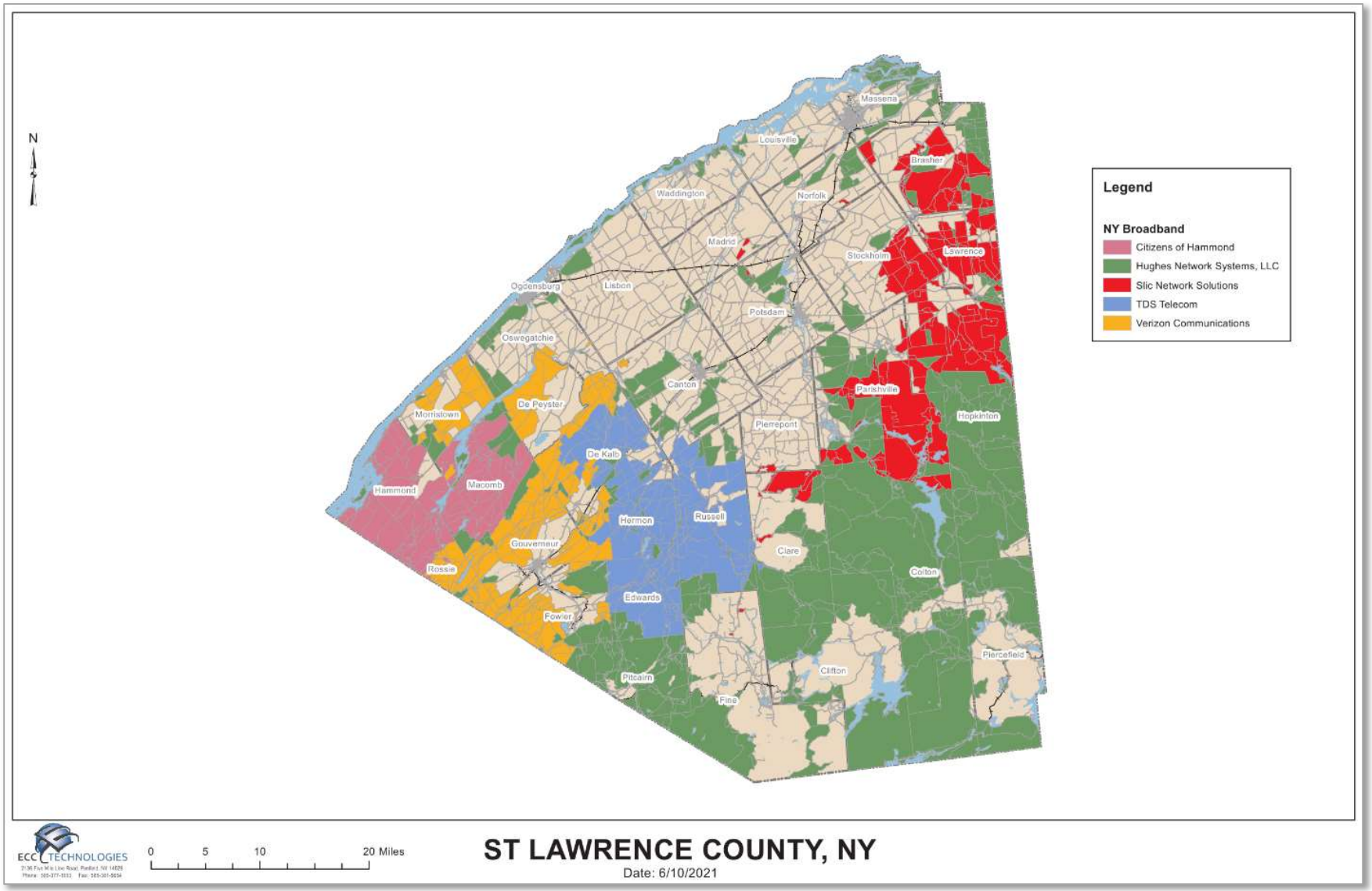
Full Sized Maps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Verizon Communications
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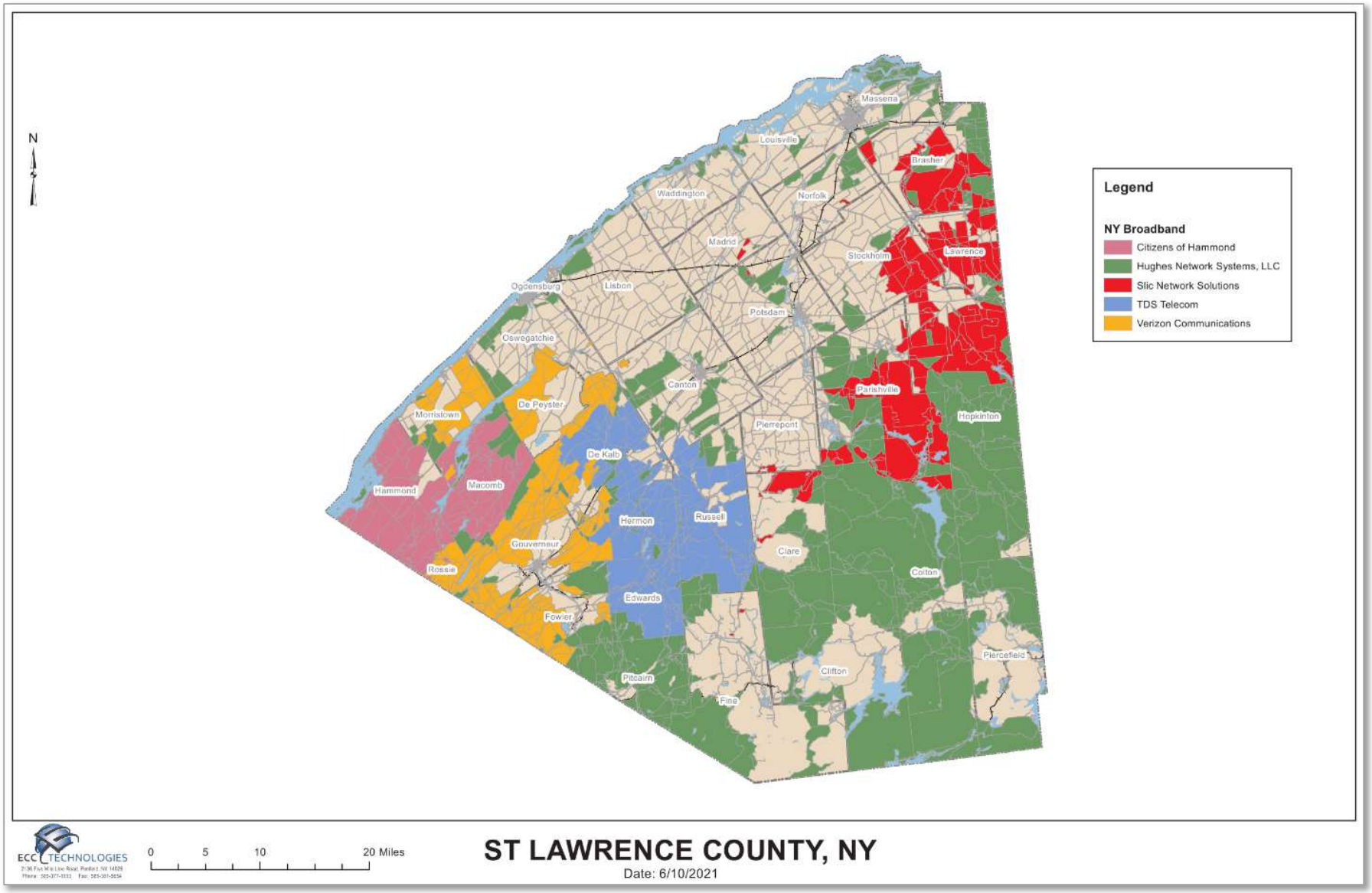
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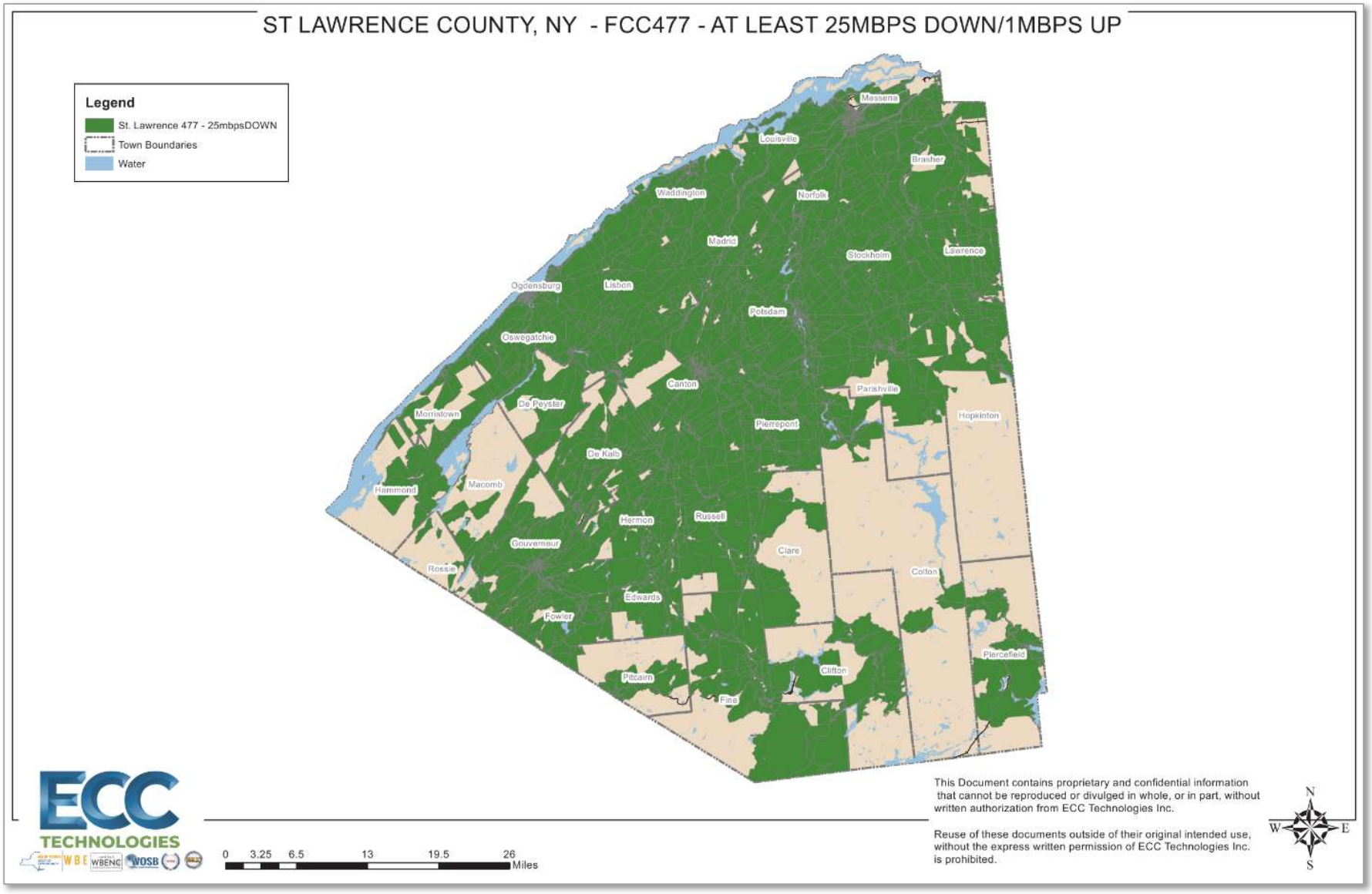
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St. Lawrence 477 - 25mbpsDOWN
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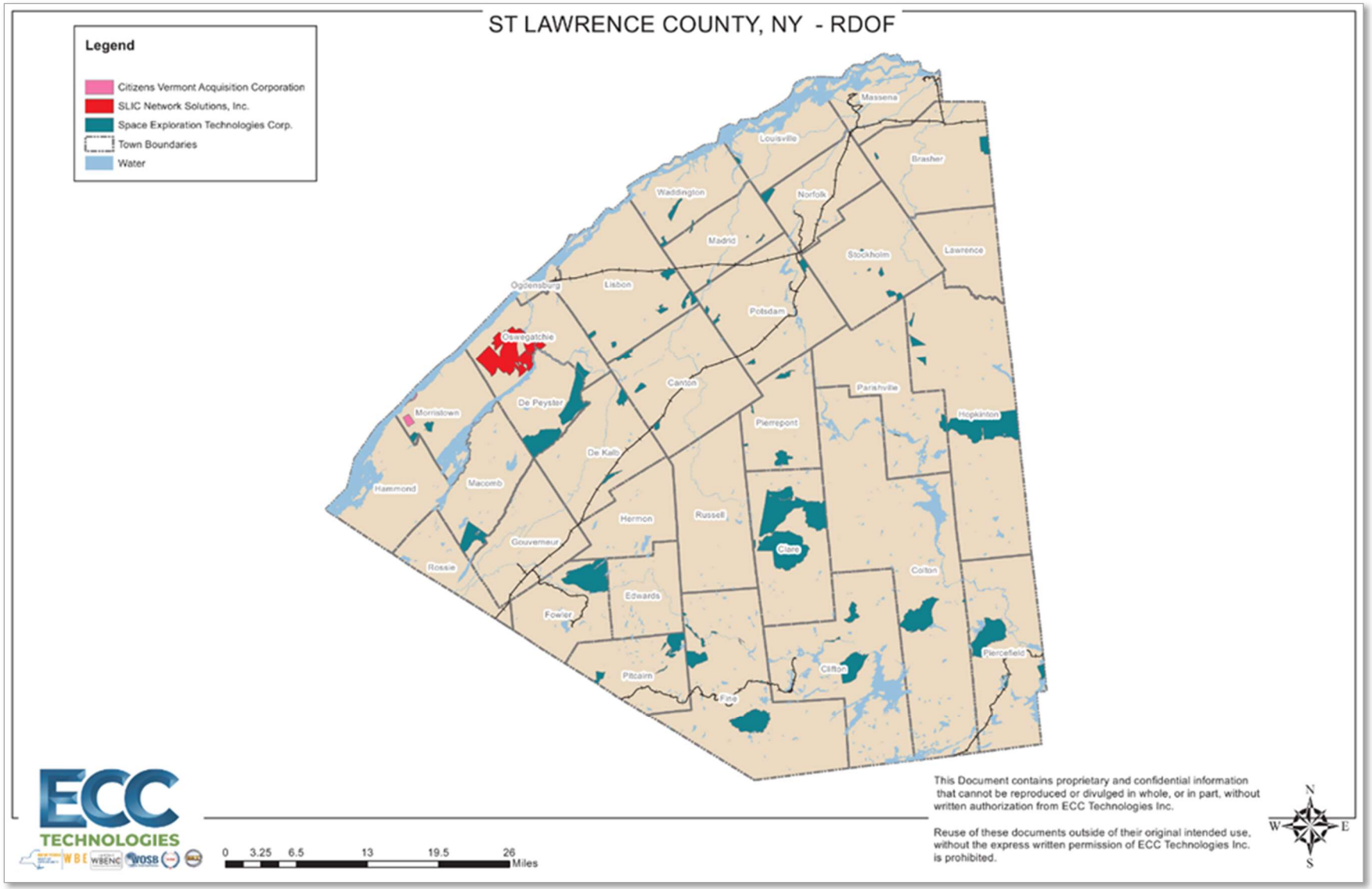
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Space Exploration Technologies Corp.
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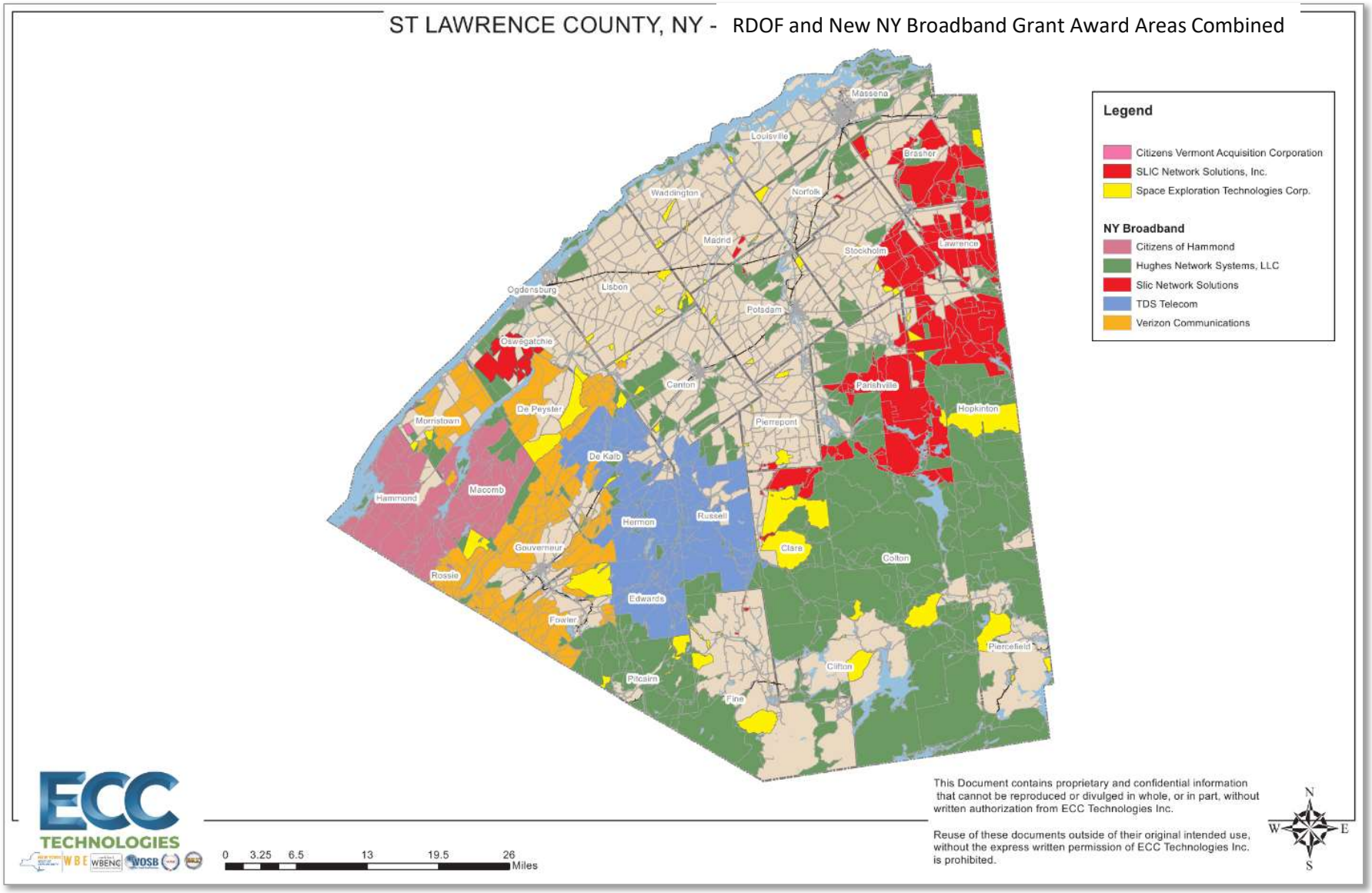
ST LAWRENCE COUNTY, NY - RDOF and New NY Broadband Grant Award Areas Combined
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Hughes Network Systems, LLC
Slic Network Solutions
TDS Telecom
Verizon Communications
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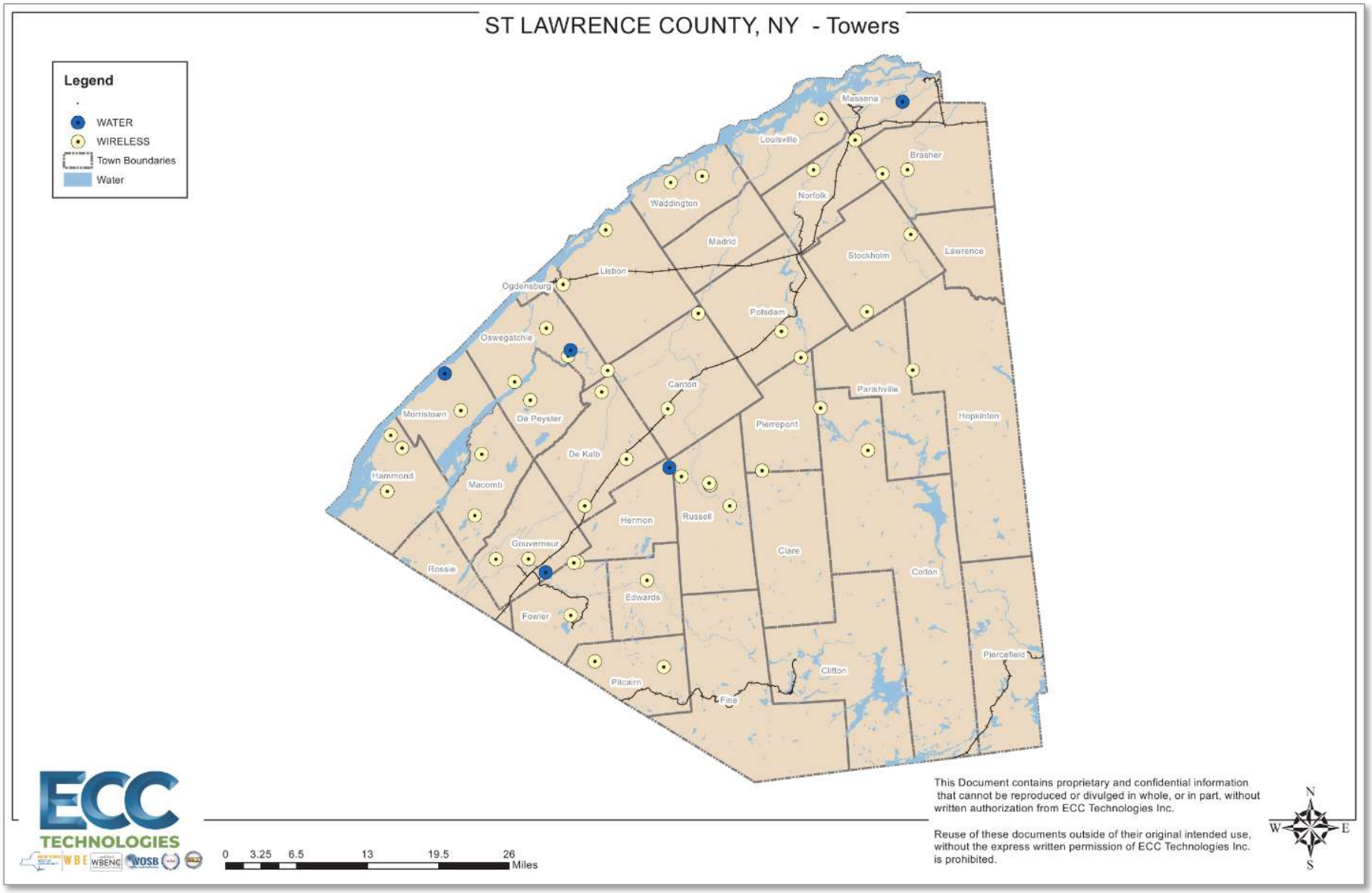
ST LAWRENCE COUNTY, NY - Towers
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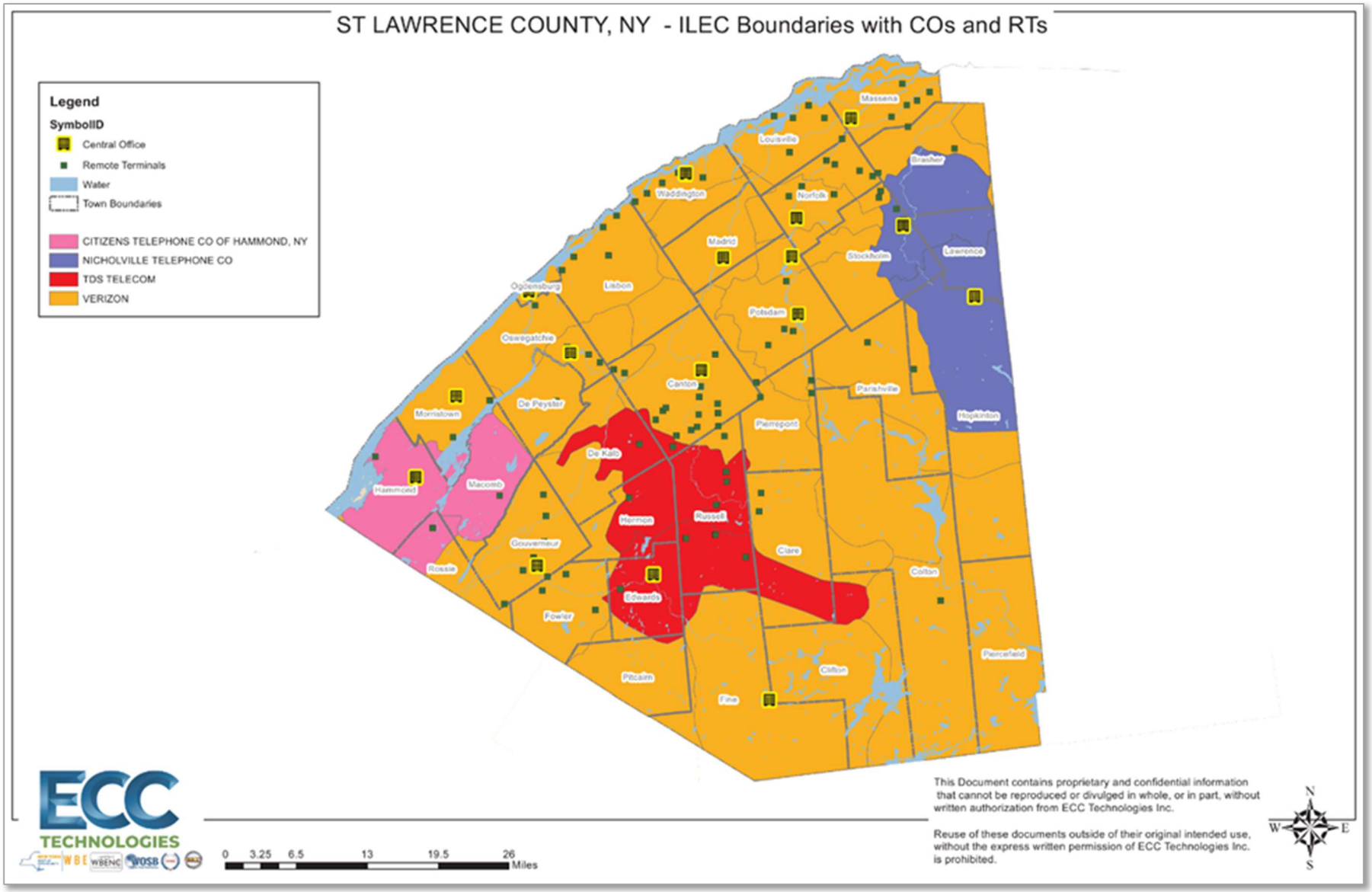
ST LAWRENCE COUNTY, NY - ILEC Boundaries with COs and RTs
Legend
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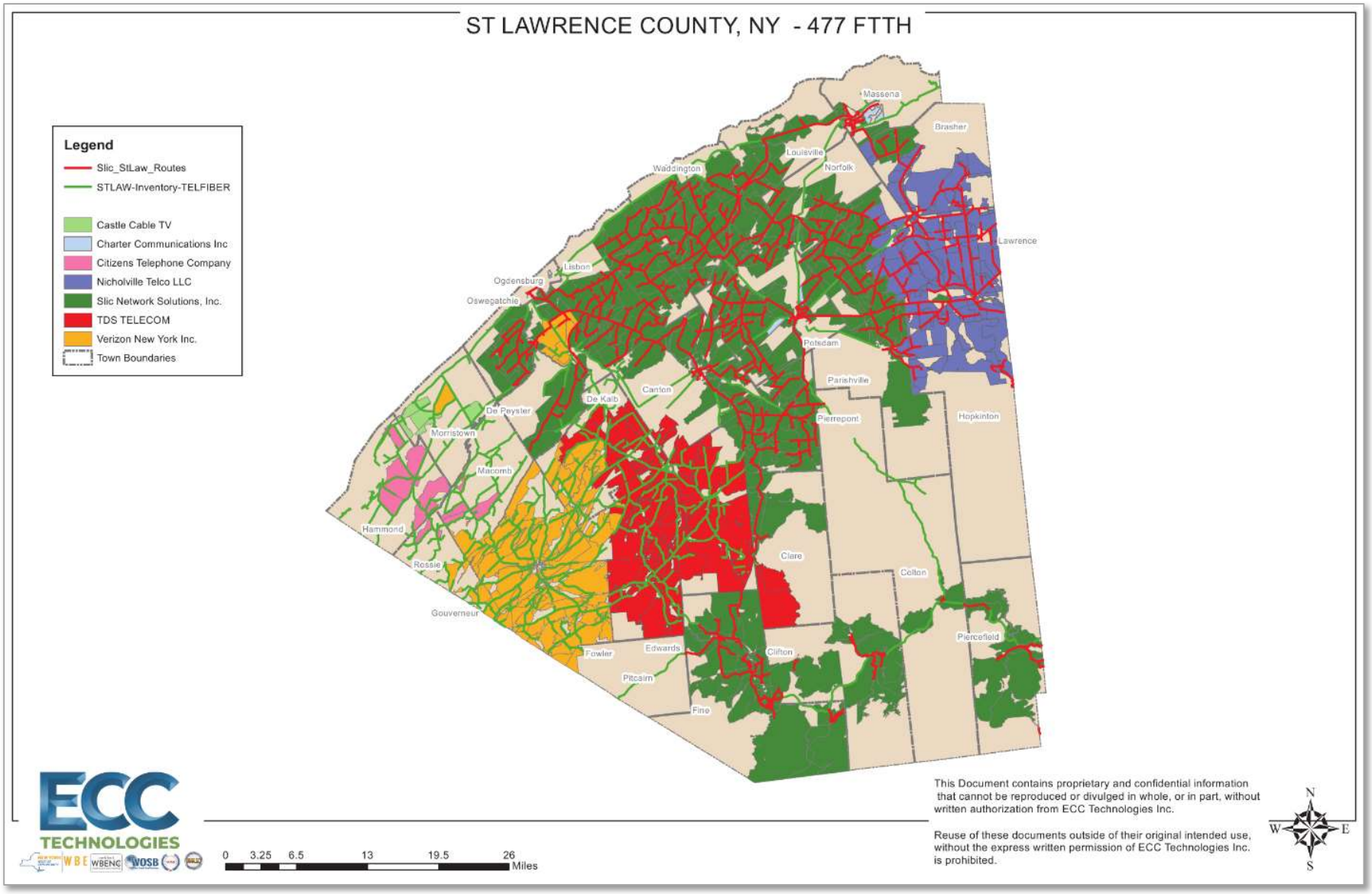
ST LAWRENCE COUNTY, NY - 477 FTTH
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STLAW-Inventory-TELFIBER
Castle Cable TV
Charter Communications Inc
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Nicholville Telco LLC
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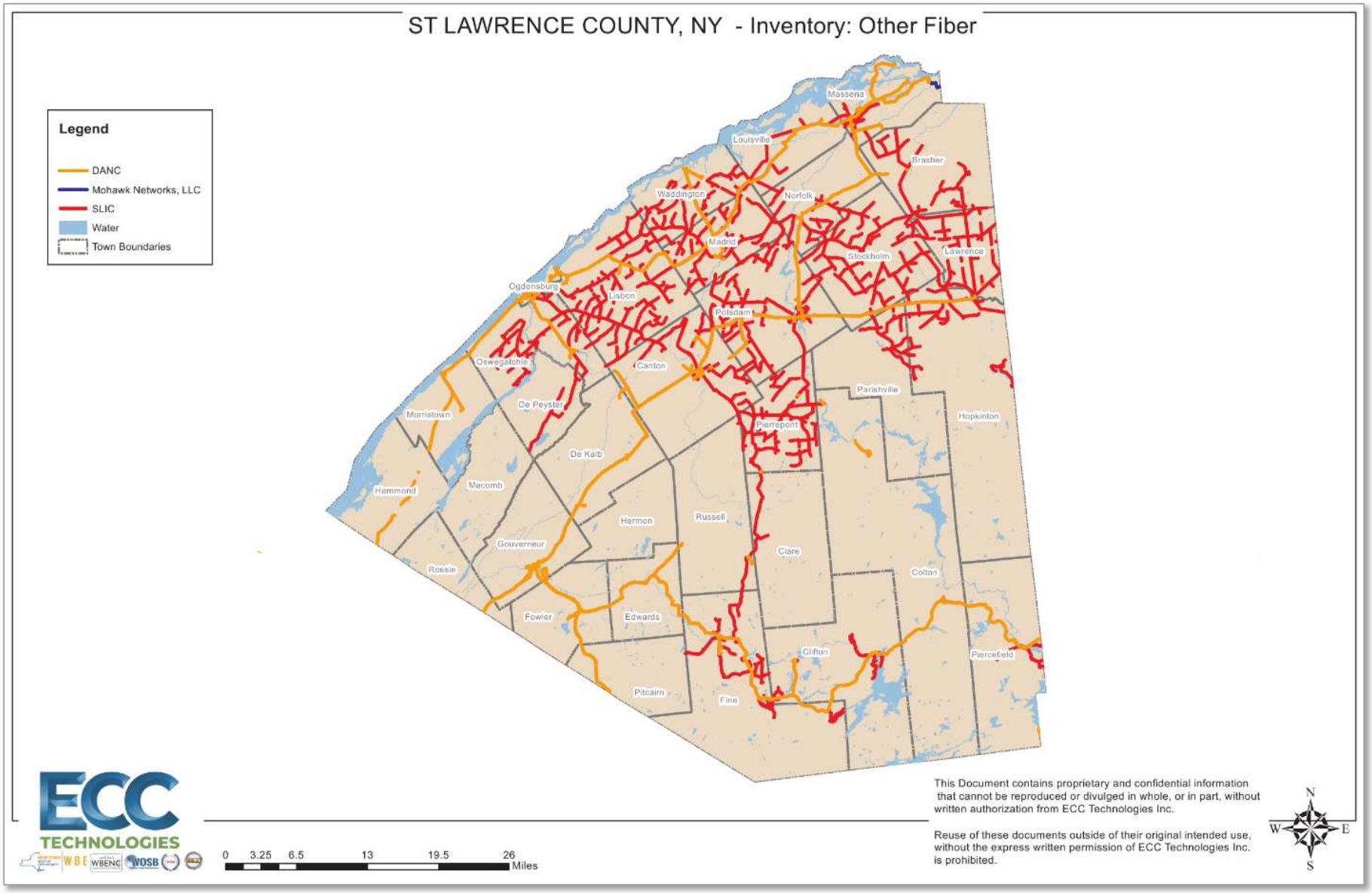
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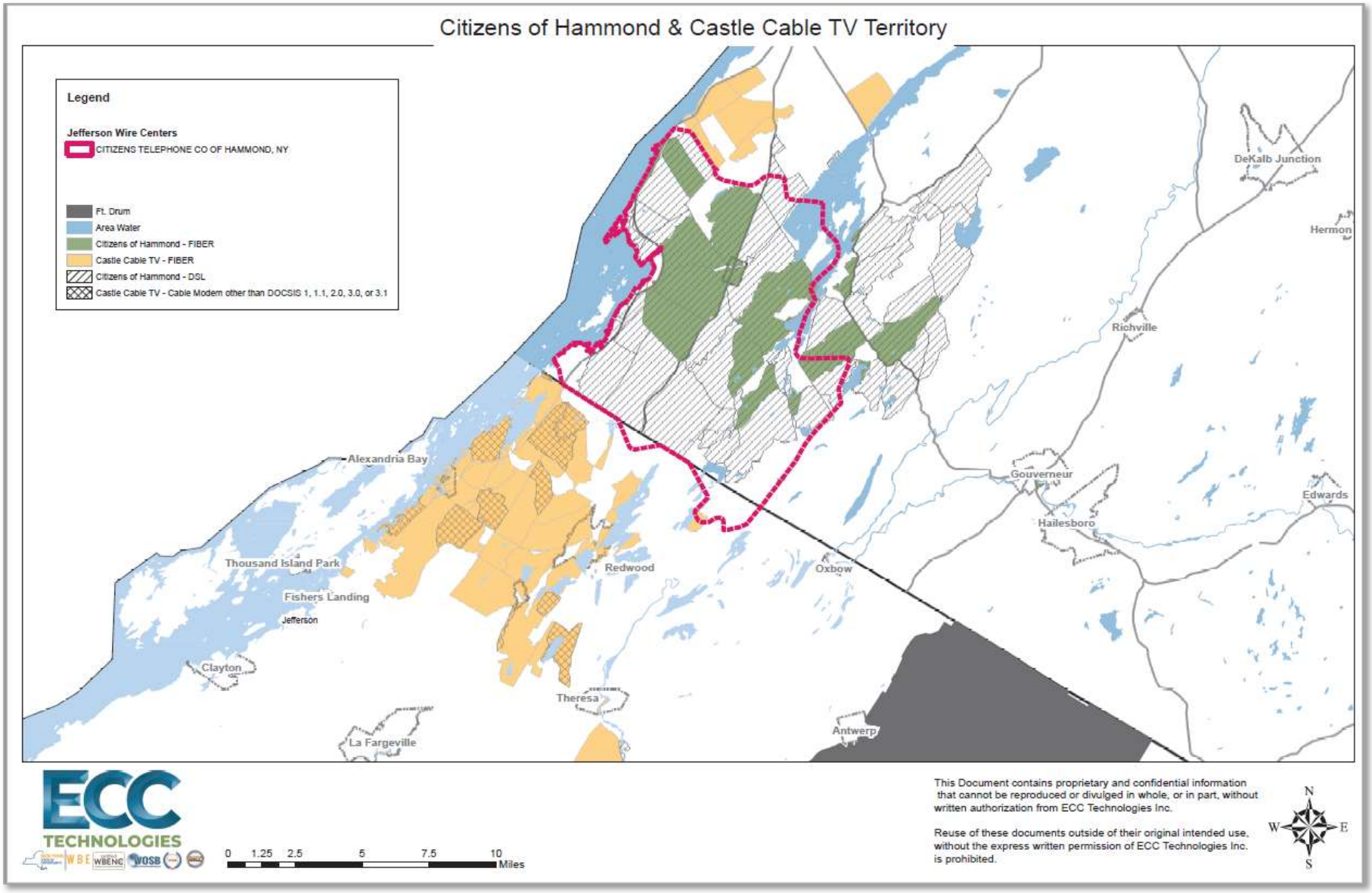
Citizens of Hammond & Castle Cable TV Territory
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Jefferson Wire Centers
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Ft. Drum
Area Water
Citizens of Hammond - FIBER
Castle Cable TV - FIBER
Citizens of Hammond - DSL
Castle Cable TV - Cable Modem other than DOCSIS 1, 1.1, 2.0, 3.0, or 3.1
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Hermon
Richville
Alexandria Bay
Gouverneur
Edwards
Hailesboro
Thousand Island Park
Redwood
Oxbow
Fishers Landing
Jefferson
Clayton
Theresa
La Fargeville
Antwerp
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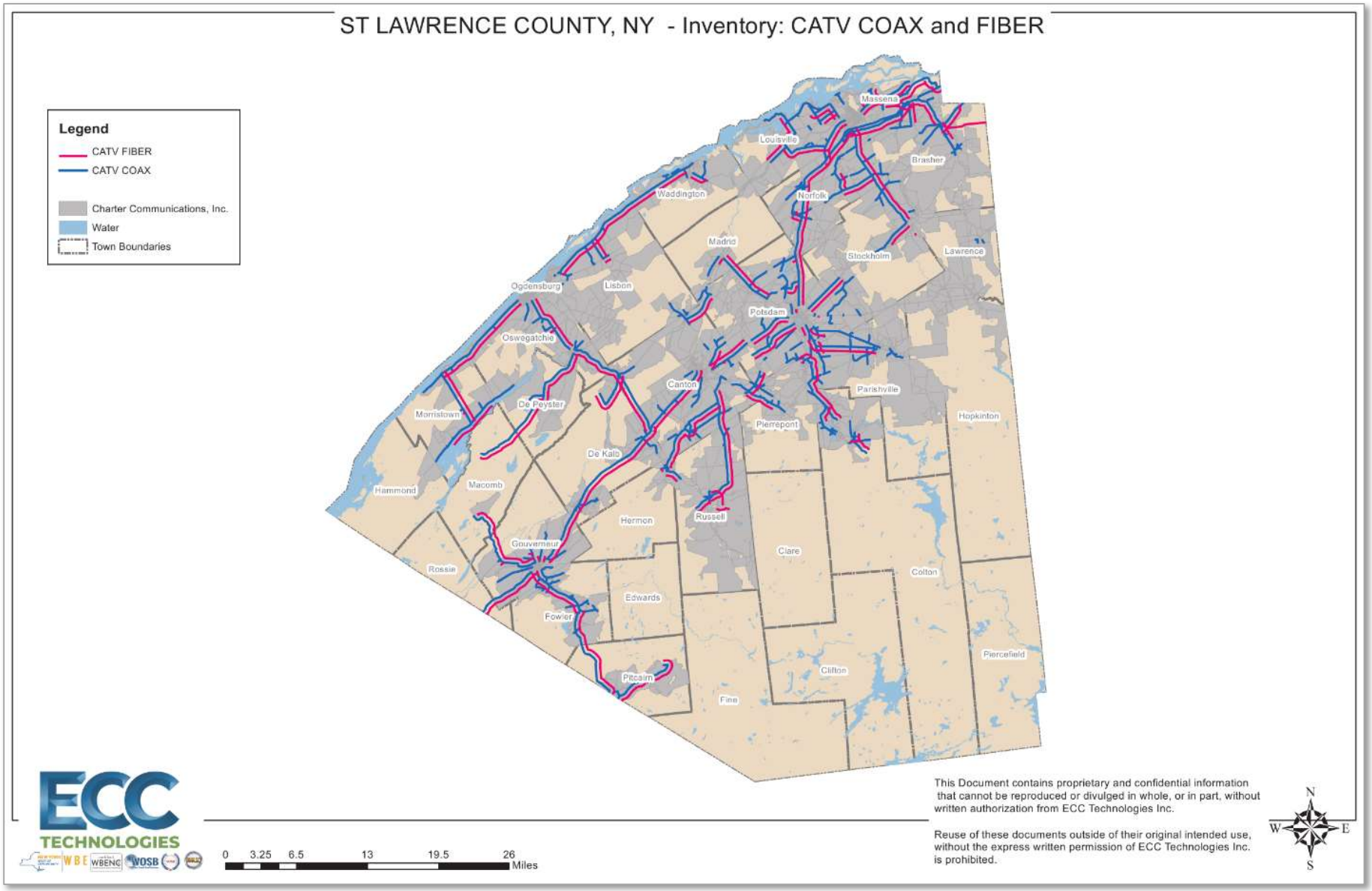
ST LAWRENCE COUNTY, NY - Inventory: CATV COAX and FIBER
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CATV FIBER
CATV COAX
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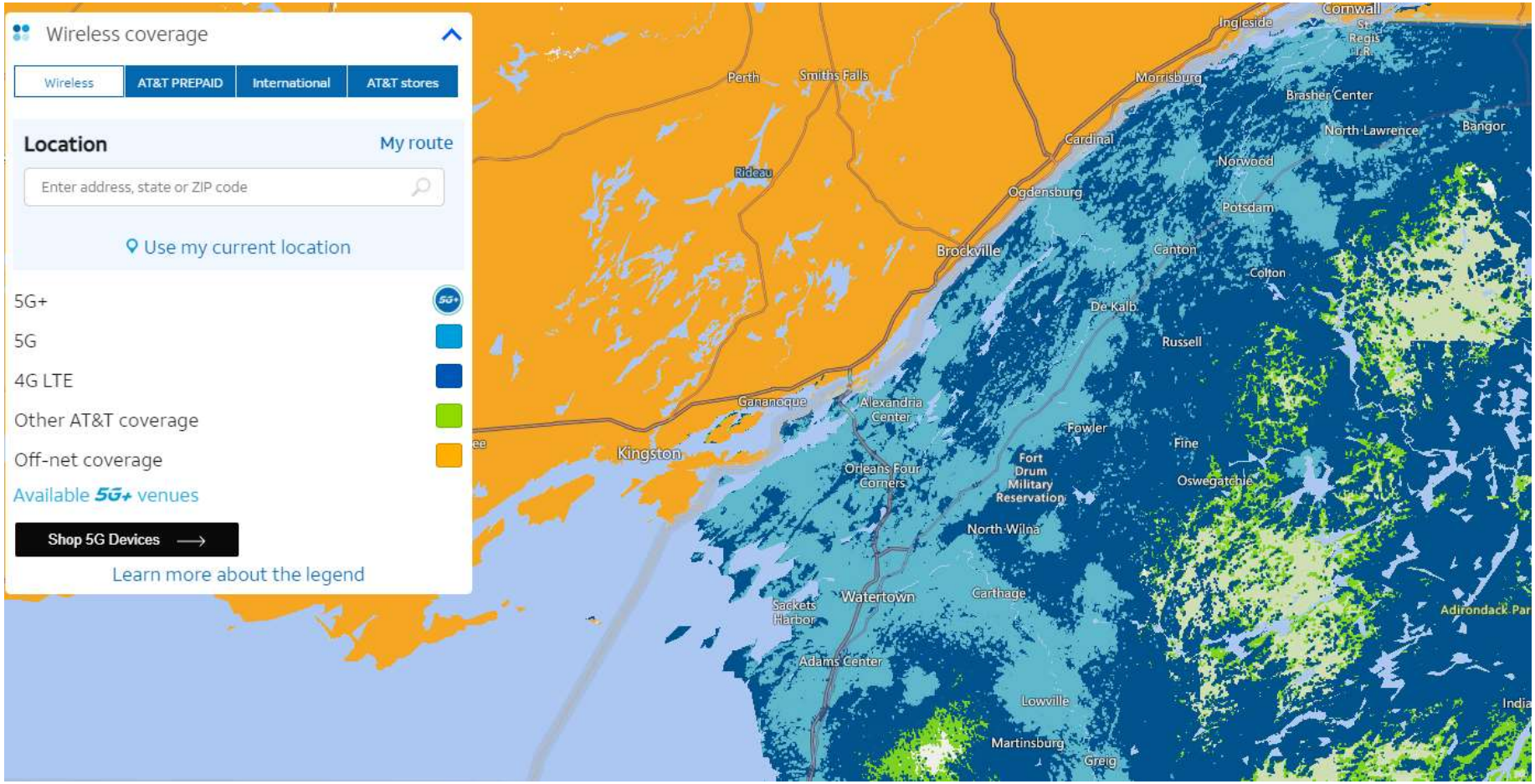
Wireless coverage
Wireless
AT&T PREPAID
International
AT&T stores
Location
My route
Enter address, state or ZIP code
Use my current location
5G+
5G
4G LTE
Other AT&T coverage
Off-net coverage
Available 5G+ venues
Shop 5G Devices
Learn more about the legend
Perth
Smiths Falls
Rideau
Brockville
Ingleside
Cornwall
Morrisburg
Brasher Center
North Lawrence
Bangor
Cardinal
Norwood
Ogdensburg
Potsdam
Canton
Colton
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Russell
Gananoque
Alexandria Center
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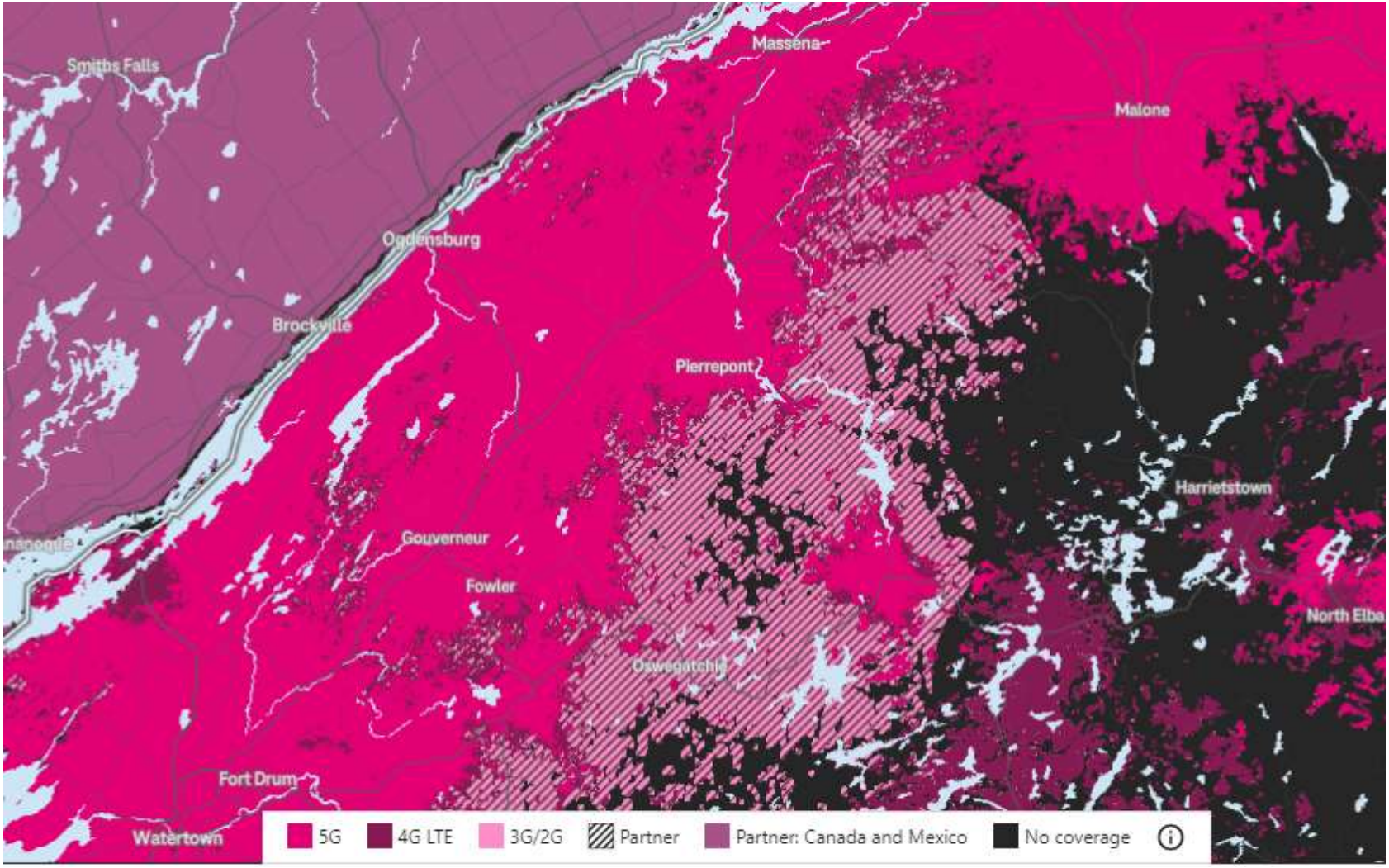
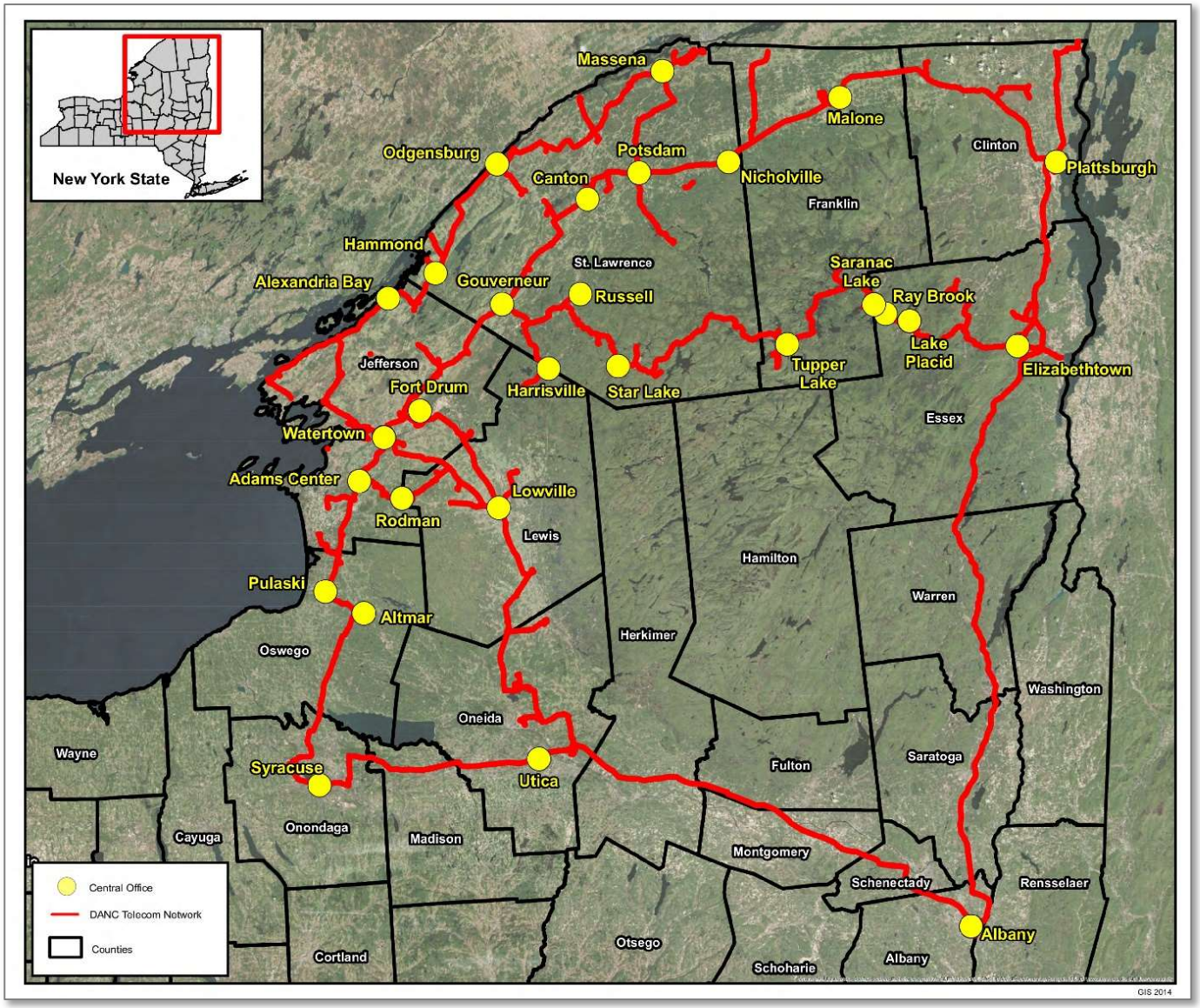
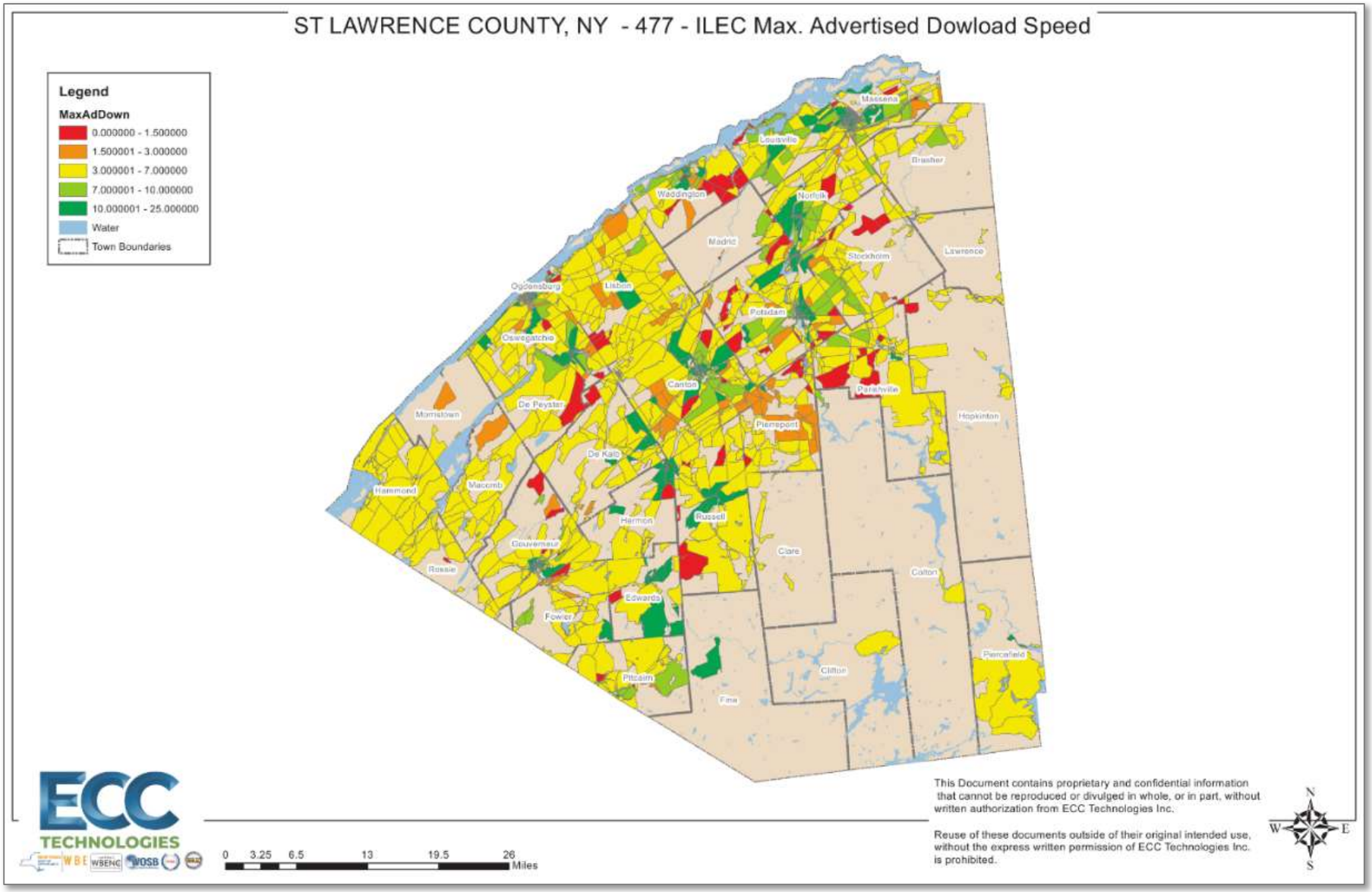
Fowler
Fine
Oswegatchie
North Wilna
Watertown
Carthage
Sackets Harbor
Adams Center
Lowville
Martinsburg
Greig


Smiths Falls
Massena
Malone
Ogdensburg
Brockville
Pierrepont
Harrietstown
Gouverneur
Fowler
North Elba
Oswegatchie
Fort Drum
Watertown
5G
4G LTE
3G/2G
Partner
Partner: Canada and Mexico
No coverage


Where do you need coverage?
Legend
5G Ultra Wideband
Available in parts of these cities
5G Nationwide
Includes 4G LTE coverage
4G LTE
3G
International
No Coverage
Kingston
5G Edge cities for business
Off


New York State
Massena
Malone
Odgensburg
Potsdam
Canton
Nicholville
Clinton
Plattsburgh
Franklin
Hammond
St. Lawrence
Saranac Lake
Alexandria Bay
Gouverneur
Russell
Ray Brook
Lake Placid
Elizabethtown
Jefferson
Fort Drum
Harrisville
Star Lake
Tupper Lake
Essex
Watertown
Adams Center
Lowville
Rodman
Lewis
Hamilton
Pulaski
Altmar
Warren
Herkimer
Oswego
Washington
Oneida
Wayne
Syracuse
Utica
Fulton
Saratoga
Onondaga
Cayuga
Madison
Montgomery
Schenectady
Rensselaer
Albany
Central Office
DANC Telecom Network
Counties
Otsego
Cortland
Schoharie
Albany
GIS 2014


ST LAWRENCE COUNTY, NY - 477 - ILEC Max. Advertised Dowload Speed
Legend
MaxAdDown
0.000000 - 1.500000
1.500001 - 3.000000
3.000001 - 7.000000
7.000001 - 10.000000
10.000001 - 25.000000
Water
Town Boundaries
Massena
Louisville
Brasher
Waddington
Norfolk
Madrid
Stockholm
Lawrence
Ogdensburg
Lisbon
Potsdam
Oswegatchie
Canton
Parishville
De Peyster
Hopkinton
Morristown
Pierrepont
De Kalb
Hammond
Macomb
Russell
Hermon
Gouverneur
Clare
Rossie
Colton
Edwards
Fowler
Parishville
Pitcairn
Clifton
Fine
0 3.25 6.5 13 19.5 26
Miles
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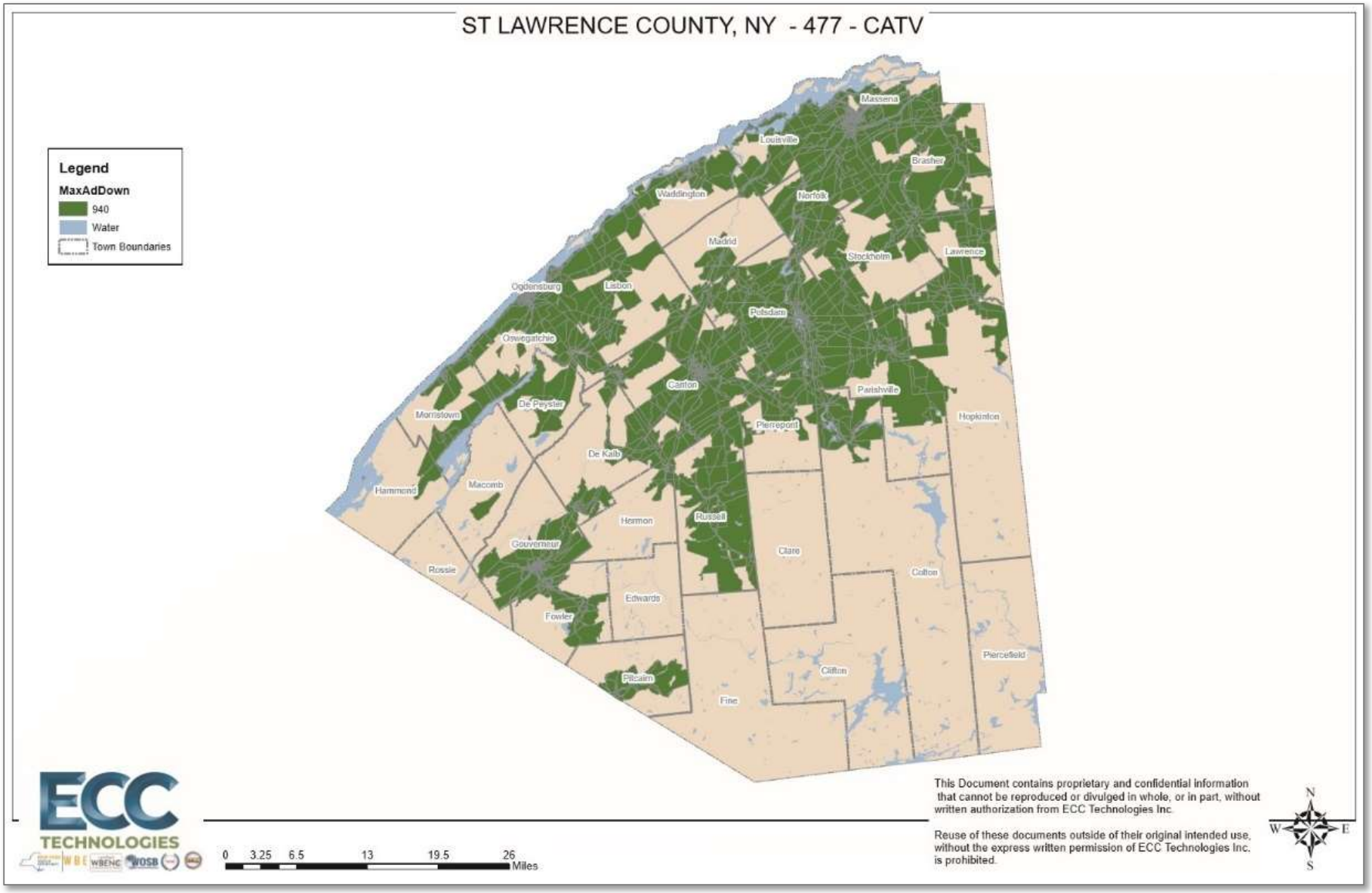
N
W
E
S


ST LAWRENCE COUNTY, NY - 477 - CATV
Legend
MaxAdDown
940
Water
Town Boundaries
Massena
Louisville
Brasher
Waddington
Norfolk
Madrid
Stockholm
Lawrence
Ogdensburg
Lisbon
Potsdam
Oswegatchie
Canton
Parishville
De Peyster
Morristown
Hopkinton
Pierrepont
De Kalb
Hammond
Macomb
Russell
Hermon
Gouverneur
Clare
Rossie
Colton
Edwards
Fowler
Piercefield
Clifton
Pitcairn
Fine
ECC TECHNOLOGIES
0 3.25 6.5 13 19.5 26 Miles
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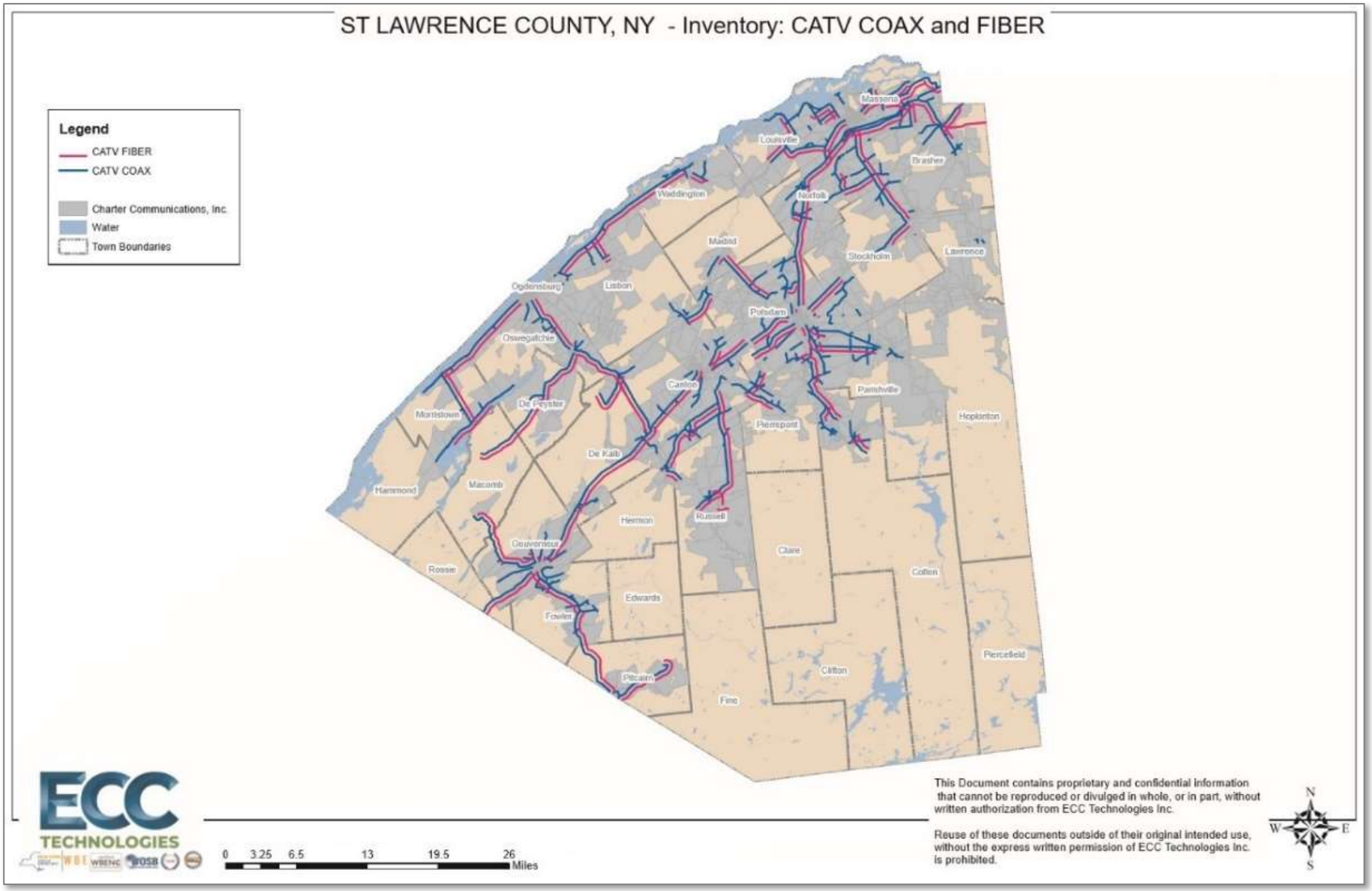
ST LAWRENCE COUNTY, NY - Inventory: CATV COAX and FIBER
Legend
CATV FIBER
CATV COAX
Charter Communications, Inc.
Water
Town Boundaries
Massena
Louisville
Brasher
Waddington
Norfolk
Madrid
Stockholm
Lawrence
Ogdensburg
Lisbon
Potsdam
Oswegatchie
Canton
Parishville
Hopkinton
Morristown
De Peyster
Pierrepont
De Kalb
Hammond
Macomb
Hermon
Russell
Gouverneur
Clare
Rossie
Colton
Edwards
Fowler
Pierrefield
Clifton
Pitcairn
Fine
ECC TECHNOLOGIES
0 3.25 6.5 13 19.5 26
Miles
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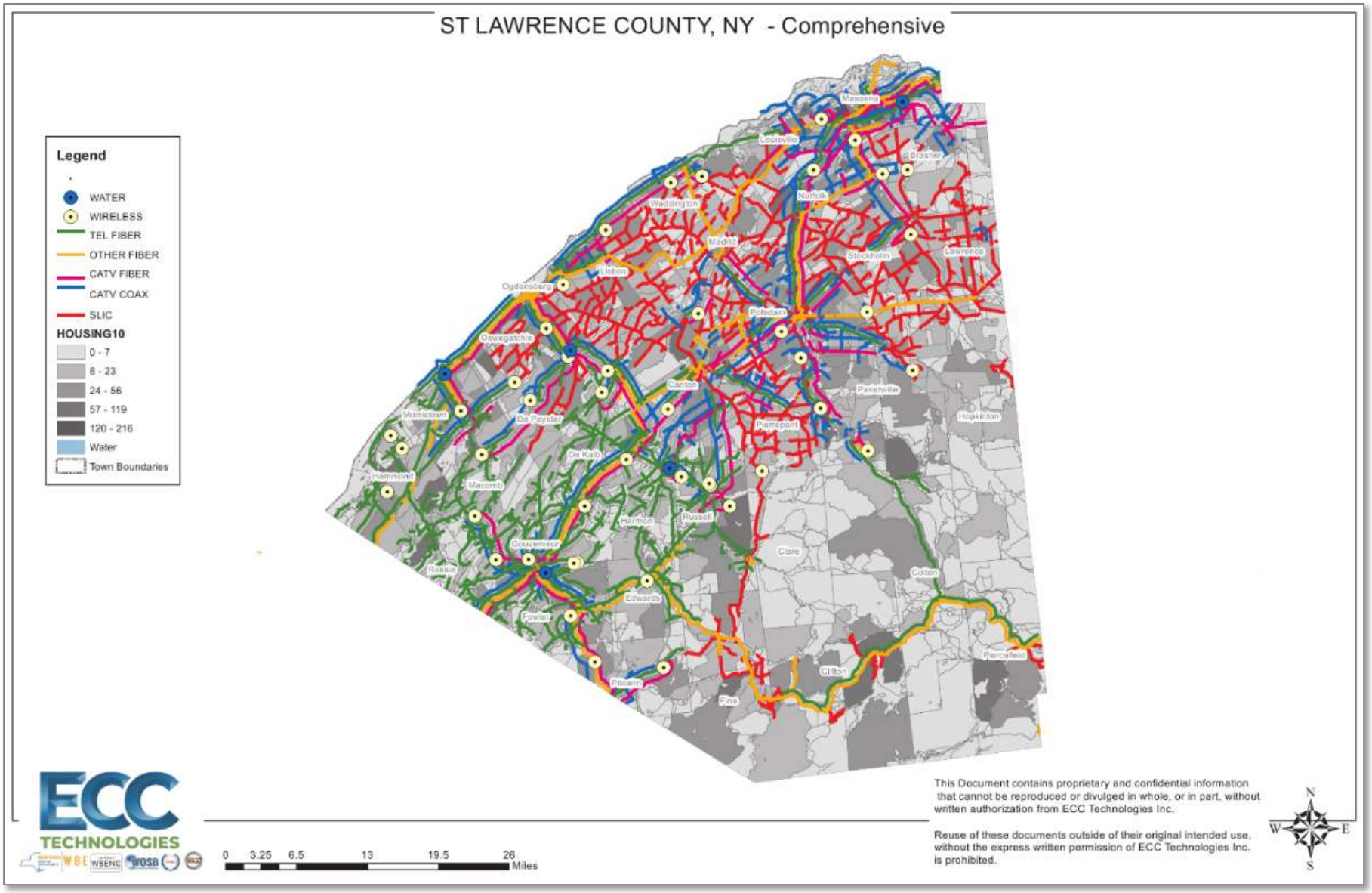
ST LAWRENCE COUNTY, NY - Comprehensive
Legend
WATER
WIRELESS
TEL FIBER
OTHER FIBER
CATV FIBER
CATV COAX
SLIC
HOUSING10
0 - 7
8 - 23
24 - 56
57 - 119
120 - 216
Water
Town Boundaries
Massena
Louisville
Brasher
Norfolk
Waddington
Madrid
Stockholm
Lawrence
Lisbon
Ogdensburg
Potsdam
Oswegatchie
Canton
Parishville
Hopkinton
Morristown
De Peyster
Pierrepont
De Kalb
Hammond
Macomb
Hermon
Russell
Gouverneur
Rossie
Clare
Colton
Edwards
Fowler
Pierrefield
Pitcairn
Clifton
Fine
0 3.25 6.5 13 19.5 26 Miles
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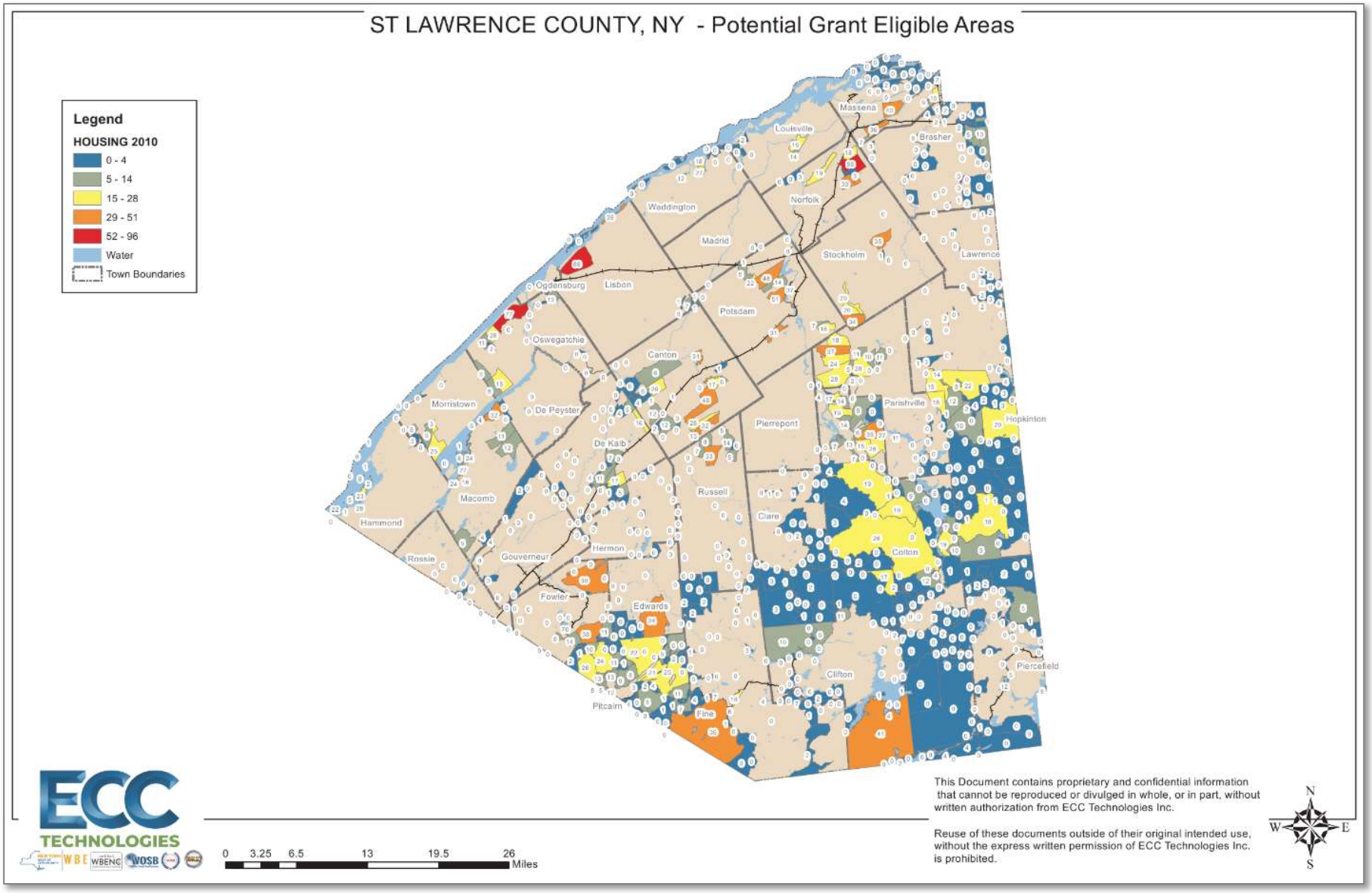
ST LAWRENCE COUNTY, NY - Potential Grant Eligible Areas
Legend
HOUSING 2010
0 - 4
5 - 14
15 - 28
29 - 51
52 - 96
Water
Town Boundaries
Massena
Louisville
Brasher
Norfolk
Waddington
Madrid
Stockholm
Lawrence
Ogdensburg
Lisbon
Potsdam
Oswegatchie
Canton
Morristown
De Peyster
Parishville
Hopkinton
Pierrepont
De Kalb
Russell
Macomb
Hammond
Clare
Rossie
Gouverneur
Hermon
Colton
Fowler
Edwards
Piercefield
Clifton
Pitcairn
Fine
ECC TECHNOLOGIES
0 3.25 6.5 13 19.5 26
Miles
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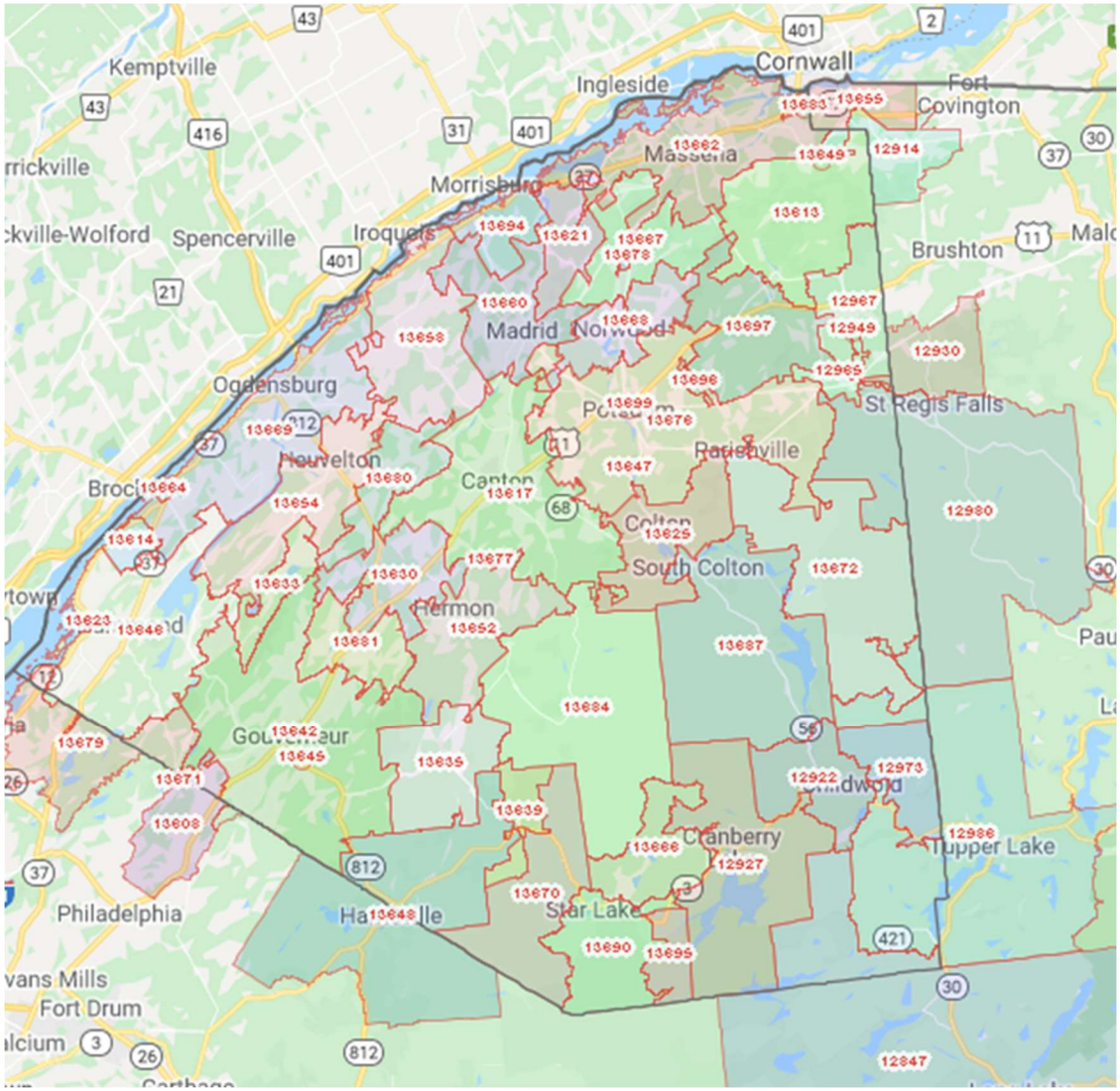
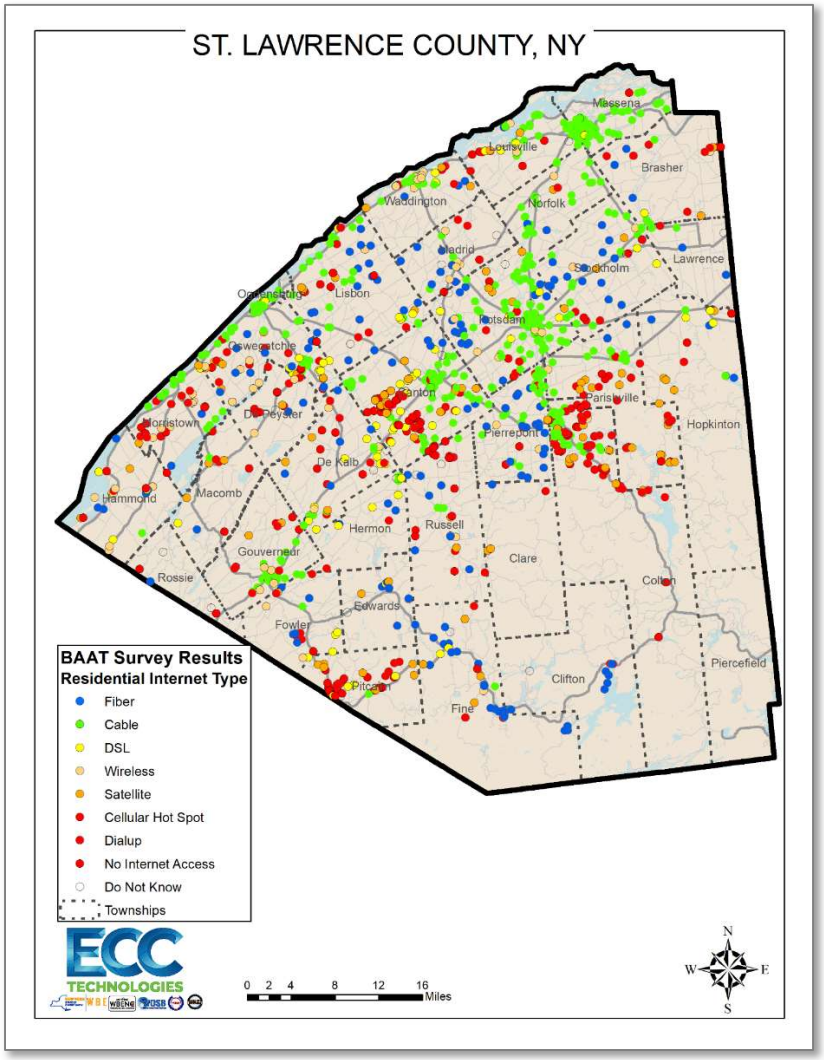
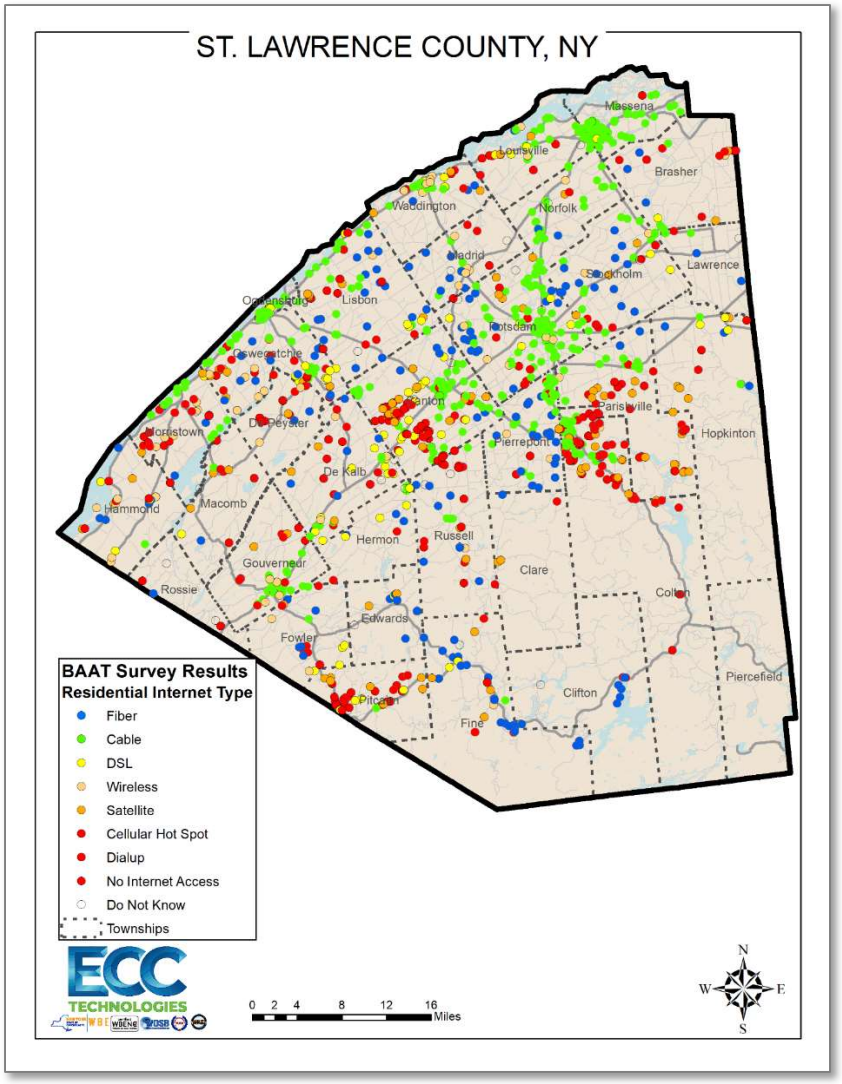
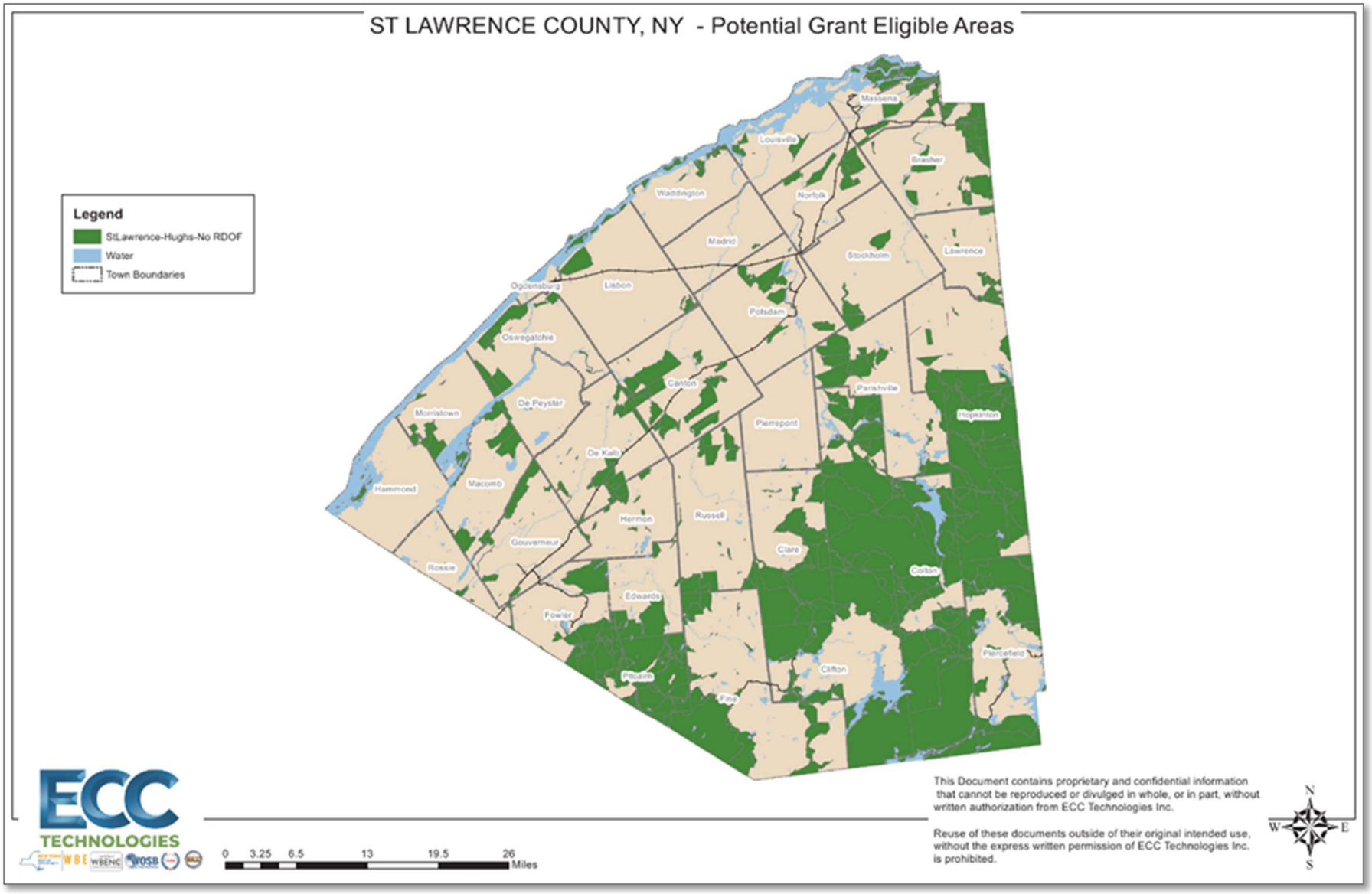

Kemptville
Ingleside
Cornwall
Fort Covington
Morrisburg
Iroquois
Spencerville
Brushton
Madrid
Ogdensburg
St Regis Falls
Canton
Colton
South Colton
Hermon
Cranberry
Tupper Lake
Star Lake
Philadelphia
Fort Drum


ST. LAWRENCE COUNTY, NY
Massena
Louisville
Brasher
Waddington
Norfolk
Madrid
Lawrence
Stockholm
Ogdensburg
Lisbon
Potsdam
Oswegatchie
Canton
Parishville
Morristown
De Peyster
Pierrepont
Hopkinton
De Kalb
Hammond
Macomb
Hermon
Russell
Gouverneur
Clare
Rossie
Colton
Edwards
Fowler
Piercefield
Clifton
Pitcairn
Fine
BAAT Survey Results
Residential Internet Type
Fiber
Cable
DSL
Wireless
Satellite
Cellular Hot Spot
Dialup
No Internet Access
Do Not Know
Townships
ECC TECHNOLOGIES
0 2 4 8 12 16
Miles
N
W
E
S


ST. LAWRENCE COUNTY, NY
Massena
Louisville
Brasher
Waddington
Norfolk
Madrid
Lawrence
Stockholm
Lisbon
Potsdam
Canton
Parishville
Hopkinton
Pierrepont
De Kalb
Hammond
Macomb
Hermon
Russell
Gouverneur
Clare
Rossie
Colton
Edwards
Fowler
Clifton
Piercefield
Fine
BAAT Survey Results
Residential Internet Type
Fiber
Cable
DSL
Wireless
Satellite
Cellular Hot Spot
Dialup
No Internet Access
Do Not Know
Townships
0 2 4 8 12 16
Miles
N
W
E
S


ST LAWRENCE COUNTY, NY - Potential Grant Eligible Areas
Legend
StLawrence-Hughs-No RDOF
Water
Town Boundaries
Massena
Louisville
Brasher
Waddington
Norfolk
Madrid
Stockholm
Lawrence
Ogdensburg
Lisbon
Potsdam
Oswegatchie
Canton
Parishville
Morristown
De Peyster
Hopkinton
Pierrepont
De Kalb
Hammond
Macomb
Hermon
Russell
Gouverneur
Clare
Rossie
Colton
Edwards
Fowler
Piercefield
Clifton
Fine
ECC TECHNOLOGIES
0 3.25 6.5 13 19.5 26
Miles
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N
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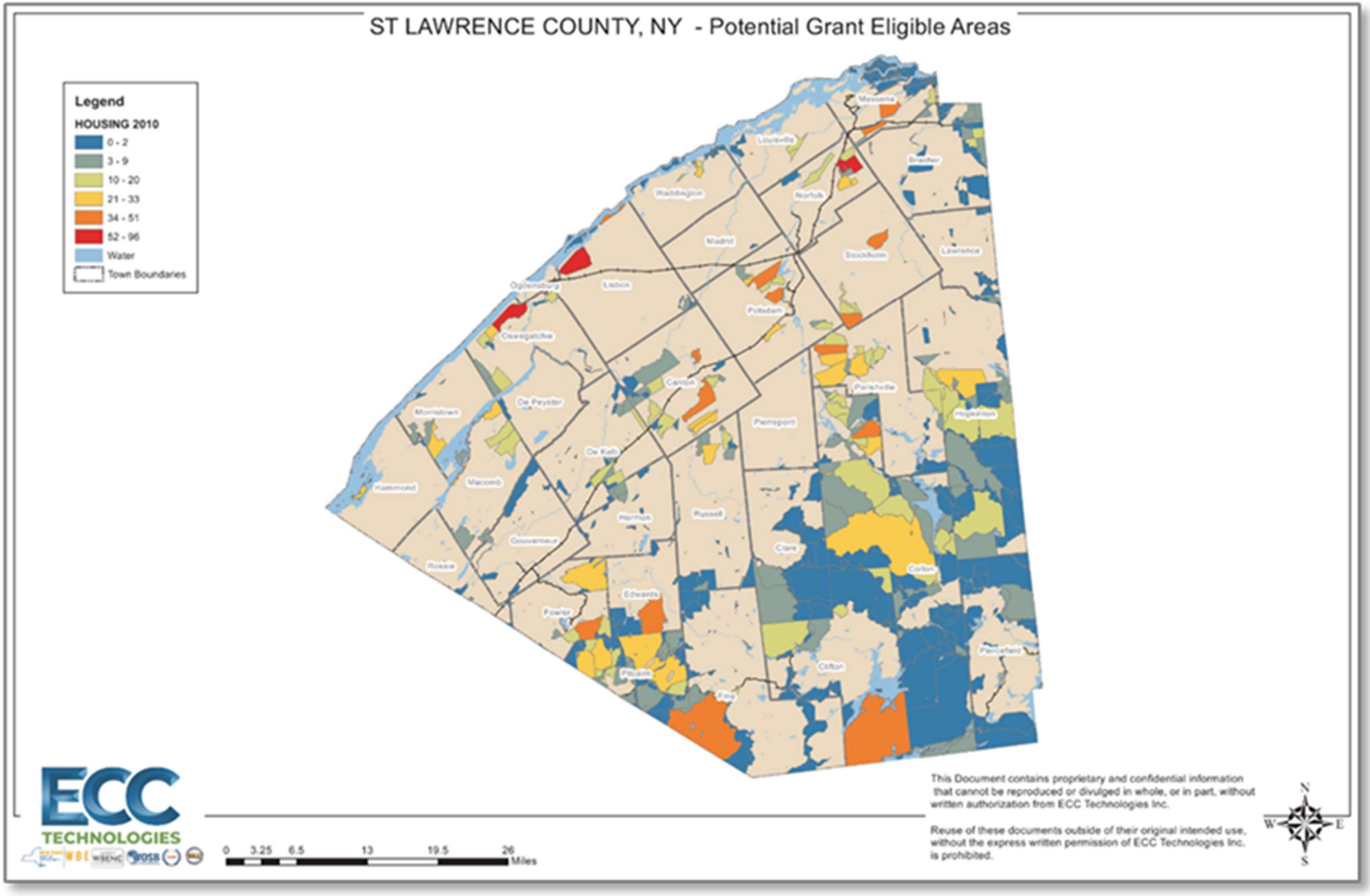
E
S


ST LAWRENCE COUNTY, NY - Potential Grant Eligible Areas
Legend
HOUSING 2010
0 - 2
3 - 9
10 - 20
21 - 33
34 - 51
52 - 96
Water
Town Boundaries
Massena
Louisville
Brasher
Waddington
Norfolk
Madrid
Stockholm
Lawrence
Ogdensburg
Lisbon
Potsdam
Oswegatchie
Canton
Parishville
Hopkinton
Morristown
De Peyster
Pierrepont
De Kalb
Hammond
Macomb
Rossie
Hermon
Russell
Gouverneur
Clare
Edwards
Fowler
Pitcairn
Fine
Clifton
Pierrepont
0 3.25 6.5 13 19.5 26
Miles
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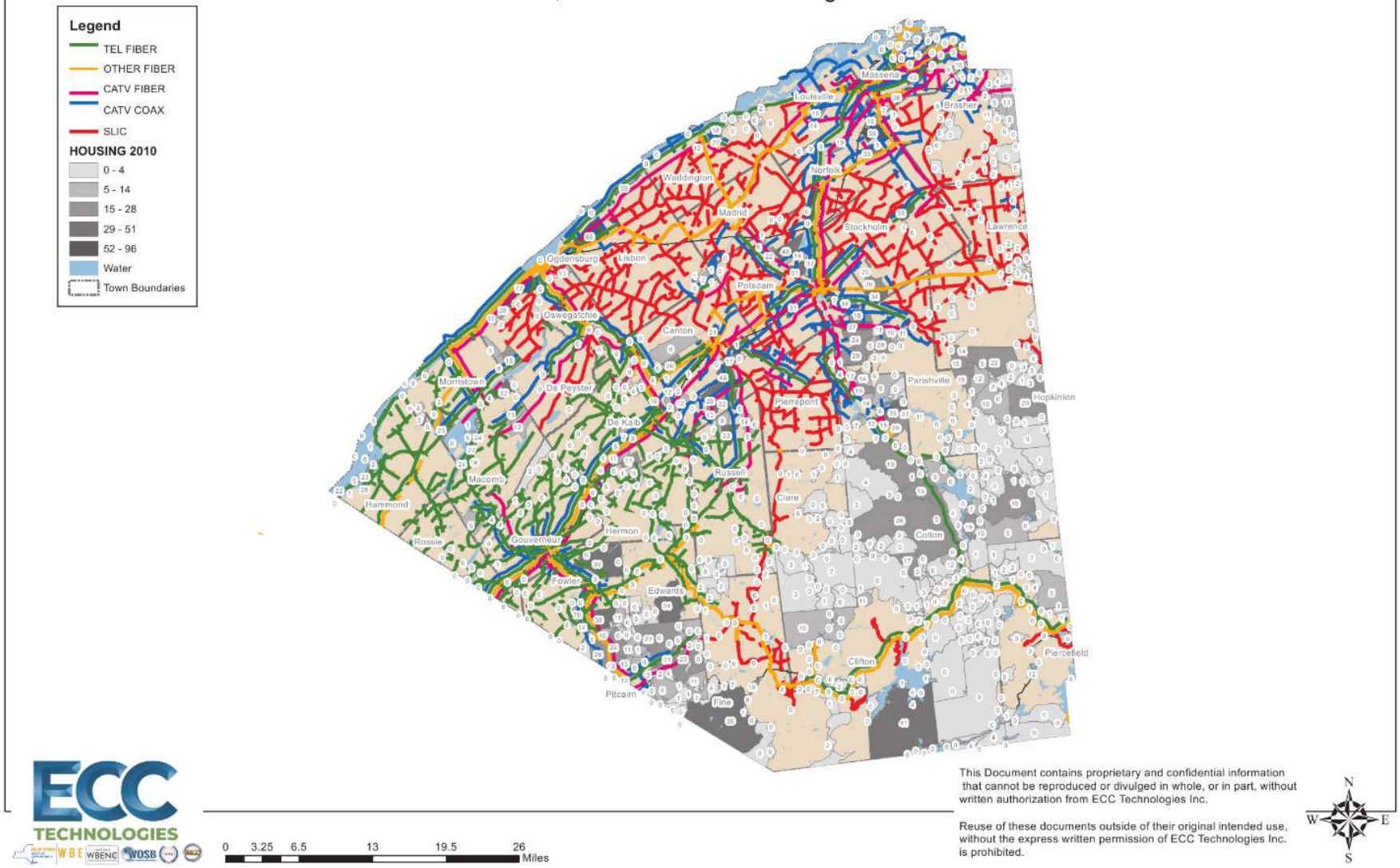
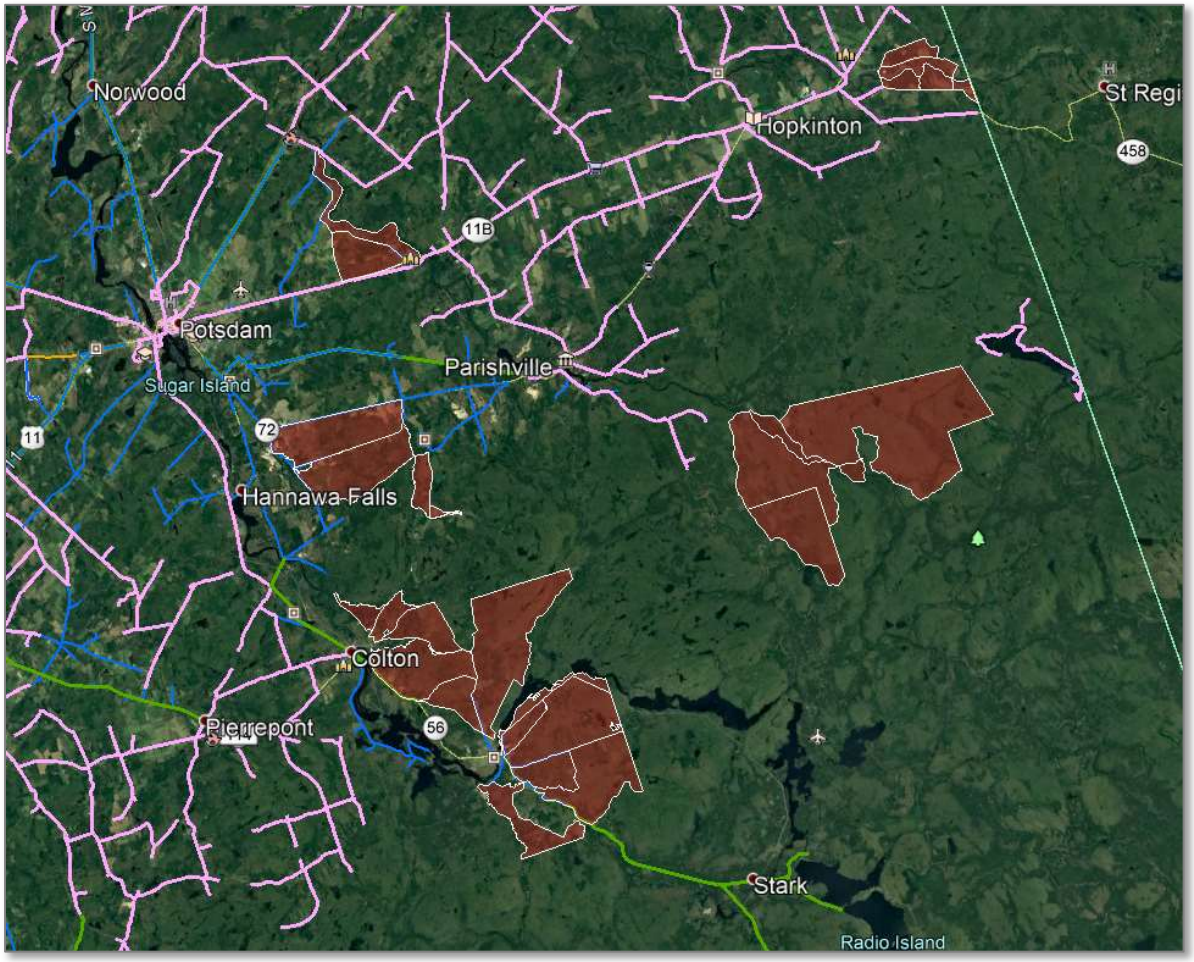
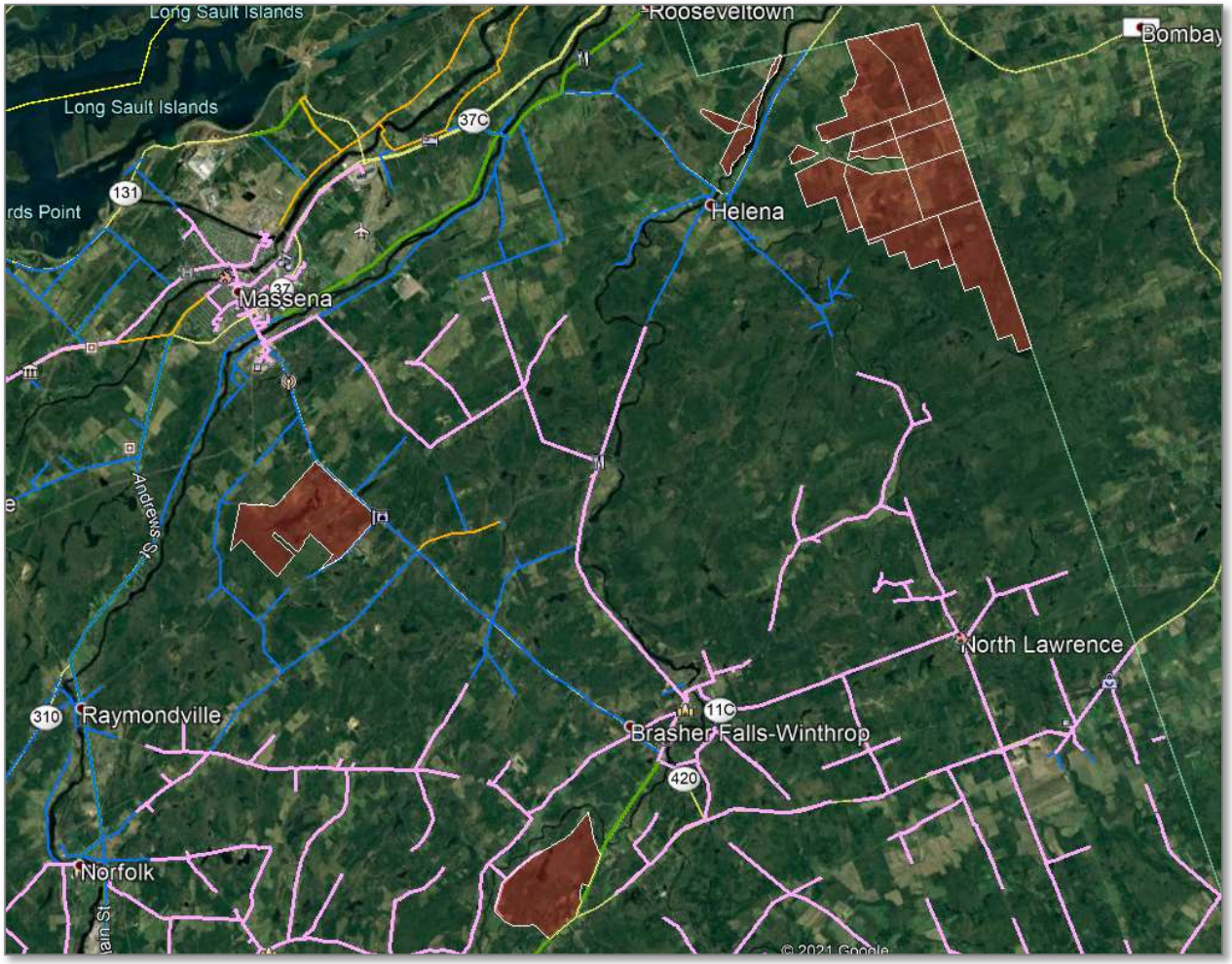
ST LAWRENCE COUNTY, NY - Potential Grant Eligible Areas with Infrastructure



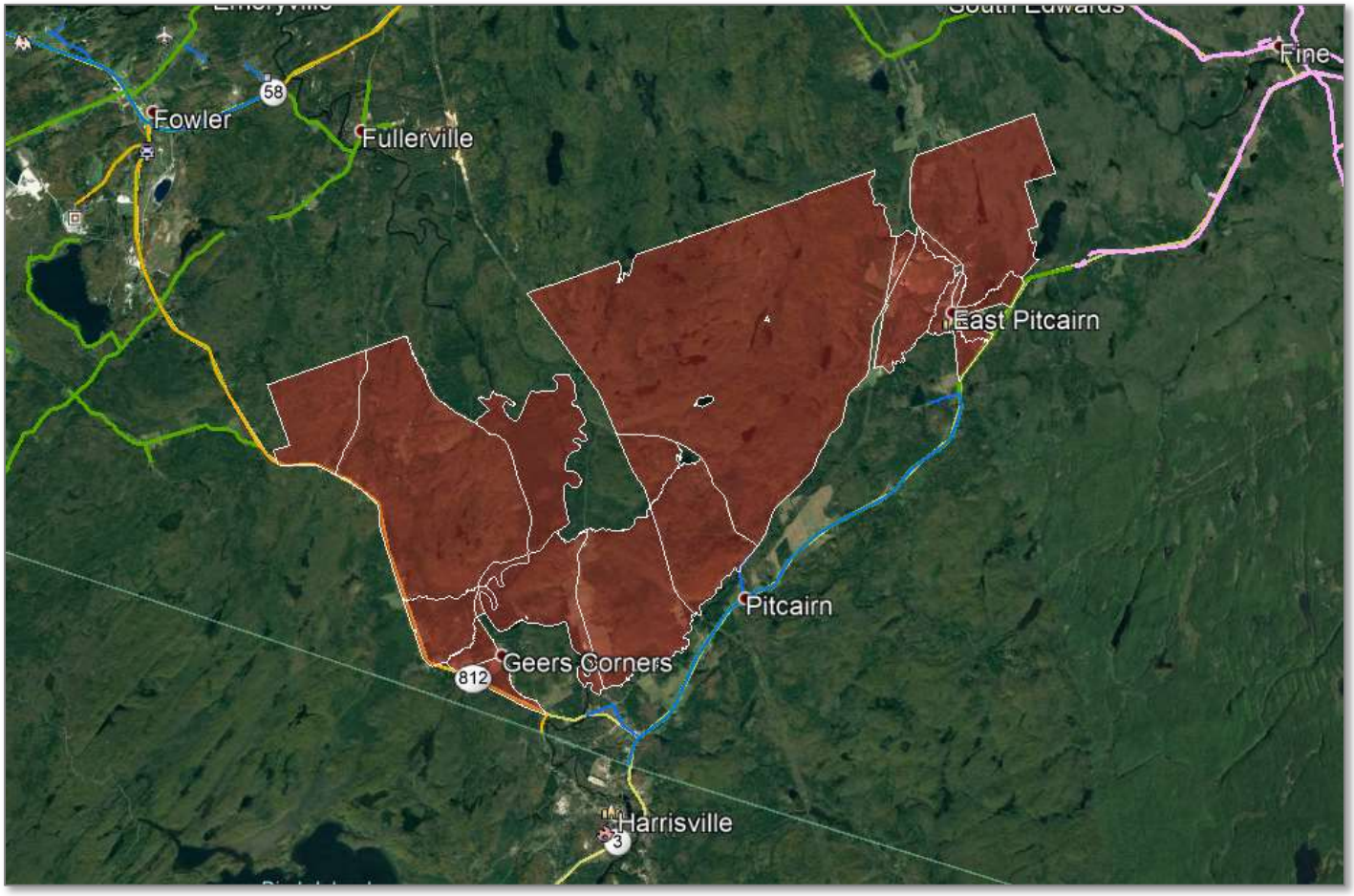
Parishville NY



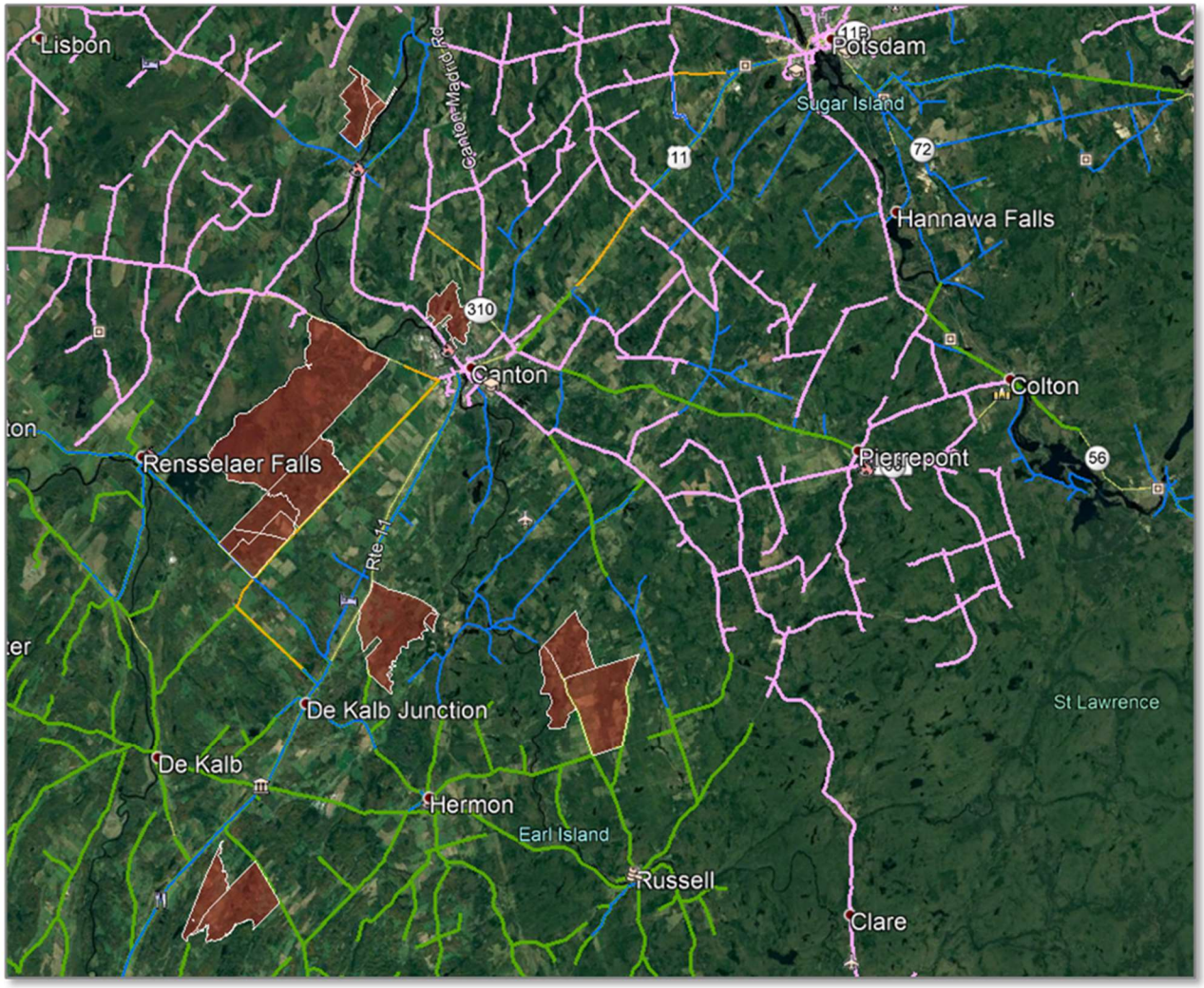
Brasher NY


Long Sault Islands
Long Sault Islands
Roosevelttown
Bombay
37C
131
rds Point
Helena
37
Massena
Andrews St
North Lawrence
310
Raymondville
11C
Brasher Falls-Winthrop
420
Norfolk
© 2021 Google

Pitcairn NY


Fowler
58
Fullerville
Fine
East Pitcairn
Pitcairn
Geers Corners
812
Harrisville
3

Canton NY


Lisbon
Potsdam
Sugar Island
Canton-Madrid Rd
11
72
Hannawa Falls
310
Canton
Colton
Rensselaer Falls
Pierrepont
56
Rte 11
De Kalb Junction
St Lawrence
De Kalb
Hermon
Earl Island
Russell
Clare

Oswegatchie NY