Town of Howland
Community Technology Plan

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Executive Summary

Axiom is the planning partner of Eastern Maine Development Corporation (EMDC) who together have worked with a number of communities across EMDC's service area. Axiom was charged with helping communities better understand their options to obtain better broadband connectivity. Over the past year, Axiom and EMDC have followed the ConnectME Authority's planning grant criteria through a two-phased approach.

Phase I comprised of four elements:

- Town Survey
- Meetings with current providers
- A review of Assets and Municipal Procedures that might impede broadband expansion
- Digital Equity and Inclusion Plan

During Phase I meetings with internet providers, the Town of Howland was initially told by Otelco, one of the providers of service in the community, that Howland was not on their list of capital investments this year. The second provider, Spectrum, only serves the most densely populated areas of the community and is very likely not interested in expanding service. This left Howland in a difficult position. It was clear that the outskirts of the community (served by Otelco) would continue to suffer with poor service, with pockets of unserved homes- homes that are resorting to satellite service (very expensive and unreliable) or cellular hotspots, using their phone to access the internet (inefficient and expensive). However, as poorly served some parts of the community are, some areas are well served by Spectrum, with those areas in Spectrum's service area able to get 100Mbps internet service, as well as cable TV and Phone service- Triple Play.

At a recent presentation to the Town Select Board, Axiom learned that both Otelco and Spectrum were invited before the Board to present possible plans for enhancements to their current network and to discuss if expanding service to the unserved or underserved areas would be feasible. Axiom was asked to work closely with the community to evaluate these presentations and continue representing the Town's interest as it worked through the implications of each provider's plan.

A significant part of this report will help Howland understand the choices between providers and how to engage while evaluating each proposal. How the Town approaches these negotiations- and whether they believe they should investigate other solutions will be dictated by the goals of the Town. In this report, we will discuss two possible goals that will give the Town a sense of the choices in front of you and help better define what the community would like to achieve.

Last, for ongoing internal discussions we have prepared a fiber optic network map, with associated construction cost and a revenue model to help you better understand the economics of building a new network in your community.

The objective of this report is to give you a solid framework on which to base your decisions. There is no doubt that a significant part of your community is suffering from the lack of strong reliable internet connectivity and that a smaller, but significant number, do not have access at all. This report will give Town Officials the tools they need to decide if a significant effort of time and resources are desired to fix this problem. Axiom will remain a resource to the Town throughout the process, and well after this report is delivered and the planning grant is closed. In addition, EMDC has pledged their support throughout the process and remain a resource for grant funding possibilities and subject matter guidance.

Working with Internet Providers

Otelco

Otelco is a provider of DSL service. DSL stands for Digital Subscriber Line. Otelco offers DSL though their existing telephone network. Because it is built on existing phone lines, Otelco' s DSL is widely available throughout Howland, and is typically less expensive than Spectrum internet service. However, and importantly, a DSL connection is distance sensitive, meaning the connection is better and more reliable, the closer you are to the equipment. In a rural community, DSL service tends to garner the most complaints from subscribers at the edge of the network. In many cases, users cannot get a connection better than 7/1Mbps. The national FCC standard recently become 25/3Mbps, over 3 times the speed that an average DSL connection can deliver. Also, because the internet is delivered on old, copper lines, it can be quite unreliable because those lines have degraded, leading to more consumer complaints. The bottom line is that DSL is increasingly an outdated technology that cannot keep up with the demands of consumers. This is why many of the complaints in your community are coming from subscribers of this service.

Otelco, however, is likely interested in sharing the cost of putting in a fiber system to unserved and/or underserved areas. Fiber is a far superior technology that if installed correctly will be virtually futureproof. It would allow for unlimited speed increases as demand warrants and even more importantly, has industry leading reliability. It just works. The catch is that in order to build out service of this type, Otelco would be relying on a specific type of federal money that can only be used in eligible areas. We assume that those areas cover only a small part of the community, and they would then rely on state money, with a match from the town to complete a project that would cover the majority, if not all of the areas of most concern to the town. The bottom line is that this could be a very economical way for the town to proceed and should be taken seriously. Of course, the devil is in the details, but this very likely is the lowest cost approach to upgrading the parts of town most in need.

Spectrum

Spectrum uses co-ax cable to deliver its TV and internet signal to the home. This is also a copper-based delivery system that because of several factors has better reliability because of the cable's attributes. In comparison to twisted pairs (DSL), co-ax cable can transmit over 80 times the amount of data and the signal can travel farther without the signal degrading. Because of the way co-ax cable works, and the over prescription rates that cable providers like Spectrum use, Spectrum subscribers can still experience service slowdowns at heavy use times, because the line that you receive your signal is shared, many homes are drawing from the same amount of internet, limiting the amount that any one customer may use at one time. For many, after school and 7pm-9pm tend to slow the connection down as many customers are using the internet at the same time. In addition, through the surveys, people find Spectrum service to be expensive.

Choice

Our recommendation would be not to consider any expansion of DSL service unless that is being paid for by the provider entirely (Otelco in this case). This would not be a technology that we would recommend spending public dollars on. First, because of its limitations, it is quickly becoming obsolete. Second, any upgrades to DSL will be modest and subscribers will be complaining in a short time about the same unreliability and paltry bandwidth speed. To give you a general idea, the vast majority of Maine struggles to meet the federal definition of broadband- 25Mbps/3Mbps. If Otelco is

offering to expand fiber optics, that is something to take much more seriously. In the next section, we will discuss why fiber is a superior product to both DSL and co-ax cable.

Spectrum is being asked to visit the town. They have service in the more populated parts of the community.

Getting Spectrum to expand their service coverage in the community can be difficult. They expect to have a minimum of 20-25 homes per mile to even consider expanding to that area. In a rural community like the Town of Howland, you can likely put a pin on where Spectrum service stops, and it is very likely because the density of homes beyond that end point do not meet the number of homes they require. That said, their cable/internet service is reliable and working with them might be an opportunity to expand the same service that is there now to other parts of town. Always a consideration.

However, Spectrum will utilize the same state program available to Otelco to apply for a small grant to offset cost and often asks the community to pitch in some match amount. It's also likely that any expansion would not get to all homes without additional significant public subsidy from the town, and that might also require a business case model that Spectrum would initiate to determine take rates from potential customers. So many communities have had this discussion with Spectrum and the success of these discussions will depend on a number of factors in your community, including how much taxpayer money you may be willing to spend. Generally, towns have a better experience with Spectrum if they go in knowing that they will need to be a serious partner and contribute to any expansion. In the case of co-ax cable, it also has limitations in comparison to fiber, but an expansion of Spectrum service to underserved or unserved areas of the community would be less expensive, likely considerably less expensive that a full fiber build-out.

Working with Spectrum is also worthy of serious consideration. One last point of leverage with Spectrum would be the current Franchise Agreement that they have with your community. If you can find it (its likely many years old), it might contain provisions that were never fulfilled, like a promise to expand service over time to include more of the town. It also should have a provision that returns a percentage of revenue back to the town. This agreement, if outdated, might be a way to bring Spectrum to the table to negotiate a new agreement with more favorable terms for the town, or help engage them to determine the cost and complexity of expanded service to areas currently not being served by Spectrum.

Other Providers

While either of your current providers might expand service, other providers not serving the community now might be interested in serving you, if you incentivized them to do so. It is very unlikely that outside providers could make a business case to provide service, without substantial assistance. As you consider this option, several local ISPs, such as GWI or Axiom may provide an alternative solution that meet your town goals and might be something to consider if the town feels it can find federal or state grant money to assist. The section labeled Fiber for your Town describes in detail what a new solution, using state-of-the-art technology and serving every home would cost and what the revenue model would generally look like. This will give you an idea if that approach is feasible.

The Town of Howland has already begun the process of engaging current providers of service in your community. Each provider delivers a different type of service using different technology and

approaches. It is important to understand what these providers offer and evaluate the merits of any proposal to help the town's citizens get better connected.
Whether you work with your current providers or explore new options with other Internet Service Providers, we recommend keeping two concepts in mind for consideration.

Equal Access to All

Currently the town's internet connectivity is determined by the location of a resident's home. Depending on where you live in town, you may have a different type of internet service delivered to your home. If you are a current Otelco customer, and are far away from their equipment, you may only be able to receive 3Mbps. If you live in an area covered by Spectrum, you can receive 100Mbps of internet service. However, if you live in an area that does not have either service, you are left with no internet choice and must rely on satellite or cellular service, both of which are very expensive and unreliable. If a resident has school age children but lives in a home that is unserved or underserved, they may not be able to complete their homework online, leading to an inequitable situation that is often a concern of community leaders. Expecting that all homes should be able to receive the same speed and reliability for a reasonable price, is a goal that is often important if public money is being spent to support the effort.

While you are thinking about the potential to expand Spectrum or Otelco internet service, keep in mind that you could exasperate the divide by plans that give only some homes upgraded service. Understanding a provider's coverage plan (homes that the service can serve) and if the service is equitable to all homes (every home can receive a minimum of level of service) are important concepts to keep in mind while evaluating proposals.

Own Your Own

Currently, the internet service levels, subscriber cost and technology they use to deliver service are all dictated by private companies with little or no interaction with the town. As complaints about lack of internet service are heard by town officials, they often get frustrated by the lack of response or interest from the providers to fix the problem.

Increasingly, towns are taking matters into their own hands and putting taxpayer and other public money into a plan to bring better service by providing the infrastructure to do so, then contracting with an Internet Service Provider to run the system and deliver service to customers. This has been done in Sanford, Cranberry Isles, Calais/Baileyville and Islesboro.

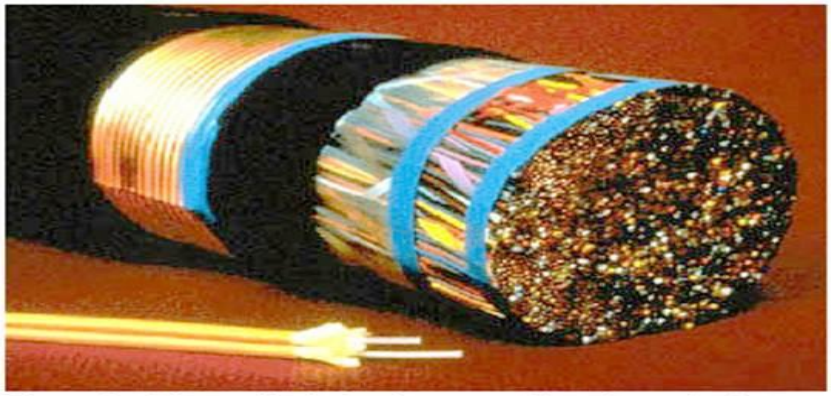
Effectively, this gives the leverage to the community to create a better partnership and relationship with the ISP, and also can dictate terms of service or in extreme cases, allows the community to replace the ISP for another in order to facilitate the goals of the town. Some federal grant programs require that the public entity applying for funds own the infrastructure. Many municipalities are seeing this as a better way to be heard, create leverage and strong partnerships with ISPs that generate better outcomes for consumers. This concept has not been something that has been of interest to large providers, who prefer to own their own infrastructure, so is not something that Otelco or Spectrum would be interested in working with you on. However, it is a goal worth keeping in mind, should you decide to apply for grant funds that may require public ownership or when courting another internet provider to work with you to provide a new alternative service. As an example, two recent projects that Axiom built, and now operate are owned by the municipality. This is not a model for everyone, but it does maximum leverage with the partner ISP.

Summary

- Worth discussions with various providers of internet service
- Likely less expensive to work with current providers- Otelco or Spectrum
- Look closely at technology being considered and the coverage area proposed
- Two questions to answer to help frame your decision making

Advantages of Fiber Optics

Fiber technology is the gold standard for internet connections and is a technology many communities are increasingly striving to install because of its many positive attributes. One of the major concerns with fiber systems is the up-front cost. However, we actually see fiber as an investment that will stand the test of time. Other technologies would need to be replaced or upgraded or will be deemed obsolete long before fiber would pass its life expectancy. Fiber will allow you to scale the bandwidth delivered as needed, all while using the same fiber distribution network over a period of decades making fiber the affordable choice.



The optical fiber cable in the foreground has the equivalent capacity of the copper cable in the background.

Just one visual example will underscore the capabilities of a fiber connection versus a legacy copper network connection. With today's technology, one fiber the thickness of a human hair can carry more data than 4,000 top-speed DSL lines.

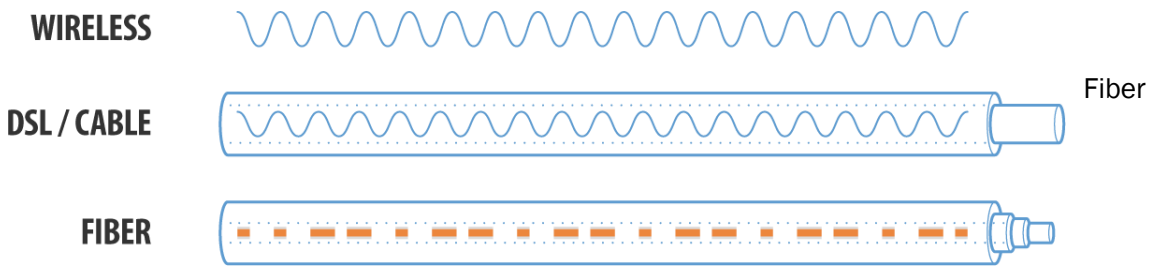
Homes that are being served by copper, either through DSL from the phone company, or with co-ax from the cable company, have serious limitations in service because of how each technology works. In the case of DSL, not only is the driving technology outdated, but also the old copper lines themselves are susceptible to corrosion that can severely impact the reliability of the connection. Furthermore, DSL is limited by the distance it can push a signal (3 miles maximum), meaning that those homes furthest from the telco equipment are faced with connections that often cannot reach even a paltry 3Mbps download speed.

In the case of coaxial cable (co-ax), used by TV cable providers, capacity is still an issue, but for different reasons than with DSL. Compared to a fiber-optic system, cable is not nearly so scalable – for every step up in speeds, equipment needs to be upgraded both at the home and at the cable plant. Furthermore, cable systems were designed primarily to push data down to the customer, a significantly different model than the emerging needs for telecommuting and interactive video, which require high bandwidth in both directions. Finally, there is a major concern with the fact that cable is a shared system, meaning that the signal strength you receive is dependent on how much bandwidth is being drawn by other users that are also connected to that line of cable. Cable companies

commonly oversaturate their subscriber networks by a ratio of up to 100:1, leading to inconsistent speeds for the end user.

Naturally, questions arise about the capabilities of each technology and these differences should be carefully considered when building a network. We firmly believe that the benefits of having fiber connections to your homes – are worthy of consideration, even with the cost associated with fiber. Please consider this section something that can be used by community to help citizens understand the benefits of a fiber network, while weighing the cost against those benefits over time.

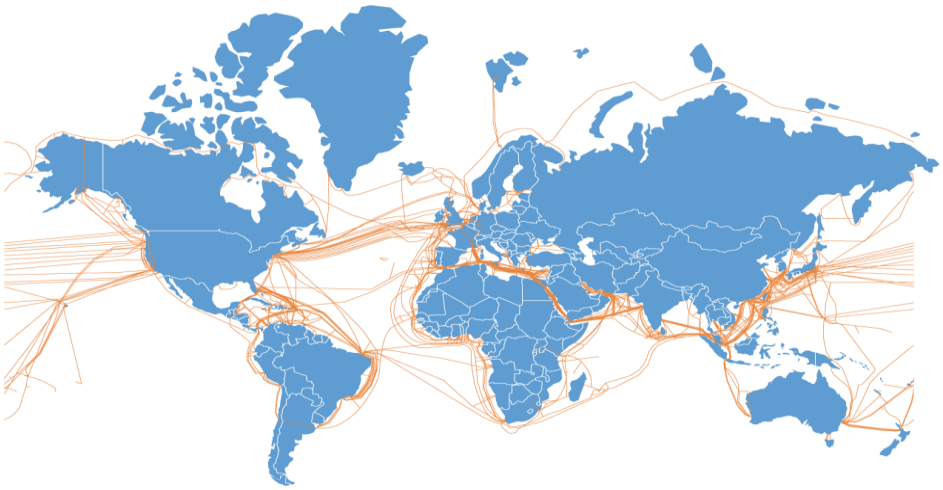
How it works is the secret to higher speeds



"Broadband" describes the fastest method of delivering high-speed internet to subscribers. While DSL and cable utilize existing phone and TV infrastructure to transmit data as frequency "vibrations" over copper wires, fiber networks transmit data using light over specialized cables that contain glass fiber strands. Light moves at 186,000 miles per second, and this is what enables speeds of 1 Gig (1000Mpbs) or much more per connection- 100 times faster than a 10Mbps DSL connection and 10 times faster than a 100Mbps cable connection. In addition, both DSL and cable suffer from the limits of their own technology, making them less than ideal choices into the future.

Like other technology- is it going to become obsolete?

While we cannot predict the future, all indications are that fiber optics is here to stay for a very long time. Frankly, this technology has already been used for many, many years, which means that there are trillions of dollars of fiber installed globally. A whole industry has grown up around how to utilize fiber to its fullest capacity to make all of our lives better. This industry has proven very good at developing new electronics to push more and more data through existing fiber lines.

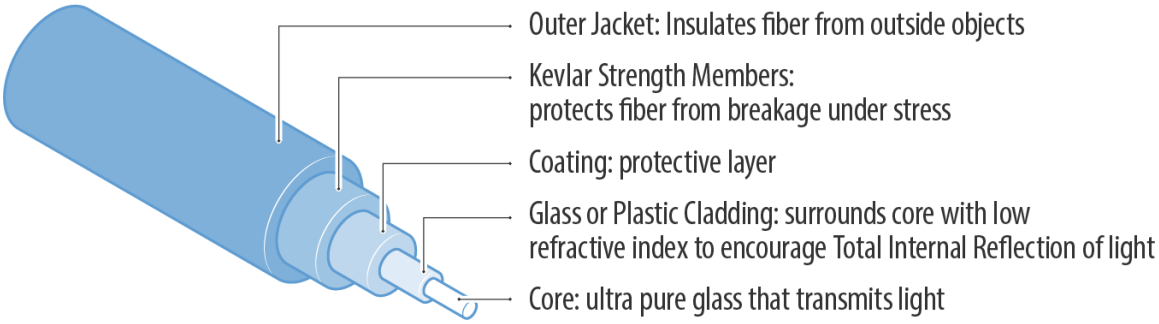


Most people think of fiber as a new technology but, in reality, it has been used for "backbone" connectivity as far back as the 80s, with hundreds of fiber optic cables running across the sea floor all around the world.

What is new, is that fiber is starting to be used to serve homes in places like Austin and Chattanooga and right her in Maine on the islands of Cliff and Cranberry Isles, where FTTH (Fiber to the Home) networks have been deployed. Because of the extensive network of fiber already deployed and continuing to be deployed, it is very unlikely that we would see any major shift in market forces that would make fiber optics obsolete.

What is in a fiber-optic cable?

An individual optical fiber (the size of a human hair) is surrounded by several layers of material that strengthen and protect the fiber. A fiber-optic cable can have any number of "fibers" ranging from 1 to several 100s.



Benefits of Fiber Technology

Speed and Capacity. Many experts say that FTTH connections are the only technology with enough bandwidth to support the projected consumer demands over the next decade.

Future proof. Because of fiber's capabilities, new technological innovations are being invented every day to utilize fiber's superior ability to transport tremendous amounts of data at blazingly fast speeds. Technologies such as 3D holographic high-definition television and gaming will someday be everyday items in households around the world. FTTH will be able handle the estimated 30 gigabit-per-second needs of such equipment… and this is just one technology. Think about the new ways that you use the internet that seem commonplace now that were not even conceived of 10 years ago.

One delivery system. Right now, a consumer can receive telephone, video, audio, television and almost any type of data transmission using a single seamless FTTH connection. That trend will continue as consumers are given increasing array of a la carte choices for how they receive their various communication and data and streaming choices. Subscribers are also realizing that receiving bundled services through a fiber connection can save money.

Reliability. Fiber is the most reliable connection you can have. In surveys across the state of Maine, the #1 complaint is reliability. An internet connection is becoming a necessity, not a luxury. When connectivity is interrupted or slowed down unexpectedly or inexplicably, consumers are furious that they cannot accomplish the on-line task, leading to a significant loss of productivity or time.

Direct benefits of Fiber to Communities

Job Creation- There are many examples of fiber networks creating jobs by either supporting existing businesses or attracting new ones

Business Attraction- When we say business attraction, we really mean businesses that are looking for the kinds of connections that can move large amounts of data, quickly- architects, designers, banks and other heavy users

Entrepreneurship- Fiber helps induce young people to locate and work from anywhere

Telemedicine- The medical field and how patients and providers interact is undergoing seismic changes. One of those changes is the way patients are able to be seen, treated, monitored and are increasingly being given tools to manage their own health care, right from their home. A fiber connection has the capacity to manage these data transmission uses, which in turn facilitates our elders aging in place

Increased Home Values- A Broadband Communities study indicated that FTTH networks increase the value of a $300,000 home by an average of $5,000-$6,000. Another study by the FTTH Council in conjunction with the University of Colorado showed that homes with a FTTH connection are worth, on average, 3.1% more than homes that do not have a fiber connection

A fiber network can be leveraged to help communities differentiate themselves in positive ways. Letting the world know that you are on the cutting edge of realizing what homeowners and businesses are demanding to help them work or play online more efficiently, drives prominence for your town and encourages both in-migration and business growth.

In short,

- Fiber is a long-term investment in a community's future
- Fiber supports 21st century economic opportunities
- Fiber leapfrogs communities that are left behind to the front of the pack
- Fiber, over the long run, is a less expensive technology

Fiber Plan for Town

The plan below is our recommended best solution for the town and is based on three criteria:

- Equal Access to All- no matter where you live in Howland your home would have access to the same speeds and reliability as any other resident
- Fast & Reliable- The system would be built to withstand fluctuations in demand, would deliver lightning fast speeds and use the most reliable technology on the market
- Futureproof- This technology would allow Howland to never fall behind again, with little to no upgrades to the system over the next 20 plus years

Map of Proposed Howland Fiber
RED= Main Trunk
YELLOW= Spurs off of main Trunk

The map does not depict each connection from the fiber to the individual homes. However, we have built into our pricing model connections to every home that wants service. If a home looks like it may be unserved by the new system, this mapping was not meant to depict that information. Again, any home is capable of receiving a connection from this construction design.

Cost

The cost projections for this project are based on a number of assumptions that could change the final overall cost. Please remember, this is a desktop estimate and additional, significant work would need to be completed to give the community a cost that eliminates all of the variables. The different cost components will give the reader a good idea of where estimated cost would possibly change.

Category		Cost
OSP Material and Labor		$700,000
CO/Regen hardware & Installation		$170,000
Bridge Crossing		$10,000
CPE Hardware and Installation		$523,000
Pole Licensing – App & FSW		$16,000
Make Ready (50% of poles)		$139,050
Pole replacement (10%)		$186,000
Total		**$1,744,050**
		Total # of homes 523
		# of poles 618

The total cost of the budget contains several line items that may change and lower the cost of the project overall. A lot of additional costing information will be learned by proceeding with the pole licensing process. For example, we have made some assumptions based on past experience, but the true understanding of the costs associated with pole attachments and make ready - the cost of other users of the poles moving their lines to "make ready" a space for a new cable - only will come through the licensing process. In addition, pole replacement costs are only estimates and will not be known till the pole make ready work is completed.

Additionally, a contingency budget has not been included with this budget to account for unforeseen construction cost overruns.

Breakdown of Cost Components

OSP Material and Labor

OSP Materials refers to the cost of the trunk cable and associated equipment to hang the cable and the equipment needed to bring fiber optic across the community. This line item also includes the cost of labor to do this work.

CO/Regen Hardware & Installation

CO refers to Central Office, which is a term of art that Internet Service Providers use to describe where the equipment that would be needed to power the system and from which the internet would be distributed to each home. Regen hardware is the equipment that would be used to power the internet system and control each individual connection through this central system. These costs also include a heated and cooled utility shack that would house the equipment.

Bridge Crossing

Because the expense of crossing a bridge with fiber can be highly variable, we usually put a placeholder number that hopefully will cover the cost. Until a detailed engineering study is

conducted, it is hard to know what to expect. It could be as easy as using an existing conduit or utility poles that cross the bridge now… or more complicated.

Customer Premise Hardware and Installation

These costs are associated with the equipment needed at each home, the drop cable and the labor cost associated with each customer installation. In the case of this estimate, we anticipate connecting 50% of homes (estimated at 262 homes).

Licensing and Make Ready

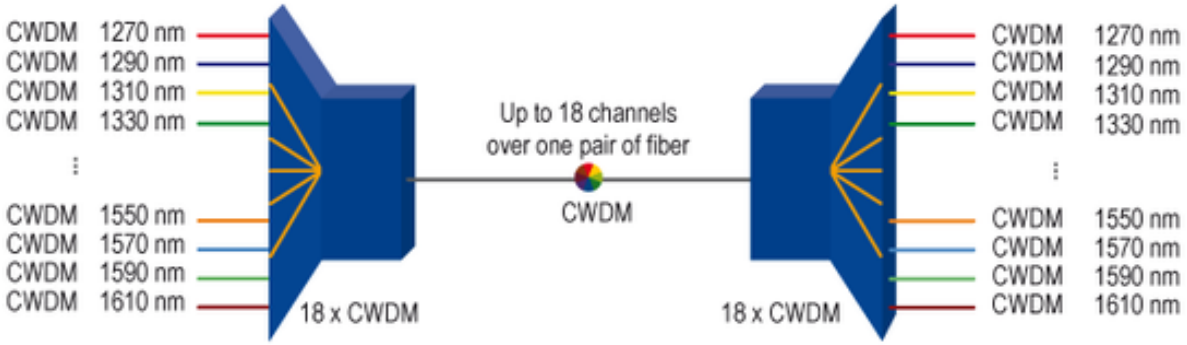
Licensing and Make Ready refers to the cost of applying for utility pole rights and the associated cost of making the poles ready to accept a new fiber cable. In order to install new fiber optics cable on utility poles, a licensing process is in place that evaluates each pole for readiness to accept a new cable. Each provider (other than the electrical) would move the current lines to accommodate a space for a new cable. The cost of this process is estimated in our calculations and can change depending on the application process costs associated with each pole.

Replacement Poles (10%)

We estimate that 10% of the poles, through the licensing process might need replacement. There are two major reasons for pole replacements. First, the amount of equipment or utility lines on a pole deem it necessary to increase the height of the current pole to allow for an additional line to be placed on it (pole too short). Or the current pole is aged to the point where it would be unsafe to place the additional line strain on the pole without a replacement pole. (Aged poles). We make an estimate, but these issues get addressed through the application and Make Ready process.

Proposed Fiber Equipment

CWDM (Coarse Wavelength Division Multiplexing)



Our cost estimates use a fiber technology hardware called Coarse Wavelength Division Multiplexing (CWDM). This system allows up to 18 connections over a single fiber pair by having each connection operate on a separate light wave.

This allows multiple premise connections operating over a single fiber pair that can currently each carry up to 10Gbps (10,000Mbps) depending on the hardware used. 40G and 100G CWDM transponders are in the development pipeline.

What does this mean for communities deploying this technology?

- Saves cost, because size of trunk cable has potential to be sized differently (smaller)
- Allows for inexpensive connections up to a Gigabit to each business or home and can increase to 10Gigs (10,000Mbps) with off-the-shelf hardware upgrades
- Scalable, allows for a single fiber to serve up to 18 businesses or homes, can easily accommodate years of new growth with just a few additional strands of fiber

The CDWM solution saves cost, but not at the sacrifice of performance. First, the trunk line that will serve as the main line of fiber that is used to create "drops" (fiber connections) to each premise does not need to be as large, saving space, reducing tension and weight on the existing utility pole infrastructure that the trunk line would be located. Using CDWM allows the trunk line size, weight, and cost to be reduced, while still offering excellent scalability.

Weight and tension matter when you consider poles can cost up to $3,000 a piece to replace. Every 10 poles of replacement cost you can avoid saves $30,000. The size and weight of the fiber cable can have a direct relationship to potential pole replacements.

With inexpensive optics, up to 1Gbps (1000Mbps) could be offered to each home today. Unlike with cable, or even other fiber technologies (xPON), this is not a shared connection – the network truly supports a full Gig to each home. As time passes, we imagine a day when more than a Gig of service would be needed at each premise. At that time, optical equipment can easily be switched out to offer up to 10Gbps (10,000Mbps) of service for a robust upgrade that is both easy and inexpensive.

When looking at future proofing a network, this design allows for almost unlimited speed and capacity increases without changing the actual fiber deployment on the street. As fiber has become the chosen technology for connectivity, equipment providers continue to innovate by changing the hardware on each end of the fiber to increase capability, without having to reinvest in a whole new system. We are comfortable recommending a system that will easily last 20 years or more with relatively small, if any, equipment upgrades over the life of the fiber.

Revenue Modeling for Operations of the System

As part of Axiom's commitment to our mission to help rural communities more fully understand what ISPs are facing serving a small community, we have created a revenue and operational expense budget that helps the community and the ISP better negotiate an operating agreement through a Public-Private Partnership, should the community choose to own the new infrastructure.

It is important to understand that these are just an illustration of how Axiom would envision the feasibility of operating a system and what potential customer rates could look like. The potential revenue is based on service levels and take rates that are solely Axiom projections and are intended for illustration only, each provider would have their own revenue and cost models. However, these numbers can show you generally what a provider might expect if the town were to build a new fiber system.

Revenue Model

Rate Groups	Number of Subscribers	Monthly rate	Revenue per month	Revenue per year
25M/5M	182	$69.99	$12,738	$152,858
50M/10M	53	$79.99	$4,239	$50,874
100M/20M	27	$109.99	$2,970	$35,637
Business Service (50M/50M)	9	$129.99	$1,170	$14,035
Total Homes served (50%)	271			
Monthly and Year-Round Revenue			$21,117/mo.	$253,404/yr.

- Each rate of service category are approximate estimates of what we think each category will attract for subscribers.
- The number of customers is determined as a 50% take rate (one of two homes passed would take service) for a total estimated number of customers that would take service of 262 plus 9 businesses

Yearly Operating Expenses				
Bandwidth				$27,864
Phone technical support				$3,421
Administrative support				$1,803
Local Field Crew support				$12,173
Field Crew support (Machias)				$46,360
5% Gross Returned to Community				$12,670
			Total	**$104,291/yr.**

Bandwidth is the cost of bulk wholesale internet.

Phone tech support is the estimated cost to maintain phone support for customers for the year.

Administrative Support is the cost of billing/collections and support for billing questions.

Local Field Crew is the cost of Axiom hiring a local person to conduct simple trouble shooting at the home.

Field Crew (Machias) is the cost of dispatching FC from Machias to deal with more serious issues- breakage, splicing, etc.

Utility Pole fee is the cost of yearly licensing fee paid to utility pole owner to maintain the pole broken into a monthly cost.

Revenue return of 5% is Axiom's commitment to give 5% of Gross revenue- $12,760/year- back to the community.

Three important takeaways:

- ◊ How critical take rate is to the overall viability of the project (less subscribers, less opportunity for profits and payments back to the town)
- ◊ The monthly operating expenses are generally fixed, no matter the number of subscribers (there is not a direct correlation between subscriber counts and expenses)
- ◊ The yearly profits meet industry standards, which makes the project more feasible

Final Thoughts

This document is intended to provide guidance to the town on how to properly evaluate proposals for better Broadband connectivity. Axiom uses a proven Rural Broadband Kit to help communities work through the steps necessary to get them to an actionable plan and ultimately to implement a project.

Important steps to consider:

- Evaluate the level of concern in the town
- Hold a Community Workshop to hear from the public
- Form a Broadband Committee that includes at least one Select Board member and perhaps the Town Manager
- Create clearly defined goals
- Interview Internet Service Providers
- Create a strategic roadmap and plan
- Investigate Resources to help

If you follow these steps, you increase your chance of success.

Beyond the Report

This report should not be the end, but the beginning of Howland's journey to obtain better internet connectivity for the community. Whether the town ultimately moves forward with a plan, will depend what is discovered as you move through the process. A good start is to engage broadband providers and begin discussions at the municipal level about what you hope to achieve.

Eastern Maine Development Corporation and Axiom are committed to be resources for as long as needed to ensure that the town has the means to make smart, forward looking decisions. These processes are hard work and require a level of intensity that many small towns are not used to. Between EMDC and Axiom, we have guided dozens of communities through this process. We believe that the Town Howland has all the elements necessary to move the process forward.

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