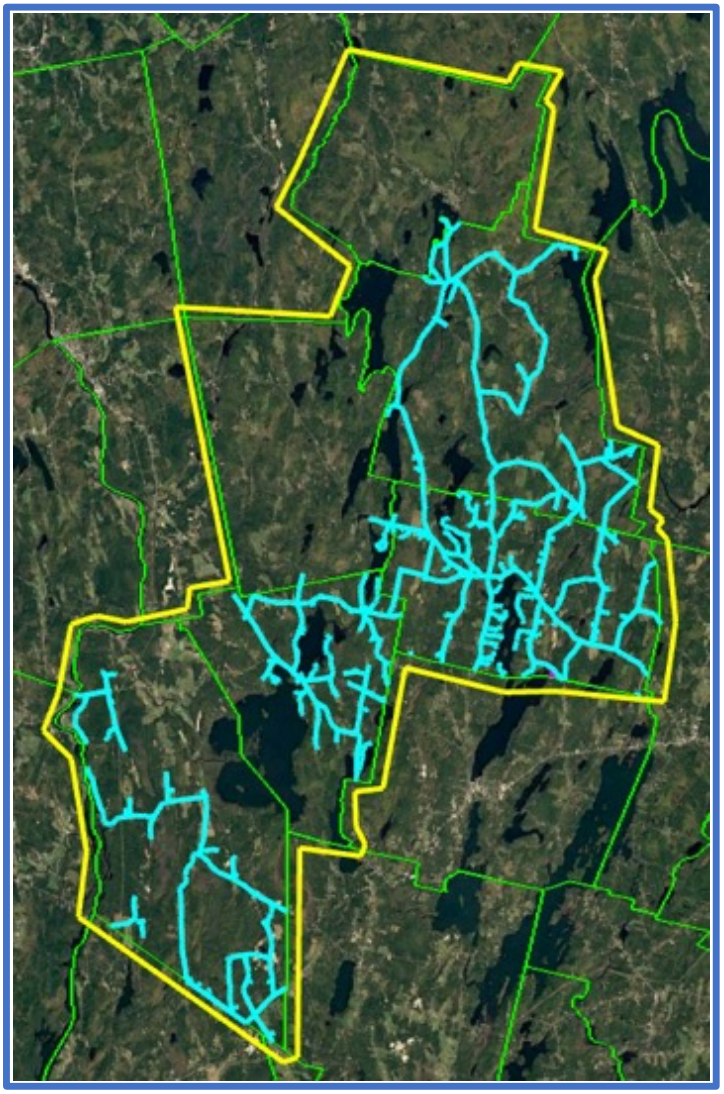
Casco Bay Advisors, LLC
Broadband/Telecom Consulting

West Kennebec Lakes Community Broadband Association

Fayette, Leeds, Readfield, Mount Vernon, Vienna, Wayne

Broadband Planning Report



Casco Bay Advisors, LLC

February 25, 2020

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1 Executive Summary

Casco Bay Advisors, LLC (Casco Bay) is pleased to present this Broadband Planning Report (Report) to the West Kennebec Lakes Community Broadband Association (WKLCBA), comprised of the Towns of Fayette, Leeds, Mount Vernon, Readfield, Vienna and Wayne (Towns), examining existing high-speed broadband assets within the Town limits, where gaps in coverage may exist, potential solutions and costs to fill those gaps and recommendations for next steps.

This Report begins with an overview of the various technologies capable of providing Internet access and the differences in the capability of each. We recommend reviewing this section first in order to easily interpret and digest the remainder of the Report.

The foundation of our research efforts included contacts with each of the land-line based service providers currently serving the Towns and reviewing and incorporating any mapping data provided by the service providers. We then conducted a field audit of every public and private roadway, including long driveways to verify the accuracy of the data provided and to acquire data where sufficiently detailed mapping was not provided. This information was then incorporated into a Geospatial Information System (GIS), along with 911 addressing data, parcel data where available and aerial imagery, to facilitate analysis and presentation of the data collected.

Percentage of Potential Subscribers with access to Charter (Spectrum) cable modem service	
Fayette	9%
Leeds	71%
Mount Vernon	64%
Readfield	68%
Vienna	0%
Wayne	75%
WKLCBA	**55%**

Our research has determined that 55% of potential subscribers across the WKLCBA study area have access to cable modem service provided by Charter (Spectrum) with minimum advertised download speeds of 100Mbps and minimum advertised upload speeds of 10Mbps, from a high of 75% in the Town of Wayne to the entire community of Vienna with no cable modem service.

Consolidated Communications - DSL Coverage							
	Fayette	Leeds	Mount Vernon	Readfield	Vienna	Wayne	WKLCBA Total without Readfield
Total Potential Subscribers per 911 & Imagery Analysis	825	1,121	1,141	1,320	428	881	**4,396**
No service	40	0	179	*data unavailable*	0	271	**490**
Percent	*5%*	*0%*	*16%*		*0%*	*31%*	*11%*
Less than 10Mbps/1Mbps	179	224	133	*data unavailable*	36	370	**942**
Percent	*22%*	*20%*	*12%*		*8%*	*42%*	*21%*
Less than 25Mbps/3Mbps	685	836	964	*data unavailable*	383	556	**3,424**
Percent	*83%*	*75%*	*84%*		*89%*	*63%*	*78%*

All of the Towns are widely served by lower speed DSL Internet from Consolidated Communications. Overall, there is no DSL service available to 11% of the study area and 78% of potential DSL subscribers cannot be served by a minimum 25Mbps/3Mbps DSL service. *Note: Consolidated Communications was unable to provide confident data for the Town of Readfield.*

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The Report includes an estimation of the overall cost to extend the Charter (Spectrum) cable modem service to the remaining areas of all six Towns not currently served. The costs range from a low of $647,550 in Wayne to a high of $2,336,400 in Fayette, although we anticipate the final costs will be lower by negotiation of a cost sharing arrangement with Charter (Spectrum). These figures do not include the cost of extending service from the street to subscribers at the end of driveways longer than approximately 250 feet from the roadway, which is typically borne by the subscriber.

Total Cost to Extend Charter (Spectrum) cable modem service	
Fayette	$2,336,400
Leeds	$1,039,500
Mount Vernon	$1,560,600
Readfield	$771,300
Vienna	$1,417,050
Wayne	$647,550
WKLCBA	**$7,772,400**

Total Cost Fiber-to-the-Home Overbuild	
Fayette	$3,632,321
Leeds	$4,308,401
Mount Vernon	$5,116,265
Readfield	$4,654,466
Vienna	$2,107,102
Wayne	$3,473,530
WKLCBA	**$23,292,084**

As an alternative to the existing providers, we have estimated the costs for various options to overbuild both Towns with a new Fiber-to-the-Home (FTTH) network under municipal ownership or in partnership with a service provider. At the high end, the estimated capital costs range from a high of $5,116,265 for Mount Vernon to a low of $2,107,102 for Vienna. We believe these costs could potentially be reduced by up to 50% in a partnership arrangement with a willing service provider.

After learning about the technologies described in Sections 2 and 3, Sections 4 and 5 of this Report provide the granular data and mapping detail for each community.

With this Report in hand and the data now transparently available, we recommend the Towns develop a vision and set of goals to guide their efforts going forward and to engage both the incumbent service providers and other potential alternative service providers to expand the availability, capacity and competitive options for the provision of affordable, reliable high-speed Internet.

As has been demonstrated this spring of 2020, unrestricted access to robust, universally available, affordable and reliable Internet is a critical infrastructure required to participate in the increasingly global economy, especially in the areas of healthcare, education, entertainment, financial services, consumer goods and services, and global commerce.

We applaud the Towns for taking this initiative to better understand their current resources and to set the stage for ensuring all of your communities are well positioned to take advantage of the introduction of new Internet enabled services.

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2 Internet Access and Broadband Definition

The terms “Internet access” and “broadband” are often used interchangeably. There is frequently confusion between the two, especially as the definitions evolve with technology changes.

Internet access connects individual computer terminals, computers, mobile devices, and computer networks to the Internet, enabling users to access Internet services such as email, applications and information delivered via the World Wide Web. Internet service providers (ISPs) offer Internet access through various technologies that offer a wide range of data signaling rates (speeds).

Consumer use of the Internet first became popular through dial-up Internet access in the 1990s. By the first decade of the 21st century, many consumers in developed nations used faster, broadband Internet access technologies.

Broadband is a generic term representing any wide-bandwidth data transmission method with the ability to transport multiple signals and traffic types simultaneously. This data can be transmitted using coaxial cable, optical fiber, radio or twisted pair copper. In the context of Internet access, broadband is used much more loosely to mean any high-speed Internet access that is always on and faster than traditional dial-up access. Different governing authorities have developed inconsistent definitions of what constitutes broadband service based on access speed.

In January 2015, the Federal Communications Commission (FCC) voted to define broadband as Internet service with at least 25 Mbps (megabits per second) download and 3 Mbps upload. Their definition affects policy decisions and the FCC's annual assessment of whether broadband is being deployed to all Americans quickly enough. In Maine, the ConnectMaine Authority Board[1] currently defines effective broadband network capacity as speeds equal to or greater than 25Mbps/3Mbps, and anything less as “unserved.”

For those rural and high-cost areas served by Consolidated Communications, Inc. (CCI) where CCI has accepted subsidies through the Connect America Fund – Phase II (CAF-II), the FCC has adopted a minimum speed standard of 10Mbps/1Mbps.

[1] In recognition of the critical importance of modern technology for education, health care, and business success in Maine, the Legislature created the ConnectME Authority (Authority) in 2006 as an independent state agency to develop and implement broadband strategy for Maine. The Authority is governed by a board which is comprised of members appointed by the Governor or specifically identified and designated by statute.

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3 Internet Access Technology Overview

In this section, we present an overview of different Internet access technology, including digital subscriber line, cable modem, fixed wireless, 4G/LTE Advanced, 5G, satellite, and Fiber-to-the-Premise.

3.1 DSL

Digital subscriber line (DSL) is a technology most frequently used by traditional telephone system operators such as Consolidated Communications, Inc. (CCI) to deliver advanced services *(high-speed data and potentially video)* over twisted pair copper telephone wires. This technology has lower data carrying capacity than the hybrid fiber coaxial network deployed by cable system operators like Charter Communications (Spectrum). Data speeds are range-limited by the length of the copper cable serving the premise, the wire gauge of the copper conductors and the condition of the copper.

DSL service can be delivered simultaneously with wired telephone service on the same telephone line. This is possible because DSL uses higher frequency bands for data transmission than are required for the voice service transmission. On the customer premises, a DSL filter on each non-DSL outlet blocks any high-frequency interference to enable simultaneous use of the voice and DSL services.

The bit rate of consumer DSL services can range from 256 Kbps *(kilobits per second)* to over 100 Mbps in the direction of the service provider to the customer (downstream), depending on the DSL technology, line conditions, and the length of the copper loop. Until recently, the most commonly installed DSL technology for Internet access has been asymmetric digital subscriber line (ADSL). With ADSL, the data throughput in the upstream direction *(the direction from the consumer to the service provider)* is lower, hence the designation of asymmetric service.

At the central office, a digital subscriber line access multiplexer (DSLAM) terminates the DSL circuits and aggregates them, where they are handed off to other networking transport equipment. The DSLAM terminates all connections and recovers the original digital information. For locations beyond the maximum distance from the central office for the particular type of DSL technology deployed (7,000 – 12,000 feet), DSLAMs can be deployed in the field in outside plant cabinets *(remote terminals)* and connected to the central office by fiber optic cables. A shorter distance from the subscriber premise to the DSLAM results in greater bandwidth *(speed and/or capacity)* for the connected users.

The customer end of the connection consists of a terminal adaptor or "DSL modem." This converts data between the digital signals used by computers and the voltage signal of a suitable frequency range which is then applied to the phone line.

There are additional formats of DSL technologies that can enhance the capacity of the network. ADSL2+ extends the capability of basic ADSL by doubling the number of downstream channels,

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increasing the frequency from 1.1 Mhz to 2.2 Mhz. The data rates can be as high as 24 Mbps downstream and up to 1.4 Mbps upstream, depending on the distance from the DSLAM to the subscriber's premises. Like the previous standards, ADSL2+ will degrade from its peak bit rate after a certain distance.

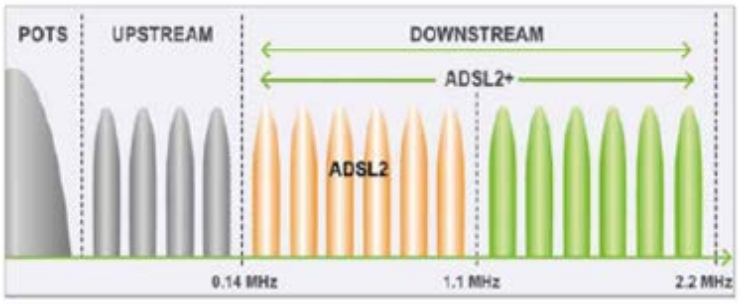

Figure 1: ADSL2+ Frequency Utilization

ADSL2+ allows port bonding, where multiple ports are physically provisioned to the end user and the total bandwidth is equal to the sum of all provisioned ports. When two lines capable of 24 Mbps are bonded, the end result is a connection capable of 48 Mbps download and twice the original upload speed.

Very-high-bit-rate digital subscriber line 2 (VDSL2+) permits the transmission of asymmetric and symmetric aggregate data rates up to 200 Mbps downstream and upstream on twisted pairs using a bandwidth up to 30 Mhz. It deteriorates quickly from a theoretical maximum of 250 Mbps at the source to 100 Mbps at 1,600 feet and 50 Mbps at 3,300 feet but degrades at a much slower rate from there. Starting from one mile, its performance is similar to ADSL2+. Bonding may be used to combine multiple wire pairs to increase available capacity or extend the copper network's reach.

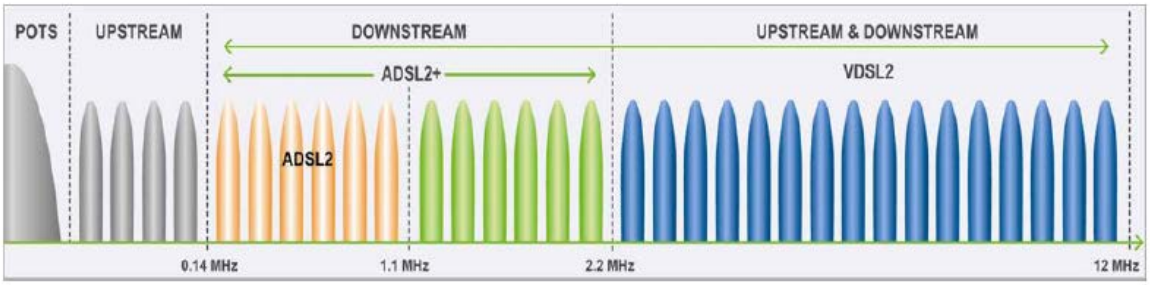

Figure 2: VDSL2+ Frequency Utilization

All new DSL deployments for CCI utilize VDSL2+ equipment.

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3.2 Cable Modem

Cable modem Internet access is provided over a hybrid fiber coaxial (HFC) broadband network. It has been employed globally by cable television operators since the early 1990s and is the network architecture utilized by Spectrum. In an HFC cable system, the television channels are sent from the cable system's distribution facility, the headend, to local communities through optical fiber trunk lines. The fiber-optic trunk lines provide adequate bandwidth to allow future expansion for bandwidth-intensive services. At the local community, an optical node translates the signal from a light beam to an electrical signal and sends it over coaxial cable lines for distribution to potential subscribers.

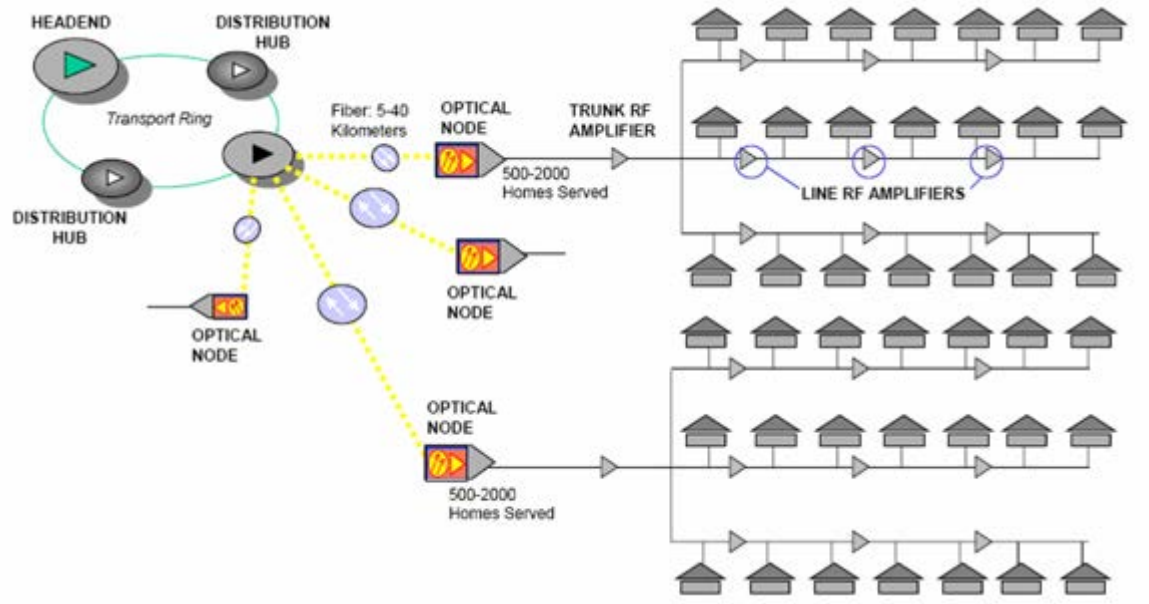

Figure 3: Hybrid Fiber/Coax Network Architecture Diagram

The coaxial portion of the network connects 25–2,000 homes in a tree-and-branch configuration off the node. RF amplifiers are used at intervals to overcome cable attenuation and passive losses of the electrical signals caused by splitting or "tapping" the coaxial cable.

The HFC broadband network is typically operated bi-directionally, meaning that signals are carried in both directions on the same network from the headend/hub office to the home, and from the home to the headend/hub office. The forward-path or downstream signals carry information such as video content, voice and data. The return-path or upstream signals carry information such as video control signals to order a movie or Internet data to send an email. The forward-path and the return-path are carried over the same coaxial cable in both directions between the optical node and the home.

Data Over Cable Service Interface Specification (DOCSIS) is an international telecommunications standard that permits the addition of high-bandwidth data transfer to an existing cable TV (CATV)

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system. DOCSIS 3.1 has been deployed by Spectrum to provide Internet access over their existing HFC infrastructure. The DOCSIS 3.1 standard is capable of supporting Internet speeds of up to 10 Gbps *(gigabits per second),* but most providers are currently offering speeds of 1 Gbps or less service for residential users.

3.3 Fixed Wireless

Fixed wireless broadband is the operation of wireless devices or systems used to connect two fixed locations *(e.g., building to building or tower to building*) with a radio or other wireless link. Fixed wireless data (FWD) links are often a cost-effective alternative to leasing fiber or installing cables between the buildings. The point-to-point signal transmissions occur through the air over a terrestrial microwave platform. The advantages of fixed wireless include the ability to connect with users in remote areas without the need for laying new cables and the capacity for broad bandwidth that is not impeded by fiber or cable capacities. Fixed wireless services typically use a directional radio antenna on each end of the signal. These antennas are generally larger than those seen in Wi-Fi setups and are designed for outdoor use. They are typically designed to be used in the unlicensed Industrial, Scientific, and Medical (ISM) radio frequency bands (900 MHz, 1.8 GHz, 2.4 GHz and 5 GHz). However, in many commercial installations licensed frequencies may be used to ensure quality of service (QoS) or to provide higher connection speeds.

To receive this type of Internet connection, consumers mount a small dish to the roof of their home or office and point it to the transmitter. Line-of-sight is usually necessary for Wireless Internet Service Providers (WISPs) operating in the 2.4 and 5 GHz bands. The 900 MHz band offers better non-line-of-sight (NLOS) performance. Providers of unlicensed fixed wireless broadband services typically provide equipment to customers and install a small antenna or dish somewhere on the roof. This equipment is usually deployed and maintained by the company providing that service.

3.4 4G/LTE Advanced Broadband

4G/LTE Advanced is wireless technology being deployed by cellular telephone providers such as AT&T, Verizon Wireless, US Cellular, Sprint and T-Mobile for traditional mobile phone and data services. The latest standard incorporates two new technologies - Carrier Aggregation, and Multiple Input Multiple Output (MIMO), in order to provide speeds in excess of 100 Mbps, and eventually up to 1 Gbps and beyond. While standard data connections use one antenna and one signal at any given time, 4G LTE Advanced has the capability of utilizing multiple signals and multiple antennas.

Mobile LTE wireless service uses MIMO technology to combine multiple antennas on both the transmitter and the receiver. A 2×2 MIMO configuration has two antennas on the transmitter and two on the receiver, but the technology is not limited to 2x2. More antennas could theoretically operate at faster speeds as the data streams can travel more efficiently. The signal is then combined with “carrier

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aggregation," which allows a device to receive multiple 4G signals at once. The received signals don't have to be on the same frequency; one could receive an 1800 MHz and an 800 MHz signal at the same time, which is not possible with standard 4G. Up to five different 20 MHz signals can be combined to create a data pipe of up to 100 MHz of bandwidth.

3.5 5G Wireless[2]

Fifth-generation wireless (5G) is the latest iteration of cellular technology, engineered to greatly increase the speed and responsiveness of wireless networks. With 5G, data transmitted over wireless broadband connections could travel at rates as high as 20 Gbps by some estimates -- exceeding wireline network speeds -- as well as offer latency of 1 millisecond or lower for uses that require real-time feedback. 5G will also enable a sharp increase in the amount of data transmitted over wireless systems due to more available bandwidth and advanced antenna technology.

In addition to improvements in speed, capacity and latency, 5G offers network management features, among them network slicing, which allows mobile operators to create multiple virtual networks within a single physical 5G network. This capability will enable wireless network connections to support specific uses or business cases and could be sold on an as-a-service basis. A self-driving car, for example, would require a network slice that offers extremely fast, low-latency connections so a vehicle could navigate in real time. A home appliance, however, could be connected via a lower-power, slower connection because high performance isn't crucial.

5G networks and services will be deployed in stages over the next several years to accommodate the increasing reliance on mobile and internet-enabled devices. Overall, 5G is expected to generate a variety of new applications, uses and business cases as the technology is rolled out.

How 5G works - Wireless networks are composed of cell sites divided into sectors that send data through radio waves. Fourth generation (4G) Long-Term Evolution (LTE) wireless technology provides the foundation for 5G. Unlike 4G, which requires large, high-power cell towers to radiate signals over longer distances, 5G wireless signals will be transmitted via large numbers of small cell stations located in places like light poles or building roofs. The use of multiple small cells is necessary because the millimeter wave spectrum -- the band of spectrum between 30 GHz and 300 GHz that most 5G implementations rely on to generate high speeds -- can only travel over short distances (500 - 1,000 feet) and is subject to interference from weather and physical obstacles, like buildings[3].

[2] https://searchnetworking.techtarget.com/definition/5G

[3] T-Moble is reportedly deploying 5G in the 600Mhz spectrum that can travel over much longer distances (3 - 5 miles) and is will not require line-of-sight, but the bandwidth available will be much less than that provided in the higher spectrum ranges.

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Previous generations of wireless technology have used lower-frequency bands of spectrum. To offset millimeter wave challenges relating to distance and interference, the wireless industry is also considering the use of lower-frequency spectrum for 5G networks so network operators could use spectrum they already own to build out their new networks. Lower-frequency spectrum reaches greater distances but has lower speed and capacity than millimeter wave.

3.6 Satellite

Satellite Internet is available to virtually the entire lower 48 states, with some coverage in Alaska, Hawaii and Puerto Rico. The satellites are positioned more than 22,000 miles above the equator. These satellites are geostationary, which means they are always above a specific point on the earth as it rotates. The first Internet satellites successfully brought the Internet to a larger audience, but the rates were incredibly slow. Modern satellites use more advanced technology to transmit information which provides faster Internet access, but this is still much slower than landline-based Internet and terrestrial wireless Internet services.

When a consumer subscribes to satellite Internet, the company installs household equipment, which consists of an antenna dish and a modem. The antenna is located outside of the house and is generally two or three feet in diameter. The antenna must have an unobstructed view of the sky, called the line-of-sight, in order to communicate with the satellite. The antenna is connected to a modem, which connects to a computer with an Ethernet cable.

To manage bandwidth quality for all users, each plan comes with a cap on the data you can transmit or consume per month. The amount of data allotted depends on the subscriber's plan. Plans typically range from 5 GB to 50 GB of data transmission per month with use limits prescribed. If you exceed the allotted data amount, Internet speeds will be throttled back until the next month. However, some companies allow subscribers to pay for more data capacity once the threshold is met, resetting normal operation levels.

Looking forward, at least a dozen companies, including Boeing, Amazon, SpaceX, OneWEb and Telesat are deploying, or planning to deploy thousands of Low Earth Orbit (LEO) satellites in massive constellations to provide Internet service to unserved and underserved regions of the world. The benefit of LEO satellites includes greater bandwidth and less latency, with the reported potential of displacing traditional land-line based Internet service. SpaceX and others have begun deploying LEO satellites and are in the process of testing the service to demonstrate their viability.

Satellite industry proponents say that now, unlike decades ago when Teledesic and the earlier iteration of Iridium failed to develop successful businesses, technology advancements are enabling satellite service to be offered more affordably and efficiently.

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3.7 Fiber-to-the-Home (FTTH)

Fiber-to-the-Home (FTTH) or Fiber-to-the-Premise (FTTP) is a network utilizing fiber optic cables directly to the home or business and is capable of offering virtually unlimited symmetrical bandwidth. Most FTTP networks can offer 1 Gbps of bandwidth in both download and upload directions, with some providers offering 2 Gbps and even 10 Gbps service capacity. The majority of new networks being deployed utilize this type of technology.

FTTH networks can be configured and operated in a number of different ways. These include:

- As a single service provider in a closed network environment;
- As an open access dark fiber configuration where, competing providers can lease the fiber and place their own optical/electronics to complete the service;
- As an open access dark fiber configuration where the network owner provides the optical/electronics and leases the service to competing providers; and,
- As a Software Defined Network, where competing providers interconnect with the network and users select their provider in a virtual manner.

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4 Project Plan - Phase 1

4.1 Defining Local Broadband Needs and Goals

The WKLCBA Committee has given considerable thought to the broadband needs and goals for each of their communities by learning about the various technologies to provide service, meeting with the service providers currently providing service to the communities and educating themselves with respect to what they believe are their future needs to ensure the viability of the WKLCBA communities into the future. As part of the process, the Committee asked themselves each of the questions below. While each community is different and the goals and vision of each community may differ in unique ways, the answers documented below attempt to encompass the common needs and goals of each.

Once Phase 2 of the study is complete and we have the benefit of cost, options for operating models and potential funding information, we intend to revisit each of these questions and will potentially redefine our answers and solidify our goals.

1. **Question: What are we trying to solve for?**

   Answer: *Availability of fast, efficient, reliable, uniform, cost effective and affordable Internet service to 95% of the potential subscriber locations within 5 years, with a program to support adoption by low income households.*

2. **Question: Why are we trying to solve it?**

   Answer: *Internet service has become a requirement for all communities to maintain viability in the modern world and our towns service is insufficient. Affordable, reliable high-speed Internet is required for: economic development, telecommuting, education, homework, adult education and continuing education. If recent history is any indication, the uses and applications of the Internet will increase dramatically in the next 5 years. We must move quickly and aggressively to keep pace with other communities, or we will be left behind.*

3. **Question: If you are able to solve it, what are the benefits of doing so?**

   Answer: *Attract new businesses and remote workers, improve connectivity for existing businesses and residents, telecommunicating opportunities for existing residents, increase property values and tax base, enable residents to age in place and take advantage of telehealth services, enable security monitoring services, improve education, research and continuing*

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education opportunities.

4. **Question: Do you have a preference for a specific technology?**

   Answer: *Preference will depend upon costs, availability of funding, ability to meet minimum required service requirements and the ability to scale in the future. All things being equal, we prefer Fiber-to-the-Home.*

5. **Question: Why do you prefer that technology?**

   Answer: *Future proof*

6. **Question: What speed capability do you want?**

   Answer: *FCC specified minimum of 25Mbps/3Mbps, with ability to scale up to faster speeds when needed.*

7. **Question: Do you want/need the same capability for all residents and businesses regardless of location?**

   Answer: *Yes*

8. **Question: Do you want to provide 100% coverage or are you willing to leave some areas unserved or underserved?**

   Answer: *All locations must receive FCC specified minimum of 25Mbps/3Mbps, with ability to scale up to faster speeds when needed.*

9. **Question: With whatever solution you choose, how would you like to pay for it?**

   Answer: *We expect funding will be a combination of user fees and federal, state, local and private funding.*

10. **Question: As you move to the implementation phase, do you want to move forward as a group or as individual towns?**

    Answer: *We recognize scale is important with respect to construction and operation. We also recognize funding capacity of each town may be different. To the extent it makes sense, we prefer a coordinated approach, but plan to explore all alternatives.*

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4.2 Inventory of Existing Broadband Infrastructure

Only two (2) service providers currently provide within the WKLCBA communities. Charter Communications (Spectrum) shared small PDF maps of their infrastructure for each community and Consolidated Communications, Inc. (CCI) chose not to share any detailed mapping information. As such, Casco Bay audited each providers infrastructure by driving along every roadway and visually identifying the infrastructure present on the utility poles in each community.

4.2.1 Spectrum

For Spectrum we have identified areas where their service is available through their hybrid fiber/coaxial cable network. Spectrum provides cable modem service to the majority of Readfield and significant portions of Mount Vernon, Wayne and Leeds. Spectrum also provides service to a very small area of Fayette just across the border with Readfield. Spectrum provides no service in the Town of Vienna *(see Section 3.3 below)*.

For residences, Spectrum provides a minimum 100Mbps/10Mbps service and can provide residential service up to 940Mbps/xxMbps. Business service is available up to 10Gbps and pricing can be quoted on an individual case basis. Residential pricing for Spectrum is illustrated in the table below.

Spectrum Service & Pricing			
Pricing	**Service**	**Download**	**Upload**
$49.99	Spectrum Internet	100Mbps	10Mbps
$69.99	Spectrum Internet Ultra	400Mbps	20Mbps
$109.99	Spectrum Internet Gig	940Mbps	35Mbps
Wi-Fi is $5.00 per month or subscribers can purchase their own router.			
Wi-Fi is free with Gig service			

4.2.2 CCI

For CCI, we have identified areas where they have deployed fiber optic cables, recognizing the use of this fiber optic infrastructure is limited to providing capacity to enable their own DSL remote terminal infrastructure and to deliver business grade data and Internet services *(see Section 3.4 below)*. Business grade services are available up to 10Gbps and pricing can be quoted on an individual case basis.

Casco Bay has made no attempt to map CCIs DSL infrastructure as the speeds and capabilities cannot be determined by a visual review of the copper infrastructure in the field. For pricing and availability of CCI DSL services, potential subscribers should contact CCI directly.

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4.2.3 ConnectMaine Authority Data

As a surrogate for mapping of CCI DSL speed capability and availability, we have accessed data collected by the ConnectMaine Authority that illustrates speed availability on a combined service provider basis without identifying the underlying service providers. Since there are only two (2) service providers serving the WKLCBA communities and the minimum speed offered by Spectrum is 100Mbps/10Mbps, one can assume that speeds identified on the ConnectMaine Authority mapping below 100Mbps/10Mbps is that of CCI[4] *(see Section 3.5 below)*.

[4] It is important to understand that the ConnectMaine mapping data is provided by the service providers in a process defined by the FCC and is the "maximum advertised" speed available. The data as submitted also assumes that if a single location within a census block is served, then the entire census block is considered to have service available at that "maximum advertised" speed. Finally, the data as represented can be as much as 18 months old. As such, we know this data is of limited value, availability is over-stated geographically, and service may have been improved since the data was submitted and mapped by the ConnectMaine Authority. We provide this information for lack of availability of better information.

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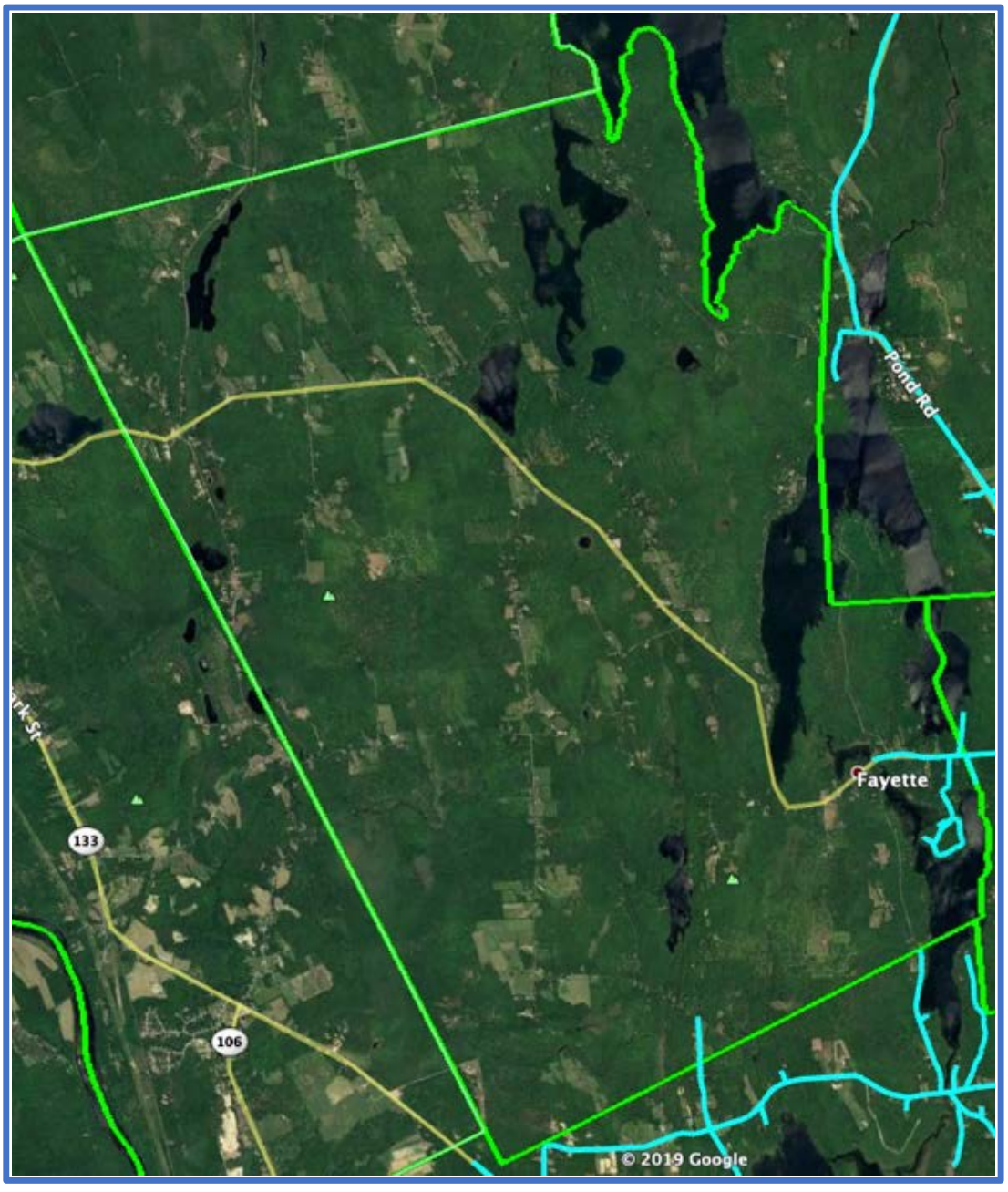
4.3 Spectrum Mapping

Light blue color lines represent Spectrum network.

4.3.1 Fayette



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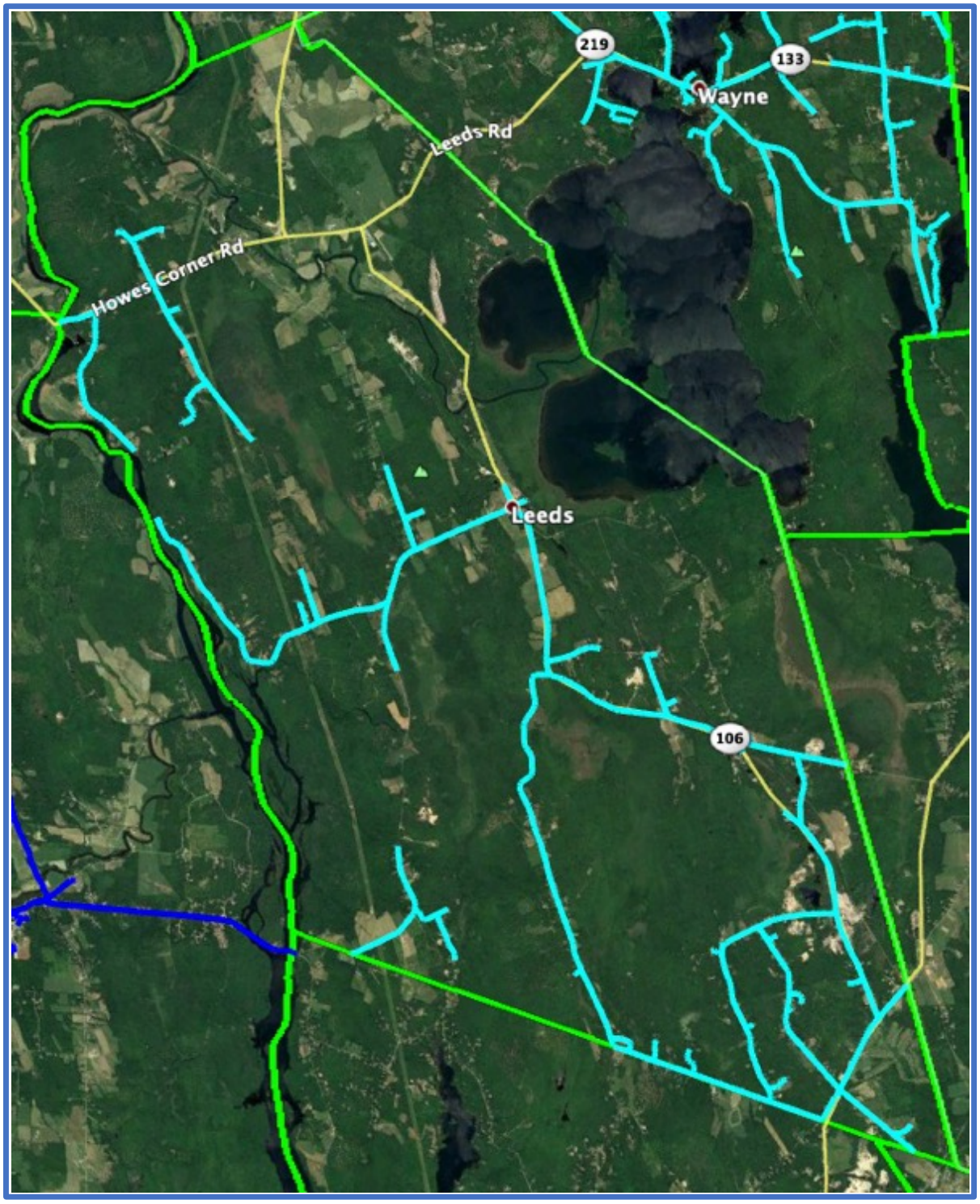
4.3.2 Leeds



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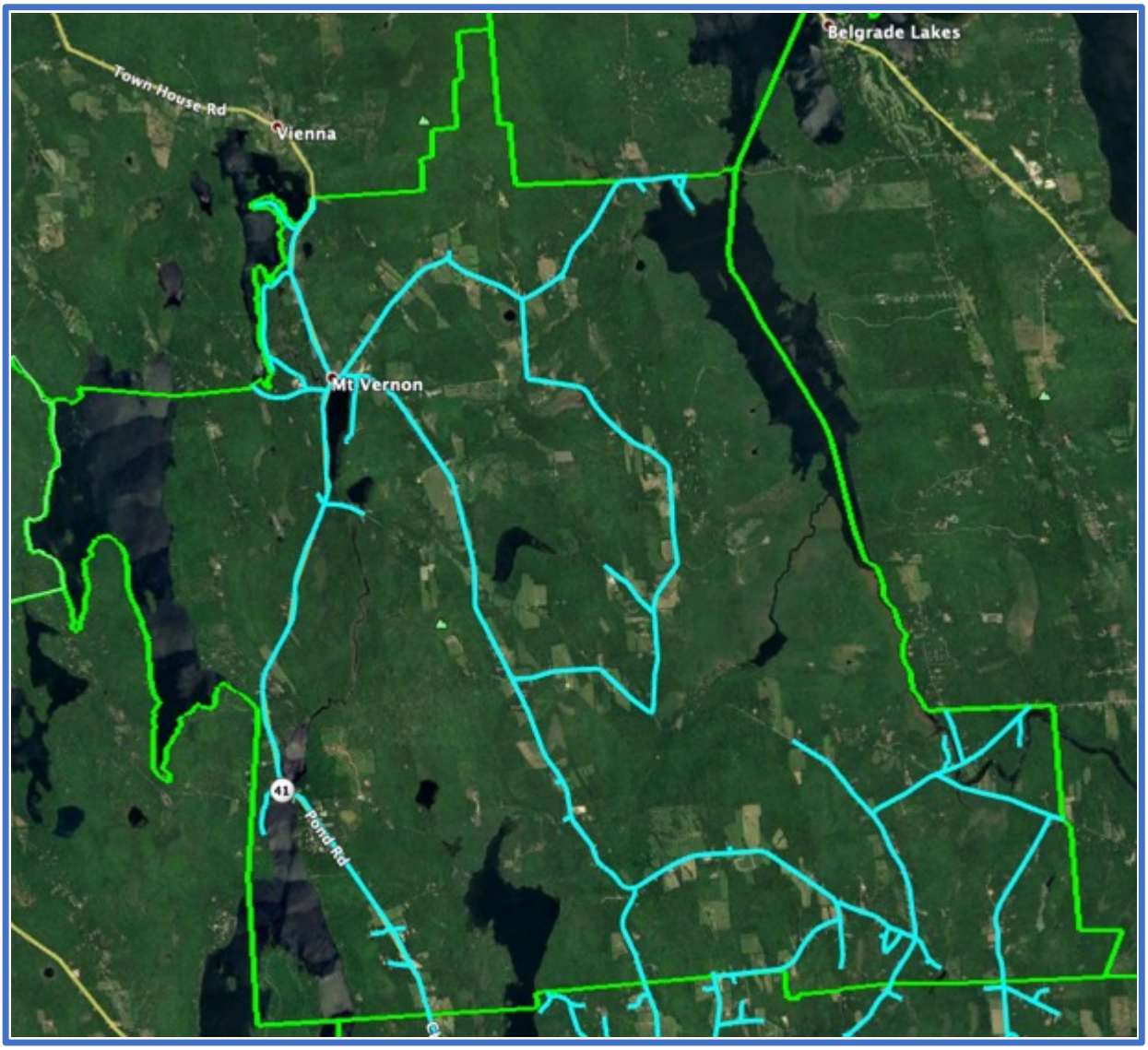
4.3.3 Mount Vernon



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4.3.4 Readfield

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4.3.5 Wayne

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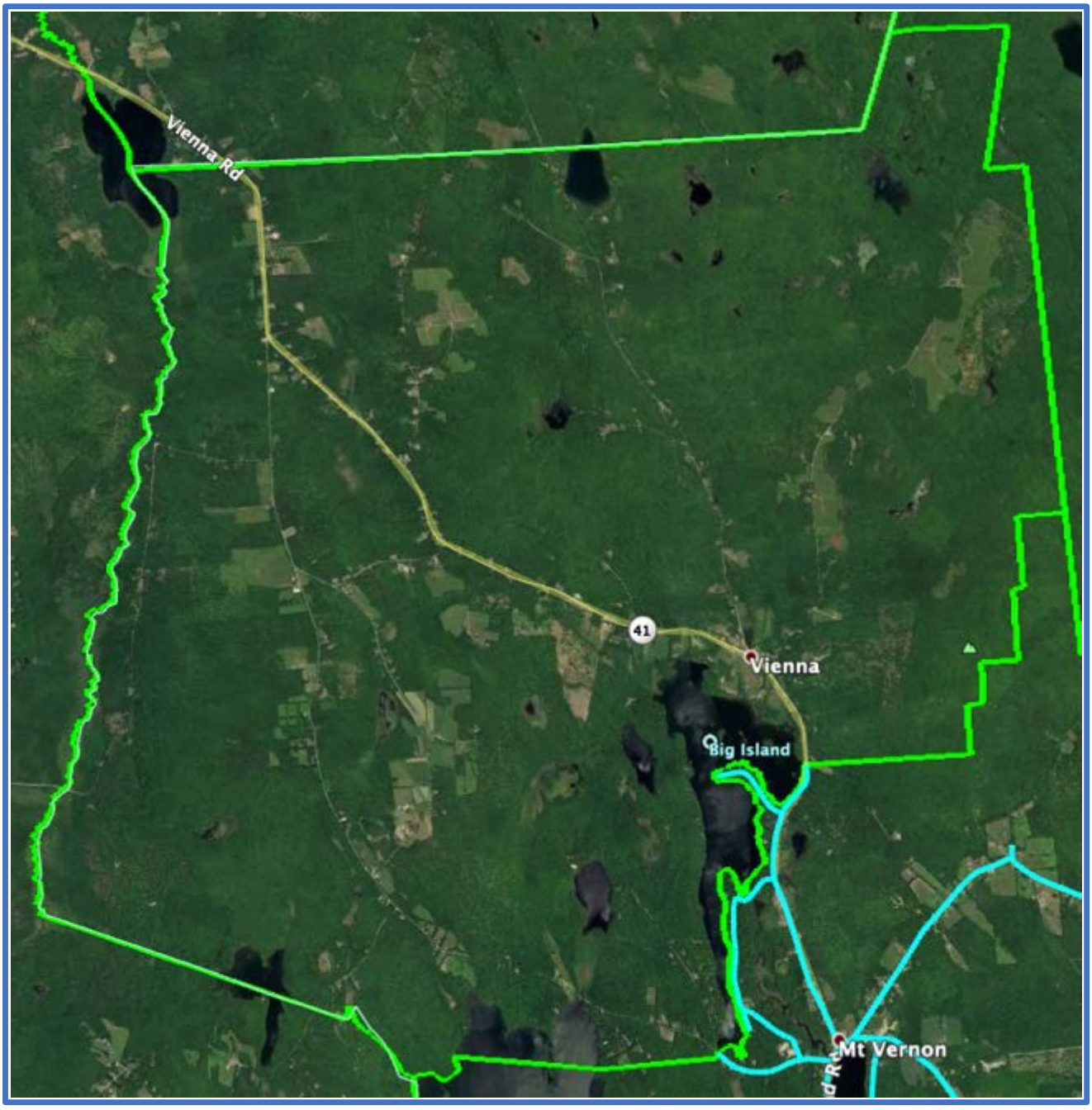
4.3.6 Vienna



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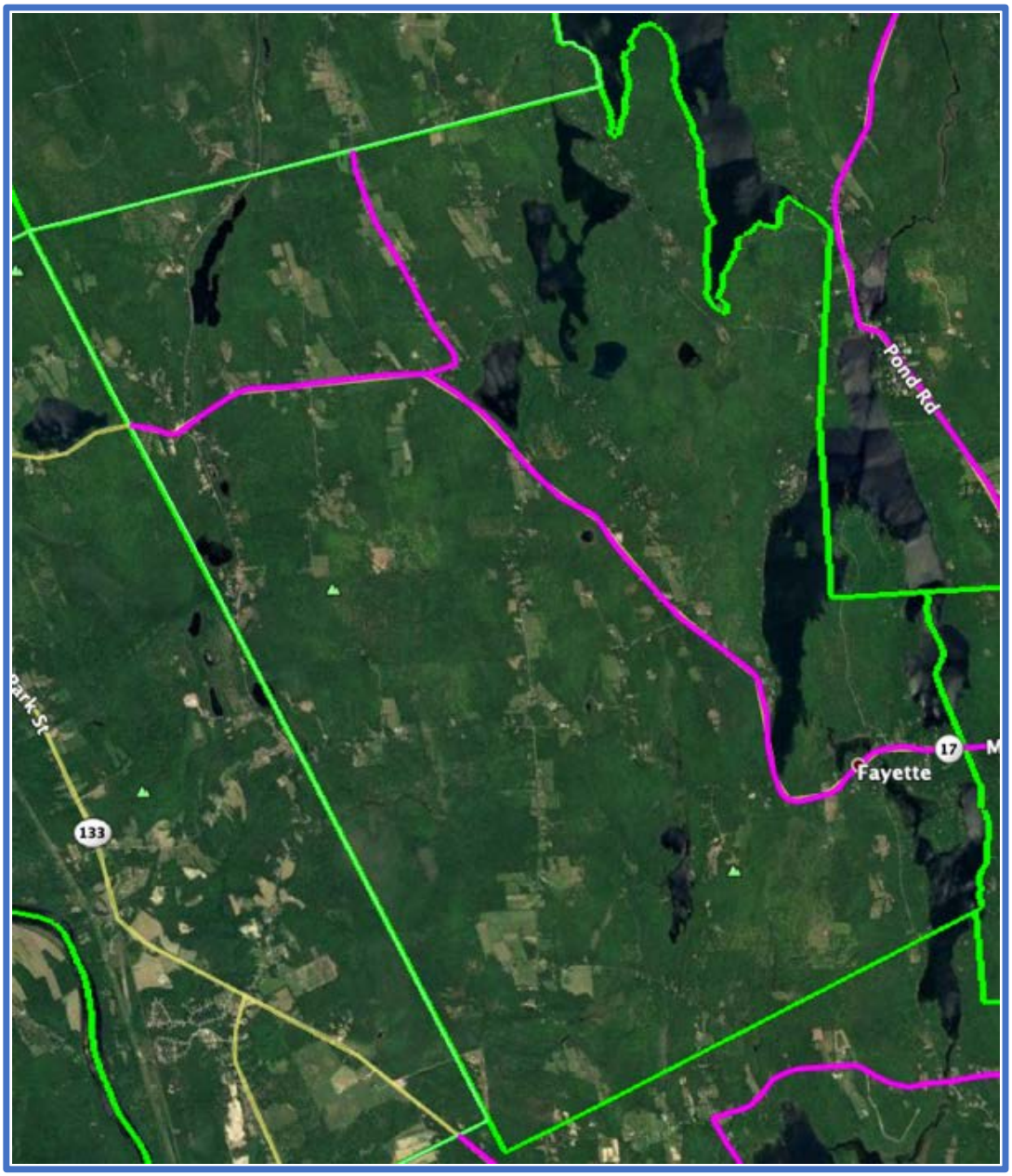
4.4 CCI Mapping

Magenta color lines represent CCI fiber optic cables.

4.4.1 Fayette



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4.4.2 Leeds

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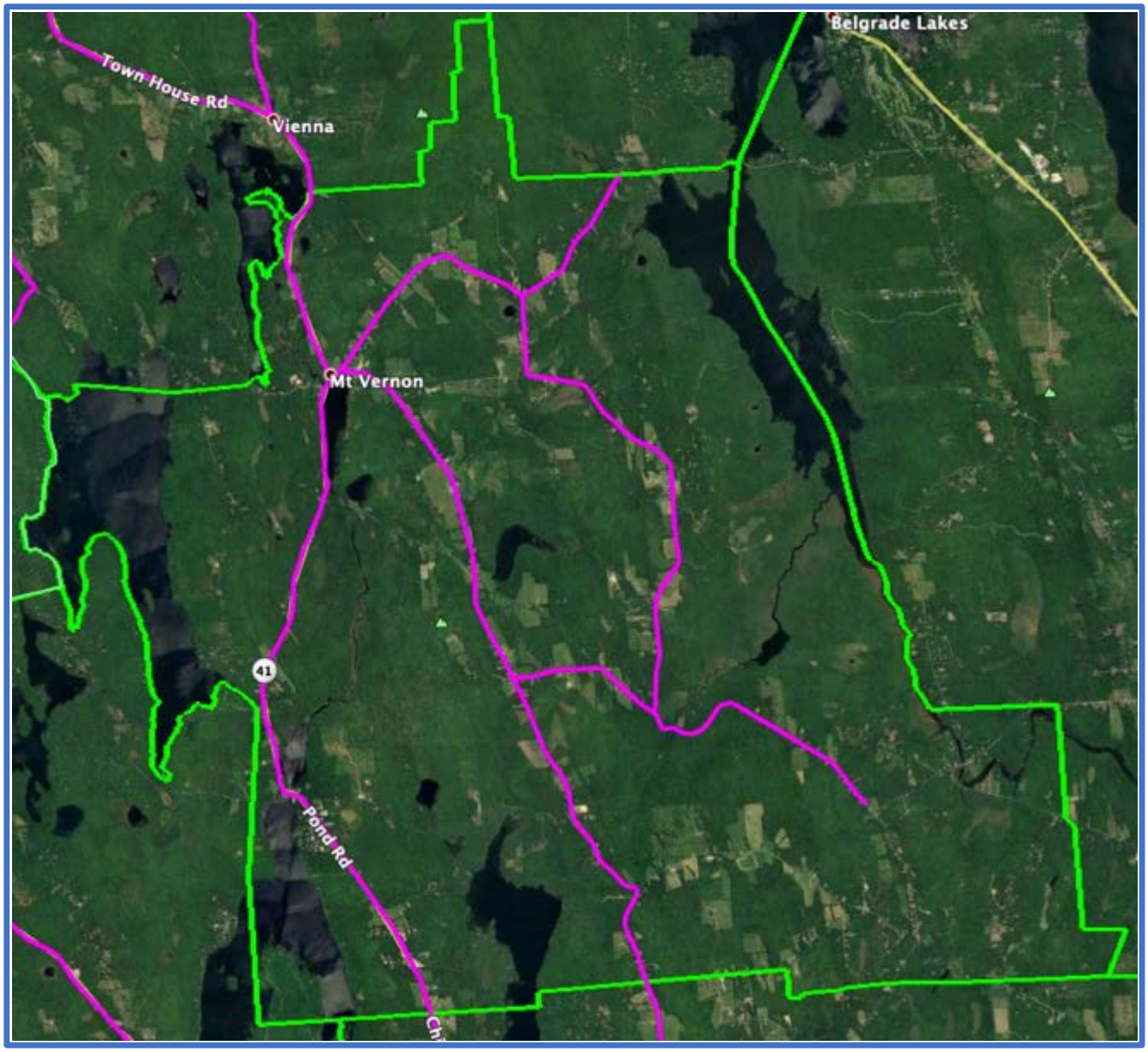
4.4.3 Mount Vernon



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4.4.4 Readfield

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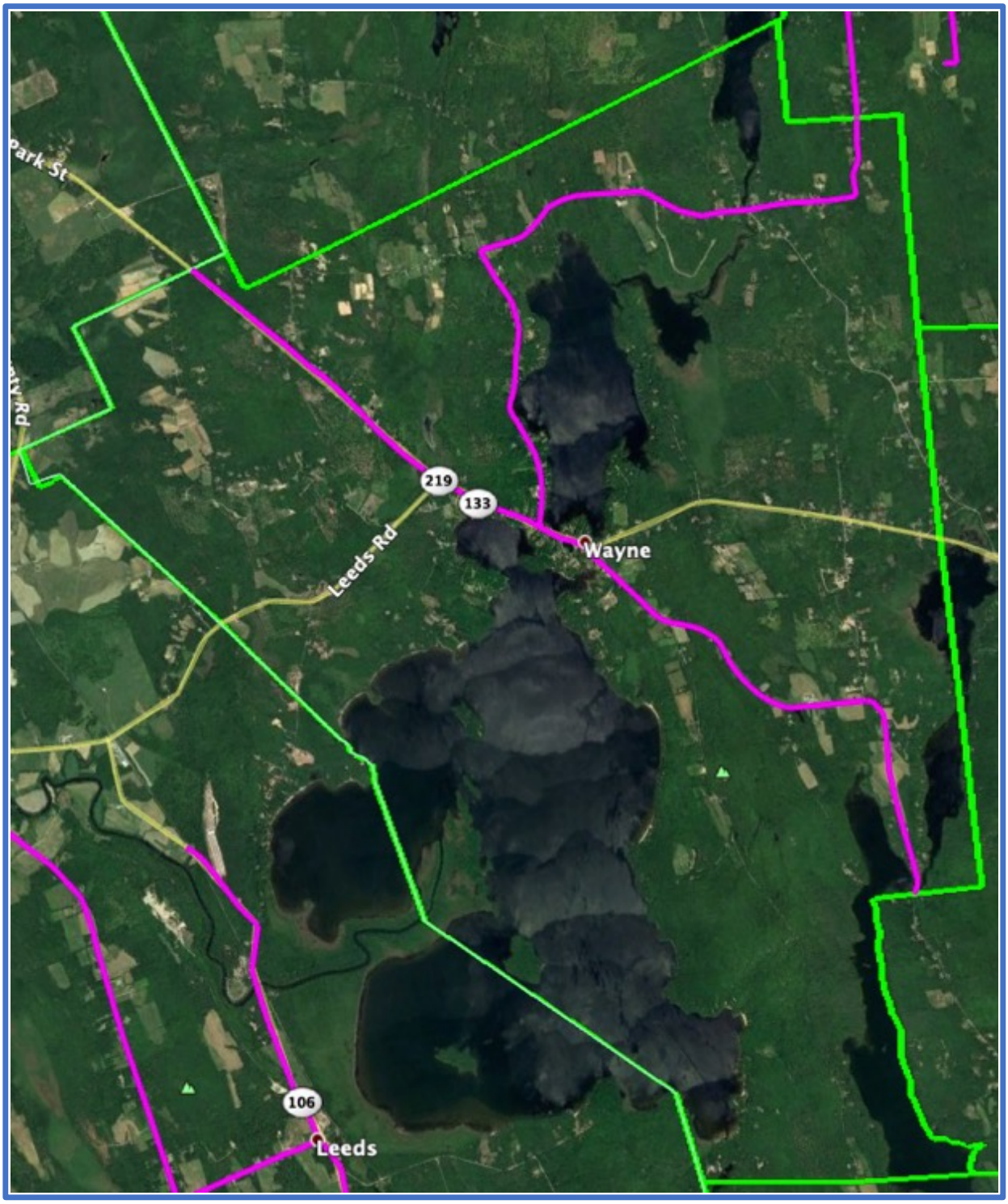
4.4.5 Wayne



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4.4.6 Vienna

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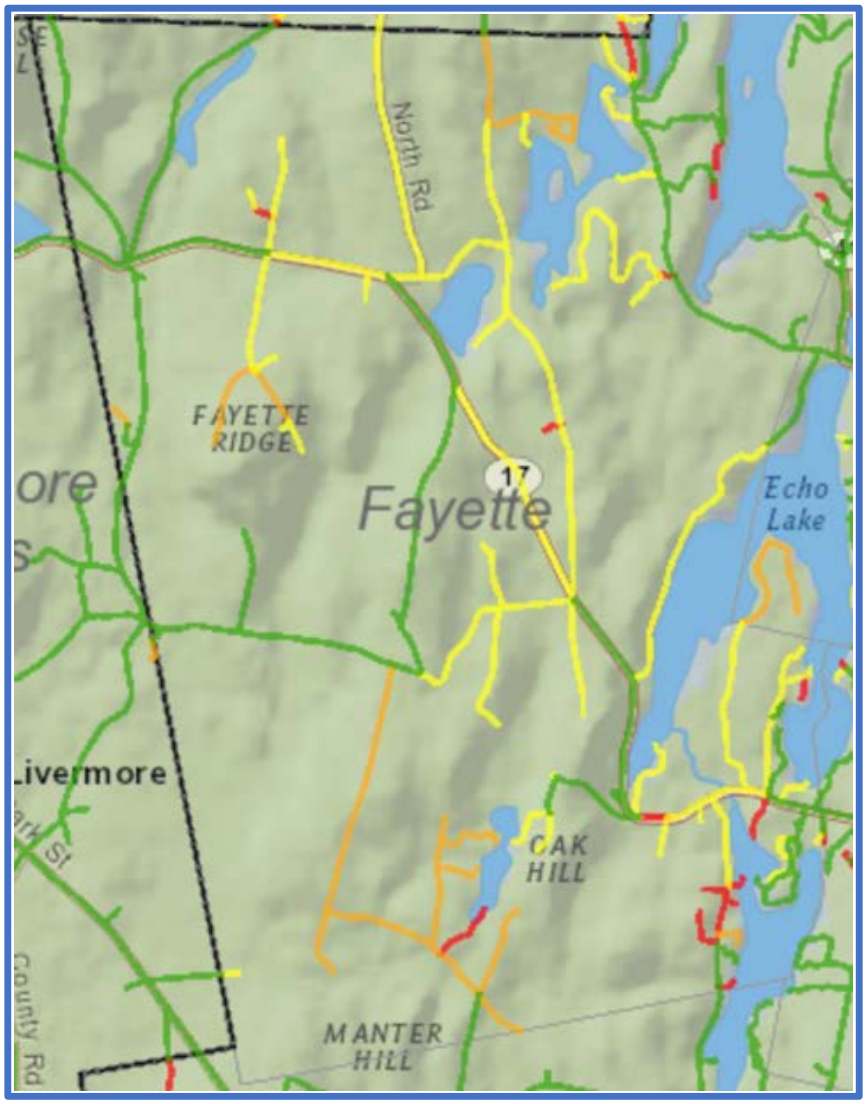
4.5 ConnectMaine Authority Mapping

4.5.1 Fayette



It is important to understand that the ConnectMaine mapping data is provided by the service providers in a process defined by the FCC and is the "maximum advertised" speed available. The data as submitted also assumes that if a single location within a census block is served, then the entire census block is considered to have service available at that "maximum advertised" speed. Finally, the data as represented can be as much as 18 months old. As such, we know this data is of limited value, availability is over-stated geographically, and service may have been improved since the data was submitted and mapped by the ConnectMaine Authority. We provide this information for lack of availability of better information.

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4.5.2 Leeds

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4.5.3 Mount Vernon

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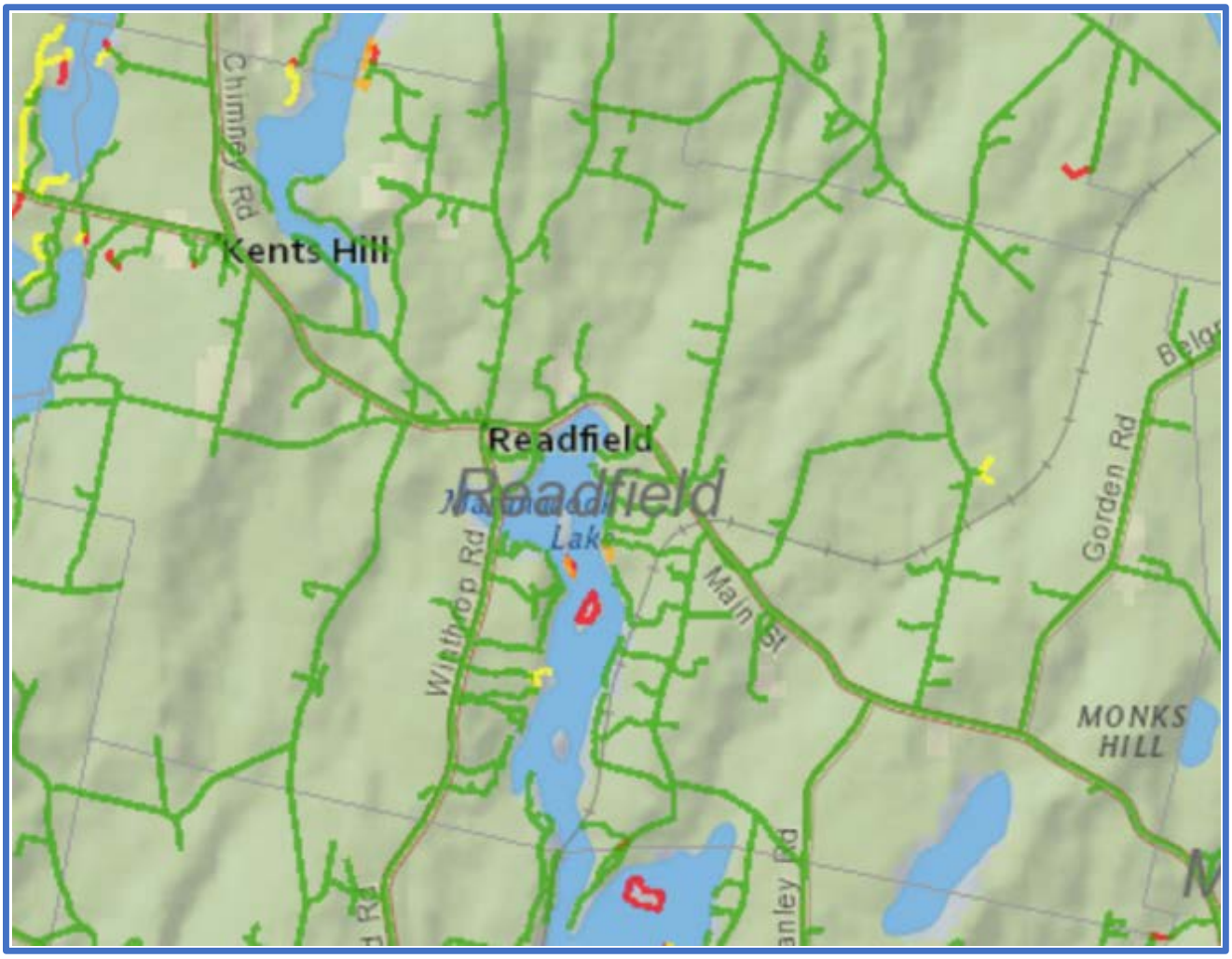
4.5.4 Readfield



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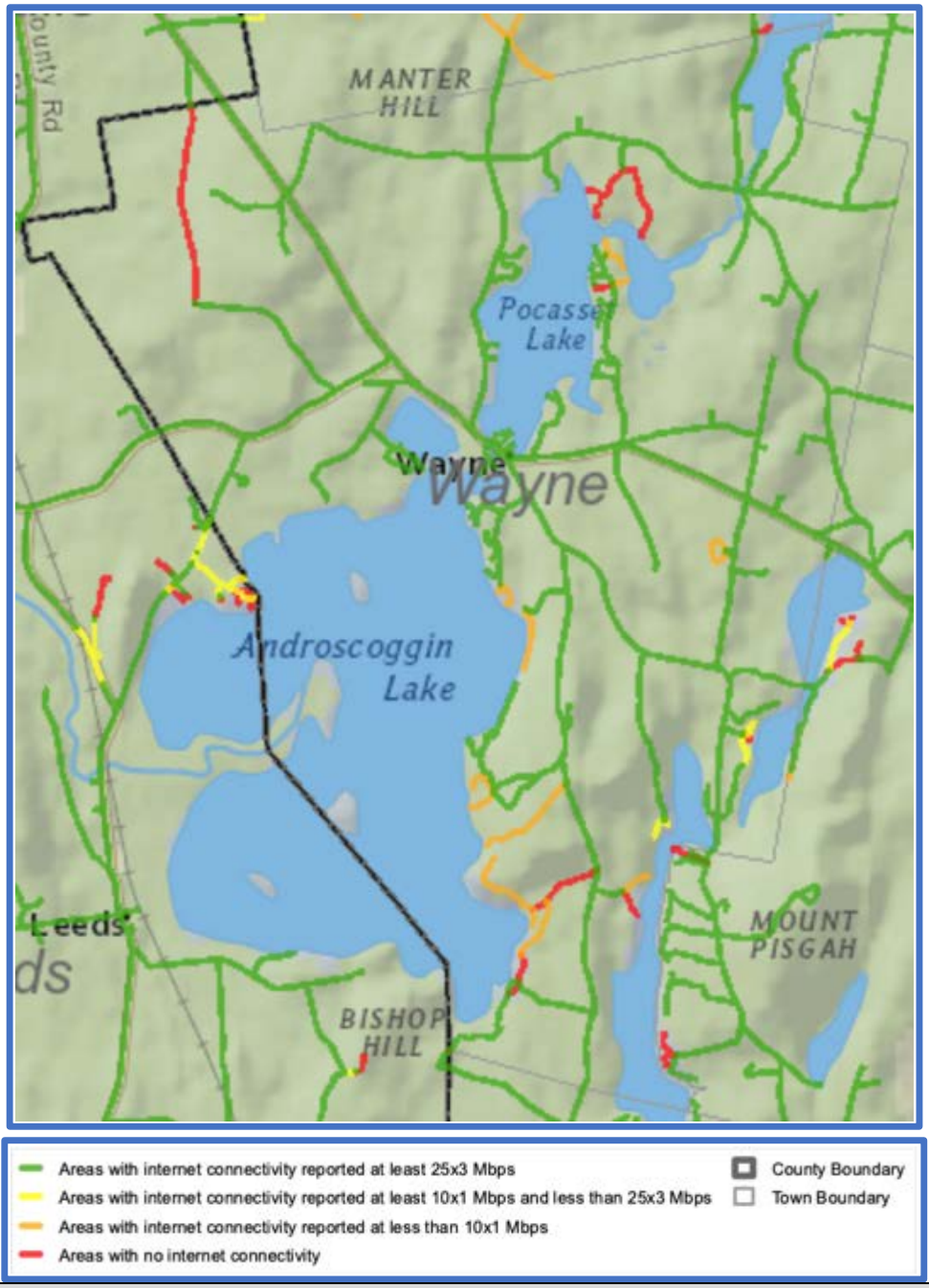

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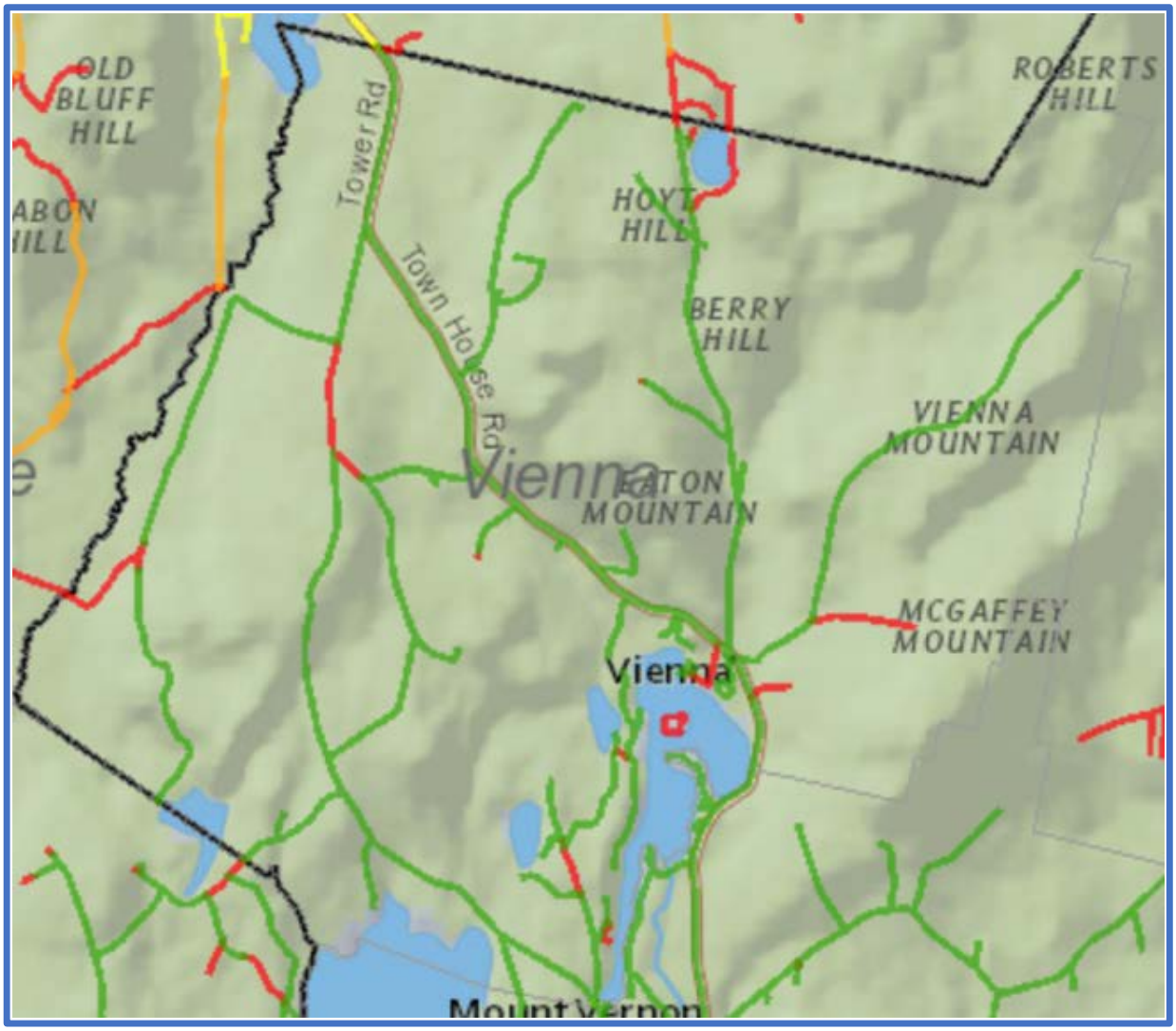
4.5.6 Vienna



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4.6 Gap Analysis Between Goals and Existing Infrastructure

While we have completed a goal setting exercise as described in Section 3.1 above, we plan to revisit those goals after Phase 2 of the Study is completed. As such, we are comparing the existing infrastructure against four (4) different levels of service (goals).

4.6.1 Geographic areas with service of less than 1Gbps symmetrical

No service providers currently offer 1Gbps symmetrical service to residential subscribers anywhere within the WKLCBA town boundaries.

4.6.2 Geographic areas with service of less than 100Mbps/10Mbps

The only service provider currently offering 100Mbps/10Mbps service is Spectrum. The maps in Section 3.3 illustrate the extent of their service availability. Any roads not highlighted in the color "teal" are considered gaps in coverage. Phase 2 of the Study will determine the mileage of roads in these gap areas and estimate the cost to extend Spectrum's network to fill in the remaining gaps in coverage.

4.6.3 Geographic areas with service of less than 25Mbps/3Mbps

The maps in Section 3.5 illustrate areas with service of less than 25Mbps/3Mbps. Roads illustrated in the colors yellow, orange and red define the gaps in this level of coverage. We provide the same level of caution here as described in Section 3.2.3.

> It is important to understand that the ConnectMaine mapping data is provided by the service providers in a process defined by the FCC and is the "maximum advertised" speed available. The data as submitted also assumes that if a single location within a census block is served, then the entire census block is considered to have service available at that "maximum advertised" speed. Finally, the data as represented can be as much as 18 months old. As such, we know this data is of limited value, availability is over-stated geographically, and service may have been improved since the data was submitted and mapped by the ConnectMaine Authority. We provide this information for lack of availability of better information.

4.6.4 Geographic areas with no service

The maps in Section 3.5 illustrate areas no service by highlighting those roads in the color red.

4.7 Assessment of Municipal Procedures, Rules and Ordinances

We are not aware of any municipal procedures, rules or ordinances that may inhibit the deployment of affordable, reliable high-speed Internet services within our member communities.

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4.8 Digital Inclusion

Universal availability of high-speed broadband is critical to retaining existing residents, supporting our economy and educating future generations. In order to achieve these goals and support a robust broadband infrastructure in a sustainable manner, all members of the community must be included, must be digitally literate, and must have the opportunity to participate on an equitable basis.

Definition: Digital Literacy - The ability to find, evaluate, utilize, share, and create content using information technologies and the Internet.

Definition: Digital Equity - Where all individuals and communities have the information technology capacity needed for full participation in our society, democracy and economy. Digital Equity is necessary for civic and cultural participation, employment, learning, and access to essential services.

Definition: Digital Inclusion - Refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of Information and Communications Technologies (ICTs). This includes five elements:

1. Affordable, reliable and robust broadband Internet service
2. Internet-enabled devices that meet the needs of the user
3. Access to digital literacy training
4. Quality technical support
5. Applications and online content designed to enable and encourage self-sufficiency, participation and collaboration

Digital Inclusion must evolve as technology advances and requires intentional strategies and investments to reduce and eliminate historical, institutional and structural barriers to access.

Local Resources Necessary to Foster Digital Literacy, Equity and Inclusion

1. Full-time digital inclusion staff
2. Established digital inclusion planning process
3. Active collaboration with regional and national digital inclusion peers
4. Periodic assessment of resident's Internet access and use
5. Community based digital inclusion programs
6. Availability of public access computer labs
7. Programs for discount Internet service for low- and moderate-income users
8. Affordable equipment programs

Below we evaluate these eight resources as the related to the WKLCBA area.

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4.8.1 Full-Time Digital Inclusion Staff

While not specifically identified as "digital inclusion staff", the adult education programs at Spruce Mountain Adult Education in Livermore Falls, Winthrop Adult & Community Education in Winthrop, Maranacook Adult Education in Readfield and MSAD 52 Adult & Community Education in Turner all have program staff who could be assigned as a lead in this area.

Establishing a digital inclusion/literacy program, led by an assigned staff member under the auspices of Maranacook Adult Education in Readfield and in collaboration with the other Adult & Community Education Program in the area, may address this requirement and foster an expansion of the course selection and delivery locations.

4.8.2 Established Digital Inclusion Planning Process

Our research finds no established digital inclusion planning process for the WKLCBA area, but Maine is fortunate to have one of the nation's premier organizations headquartered in Machias, Maine. The Axiom Education & Training Center's "National Digital Equity Center" (NDEC)[5], led by nationally recognized Susan Corbett, can provide a complete planning process to facilitate a robust digital literacy, equity and inclusion program.

4.8.3 Active Collaboration with Regional and National Digital Inclusion Peers

Collaboration with regional peers and national digital inclusion experts will be important to leverage the work of other successful programs and share resources within the surrounding area. The digital inclusion planning process should incorporate active collaborations with the State of Maine and the communities adjacent to the WKLCBA area.

4.8.4 Periodic Assessment of Resident's Internet Access and use

This study identifies where Internet access is available and the download and upload speeds available but makes no effort to determine how the residents use the Internet. A periodic survey to support the planning process will be important to define the needs and better understand the use of the Internet within the WKLCBA Area.

[5] http://digitalequitycenter.org/

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4.8.5 Community Based Digital Inclusion Programs

The only available course we have identified in the area Adult & Community Education programs is a Basic Computers course offered at Spruce Mountain. The National Digital Equity Center is currently offering the following courses in the Augusta area.

NEDC Current Course Availability	
Course	Location
Android Basics	Kennebec Plaza, Augusta
Aging Well with Technology	Augusta Adult & Community Education
Introduction to Computer	Augusta Adult & Community Education
Improve your Computer Skills	Lithgow Public Library, Augusta
Internet Safety	Augusta Adult & Community Education

4.8.6 Availability of Public Access Computer Labs

For those currently without access to the Internet at home or who cannot afford to subscribe to the Internet or have their own computer, availability of public computers is critical. The follow table identifies the area libraries where computers are available for public use.

Public Access Computers	
Location	Quantity
Fayette - Underwood Memorial Library	3
Leeds / Greene - Julia Adams Morse Memorial Library	4
Mount Vernon - Dr. Shaw Memorial Library	4
Readfield - Readfield Community Library	1
Wayne - Wayne/Cary Memorial Library	3

Wayne-Cary Memorial Library reports that while their public access computers receive considerable use, their Wi-Fi both inside the building and outside is used heavily, especially by summer season residents and vacationers who don't have sufficient Internet access at their homes and camps.

4.8.7 Programs for Discount Internet Service for Low- and Moderate-Income Users

For those who cannot afford Internet service, Consolidated Communications and Spectrum offer discounted services to those who qualify.

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4.8.7.1 FCC Lifeline Program

Lifeline is the FCC's program to help make communications services more affordable for low-income consumers. Lifeline provides subscribers a discount on monthly telephone service purchased from participating providers in the marketplace. Subscribers can also purchase discounted broadband from participating providers. The discounts, which can be applied to stand-alone broadband, bundled voice-broadband packages (either fixed or mobile, along with stand-alone voice service) will help ensure that low-income consumers can afford 21st-century broadband and the access it provides to jobs, education and opportunities.

Consolidated Communications, Inc. (CCI) offers a Lifeline Program for eligible low-income residential subscribers at their primary residence[6]. The Lifeline Program is a government benefit program. Eligible subscribers can apply the monthly $9.25 federal Lifeline Program discount to a voice service or to a qualifying Internet service. In some states, an additional monthly voice discount is also available. Eligible subscribers who apply the Lifeline Program discount to their CCI voice service may also qualify for free toll blocking to help control long distance usage. These eligible subscribers can still use pre-paid calling cards or dial-around services to place long distance calls from their homes.
Only one Lifeline Program discount is available per household on either a wireless or wireline qualifying service. Under the Lifeline Program, a household is defined as any individual or group of individuals who live together at the same address and share income and expenses. The Lifeline Program benefit is non-transferable. Consumers who willfully make false statements in order to obtain the discount can be punished by fine or imprisonment or can be barred from the Lifeline Program. Visit Universal Service Administrative Co. at www.usac.org for more information on the Lifeline Program.

How do I apply?
To receive the Lifeline Program discount, residential customers must establish the eligibility of their household. Eligibility requirements are explained in detail on the Lifeline Program application and at www.lifelinesupport.org. If you meet the eligibility requirements, complete and sign the application form, attach proof of eligibility and mail directly to USAC. Alternatively, you can verify your eligibility with USAC at www.checklifeline.org. After your eligibility is verified, call CCI at (1.844.968.7224) to add the Lifeline Program discount to your CCI account.

4.8.7.2 Spectrum Internet Assist[7]

Through the Spectrum Internet Assist program, qualified households can receive:

- High-speed 30 Mbps Internet with no data caps

[6] https://www.consolidated.com/support/residential-support/lifeline-assistance-programs

[7] Further information can be found at: www.spectruminternetassist.com

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- Internet modem included
- No contracts required
- Add in-home WiFi for $5 more per month

To qualify for Spectrum Internet Assist, a member of the household must be a recipient of one of the following programs:

- The National School Lunch Program (NSLP) free or reduced lunch
- The Community Eligibility Provision (CEP) of the NSLP
- Supplemental Security Income (>/= age 65 only)

4.8.8 Affordable Equipment Programs

Low or moderate income should not be a barrier to participating in our digital society. The following organizations focus on making computers available for all:

- **PC's for Maine**[8] – A nonprofit effort to increase technology access for people and nonprofits that need technology to achieve important goals. So far, this program has provided more than 9,000 computers that have been used by more than 120,000 Mainers. The average actual cost for each computer with all of its support services is $277. The market value of this service is more than $910 - if such a service was available.

- **Goodwill Technology Access Program**[9] **-** Goodwill's GoodTech Technology Access Program (TAP) offers refurbished computers to qualified individuals at discounted prices. Computers are guaranteed to work and come with new, legal installations of Windows and Microsoft Office obtained directly from Microsoft.

4.8.9 Recommendations

As illustrated in this Study, the WKLCBA area appears to be very underserved by a comprehensive digital inclusion and digital literacy program. We recommend the WKLCBA Committee collaborate with the area Adult & Community Education program directors and the staff of the National Digital Equity Center to develop a community survey specific to this subject to validate the need and determine potential courses to be offered. With the results of the survey, the WKLCBA Committee can then collaborate with these same entities to establish a digital inclusion program with courses offered within the communities served.

[8] www.pcsformaine.org
[9] www.goodwillnne.org/stores/goodtech/

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The next four (4) pages provide an overview of the National Digital Equity Center's "Maine Digital Inclusion Initiative" which can be customized for the WKLCBA area, as well as the survey they use for their program. As a first step, we recommend inviting NDEC to conduct a workshop for the WKLCBA Committee at the February 2020 committee meeting.

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...a program of the Axiom Education & Training Center

Maine Digital Inclusion Initiative

Digital inclusion is a national priority in the United States, and increasingly, a priority in Maine. High-speed internet access is widely recognized as a necessity for full participation in today's society. Employers, educators, businesses, healthcare providers, and civic institutions expect people to have access to computers and broadband connectivity.

Digital Inclusion includes:

- Affordable Broadband
- Affordable Equipment
- Digital Literacy Training
- Public Computer Access

The National Digital Equity Center's "Maine Digital Inclusion Initiative" program promotes and advocates for Digital Inclusion. Included is the expansion of digital literacy services to traditionally underserved populations to provide job training/employment-related education as well as technology training to older adults. The program has engaged and trained digital literacy instructors to provide digital literacy instruction to adult learners for the next three years throughout Maine.

The University of Maine System is a collaborative partner, and hosts a "regional hub"—on each of its seven campuses that serve as learning and meeting sites. Another project partner is the Maine State Library and the 230 local libraries throughout Maine as learning center sites in local communities. We are collaborating with Adult Education programs, Older Adult/Healthcare agencies, and Economic Development organizations and other state government entities.

Digital Literacy assessment and skills training play a critical role in technology and workforce skills development that increase employability of program participants, improve job-seeking skills, and create a more highly skilled, job-ready workforce across Maine. The program also helps seniors "age in place" by offering classes and workshops on how to use technology tools that will help them remain in their homes, as they grow older.

Program participants receive personalized support along a scaffolded learning path that leads to life-long learning and the skills and resources to continue growth along their individual trajectories. They also experience far-reaching meaningful impacts through use of internet resources.

Some areas of impact are education, financial stability, improved health, reduced isolation and increased communication, improved access to information, and increased civic participation. In addition to gaining digital literacy, formerly socially isolated participants often develop relationships with other peers they can rely on for assistance. Among older adults, this reduces the occurrence of depression, and negative health affects over time.

Through digital literacy efforts, communities benefit from a more highly skilled workforce that help grow the local economy and perpetuate creation of economic opportunity. Innovation and technology throughout the state will be leveraged to significantly improve the lives of Mainers. The project is one of the first statewide Digital Inclusion programs in the country.

The Axiom Education & Training Center, a 501c3 non-profit, has established itself as a nationally recognized Digital Equity, Digital Inclusion and Digital Literacy expert and rolled out its National Digital Equity Center program in September 2017. The National Digital Equity Center provides communities with the expertise needed to mobilize broadband technologies through digital inclusion, literacy efforts, education, resource planning, funding research, leveraging infrastructure, and stakeholder engagement. Over 9,000 residents and 1,000 businesses have received digital literacy training at more than 200 locations in Maine.

For more information – www.digitalequitycenter.org or email info@digitalequitycenter.org

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info@digitalequitycenter.org www.digitalequitycenter.org

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Class Interest Survey

The National Digital Equity Center through its Maine Digital Inclusion Initiative is committed to providing FREE Digital Literacy Course in all Maine counties.

Let us know what courses you are interested in taking! This helps us determine which courses to offer and where. We will be in touch with you once a course is scheduled.

An online version of this survey is available at: https://survey.digitalequitycenter.org

Any questions, feel free to call the National Digital Equity Center at 207-259-5010 or email info@digitalequitycenter.org.

1. **Name**
2. **Business Name (if applicable)**
3. **Email**
4. **Phone Number**
5. **City/Town**
6. **Courses you are interested in taking. Check as many as you wish!**

- ☐ **Improve Your Computer Skills for Free!**
  This is an information workshop to learn about the free computer classes offered in your community.
- ☐ **Introduction to Computer**
  If you are new to computers, or just want to update your skills, this is the course for you.
- ☐ **Internet Safety**
  Staying safe online is essential in today's world. This class teaches you how to keep your information and your computer/devices safe.
- ☐ **Windows 7**
  Learn the basics and features of Windows 7 and personalize it to suit your style.
- ☐ **Windows 10**
  Learn how to manage and take advantage of the new capabilities of Windows 10.
- ☐ **Microsoft Word**
  Learn how to format text, use paragraph dialog boxes, add indents, work with tables and columns and do more with your documents.

- ☐ **Microsoft Excel**
  Learn your way around the Excel 2016 environment. Learn how to insert and delete cells, drag and drop cells, modify rows and columns.
- ☐ **Microsoft Outlook/Email**
  Learn Outlook Setup, Calendar, Tasks, Shortcuts and more.
- ☐ **Microsoft PowerPoint**
  Learn how to create a presentation; add text, graphics, photos, clip art, sound and videos to your slides.
- ☐ **QuickBooks:**
  Become familiar with this easy accounting and budgeting program and customize it for your needs.
  - ☐ QuickBooks Desktop Version
  - ☐ QuickBooks Online Version
- ☐ **Social Media, including FaceBook for Business & Individuals, Twitter, etc.**
  Discover the lesser-known details of presenting your business in a positive and effective way on FaceBook. Get answers to your questions about using other social media platforms.
- ☐ **Gmail, Google Docs**
  Learn how to use this cloud-based program to create and share documents, spreadsheets, presentations, set up a Gmail account and more.
- ☐ **Dropbox**
  Learn how to store and share files, collaborate on projects, etc.
- ☐ **WordPress**
  Find out how to use the software, navigate the administrative area and create your WordPress website.
- ☐ **Library Digital Services**
  Learn how to use Cloud Library to access e-Books

☐ **Aging Well with Technology Workshop**
Learn about the free computer classes that will be offered in your community to:

- Connect through basic technology
- Protect your digital presence
- Use technology for better health
- Get what you need online

- **Connecting through basic technology**
  ☐ Course 1 (2 to 3 classes) includes:
  Introduction to Computer
  Learning about devices – Bring your own Mac laptop, PC laptop, Tablet, iPad, Kindle, Phones
  ☐ Course 2 – (1 to 2 classes) includes:
  Videoconferencing with Family & Friends – FaceTime, Google Hang-out, Zoom, Skype, etc.
  Email Programs – Outlook, Gmail, etc.

- **Protecting your digital presence**
  ☐ Course 1 (1 to 2 classes) includes:
  Internet Safety
  Fraud & Scams
  Protecting you online presence

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- **Using technology for better health**
  - ☐ Course 1 (1 class) includes:
    - Videoconferencing with your healthcare providers
    - HIPPA Compliance – Protecting your health data
  - ☐ Course 2 (1 to 2 classes) includes:
    - Software "Apps" to monitor health
    - Exercise, diet, monitoring blood sugar, blood pressure, weight, medication reminders, using FitBits, Apple Watch, etc., and connecting with Bluetooth

- **Getting what you need online**
  - ☐ Course 1 (1 to 2 classes) includes:
    - Social Media including FaceBook & Twitter
  - ☐ Course 2 (1 to 2 classes) includes:
    - Online newspapers, magazine, e-Books
    - Identifying fake news
    - Online games including puzzles, brainteasers, etc.
    - Creating a community FaceBook group
    - Cutting the Cord – Accessing TV & phone service online

7. **Best day(s) to attend classes (Check all that apply)**
   - ☐ Monday
   - ☐ Tuesday
   - ☐ Wednesday
   - ☐ Thursday
   - ☐ Friday
   - ☐ Saturday

8. **Best times(s) to attend classes (Check all that apply)**
   - ☐ Morning
   - ☐ Afternoon
   - ☐ Early Evening
   - ☐ Other (please specify)

9. **Other Information:**
   Laptops/Computers may be provided for those that do not have their own with applicable software.

   Will you be bringing your own laptop/device?
   - ☐ Yes
   - ☐ No

10. **Would you like to be notified by email about upcoming classes?**
    - ☐ Yes
    - ☐ No

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5 Project Plan – Phase 2

5.1 Determine statistics and create high-level network designs to fill each gap

With the Cable TV system mapping data created in Phase 1 of the Project Plan (Section 3.3), combined with 911 address data, parcel data where available and Google Earth imagery; we have identified the road segments where the Cable TV system can be extended to provide 100% coverage in each community. Maps of these Cable TV gap areas are included for each Town in Section 4.1.1 below, with the light blue (cyan) colored lines representing existing Cable TV system infrastructure and light green lines representing the gap road segments.

For each road segment, we have measured the length and the number of potential subscribers along that road segment, or which would be served by infrastructure along that road segment. Using industry standard design parameters, we have designed road segments to be extended to the second to the last potential subscriber along that segment, with the last potential subscriber to be served by a drop cable connection that is not illustrated on the maps.

The accuracy and currency of 911 address data varies from town to town. As such, we also examined current and historical Google Earth imagery to identify potential subscriber locations not identified with 911 address data. In all most all cases, we have identified more potential subscriber locations than contained in the 911 address data.

Finally, there are a number of lakeside properties where we have assumed the electric distribution system does not parallel roadways. In those instances, we have assumed there are, or could be, utility easements that parallel the lakeshore allowing for more efficient deployment of broadband infrastructure. Examples include: East Shore of Maranacook Lake in Readfield, West Shore of Maranacook Lake in Readfield, and East Shore of Androscoggin Lake in Wayne.

We have also provided tables after each town map listing each road segment currently served by Charter (Spectrum) and each “uncabled” road segment with the corresponding mileage, quantity of potential subscribers and the average potential subscribers count per mile. This is critical information that will be utilized by potential service providers to examine the economic viability of extending service to currently unserved areas.

5.1.1 Cable TV system gaps

The following pages provide a map and statistics table for each of the six (6) WKLCBA towns.

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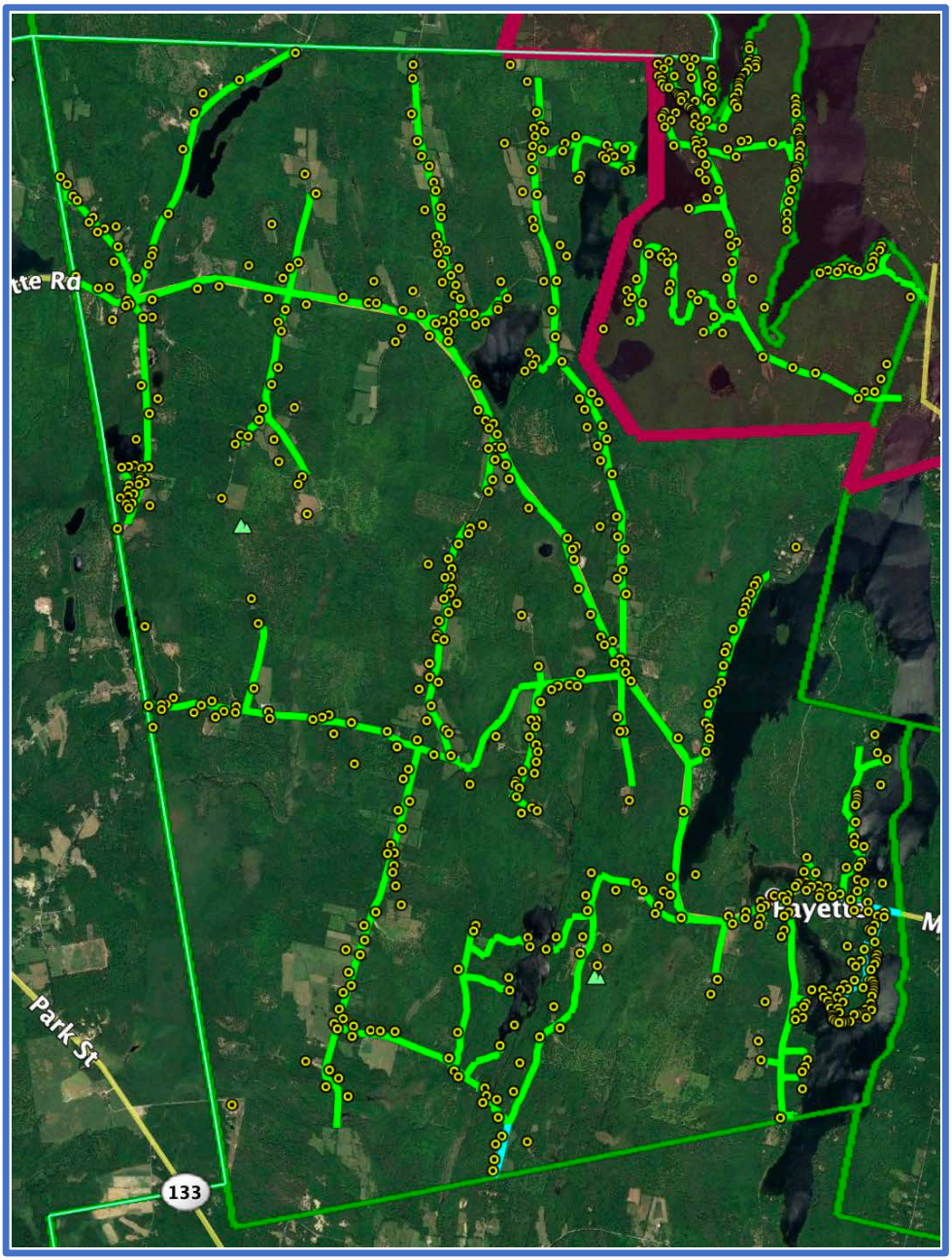
5.1.1.1 Fayette



	Dark Green = Town Boundary
	Red Border with Darkened Landscape Image = Legacy FairPoint Service Territory
	Light Green = Uncabled Road Segments
	Light Blue = Charter (Spectrum) Served Road Segments

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Fayette			
Existing Charter (Spectrum) Potential Subscribers			
Road Segment	Mileage	Quantity	Per Mile
ME-17	0.67	18	26.9
Lovejoy Shores Dr	1.24	46	37.1
Loon Watch Rd	0.10	6	60.0
Water Lily Ln	0.11	3	27.3
Richmond Mills Rd	0.33	4	12.1
Total	**2.45**	**77**	**31.4**

Fayette							
Uncabled Road Segments Potential Subscribers							
Road Segment	Mileage	Quantity	Per Mile	Road Segment	Mileage	Quantity	Per Mile
ME-17	7.25	70	9.7	Knox Hill Rd	0.54	3	5.6
Richmond Mills Rd	1.26	14	11.1	Fayette Ridge Rd	1.10	11	10.0
Oak Hill Rd	0.66	6	9.1	Asa Hutchinson Rd	0.44	6	13.6
Young Rd	1.67	12	7.2	Campground Rd	1.44	20	13.9
Fayette Corner Rd	1.59	10	6.3	Gail Rd	0.28	8	28.6
Bamford Hill Rd	1.73	25	14.5	Burgess Pond Rd	0.10	2	20.0
FR 17-1	0.12	5	41.7	Moose Hill Rd	0.81	13	16.0
Riley Rd	0.61	9	14.8	Limber Lost Rd	0.11	3	27.3
Echo Lodge Rd	0.42	2	4.8	Mosher Pond Rd	2.00	22	11.0
Mitchell Ln	0.17	4	23.5	West Rd	0.64	6	9.4
Point Drive on Echo Lake Rd	0.17	4	23.5	Jackmans Mill Rd	0.61	13	21.3
N Wayne Rd	1.38	13	9.4	North Rd	1.58	25	15.8
Taylor Ln	0.10	2	20.0	East Rd	3.89	49	12.6
Foster Ln	0.11	2	18.2	Tilton Pond Rd	0.21	5	23.8
Woods Ln	0.21	3	14.3	David Pond Rd	0.63	14	22.2
Clyde Wells Rd	0.11	2	18.2	Blue Jay Way	0.29	6	20.7
Sydney Rd	0.10	3	30.0	Black Bird Way	0.10	5	50.0
Maple Ln	0.11	4	36.4	Flagg Rd	0.20	5	25.0
Tom Surret Rd	0.32	2	6.3	Sandy River Rd	2.93	37	12.6
Echo Lake Rd	1.33	30	22.6	Our Rd	0.10	3	30.0
Norton Rd	0.69	5	7.2	Shore Rd	1.76	24	13.6
Gile Rd	0.87	18	20.7	Basin Rd	0.16	1	6.3
South Rd	2.41	29	12.0	Hemlock Ln	0.21	5	23.8
Bamford Pond Rd	0.87	4	4.6	Deer Ln	0.40	13	32.5
Bp 1	0.28	2	7.1	Rocky Ln	0.36	25	69.4
Piddock Ln	0.44	2	4.5	Quimby Ln	0.32	16	50.0
Barett Ln	0.37	2	5.4	Fellows Cove Rd	0.70	32	45.7
Paddleford Rd	0.30	2	6.7	Fellows Farm Rd	1.13	28	24.8
M Springer Rd	0.10	2	20.0	Fellows Farm Rd South	0.42	11	26.2
Baldwin Hill Rd (north)	0.36	5	13.9	Dolloff Woods Rd	0.70	8	11.4
Baldwin Hill Rd (south)	1.53	32	20.9	Dorothy Ln	0.12	4	33.3
				Total	**51.92**	**748**	**14.4**

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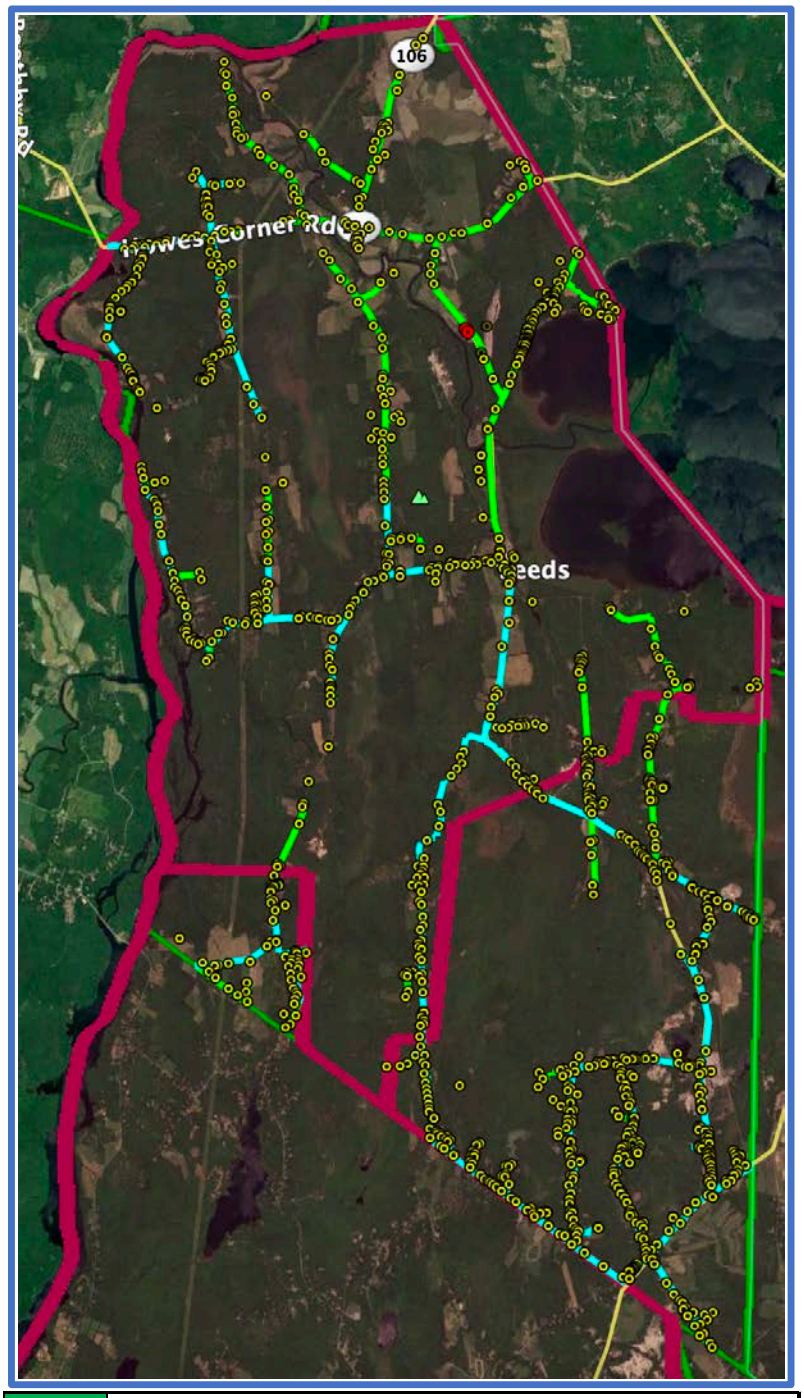
5.1.1.2 Leeds



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Leeds							
Existing Charter (Spectrum) Potential Subscribers				Uncabled Road Segments Potential Subscribers			
Road Segment	Mileage	Quantity	Per Mile	Road Segment	Mileage	Quantity	Per Mile
River Road (south)	2.99	53	17.7	Howes Corner Rd (east)	0.15	4	26.7
Fish St (south)	0.50	7	14.0	Benson Dr	0.10	2	20.0
Corvella St	0.23	10	43.5	Woodchuck E Ln	0.10	2	20.0
Sand Hill Rd	0.05	1	20.0	Drewy Dr	0.24	2	8.3
River Road (north)	1.48	29	19.6	River Trail	0.10	2	20.0
Howes Corner Rd	1.00	18	18.0	Fish St	0.64	9	14.1
Fish St (north)	1.67	18	10.8	Church Hill Rd (south)	0.63	7	11.1
Morris Ln	0.12	2	16.7	Church Hill Rd (north)	0.10	3	30.0
Mountain View Rd	0.53	20	37.7	N Line Rd	0.72	7	9.7
Sedgley Rd	0.75	17	22.7	Fairview Dr	0.12	3	25.0
Woodman Ln	0.18	2	11.1	Anson Rd	0.19	4	21.1
North Rd	0.80	10	12.5	Waltons Way	0.10	2	20.0
Austin Rd	0.19	5	26.3	Bush Rd	0.28	7	25.0
Plains Rd	**0.71**	15	21.1	Austin Rd	0.16	2	12.5
Hartford Rd	0.37	11	29.7	Herrin Dr	0.05	2	40.0
Keeran Ln	0.05	1	20.0	Ambrose Way	0.10	2	20.0
Robertson Ln / Plains Rd	0.12	4	33.3	Levesque Ln	0.10	2	20.0
Kenney Rd	1.45	43	29.7	Burnt Piece Dr	0.10	3	30.0
Melanson Dr	0.20	2	10.0	Tricia Cir	0.10	2	20.0
Rioux Dr	0.10	4	40.0	Plains Rd	0.18	3	16.7
Roger Sumner Rd	1.70	52	30.6	Lowmoor Dr	0.17	6	35.3
Dell Dr	0.10	2	20.0	Libby Rd	0.58	5	8.6
Star Dr	0.18	8	44.4	Bishop Hill Rd	2.63	35	13.3
Walter Dr	0.05	1	20.0	Murphy Dr	0.13	2	15.4
Leeds Junction Rd	0.86	20	23.3	Wilson Pond Rd	0.10	3	30.0
Brook Hill Dr	0.19	3	15.8	Monarch Ln	0.12	2	16.7
US-202	1.43	31	21.7	Bernie Harford Rd	0.77	9	11.7
ME-106 (south)	2.10	39	18.6	ME-106 (south)	2.76	20	7.2
ME-106 (north)	0.11	4	36.4	Lakeshore Dr	1.42	51	35.9
ME-106	3.59	46	12.8	Screaming Eagle Dr	0.10	2	20.0
Bogg Rd	0.99	23	23.2	Anne St	0.12	5	41.7
Church Hill Rd	2.14	44	20.6	Stinchfeld Beach Rd	0.34	1	2.9
Camero Dr	0.14	**4**	28.6	Cove Rd	0.14	3	21.4
Alden Rd	0.64	14	21.9	Point Ln	0.34	10	29.4
Charlton pl	0.15	4	26.7	Howes Corner Rd (further east)	2.28	17	7.5
Depot St	0.14	2	14.3	Gould Rd	0.23	4	17.4
Church Hill Rd (south)	1.31	45	34.4	Rolling Knoll Dr	0.15	7	46.7
Jordan Dr	0.36	6	16.7	North Rd	2.10	23	11.0
Anson Rd	0.44	15	34.1	Fortin Dr	0.11	3	27.3
Quaker Ridge Rd	3.68	68	18.5	Bryant Rd	0.27	2	7.4
Mateuse St	0.27	8	29.6	Me-106 (north)	1.69	18	10.7
Waltons Way	0.10	1	10.0	Knapp Rd	0.73	6	8.2
Country View Dr	0.19	9	47.4	Campbell Rd	1.56	24	15.4
Curtis Dr	0.25	7	28.0				
Line Rd	1.96	24	12.2		**23.10**	**328**	**14.2**
Bernie Harford Rd	0.98	20	20.4				
King Rd	0.12	5	41.7				
Jennings Rd (east)	0.11	4	36.4				
Jennings Rd (west)	0.50	12	24.0				
	38.27	**793**	**20.7**				

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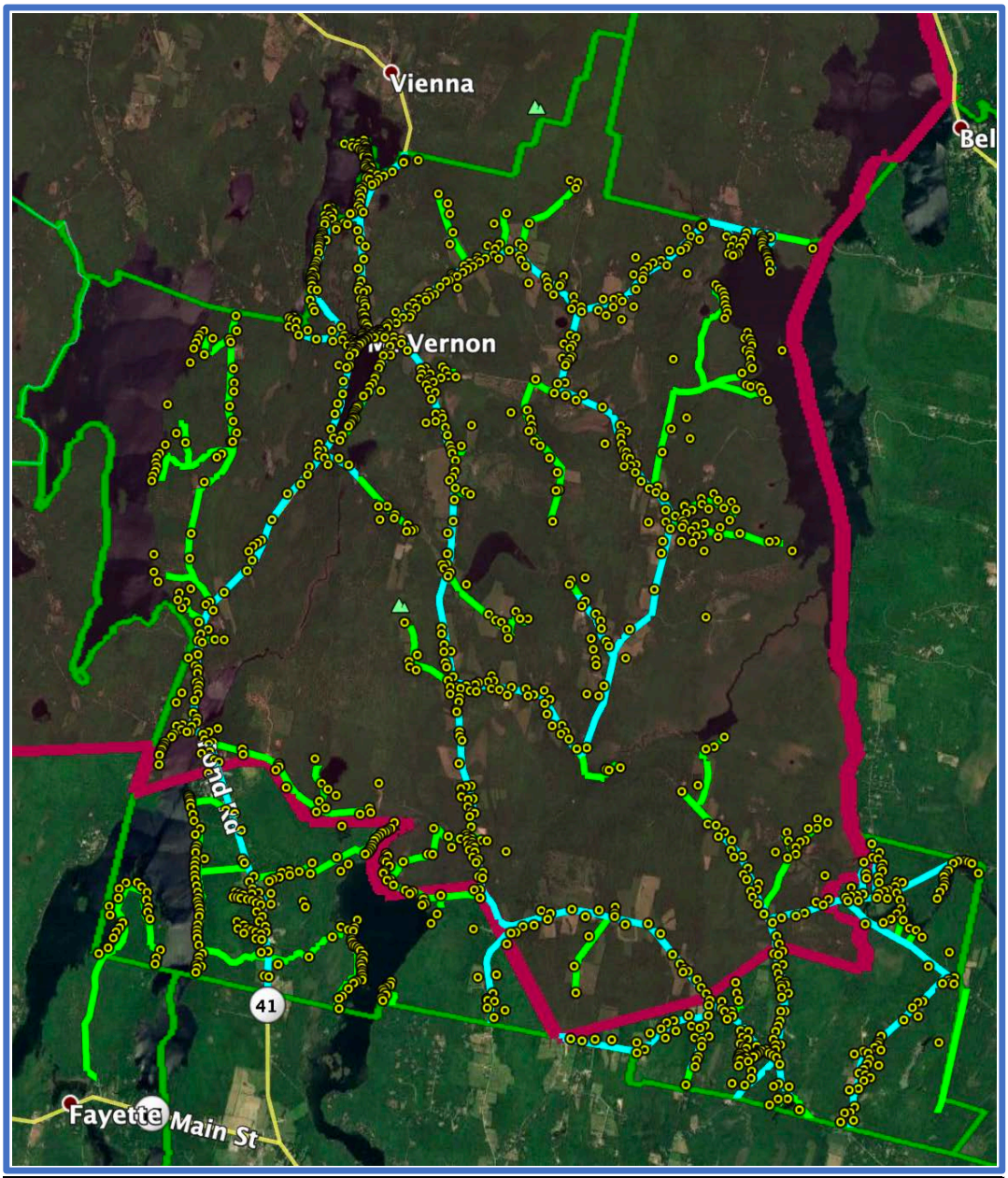
5.1.1.3 Mount Vernon



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Mount Vernon			
Existing Charter (Spectrum) Potential Subscribers			
Road Segment	Mileage	Quantity	Per Mile
Pig Dog Ln	0.05	2	40.0
Cottle Hill Rd	0.94	17	18.1
Fogg Rd (south)	0.05	1	20.0
Curier Hill Rd	0.10	3	30.0
Sadie Dunn Rd	1.26	24	19.0
Dunns Corner Rd	1.10	19	17.3
Fire Rd DC-1	0.46	16	34.8
Starr Ln	0.10	2	20.0
North Rd (north)	7.86	99	12.6
Minnehonk Rd	0.62	13	21.0
Max Ln	0.10	2	20.0
Desert Pond Rd	0.10	1	10.0
ME-41 - Pond Rd	7.74	122	15.8
Pine Grove Rd	0.20	8	40.0
Breezy Acre Trail	0.19	7	36.8
Debbie's Rd	0.12	2	16.7
Sandy River Rd	0.16	5	31.3
Echo Lake Rd	0.37	10	27.0
Staples Dr	0.11	2	18.2
Blake Hill Rd	0.37	4	10.8
Crest Dr	0.69	16	23.2
Teaberry Ln	1.10	32	29.1
Russ Point Rd	0.27	4	14.8
Blue Haven Ln	0.14	4	28.6
Fire Rd V-3	0.48	24	50.0
Belgrade Rd	3.58	71	19.8
Stoney Brook Dr	0.05	1	20.0
Old Rome Rd	0.10	1	10.0
Readfield Church Rd	0.87	12	13.8
Wings Mill Rd	3.24	46	14.2
Dunn Rd	0.48	8	16.7
Marble Point Rd	0.33	4	12.1
Deer Run	0.27	7	25.9
Crank Rd	1.17	11	9.4
Plains Rd	1.54	30	19.5
Bean Rd	5.73	62	10.8
S Taylor Rd	0.60	11	18.3
Laposa Dr	0.12	2	16.7
Pinewood Point	0.32	11	34.4
Arden Cove Ln	0.13	4	30.8
Castle Island Rd	0.58	11	19.0
Total	**43.79**	**731**	**16.7**

Uncabled Road Segments Potential Subscribers			
Road Segment	Mileage	Quantity	Per Mile
Carr Hill Rd	0.67	5	7.5
Hannahs Way	0.35	2	5.7
Old Rome Rd	0.71	4	5.6
Laposa Dr	0.10	5	50.0
Journeys End Rd	0.85	5	5.9
Porcupine Ridge Rd	0.95	13	13.7
Bonzo's Hollow Rd	0.51	7	13.7
Lake Ridge Rd	0.96	9	9.4
Long Acres Rd	0.97	17	17.5
Poplar Point Rd	0.64	14	21.9
Cottle Hill Rd (north)	0.26	0	0.0
Karabin Rd	0.24	3	12.5
Fire Rd R-4	0.15	3	20.0
Ingham Pond Rd	0.73	4	5.5
Cottle Hill Rd (south)	0.54	1	1.9
Spring Hill Rd	0.91	10	11.0
Bogg Rd	0.17	3	17.6
Unnamed Rd off of Crank Rd	0.18	3	16.7
Bull Moose Ln	0.12	2	16.7
Ratt Mill Hill Rd	0.23	2	8.7
Whitney Rd	1.00	5	5.0
Fogg Rd	0.69	3	4.3
Coryell Ln	0.49	2	4.1
Audrey Ln	0.10	2	20.0
Harold Ln	0.10	3	30.0
Hubert Ln	0.14	2	14.3
Desert Pond Rd (east)	0.26	4	15.4
Weston Rd	0.56	3	5.4
Columbine Ln	0.17	7	41.2
Point-O-View Rd	0.26	4	15.4
Chase Rd	0.20	8	40.0
Quiet Harbor Rd	1.47	29	19.7
Five Seasons Rd	1.30	25	19.2
Desert Pond Rd (west)	1.56	13	8.3
Goucher Dr	0.78	8	10.3
Fire Rd D-4	0.39	5	12.8
North Rd	0.15	1	6.7
S Taylor Rd	0.12	2	16.7
Mooar Hill Rd	0.25	2	8.0
Laposa Dr	0.10	6	60.0
N Taylor Rd	1.28	13	10.2
Cogswell Rd	0.13	2	15.4
Hovey Luce Rd	0.77	6	7.8
Unnamed Rd at end of Hovey Luce Rd	0.23	3	13.0
Utility easement between ME-41 & Echo Lake	0.41	0	0.0
Skoglund Rd / Turtle Ln / Hight Ln	0.94	24	25.5
Old Camp Rd	0.36	5	13.9
Point Drive on Echo Lake Rd	2.40	21	8.8
Shaws Ln	0.10	2	20.0
Walton Mills Rd	0.16	2	12.5
Kirk Rd	0.31	4	12.9
Ithiel Gordon Rd	2.64	15	5.7
Tremolo Point	0.25	3	12.0
Walter Green Rd	0.81	5	6.2
Foxfire Rd	0.44	7	15.9
Barnstow / Grants Point Rds	0.42	8	19.0
Dill Rd	0.40	3	7.5
Bowen Mountain Rd	0.33	3	9.1
Blake Hill Rd	0.65	10	15.4
Mooar Hill Rd (west)	0.27	6	22.2
Halls Dr	0.12	2	16.7
Unnamed Rd off of Dunns Corner Rd	0.17	3	17.6
Jupiter Hallow	0.10	2	20.0
Minnehonk Lake Rd	0.38	14	36.8
Castle Island Rd	0.28	1	3.6
Total	**34.68**	**410**	**11.8**

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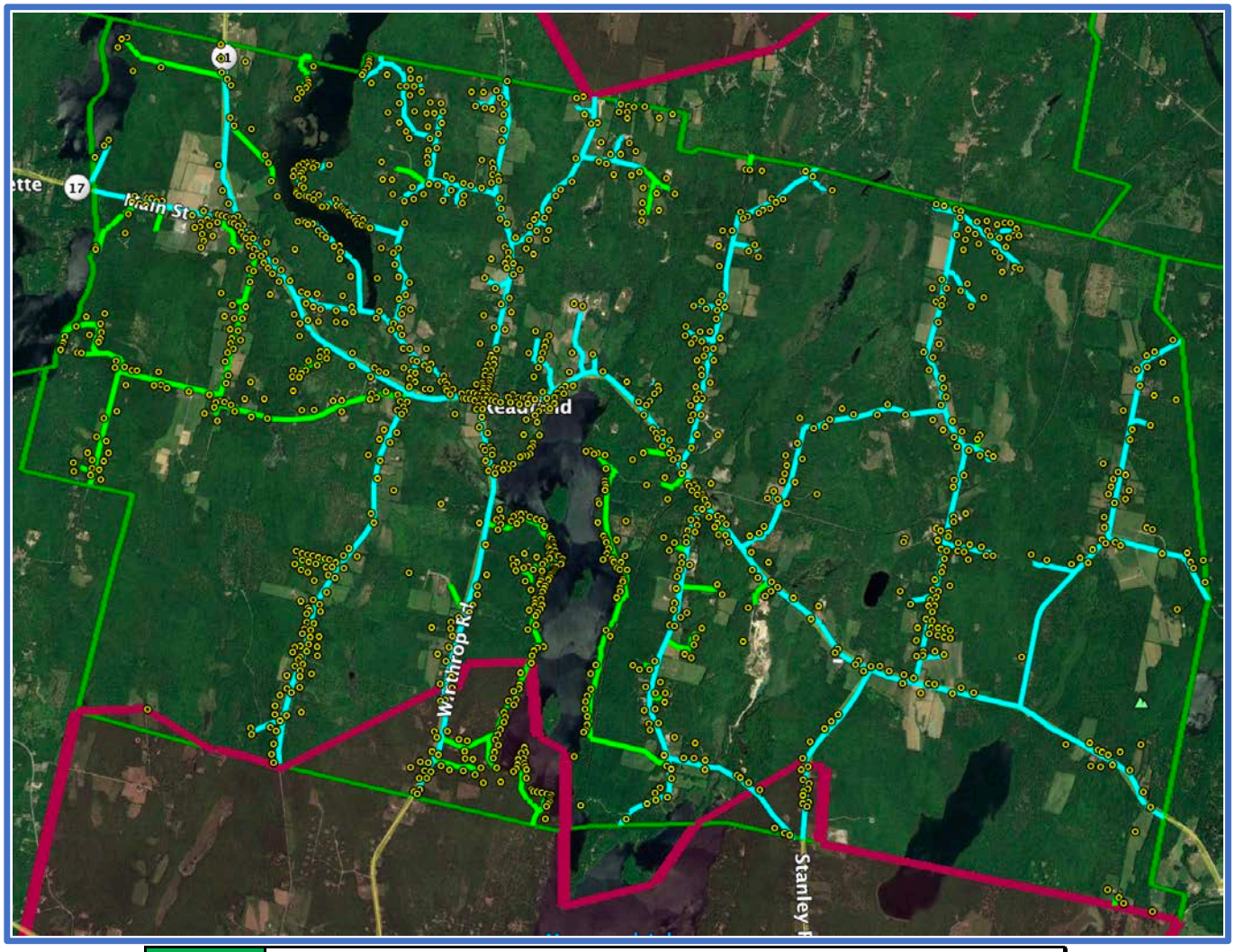
5.1.1.4 Readfield



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Readfield							
Existing Charter (Spectrum) Potential Subscribers				Uncabled Road Segments Potential Subscribers			
Road Segment	Mileage	Quantity	Per Mile	Road Segment	Mileage	Quantity	Per Mile
Giles Rd	0.24	6	25.0	Davies Ln	0.72	7	9.7
Song Bird Ln	0.10	1	10.0	Quiet Harbor Rd	0.34	9	26.5
Old Stage Rd	0.80	13	16.3	Beans Mills Rd	0.45	5	11.1
Thundercastle Rd (south)	0.73	14	19.2	Stone Hill Rd	0.23	4	17.4
Torsey Shores Rd	1.10	45	40.9	Walker Rd	0.23	3	13.0
Chase Rd	1.49	31	20.8	Frost Ln	0.24	5	20.8
Thundercastle Rd (north)	0.23	6	26.1	North Rd	0.10	2	20.0
Bethany Ln	0.13	3	23.1	Four Winds Dr	0.10	2	20.0
Wilson Way	0.17	6	35.3	Case Rd	0.10	4	40.0
Mooer Rd	0.23	7	30.4	Gravel Pit Rd	0.17	2	11.8
Badger Ln	0.13	1	7.7	Adell Rd	0.13	3	23.1
Zeppelin Ln	0.13	2	15.4	Ledgewood Dr	0.23	3	13.0
Broadview Heights Dr	0.24	5	20.8	Quarry Dr	0.27	5	18.5
Poole Rd	**0.15**	2	13.3	Partridge Hollow Ln	0.10	2	20.0
Sunrise Ln	0.13	2	15.4	East Shore of Maranacook Lake	2.52	79	31.3
Walker Rd	0.40	8	20.0	Newton Rd	0.19	2	10.5
Roddy Ln	0.18	2	11.1	Mace's Cottage Rd	0.20	3	15.0
Somers Dr	0.10	2	20.0	Fenn Way	0.10	2	20.0
Liberty Ln	0.05	2	40.0	Autumn Crest Ln	0.10	3	30.0
Old Fairgrounds Rd	0.42	9	21.4	Campers Point Rd	0.30	14	46.7
Millard Harrison Dr	0.43	2	4.7	Nobis Point Rd	0.41	12	29.3
Private Rd off of ME-17	0.12	1	8.3	Cove Rd	0.30	9	30.0
Butman Blvd	0.23	11	47.8	Poulin Dr	0.32	9	28.1
Terrace Rd	0.18	5	27.8	West Shore of Maranacook Lake	2.20	84	38.2
Tingley Brook	0.17	3	17.6	Morgan Ln	0.10	3	30.0
Plains Rd	3.17	61	19.2	Maranacook Shore Rd	0.21	9	42.9
Gorden Rd	2.68	30	11.2	Squirrel Hill Ln	0.10	2	20.0
Scribner Hill Rd	0.79	10	12.7	Red Sox Dr	0.10	2	20.0
ME-41 / Chimney Rd	1.24	13	10.5	Balsam Dr	0.20	2	10.0
Sturtevant Hill Rd	2.51	62	24.7	Russell St	0.34	14	41.2
Huntoon Rd	0.22	3	13.6	Nickerson Hill Rd	1.27	18	14.2
ME-17	8.54	178	20.8	P Ridge Rd	1.11	25	22.5
Winthrop Rd	2.59	48	18.5	Harmony Hills Rd	0.31	12	38.7
Church Rd	2.14	48	22.4	Lane Rd	0.67	9	13.4
Fogg Rd	1.17	17	14.5	N Wayne Rd	0.74	15	20.3
South Rd	1.67	36	21.6	Joy Fields Ln	0.10	2	20.0
Tallwood Rd	0.58	10	17.2	Camp Menatoma Rd	0.36	4	11.1
Beaver Dam Rd	0.98	14	14.3	Camp Menatoma Rd Ext	0.53	16	30.2
Stanley Rd	1.17	19	16.2	Kentwood Dr	0.17	3	17.6
Luce Rd	1.84	22	12.0	Grasshoper Ln	0.42	5	11.9
Wings Mill Rd	0.61	11	18.0	Rodrigue Ln	0.10	2	20.0
North Rd	1.70	34	20.0	Husky	0.26	3	11.5
Avery Ln	0.32	6	18.8				
Beans Mill Rd	0.10	1	10.0	**Total**	**17.14**	**419**	**24.4**
Old Kents Hill Rd	1.31	33	25.2				
Whitcomb Dr	0.14	1	7.1				
Barber Dr	0.17	3	17.6				
Zarella Ln	0.10	2	20.0				
Brainard Rd	0.15	2	13.3				
Ratt Mill Hill Rd	0.15	2	13.3				
Gay Rd	0.53	14	26.4				
Marden Rd	0.18	6	33.3				
Parkview Ct	0.28	4	14.3				
McKenney Rd	0.28	3	10.7				
Lucasville Ln	0.31	8	25.8				
Berry Rd	0.14	6	42.9				
Ledge Hill Terrace	0.14	2	14.3				
Wildlife Dr	0.27	2	7.4				
Edgecomb Dr	0.12	1	8.3				
	46.57	**901**	**19.3**				

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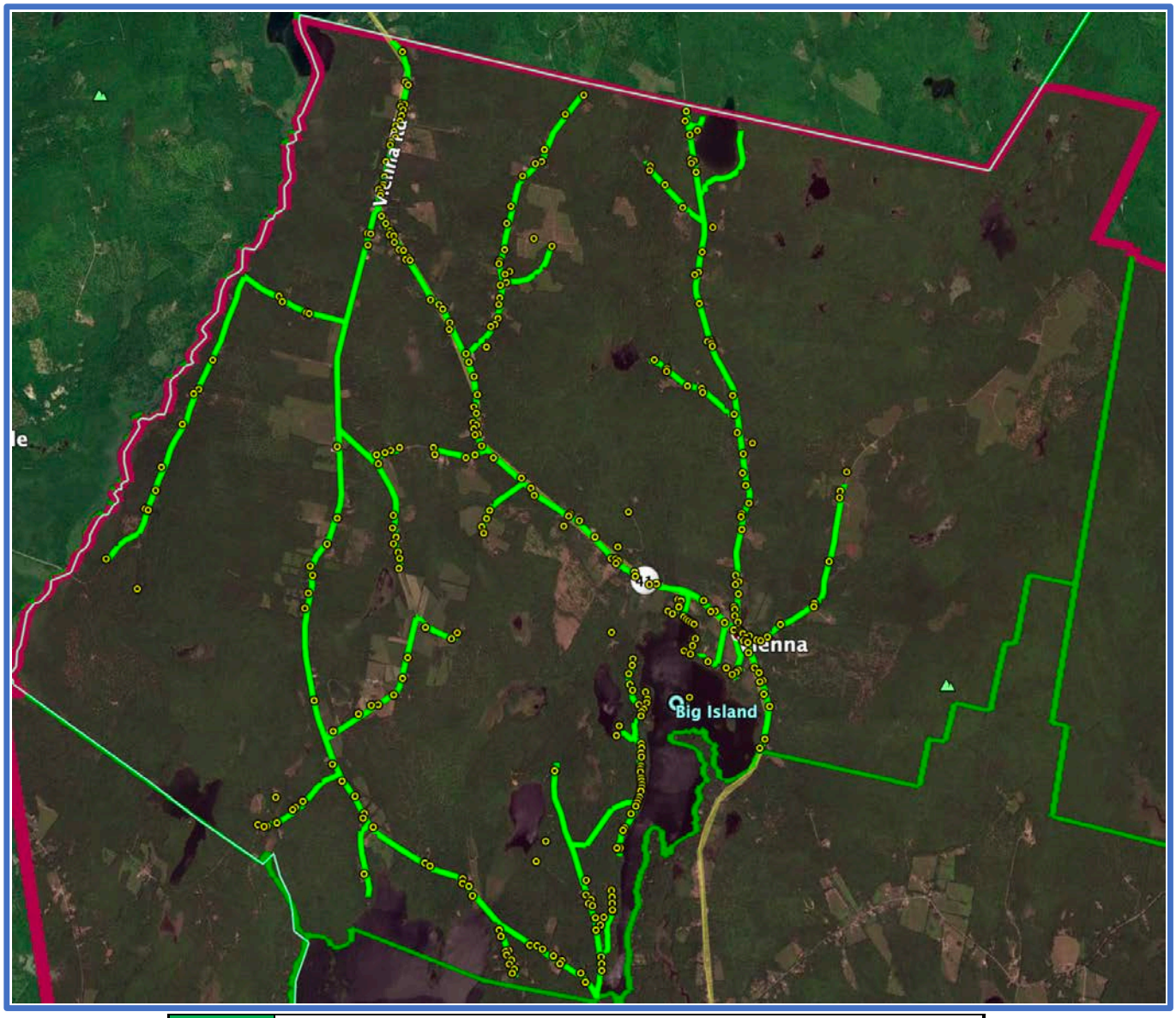
5.1.1.5 Vienna



	Dark Green = Town Boundary
	Red Border with Darkened Landscape Image = Legacy FairPoint Service Territory
	Light Green = Uncabled Road Segments
	Light Blue = Charter (Spectrum) Served Road Segments

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Vienna			
Uncabled Road Segments Potential Subscribers			
Road Segment	Mileage	Quantity	Per Mile
Seavey Point Rd	5.57	45	8.1
Route 41	5.44	107	19.7
Kimball Pond Rd	3.30	38	11.5
Vienna Mt Rd	1.25	16	12.8
Jesse Ladd Rd	0.65	8	12.3
Day Rd	0.57	14	24.6
Avery Ln	0.14	10	71.4
Anderson Rd	0.53	4	7.5
Davis Rd	1.86	20	10.8
Goucher Corner Rd	0.43	4	9.3
Besse Rd (west)	0.32	4	12.5
Besse Rd (east)	0.20	4	20.0
Trask Rd	0.39	6	15.4
Waugh Rd	0.14	5	35.7
Waite Rd	0.22	5	22.7
Bradley Rd	0.38	6	15.8
Cemetary Rd	0.32	5	15.6
Klirbeck Rd	1.39	15	10.8
Herrin Woods Rd	0.40	12	30.0
Overland Connection to Vienna Shores Rd	0.50	0	0.0
Viena Shores Rd	0.73	22	30.1
North Woods Rd	0.51	10	19.6
Theriault Dr	0.10	4	40.0
Bean Farm Rd	0.95	9	9.5
Cumner Rd (south)	0.29	3	10.3
Cumner Rd (north)	0.98	11	11.2
Ithiel Gordon Rd	0.32	13	40.6
Unnamed Rd (north end of Parker Pond)	0.44	2	4.5
Egypt Pond Rd	0.54	8	14.8
Stream Rd	2.63	18	6.8
Total	**31.49**	**428**	**13.6**

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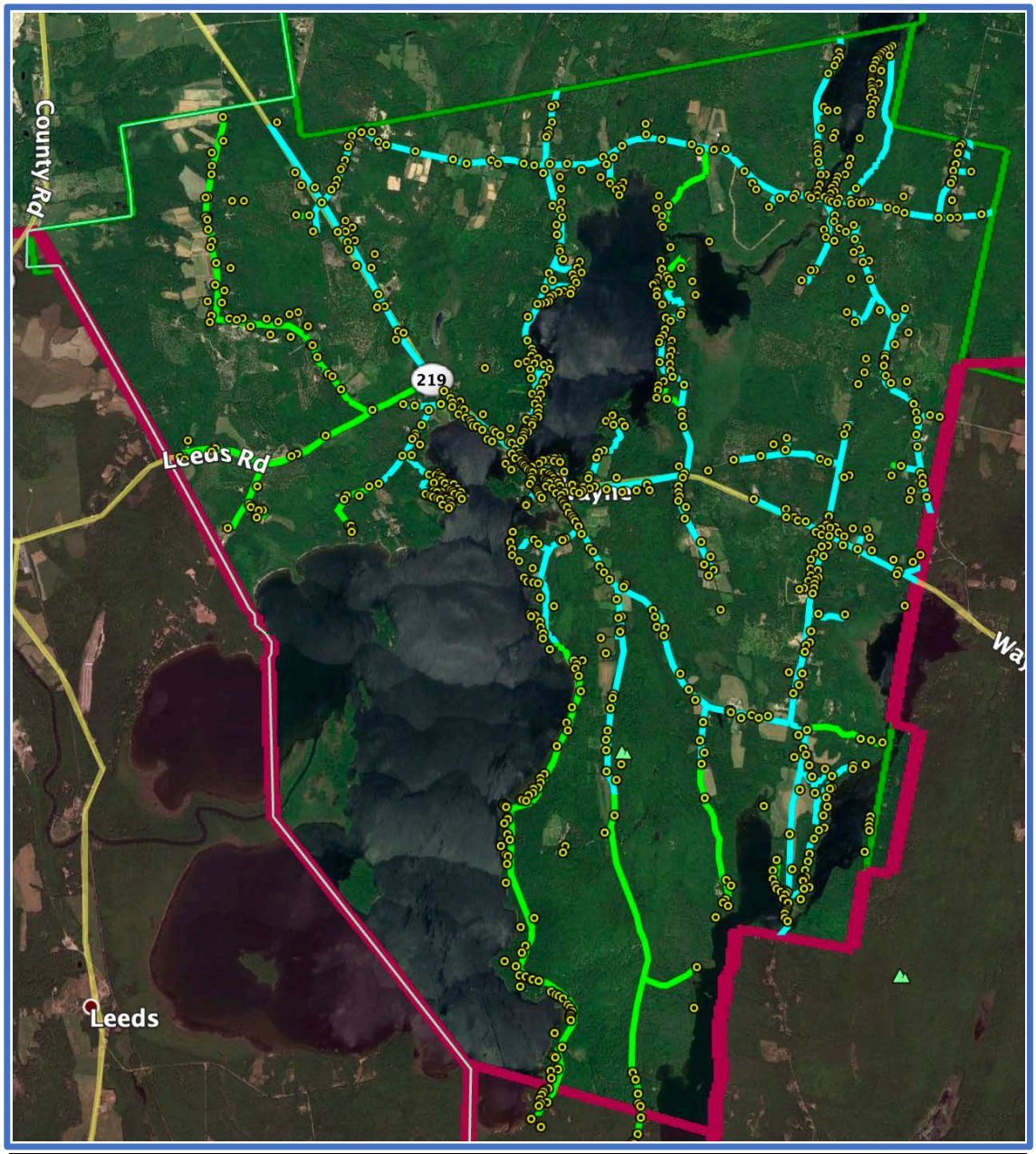
5.1.1.6 Wayne



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	Light Blue = Charter (Spectrum) Served Road Segments

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Wayne			
Existing Charter (Spectrum) Potential Subscribers			
Road Segment	Mileage	Quantity	Per Mile
Gott Rd	0.83	11	13.3
Davis Point Rd	0.22	8	36.4
Morrison Heights Rd	1.26	15	11.9
Doles Beach Rd	0.10	1	10.0
FR np1	0.10	1	10.0
Sable Ln	0.16	6	37.5
ME-133	3.75	100	26.7
Pine Needle Alley	0.10	2	20.0
Jamison Ln	0.15	3	20.0
Richmond Mills Rd	0.49	6	12.2
Pond Rd	1.90	47	24.7
Murray Rd	0.10	2	20.0
Private Dr off of Pond Rd	0.10	1	10.0
Mullen Rd	**0.21**	1	4.8
King Hwy	0.51	9	17.6
Berry Rd	1.22	13	10.7
Walton Rd	1.82	20	11.0
Kents Hill Rd	1.11	22	19.8
Innes Ridge Rd	0.52	8	15.4
Private Rd off of Innes Ridge Rd	0.10	1	10.0
Fr Kh-7	0.10	1	10.0
Fr Kh-3	0.10	1	10.0
Tall Timbers Rd	1.00	31	31.0
Church St	0.19	8	42.1
Lovejoy Pond Rd	1.10	21	19.1
Lonefeather Ln	0.10	3	30.0
Wing Ln	0.15	4	26.7
N Wayne Rd	2.20	33	15.0
Hathaway Rd	0.15	2	13.3
Farnham Rd	0.13	1	7.7
Fr NW-2	0.10	1	10.0
White Rd	0.46	5	10.9
Howard Hill Rd	0.27	2	7.4
Fr NW-9	0.11	1	9.1
Coolidge Rd	0.32	3	9.4
Leadbetter Rd	0.59	9	15.3
West Acre Rd	0.41	20	48.8
Fr A1A	0.10	0	0.0
Wood Rd	0.18	16	88.9
Memorial Park Ln	0.20	8	40.0
Lake St	0.10	4	40.0
Bellafonda Rd	0.16	9	56.3
Ice House Ln	0.10	1	10.0
Pocasset Ridge Rd	0.54	11	20.4
Lord Rd	1.41	29	20.6
Besse Rd	0.59	12	20.3
Old Winthrop Rd	2.17	36	16.6
Mt Pisgah Rd	1.31	19	14.5
House Rd	0.35	4	11.4
Fr MP4 & Fr MP7	0.78	19	24.4
Fuller Rd	0.43	7	16.3
Dexter Pond Rd	0.10	1	10.0
Fairbanks Rd	1.17	23	19.7
Green True Rd	0.70	8	11.4
Old School House Rd	0.10	2	20.0
Old Readfield Rd	0.66	5	7.6
Taylor Line Rd	0.10	1	10.0
Wayne Rd	1.11	20	18.0
Fr-W5	0.10	3	30.0
Cross Rd	0.11	2	18.2
Shoat Rd	0.25	2	8.0
	35.05	**665**	**19.0**

Uncabled Road Segments Potential Subscribers			
Road Segment	Mileage	Quantity	Per Mile
Mullen Rd	0.12	3	25.0
Jameson Ln	0.11	6	54.5
Fire Rd Np3A	0.18	1	5.6
Jennings Stream Rd	0.41	6	14.6
Fr NW-9	0.10	2	20.0
Winona Way	0.30	12	40.0
Windecker Way	0.20	6	30.0
Besse Rd	0.10	3	30.0
Brandgon Estates Way	0.10	4	40.0
Dexter Pond Rd	0.45	3	6.7
Fr Mp-6	0.23	6	26.1
House Rd	0.89	7	7.9
Hardscrabble Rd	2.34	15	6.4
Ladd Rd	0.32	2	6.3
East Shore Androscoggin Lake	3.28	76	23.2
Leeds Rd	1.66	10	6.0
Strickland Ferry Rd	1.22	18	14.8
Tucker Rd	1.30	20	15.4
Cove Rd	0.45	2	4.4
Lincoln Circle Rd	0.17	6	35.3
Leadbetter Rd	0.46	8	17.4
Total	**14.39**	**216**	**15.0**

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5.1.2 Fiber-to-the-Home gaps

Our investigation reveals there is no Fiber-to-the-Home (FTTH) infrastructure deployed within the study area. As such, the FTTH gaps are equal to the sum of the road segments currently served by a Cable TV system and the roads that are currently uncabled.

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5.1.3 Minimum 25Mbps/3Mbps DSL gaps

Consolidated Communications (CCI) is the incumbent local telephone company across the six (6) towns represented by WKLCBA through a combination of the legacy FairPoint systems and legacy Verizon systems. CCI has shared maps of their service availability and statistical tables of their speed capabilities, with the promise that we not publish the material. The maps and tables will be provided to the select board of each participating town and those who wish to view the materials may do so by contacting the towns.

For purposes of this report, we have summarized the information for each town by the quantity of potential subscribers who have no DSL service availability, those with service capability of less than 10Mbps/1Mbps and those with service capability of less than 25Mbps/3Mbps. All three (3) of these categories are considered to be "unserved" by the ConnectMaine Authority and eligible for funding through their Implementation Grant program, provided there is no other service provider who provides service with a capability greater than 25Mbps/3Mbps at that address.

It is important to note that not all potential subscriber addresses are in the CCI systems. Only those addresses which have or previously had a CCI service are contained in their systems.

Consolidated Communications - DSL Coverage							
	Fayette	Leeds	Mount Vernon	Readfield	Vienna	Wayne	Total
Total Potential Subscribers per 911 & Imagery Analysis	**825**	**1,121**	**1,141**		**428**	**881**	**9,346**
Addresses in CCI systems	**754**	**897**	**1,120**		**383**	**582**	**8,260**
No service	**40**	**0**	**179**		**0**	**271**	**730**
Percent	*5%*	*0%*	*16%*	*#DIV/0!*	*0%*	*31%*	*8%*
Less than 10Mbps/1Mbps	**179**	**224**	**133**		**36**	**370**	**2,016**
Percent	*22%*	*20%*	*12%*	*#DIV/0!*	*8%*	*42%*	*22%*
Less than 25Mbps/3Mbps	**685**	**836**	**964**		**383**	**556**	**7,534**
Percent	*83%*	*75%*	*84%*	*#DIV/0!*	*89%*	*63%*	*81%*

Because we do not have access to CCI's cable plant records to determine the direction the cable is fed, the wire gauge of the copper cables or their condition, it is impossible to estimate the cost to expand the availability and capability for improving service using DSL technology to speeds in excess of 25Mbps/3Mbps.

As of this writing, we are awaiting the coverage statistics for the Town of Readfield. This report will be updated when that information becomes available.

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5.2 High-level capital cost estimates

The table below consolidates all of the individual town metrics and utilizes those metrics to provide a high-level cost estimate to extend the Cable TV system to cover 100% of the potential subscribers in each town and the high-level cost estimate to construct a FTTH system for each community. Each line item is discussed below the table.

	B	C	D	E	F	G	H	I	J
1	**Town Metrics**								
2			Fayette	Leeds	Mount Vernon	Readfield	Vienna	Wayne	Total
3	Cable TV Mileage		2.5	38.3	43.8	46.6	0.0	35.1	**166.1**
4	Potential Subscribers		77	793	731	901	0	665	**3,167**
5	Average per mile		**31.4**	**20.7**	**16.7**	**19.3**	**0.0**	**19.0**	**19.1**
6									
7	Uncabled Mileage		51.9	23.1	34.7	17.1	31.5	14.4	**172.7**
8	Potential Subscribers		748	328	410	419	428	216	**2,549**
9	Average per mile		**14.4**	**14.2**	**11.8**	**24.4**	**13.6**	**15.0**	**14.8**
10									
11	Total Potential FTTH Subscribers		**825**	**1,121**	**1,141**	**1,320**	**428**	**881**	**5,716**
12	Potential FTTH Subs per Mile Avg		**15.2**	**18.3**	**14.5**	**20.7**	**13.6**	**17.8**	**16.9**
13	Total FTTH Mileage		**54.4**	**61.4**	**78.5**	**63.7**	**31.5**	**49.4**	**338.9**
14	**Cable TV Extension**								
15	Cost per mile	**$45,000**	$2,336,400	$1,039,500	$1,560,600	$771,300	$1,417,050	$647,550	**$7,772,400**
16									
17	**Fiber-to-the-Home High-level Estimate**								
18	Poles per mile	**33**	1,794	2,025	2,590	2,102	1,039	1,632	**11,182**
19	Make-ready per pole	**$400**	$717,684	$810,084	$1,035,804	$840,972	$415,668	$652,608	**$4,472,820**
20	Annual License per pole	**$20**	$35,884	$40,504	$51,790	$42,049	$20,783	$32,630	**$223,641**
21	Backbone Construction	**$25,000**	$1,359,250	$1,534,250	$1,961,750	$1,592,750	$787,250	$1,236,000	**$8,471,250**
22	Central Office Construction	**$250,000**	$125,000	$125,000	$125,000	$125,000	$125,000	$125,000	**$750,000**
23	Subscriber Drops	**$1,000**	$825,000	$1,121,000	$1,141,000	$1,320,000	$428,000	$881,000	**$5,716,000**
24	Subtotal		**$3,026,934**	**$3,590,334**	**$4,263,554**	**$3,878,722**	**$1,755,918**	**$2,894,608**	**$19,410,070**
25									
26	Project Management	**10%**	$302,693	$359,033	$426,355	$387,872	$175,592	$289,461	**$1,941,007**
27	Contingency	**10%**	$302,693	$359,033	$426,355	$387,872	$175,592	$289,461	**$1,941,007**
28	Total		**$3,632,321**	**$4,308,401**	**$5,116,265**	**$4,654,466**	**$2,107,102**	**$3,473,530**	**$23,292,084**
29									
30	Difference between Cable & FTTH		**$1,295,921**	**$3,268,901**	**$3,555,665**	**$3,883,166**	**$690,052**	**$2,825,980**	**$15,519,684**

B3 - Cable TV Mileage – Total mileage of existing Cable TV infrastructure within each town.

B4 – Potential Subscribers – Total calculated quantity of potential subscribers who can be served by the existing Cable TV infrastructure within each town.

B5 – Average per mile – The average quantity of potential subscribers per mile across the existing Cable TV infrastructure in each town.

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B7 – Uncabled Mileage – Total mileage of road segments within each community not served by Cable TV infrastructure.

B8 – Potential Subscribers - Total calculated quantity of potential subscribers who could be served by extending the Cable TV infrastructure within each town to road segments currently uncabled.

B9 - Average per mile – The average quantity of potential subscribers per mile who could be served by extending the Cable TV infrastructure within each town to road segments currently uncabled.

B11 – Total Potential FTTH Subscribers – The total quantity of potential subscribers who could be served by a FTTH system covering 100% of each community.

B12 – Potential FTTH Subs per Mile avg - The average quantity of potential subscribers per mile who could be served by a FTTH system covering 100% of each community.

B13 – Total FTTH Mileage - Total mileage of road segments within each community that would be required to reach 100% of the potential subscribers.

C15 – **Cost per mile** quoted by Charter (Spectrum) in a similarly situated community in Maine.

Row 15 – Estimated cost to extend Cable TV system to serve 100% of each community. The percentage of the cost each community would be required to contribute is unknown. With the potential exception of Readfield with 24.4 potential subscribers per mile of uncabled road segments, based upon what we have seen in other communities, each community should expect to shoulder at least 50% of the cost.

C18 – Poles per mile – Based on our experience across Maine for other project, we are using an average of 33 poles per mile. The actual quantity of poles may differ from town to town.

C19 – Make-ready per pole - Based on our experience across Maine for other project, we are using an average of $400 per pole to create sufficient space for an additional attachment within the National Electrical Safety Code guidelines. The actual amount cannot be determined until the pole owners perform a survey to measure the available space on each pole and what steps are necessary to rearrange existing attachments.

C20 – Annual License per pole – Based on our experience across Maine for other projects, we are using an average of $20 per pole. During the make-ready process, poles ownership will be identified as phone company solely owned, power company solely owned or jointly owned by phone and power.

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Actual costs will be determined by pole attachment agreements which will be required to be negotiated with both phone and power company owners.

C21 – Backbone Construction – Cost for materials and labor to construct the backbone FTTH network on a per mile basis, not including the drop cables and optical / electronics deployed at subscriber locations. Actual costs may be lower or higher depending upon a number of variables that can only be known after performing detailed engineering, having the results of the pole owner surveys and the schedule and availability of construction contractors.

C22 – Central Office Construction – Cost for a prefabricated concrete central office structure, land acquisition and development with all peripheral equipment. We are assuming three (3) such structures would be required to serve the six (6) WKLCBA communities and have split the cost accordingly.

C23 – Subscriber Drops – Average cost per subscriber for installation of the drop cable and optical network termination (ONT) at the subscriber premise. The amounts for each town assume 100% of the potential subscribers become FTTH customers.

C26 – Project Management – Cost to oversee and management the construction and subscriber activation in each community. Assumes each community is a separate and individual project. Project Management for multiple towns under a common project will reduce this cost significantly.

C27 – Contingency – Amount to cover unforeseen circumstances.

Row 28 – Total high-level estimated cost to deploy a FTTH system in each community.

Row 30 – Difference in high-level estimated cost to extend existing Cable TV infrastructure and deploying a new FTTH network.

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5.3 Public-private partnership strategies

There are a number of potential public-private partnership strategies to improve service at a lower cost than deploying a town-owned FTTH network. Below we provide a brief overview of those options and potential partners.

5.3.1 Charter (Spectrum)

Balancing cost, speed to deployment and capability, extending the Cable TV system is an option that should be considered, although the negotiating process we have experienced in other communities has taken an extraordinary long and trying time.

Each community, with the exception of Vienna, has an existing franchise agreement in force *(some agreements have expired but remain in force under the current terms on a month-to-month basis)* that helps to guide the extension effort. Our review of those agreements reveals the following:

- **Fayette** – There is no buildout requirement defined within the agreement.

- **Leeds** – Charter (Spectrum) is required to extend their network if there are 15 year-round potential subscribers per mile from existing infrastructure. We have made no attempt to classify potential subscriber as year-round or seasonal.

- **Mount Vernon** – required to extend their network if there are 20 potential subscribers within 200 feet of the proposed extended network segments.

- **Readfield** – Required to extend their network if there are 18 potential subscribers per mile from existing infrastructure. In addition, Charter (Spectrum) is required to build one mile of line extension during each 2-year period for the duration of the Agreement in an area or areas of the Grantor's choosing, without reference to a subscriber density requirement. With an average of 24.4 potential subscribers along uncabled road segments, an audit to ensure Charter has met their obligations may be prudent.

- **Vienna** – no franchise agreement in place.

- **Wayne** - required to extend their network if there are 15 potential subscribers within 150 feet of the proposed extended network segments.

Based on our review of the franchise agreements and experience in other communities, it is unlikely Charter (Spectrum) will extend their network under any build-out obligation of the agreements. A

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better approach will be to share the maps and statistics for each Town with Charter (Spectrum) and have them quote the cost for each community to fully extend their network.

5.3.2 Consolidated Communications (CCI)

As the incumbent phone provider in each community, CCI has access to all of the pole and existing cables on which to over-lash new cables. As such, CCI should have a lower cost to improve service than any other service provider. CCI has also been active in Vermont and New Hampshire partnering with towns to overbuild their copper networks with FTTH systems. In some cases, CCI will partner with the town to share the cost and ownership of a FTTH network and the town will apply a special surcharge to the subscriber's monthly bill to cover the cost of servicing any bond debt to fund the town portion. Should there not be a sufficient quantity of subscribers to cover the monthly bond payment, CCI has guaranteed those bond payments.

We recommend sharing the maps and statistics included in this report with CCI to begin the process of exploring a potential partnership.

5.3.3 Alternative service providers

There are a number of alternative service providers who are active across the state of Maine who are willing to partner with towns to deploy FTTH networks. Those providers include GWI, Pioneer Broadband, Axiom, Premium Choice Broadband and Matrix. Each service provider has a different model with variable ownership and funding options. Each is experienced in leveraging various government grant and/or loan programs with the USDA, ConnectMaine Authority, Northern Border Regional Commission and the EDA. Sharing this report with each of these providers will generate interest and discussions which should be pursued.

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5.4 Next step recommendations

With the publication of this report, we recommend WKLCBA purse the following steps in parallel to ensure your Towns are well positioned with ongoing service provider expansion plans, current funding programs and to take the necessary steps to educate and inform your constituents.

5.4.1 Revisit and confirm goals and vision

Now that the costs and options for various solutions have been identified in this study, the WKLCBA committee should revisit the goals and vision with a recognition that each community is different and may prefer different solutions. This effort should be completed at the earliest opportunity in order to inform the next steps.

5.4.2 Public meetings

The Maine Community Foundation has generously funded a grant to WKLCBA to partially fund Phase 2 of this report and to fund efforts to build support within each community. WKLCBA is committed to hosting two (2) public meetings in each community to share WKLCBA's goals and vision, the results of this study and efforts to bring affordable, reliable high-speed Internet to all citizens. These public meetings should be scheduled at the earliest opportunity to maintain the momentum of the WKLCBA committee and build the community support for realizing the vision.

5.4.3 Public-private partnership negotiations

We recommend exploring potential partnerships with all service providers concurrently in a fully transparent and inclusive manner. This is important from a due diligence perspective to generate confidence by your constituents that all avenues have been explored and the differences given the appropriate weight.

5.4.4 Secure funding to support negotiations

While the efforts of Town staff, select board members and committee member volunteers should be celebrated and continue, any public-private partnership negotiations will benefit from the guidance and facilitation of a consultant with deep telecom/broadband engineering and operating experience and relationships with the service providers. The WKLCBA committee must secure additional funding from both municipal and grant funding opportunities to continue to support these efforts.

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