

# NEW SHOREHAM BROADBAND PROJECT FAQs

March 15, 2017

Town of New Shoreham  
Broadband Working Group  
Tilson Technology

# Broadband Project FAQs

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## Introduction

Lack of adequate and consistent internet access has constrained economic development opportunities for island businesses, particularly tourism and hospitality. The first question posed by prospective visitors is the availability of broadband service. The inability to access the same internet services available to mainland folk has also impacted quality of life for year-round residents. Over the course of several years, the Block Island Residents Association, Chamber of Commerce, Tourism Council, Block Island School and Town government have aggressively pursued solutions to this problem. Please refer to Appendix A for a history of this project.

The Town of New Shoreham has been developing a solution for the Island’s broadband needs that is designed to support all the broadband requirements of full-time and seasonal residents for the foreseeable future and beyond. Through presentation of background information and a series of questions and answers organized by topic, this document strives to be a comprehensive source of information about the Town’s initiative to bring reliable broadband internet to Block Island, addressing topics such as how and why fiber optics were chosen, what the proposed network will do, costs involved, and more. Efforts to date have been mindful of many factors, including the island’s inherent character, desire of citizens for greater access to mainland services, needs and mandates for quality education and medical care, economic impacts, the degree to which islanders want to control the level and quality of service, and others.

This initiative is a work in progress and therefore the information will continue to evolve as the project progresses.

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## Project Overview

### **1. Why is public investment in this network necessary?**

In today's world, broadband access is not a luxury. Affordable access to high quality broadband is increasingly a necessity of modern life. As noted in the introduction, Town residents, workers and visitors have long been frustrated with the limited and unreliable internet service on the Island. Speed testing provided the data to substantiate the myriad of complaints put forth by segments of the Island residential, business and government community. The limitations impact medical care, education, public safety, government efficiency, tourism, business operations and quality of life.

The Town explored many options in its efforts to improve broadband access, including several meetings with Verizon, and discussions with Cox Communications. Largely due to its geographic isolation and relatively small customer base, Block Island is not considered an economically viable place for commercial broadband providers to build out their networks. Therefore, if the community wants access to broadband internet services, then it needs to take matters into its own hands. The Town Council has concluded that access to broadband internet service is an essential public service.

### **2. What overall benefits will accrue to residents, students, our Library, Police and Fire, Medical Center and Town Hall as well as the business community?**

Block Island and all those who live, work, or visit there, will have access to internet connectivity that is – and has the potential to remain – on par with the best services available in mainland communities. Students at the Block Island School will be in compliance with state connectivity requirements and be able to participate in online testing. They'll also have access to all of the Advanced Placement materials they currently lack. The public safety department will be connected to the same state networks and information resources that all other Rhode Island departments currently have access to. Additionally, they will be able to comply with RI and federal cyber-security requirements. The Medical Center will be able to provide reliable and robust telemedicine options and access and share medical records with mainland doctors. Island businesses will be able to do everything from quickly process credit card transactions to have a fast web presence that they can quickly update and point people to – along with easy access to social media. Hotels will be able to offer broadband services to guests. Residents will have internet access that is reliable and responsive for all of a typical home's growing number of internet-connected devices and desire to conduct business on the mainland without always having to travel there. The quality of Island residents' internet connections will present no barrier to residents and visitors needing to work remotely for employers around the country or the world. The network will have the capacity to handle applications being built for internet users, from highly interactive websites to ultra-high-definition video.

### **3. How did the Town come to choose an Island-wide fiber optic network as its preferred solution?**

In 2013, the Town Manager-appointed Broadband Working Group investigated various options for improving broadband access on Block Island. As part of this process, the Working Group set out to define what it considered the ideal goals of a prospective solution. They identified two main goals for a New Shoreham broadband standard:

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- a. Supporting the year-round community's civic, educational, business and resident activities and needs.
- b. Improving the seasonal community's ability to work and communicate while on Block Island

In order to achieve these high level goals, the Working Group determined that any prospective solution should exhibit the following characteristics:

- a. Speeds at least as good as those generally available on the mainland
- b. Symmetric connections, where available upload speeds are generally equal to download speeds
- c. To the maximum extent possible, the Town should have operational control and decision-making authority over the network and its disposition, recognizing that with increased control comes increased financial responsibility.
- d. A high degree of reliability
- e. Relatively easy and economical upgrades for the foreseeable future, so that this investment in the community could last decades if not generations
- f. Minimal visual impact and disruption to the essential character of the island

Affordability was an important consideration for the Working Group, particularly in the context of minimizing the total cost over the anticipated life cycle of the solution and the requisite benefits or value to be derived across all segments of the community.

Many alternatives have been considered. A summary of these is provided in Appendix B.

Based on the objectives and characteristics it set, the Working Group determined that an Island-wide fiber optic solution was the best solution to meet all the requirements.

#### **4. What about fiber optics makes them the best long-term solution?**

Fiber optic cables are thin strands of glass through which information is transmitted in the form of laser light. There is no theoretical limit to the amount of data a single fiber strand can carry. Rather, the limitation is imposed by the electronics and laser that shine light through the cable. In order to upgrade a fiber connection, all that is needed is to upgrade the electronics on either end of the cable. Communications technology is a rapidly evolving field, and speeds available via fiber are generally increasing even as prices come down. Fiber optic cables have the potential to carry virtually unlimited amounts of information and last a very long time. There are fiber networks in operation whose cables were originally installed in the 1980s.

The solution proposed for Block Island of 1 Gigabit per second (Gbps) symmetric service (for both upload and download) per premise should be ample for virtually all requirements for the foreseeable future. A gigabit is one thousand megabits, or one billion bits, of information. Although fiber is initially more expensive to build than other technologies, it is relatively inexpensive to operate over its life cycle as compared to other technologies. Fiber does not suffer from interference that can affect other technologies, such as wireless services (e.g., mobile LTE or satellite).

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1 Gbps service will allow residents and businesses to have multiple simultaneous users take advantage of a mix of the following broadband opportunities:

- Web browsing, email, eCommerce, news and information
- Entertainment and streamed TV – Netflix, Hulu, Roku, Apple TV, Chrome TV, etc.
- Remote educational classes
- Skype for friends, family and business
- Telemedicine

### **5. Explain in simple terms the design of the fiber network on Island and why the Town selected it as the best choice for Block Island.**

The proposed on-Island fiber network will connect the Town's leased fiber in the National Grid subsea cable to all occupied premises on Block Island. There are two main designs for fiber to the premises in widespread use: passive and active, with active being the more expensive design. In an active network, each premise has a dedicated pair of fiber strands run directly to the central office. In a passive network, a single pair of strands from the central office can serve up to 64 houses with gigabit speed via a series of splitters. The "passive" name is due to the fact that the splitters used do not require power. Passive networks – also called GPON (Gigabit Passive Optical Network) – are the most common architecture used in fiber to the home networks. Both Verizon FiOS and Google Fiber use passive networks.

Block Island's proposed network is an innovative combination of active and passive. Trunk cables will run from the central office at BIPCo to several remote equipment cabinets located at strategic points throughout Block Island. Most premises will be served via a passive connection to their nearest equipment cabinet to provide the best balance between speed and cost, with 16 premises served at gigabit speeds from each pair of fiber strands originating from each premise's closest cabinet. Institutions or large businesses with higher than gigabit bandwidth requirements can be connected directly to dedicated fiber pairs if needed.

This network is initially planned to provide internet speeds to the premise of 1 gigabit per second (Gbps). This is more than 1,000 times faster than speeds currently available via Verizon DSL on Block Island, and generally at least 30 times faster than LTE cellular data services. The network will also include ample room to grow with Block Island's needs into the foreseeable future and beyond.

This solution represents an investment in Block Island and its community. The Working Group, representing a cross-section of business and residents, believes that access to broadband is a critical requirement for the future viability of the community. With access to high quality broadband, full time residents will be able to work from home, thus opening new job options that may not require travel to the mainland. Students at the Block Island School will no longer learn with a built-in disadvantage as compared to their mainland peers. Seasonal residents will be able to work remotely and therefore spend more time on the Island. Potential visitors will no longer be forced to choose other locales with broadband service to enable the ability to work remotely and/or provide entertainment and connectivity options for family members. All users will benefit from ubiquitous access to broadband service.

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### **6. How will the network be run?**

The Town will build and own the physical infrastructure, and hire a third party Network Operator, to operate and provide broadband internet service over the Town's network. New Shoreham has selected and is currently negotiating an agreement with Crocker Communications to be the initial Network Operator. Crocker is an established network operator located in western Massachusetts with 50+ years of providing communications service and 20+ years of experience providing internet access. The Town intends the Network Operator to handle all aspects of network operations, customer and technical support for subscribers, and billing. Subscribers will remit payment for their service to the Network Operator, who will deduct its contracted fee and send the remainder to the Town. The Town of New Shoreham will maintain complete control over what services are offered on the network and the prices for the services. User fees are still being worked out, but the Town could set them anywhere from zero, where New Shoreham essentially subsidizes broadband for everyone as an ongoing Town expense, up to a point where the Town makes a profit on network services. The Town's proposed plan is to define a rate structure that will pay for the cost of operating, upgrading and repairing the network. The more people who take service on the network, the lower prices can be for everyone.

### **7. What is the expected life of the undersea cable and the on Island fiber network?**

The cable will have a lifespan of at least 20 to 30 years and probably more. It also carries power to the Island and will soon be Block Island's main source of electricity. Thus, it is reasonable to assume that the cable (and its replacement, decades from now) will be a permanent connection.

The on-Island fiber network will have a similarly long lifespan of at least 20 to 30 years, based on the history of fiber optic networks which have been operating for decades. With regular and appropriate maintenance and upkeep, the fiber network will last for the foreseeable future. These maintenance and upkeep costs, as currently estimated, have been included in the pricing model proposed by the Town.

The electronics that provide service on the cable have no formally defined lifespan, however it is anticipated they will last 5-10 years. The Town has budgeted an amount in its operational forecast for periodic equipment replacement. All the electronics will be housed either in peoples' homes and businesses, in the Town's central network shelter, or in environmentally sealed remote cabinets, safe from the elements.

### **8. Will internet service be able to serve all users on the entire Island?**

Yes. The network is designed to provide direct fiber service to every occupied premise on the Island. It also leaves available capacity to provide service at parcels that don't currently have any buildings on them, but that the Town has identified as buildable. Additionally, it is planned to provide WiFi access to the downtown area. Over time, WiFi capabilities can be expanded to the Harbors and other public areas as well.

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### **9. Have other municipalities put in place similar arrangements (i.e., fiber optic infrastructure to be operated by others)? How did those work out?**

Several other communities have done or are embarking on similar projects. In general, those communities with successful projects share many commonalities with Block Island:

- Building a network in a community where there isn't a comparable or sufficient broadband service
- Committing to a plan to pay for the physical infrastructure that does not require a certain number of people to subscribe to service
- Hiring an experienced operator to run the network
- Maintaining a sufficient level of control to replace the network operator if necessary

Some communities with similar networks that have been successful include Leverett, Massachusetts, Chattanooga, Tennessee, Lafayette, Louisiana, and Westminster, Maryland. Chattanooga and Lafayette's networks are operated by their local electric company, while Leverett's is operated by Crocker Communications, the selected operator for the Town's network. The Leverett project received 90% approval at the Town's 2012 Annual Town Meeting and went live in October of that year with over 650 of 800 household signed up to take service at the time of launch. The people of Leverett were no more inclined than homeowners anywhere to want a property tax increase, but proponents of LeverettNet, as the network came to be called, believed that the costs would be outweighed by the benefits. For homeowners at the median property value of \$278,000, the broadband taxes to fund the fiber build at a 4% borrowing rate would amount to \$25 a month. They reasoned that the property tax increase benefitted them because the availability of high-speed internet would raise property values, or at least prevent artificially depressing them. They recognized that people don't want to rent or buy where there is no high speed internet. The proposed tax increase for New Shoreham to build a fiber network is addressed in Question 51.

### **10. What service reliability can be expected?**

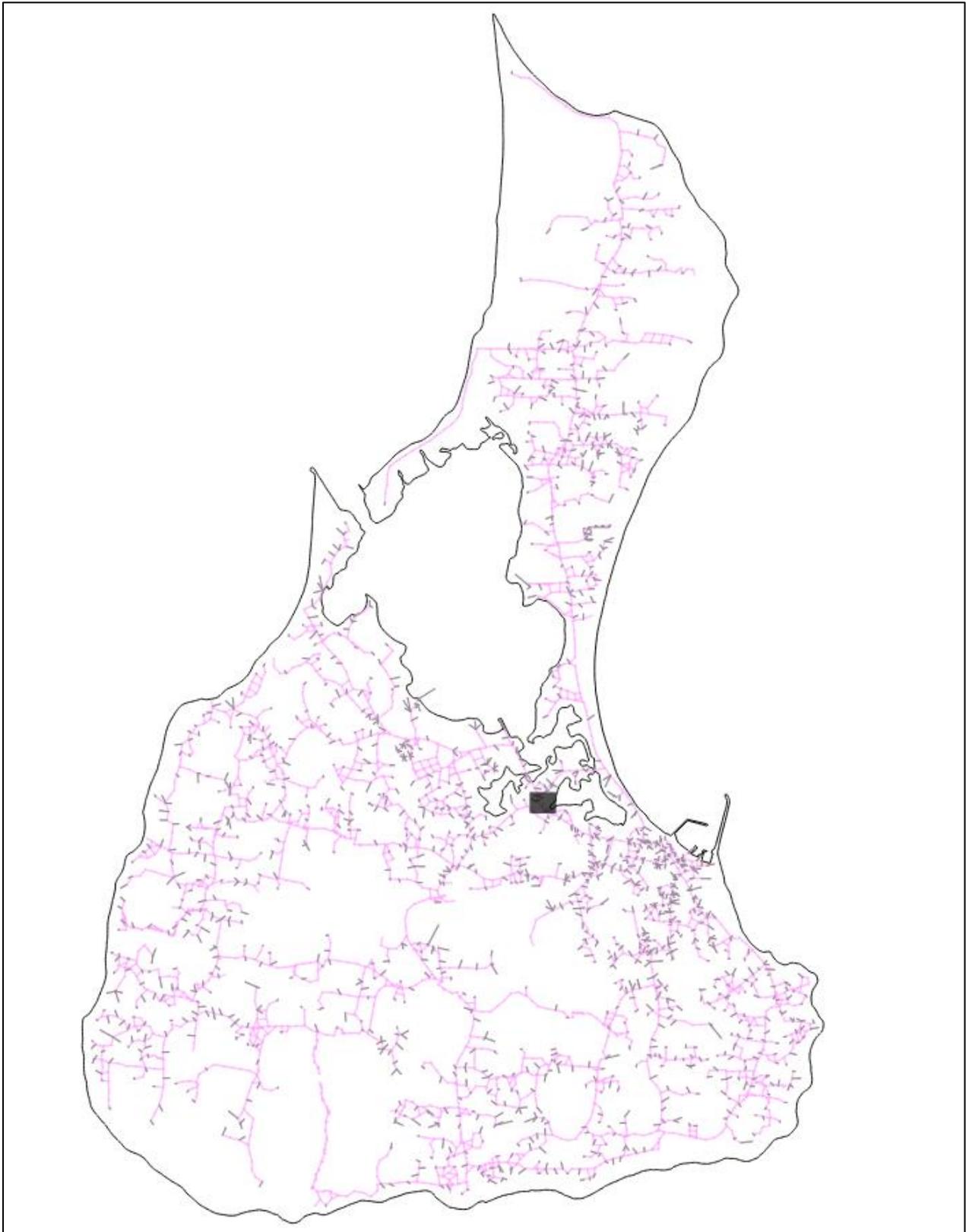
Fiber is a very reliable and well-established technology. It has formed the backbone of all US telecom infrastructures for at least the past 20 years and is now ubiquitous worldwide. You can expect the fiber service (voice and data) to be at least as reliable as Verizon's landline service on the mainland. The major risks of service interruption will come from storm or other damage to the poles, and having an agreement with a fiber maintenance service provider is built into the project cost.

### **11. Is there a map of the proposed network?**

Tilson has provided a mid-level fiber design. This includes a map of distribution fiber cables and drops to individual houses. In the below map, distribution cables are in pink and drops to premises are in dark gray. A proposed network equipment shelter at BIPCO is represented by the black rectangle. This design will be further refined as part of the final, detailed engineering work.

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## Legal and Regulatory

**12. Is it legal for the Town to own and operate a broadband network that services the community?**

Yes. Many other communities around the country have implemented or are implementing similar municipal fiber networks.

**13. Will the Public Utilities Commission allow BIPCO to maintain the network?**

The Town intends to explore every opportunity to realize cost savings by sharing maintenance resources across both the broadband and electric distribution networks on Block Island. While this exploration is at an early stage and the Town can't speak for the PUC, it is likely that an arrangement can be structured to benefit both electric and broadband consumers. It is the Town's belief that a thoughtfully-constructed agreement won't face a serious regulatory hurdle. Given the small size and isolation of the Island, use of an on-Island resource would represent the most cost-effective solution.

**14. Who owns the fiber optic cable from the road/right of way to my premises?**

This segment of cable is called a drop. The Town owns the drop, up to the demarcation box located on the side of your house or business. You own everything starting at the plug in that box. This is similar to the way that Verizon treats phone wiring, and the power company treats electric cabling.

## Installation and Equipment

**15. How does the Town plan on handling installation to individual homes and businesses?**

The Town's installer will plan to run a cable (called a "drop") to each house on the Island, whether or not the homeowner chooses to subscribe. The cable will terminate in a small UL-listed weather-resistant box (similar to the one shown below, approximately 13" x 10" by 4") on the side of the house, near where electrical or telephone wiring comes into the house. The box is made from flame-retardant and impact-resistant engineering-grade thermoplastic and passes wind-driven rain certification with gasket-less sealing design.



If and when the homeowner chooses to subscribe, the Town or its Network Operator would provide a length of jumper cable that the homeowner can connect to the outside cable termination and run into their house any way they choose. The jumper cable just plugs into the existing outdoor cable, and into the indoor electronic terminal box the Town will provide at the time of subscription.

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All drops will be installed in the same manner as the premise currently receives power and telephone service. If you receive them by overhead lines, the fiber will also come overhead. If you have buried utilities, the fiber will also be buried. Fiber burial will be performed with an effort to minimize the extent of excavation required. It is envisioned that burial will use microtrenching, a modern method of burying cables with minimum disruption to the surrounding area. In microtrenching, a machine cuts a trench approximately an inch wide and 12-18 inches deep in which to lay the fiber cable and its protective conduit. In the below photo, a worker is placing fiber in a flexible conduit into a microtrench on a paved road, but this process is used to bring the cable to the premises as well.



The cable will take the most direct route possible, in consideration of property easements or other factors, to a location on the side of your house or business near where power or telephone are currently installed. The exact path will be determined just prior to installation. The fiber will end in a small plastic box mounted to the side of your home. If you have concerns over the specific location or routing, there will be an opportunity to discuss these prior to installation. You do not need to be home for the installation.

Remedies for property damages incurred during fiber installation will be addressed as part of the negotiations with the fiber construction contractor.

### **16. Will property owners be required to rewire their houses to connect to fiber?**

It depends on the current setup at each location. In general, subscribers will need to run a single fiber cable into their home or business. The cable will plug into a small terminal box that each subscriber will receive, and, in the current plan, the terminal box can also act as an all-in-one Wi-Fi router. The terminal box is about the same dimensions as a standard Wi-Fi router. While Wi-Fi is convenient and appropriate for most residential users, some users may elect to use interior wired (Ethernet) connections for optimal performance.

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### 17. Will the Town's installer wire my home? Can I use my existing wires?

It depends on your specific needs. The installer can run the fiber cable into your house, or you can. If you subscribe to phone service, you can connect your terminal box to an existing phone jack after ensuring your house is disconnected from Verizon's system. This will allow the terminal box to provide fiber phone service to every phone jack in your house.

### 18. Why is the Town planning to install to every home and business? Wouldn't it be cheaper not to do this?

The reason for running drops regardless of whether the property owner chooses to subscribe is to take advantage of economies of scale. It's far cheaper on a per-premises basis to do all the drops at once rather than one by one as individuals decide to subscribe to service. In a similar vein, not everyone subscribes to landline phone service or runs off BIPCO power, but the cables to provide those services are generally present at the house anyway.

Of course, if a property owner doesn't want a drop and has no intention of ever subscribing, they can refuse the Town permission to run a drop to their home. Property owners who choose not to have the Town install a drop at the time of construction will be able to have one installed later should they change their minds, but should be prepared for a substantial cost to do so. Each property is different, but costs in the range of several thousand dollars are not unlikely. The Town acknowledges a need to identify for future buyers and transferees locations that have opted out and plans to define a methodology for tracking this information.

### 19. What in home/business equipment will I need? Is there a warranty on it? Who fixes it if it breaks?

Each subscriber will be provided with an Optical Network Terminal (ONT) that can also act as a Wi-Fi router, and this device will become the homeowner's property. ONTs are highly reliable commercial grade devices and are covered by a manufacturer's warranty. The Town is still evaluating alternatives for dealing with out-of-warranty replacements. Typical replacement costs are in the \$300-400 range, but as with all electronics the general pricing trend is downward over time.

Although the exact model has not been determined, the ONT option currently being considered is the Calix GigaCenter ONT, pictured below. The GigaCenter contains a built-in Wi-Fi router and provides two standard phone jacks and four Ethernet ports. It comes with a separate uninterruptible power supply containing a backup battery.



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**20. Is there a monthly cost for this and can I buy my own to avoid a monthly cost?**

There is no monthly cost for the equipment. You must use the specific ONT model approved by the network operator and designed to work with the network.

**21. Can I use my own router / wireless access point like I do now?**

Yes. Subscribers who prefer to manage their own networks or use their own router may place the ONT (which is still required) in bridge mode, as with any cable or DSL modem.

**22. If I currently own vacant land, can I get a connection for future use?**

Since there is no building on the land, it would be impossible to run a cable. Instead, the network is being designed to include extra fiber cable for each parcel of land on which a building can be built. You will be able to request a connection prior to building completion, to allow time to plan for the fiber connection.

## Operations

**23. Who will run the system and provide technical or customer support?**

The Network Operator will handle all customer and technical support (including billing). It will also monitor the network to ensure its smooth functioning. When maintenance is required, the Network Operator will dispatch the Town's designated maintenance provider to effect repairs.

**24. Who will be responsible for maintaining the fiber lines on the Island, the fiber line coming over my property, and into my home or business?**

The Town will own all portions of the network on the Island, including the drop to your home or business, up to the demarcation box located on the side of your premise. The Town's designated maintenance contractor will perform all maintenance and repairs on the network. That contractor may be BIPCO or another third party. As with telephone or power service, the wiring in your home is your responsibility.

**25. What if something happens to the undersea cable? Who fixes it?**

The undersea cable is owned and maintained by National Grid, with the Town having a 20-year lease agreement (with provisions for renewal) to use eight fiber strands. In general, the deep portions of subsea cables are very reliable. Although the risk of damage is low, National Grid is responsible for repairing the cable in accordance with its agreement with Deepwater Wind, its agreement with the Town and its legal obligations to provide power to Block Island. Depending on the nature and cause of the damage, the Town may be assessed a pro-rated cost for the repair of its portion of the fiber.

**26. Does BIPCO have the manpower to maintain the network?**

Maintenance will be generally limited to repairing cables damaged by storms, fallen trees or other pole damage. BIPCO already performs a similar type of maintenance on power lines. Discussions are just beginning with BIPCO, and the actual manpower requirements will be better defined following these discussions and/or discussions with other potential service providers.

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**27. I have heard that fiber optic cables carry laser light. Is this safe?**

Fiber optic cables do indeed work using lasers. The lasers used in fiber optics operate in infrared wavelengths that are invisible to the human eye. They are perfectly safe as long as you don't look directly into the end of the cable. Since the laser is invisible, it may be damaging your eye, but you'd be unaware of it since you can't see the light. To mitigate this, the home terminal boxes used in the network automatically deactivate their transmit lasers when they detect they've been unplugged from the network. Also, the signal strength coming out of the drop cable is relatively low and should not present a danger with incidental eye contact. While it's never a good idea to look directly into a fiber cable, they are perfectly safe to be near. For the technically-minded, typical fiber to the home uses lasers in the 1490 nm band for downstream and 1310 nm for upstream.

**28. What happens in a power outage? Will the internet still work?**

Under the Town's plan, each customer ONT will include a small Uninterruptible Power Supply (UPS) with an internal battery that will provide up to 8 hours of backup power. The UPS is expected to last as long as the ONT. Should the UPS battery fail, the cost of replacement through the Network Operator or Town is expected to be in the range of \$50 or less. The corresponding equipment in the central network shelter is backed up by both battery and generator systems, and can run for over 24 hours without grid power.

**29. Will the ONT use much electricity at my home to run it?**

The terminal uses about as much power as a standard Wi-Fi router or other small electronic device. The power adapter for the ONT currently being considered has a 12VDC, 2.5A rating.

**30. What happens if the selected Network Operator goes out of business or provides poor service?**

The Town has begun the process of negotiating an agreement with Crocker Communications as the Town's Network Operator. The final agreement will include provisions for regular revisiting of the relationship and the option for either party to cancel the contract if needed. The Town is currently considering an initial term of 3 years, with provisions for renewal. Crocker has established an excellent service track record over the last 20 years. In the unlikely event that Crocker or a future Network Operator goes out of business, the Town would select another to manage the network. This is also why the Town plans on owning the equipment that runs the subsea fiber, as well as the equipment that runs the on-Island network. If the Network Operator departs the Island for any reason, all of the infrastructure required to run the network will stay in place.

**31. What kind of contract does the Town expect to have with the Network Operator?**

The agreement is structured so that the Network Operator/ISP provides service on the Town's network for a fixed cost plus a variable component based on number of customers. The Town of New Shoreham will exclusively determine what costs are charged to end users, and what services are available on the network.

In structuring this project, the Working Group chose to maintain the maximum amount possible of Town control over the network and its services

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### **32. What quality measures and service level agreements (SLAs) will the Town have with the Network Operator? What recourse and remedies will be available to the Town if the SLAs aren't met?**

The Town expects the Network Operator to commit to SLAs around network uptime, latency, mean time to service restoration, and customer service availability and responsiveness. Recourse will range from credits to termination of the agreement. The Town is currently negotiating with Crocker Communications with the expectation that they are to be long-term partners.

### **33. What is Crocker's track record in providing internet service?**

Crocker Communications was founded in 1963 as a telephone service provider and is western Massachusetts' largest and oldest, family-run internet service provider. It has provided internet access services since the mid-1990s and has for the last few years been the ISP running the fiber to the premises network in Leverett, Massachusetts. Customer satisfaction surveys in Leverett show a 94% satisfaction rate with Crocker's service and responsiveness. Although Leverett is Crocker's only contract with an entire municipality, they provide internet service throughout western Massachusetts. They are also the major provider of eRate internet service to the schools in western MA. It should be noted that Leverett, MA is in the process of replacing Crocker as their contracted network operator as the result of a recent competitive end of term bid process. Crocker's bid was higher than the company awarded the new contract (OTT). This is the same type of flexibility the Town expects to have in selecting one or more service providers over time.

## Services Provided on the Network

### **34. What internet speeds will I get?**

Although throughput guarantees are not typically a feature of residential connections because they are cost-prohibitive, every subscriber on the Town's network is expected to experience speeds at or near 1 Gbps for both upload and download. This is 1,000 times faster than a 1 megabit per second connection on Verizon DSL, and at least 30 times faster than a standard LTE mobile connection. The Town will ensure that the network utilization is closely monitored and the network tuned so that users obtain 1Gbps speeds. The Town's Network Operator will proactively monitor the network and will advise the Town when additional bandwidth is needed, at which time the Town will take steps to increase network capacity.

### **35. Will I be able to make phone calls using the fiber service?**

There are two types of phone service you'll be able to use on the network. The first is basic landline (voice) phone service that Crocker Communications offers. It includes unlimited calling in the United States and can be used with your existing phone jacks and landline phones. The Town will determine the actual fee and disclose the amount of any taxes charged to users for this optional service.

The second type of phone service is a third party voice over IP service. There are many providers of such services, and you can typically use either a computer, mobile phone, or regular landline phone, with an appropriate adapter sold separately. This type of phone service is not provided by Crocker and will simply use your internet connection.

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**36. Can I keep my existing landline phone number with the new service?**

Yes, you can move your existing landline or mobile number to the fiber telephone service or to most third party voice over IP services; there may be a small one-time fee to do so.

**37. How will E911 work?**

If you subscribe to phone service through the Town's network, E911 will work the same way it does today. If you subscribe to a third party voice over IP service you will need to confirm E911 details with them, which usually includes a requirement that you register your physical address.

**38. Will the network provide TV service as well?**

An included managed TV service is not being contemplated initially, but individual subscribers are free to subscribe to any of the plethora of IPTV services available, or just stream their TV from Netflix, Amazon, HBO, Showtime, and many others. An advantage of the network design the Town has chosen is that it can also be used to provide cable TV-like service, should the Town choose to solicit one or more provider(s) willing to provide these services.

**39. I have satellite TV now. Do I need to keep that or will this internet service offer me additional options?**

You do not need to keep satellite TV service, but you may. Fiber internet will make numerous options available for streaming from Netflix, Amazon, HBO, Showtime, and many others. Streaming TV services provide options that are either free or on a per channel basis, enabling you to pay only for the channels you use. Many people with true broadband capability on the mainland have cancelled their TV service and watch online programming exclusively. If you are interested in this, you may want to investigate streaming players, which make it easy to watch shows online. Popular options include Roku, Google Chromecast, Apple TV, and Amazon Fire.

**40. Why aren't you planning on offering TV service?**

Although TV service isn't considered a priority in the startup phase of services deployment, the Town can choose to add this service at a later date. This will require researching available providers and costs at that time. Content licensing costs for providing traditional-style cable TV service are typically prohibitive for a small network.

**41. Can I choose just phone or just internet service? Do I have to subscribe to both?**

You can choose to subscribe to voice service, internet service, both, or neither. As noted earlier, the greater the number of subscribers, the lower the subscription costs can be for everyone.

**42. Are there any data limits or caps as in other services?**

Unlike with other internet services, including cellular and satellite, there are no data limits or caps.

**43. Can I still use my existing email address?**

If your existing email address is tied to your current internet provider, you will need to check with your provider to determine whether they require you to subscribe to their service as a condition of

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keeping your email address. If your email is not tied to a provider (such as those from AOL, Gmail, Yahoo, and others) then you can use your existing email regardless of who your ISP is.

**44. Will I now be able to use ultra-high definition services such as Netflix or HBO NOW?**

Not only will you be able to stream Netflix, HBO NOW, and others in 4k resolution, you'll be able to stream multiple 4k programs at once while surfing the web and video chatting with people on the mainland.

**45. My cellular provider offers me Wi-Fi calling with my cell phone. Will the new service offer this even if my home lacks cell phone coverage?**

Yes. You will be able to use your cellular provider's Wi-Fi calling feature with the fiber internet service and its associated WiFi, provided you have a compatible handset and you activate the feature with your mobile provider. Check with your cell service provider for further details.

## Financial

**46. How much will it cost to take service on the network?**

User fees are still being worked out, but the Town is striving to achieve service costs that are comparable to what mainland customer pay for comparable services on the mainland. Appendix D provides a preliminary pricing sheet.

**47. How much will the network cost to build?**

Tilson has completed mid-level engineering and provided an estimate of approximately \$6.2 million for the network, plus a \$2.1 million contingency, for a total of \$8.3 million. The Town, after Tilson's final network engineering and design will issue a Request for Proposals (RFP) to solicit bids from construction contractors to build the network – the cost of construction labor is the greatest unknown at this point. It is likely that some aspects of construction, such as labor, will be more expensive than anticipated, while the Town may see cost savings elsewhere. As the detailed engineering progresses, Tilson will identify areas for potential savings and expenses.

**48. How much will the network cost to operate?**

The Town is working to finalize these cost estimates and preliminary estimates are reflected in the monthly subscription costs provided in Appendix D.

**49. What is the cost to the Town to maintain the network?**

This is dependent on the Town's agreement with its maintenance contractor, whether that is BIPCO or another contractor. It is also dependent on how much damage the network experiences from storms or other causes. Other than damage repair and tree trimming, there is not a lot of maintenance required. Discussions with BIPCo and an understanding of the factors that contribute the maintenance of the electrical distribution network on Block Island will help in arriving at reasonable estimates. Refer to Appendix C for detail.

## Broadband Project FAQs

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**50. What Federal or State assistance can the Town expect, both for capital expenses and operational costs?**

Tilson has conducted an inventory of available funding grants for the Town. There are a handful of federal programs available, and the Town intends to pursue opportunities to obtain these funds. However, there is almost no chance that available grant funding will provide more than a fraction of the money needed to construct an Island-wide network that serves residents and businesses throughout the Town. The funding opportunities are subject to competitive bidding processes, so it is not possible to say for certain at this time how much funding the Town will receive, if any. Furthermore, some of the most significant opportunities are available to entities that already have a broadband network established, so obtaining a commitment from the Town to build a network and working with an experienced Network Operator will provide the Town the greatest opportunities to pursue funding that would offset some (but not most) of the capital and operating costs of the network.

**51. Will there be a tax increase on bonding? How much and how long?**

The Town has calculated that a project cost of \$8.3 million would result in a property tax increase of \$265 per million dollars of valuation annually for 20 years.

For a household with the average assessed value on Block Island of \$750,000, this implies an approximate tax increase of a little less than \$17 per month, or \$ .54 per day. For a household with the mean assessed value of \$885,000, the approximate tax increase would be \$19.58 per month, or \$ .64 per day. For a household with the median assessed value of \$911,520, the approximate tax increase would be a little more than \$20 per month, or \$ .66 per day.

**52. What will the annual payments be to pay off the bond?**

There are several considerations in how the bond and its payments will be structured, but in its simplest form an \$8.3 million bond over 20 years with a 4.0% interest rate would carry annual debt service of approximately \$607,000.

**53. How will this bond be rated? What interest rate can the Town expect?**

The Town of New Shoreham is currently rated 'AA' by Standard & Poor's, and is using 4.0% as an assumed interest rate. The Town's most recent public offering (2012) carried an average 20-year coupon of 3.3%, ranging from 2.0% to 5.0% depending on duration.

**54. The Town is proposing a 20-year bond issue to pay for initial build-out the network. How long will the network last, and when in the lifecycle will new capital investments need to be made? How will these be funded? Have contingency funds been set aside?**

The network will have a design life of at least 20-30 years. With regular and proper maintenance, it can last into the foreseeable future, though older stretches of cable might need replacement at times. Electronic equipment typically has a 5-10 year refresh cycle, but this will ultimately depend on the Town's appetite for replacing functional equipment. The operating budget and financial model Tilson has created includes an annual reserve of approximately \$50,000 for equipment refreshes. Refer to Appendix C for detail.

# Broadband Project FAQs

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## Subscription Requirements and Costs

### **55. What specific costs will subscribers pay for services?**

These details are still being worked out. The intent is for a single flat rate for internet service, another rate for phone service, and the ability to mix and match those services as desired. The Town is planning to purchase bulk bandwidth from its Network Operator and internet service provider, and have flexibility to set rates in a manner that makes the most sense for the Town. Typically, business rates are higher than residential rates, since in general businesses tend to use more of their available bandwidth more often than residences do. However, the Town may choose to differentiate businesses whose usage is anticipated to be more in line with residential use (e.g. small shops) and those that are more likely to be heavier bandwidth users (e.g. hotels). This flexibility will need to be addressed during negotiations with our selected service provider. Preliminary pricing is shown in Appendix D.

### **56. Will recurring prices increase over time? Any limit on increases?**

The Town will determine any price increases or decreases. As more people subscribe to service, it may be possible to reduce prices for everyone. Equipment and bulk internet prices are expected to decrease over time, which could enable price reductions and/or service enhancements, as determined by the Town.

### **57. What will the monthly and installation costs be?**

These are still being determined, but a targeted range for residential service is not more than \$60-90 per month for 1 Gbps internet and \$20-30 additional per month for phone service including unlimited long distance calling in the United States. Lower prices may be possible as more people sign up for service. Appendix D provides preliminary pricing, which is currently set at \$70 for 1Gbps internet service and \$25 for phone service.

### **58. Will I still need to have phone or DSL service through Verizon? What about satellite TV service?**

It's up to you. With the fiber network, you will have high speed internet up to 1,000 times faster than Verizon DSL. You'll also be able to make all-digital, fiber optic voice calls anywhere in the United States using your existing landline phones. You can choose to cancel your Verizon phone or DSL services and save that money, or you can retain them for as long as Verizon remains a service provider on Block Island.

As for TV, the network is capable of providing cable TV services but these are not planned at this time. Should the Town wish to procure these services, it could enter into discussions with potential providers, or people could develop their own solutions. More and more people these days with high quality broadband access are choosing to "cut the cord" and get all their TV over the internet. There is a wealth of streaming content available from Netflix, Amazon, Hulu, HBO, Showtime, and many, many more.

## Broadband Project FAQs

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**59. I don't want a connection now, but I might in the future. What can I do?**

The Town currently plans to connect all premises on Island by running a fiber optic cable to them. If you do not want to take service at this time, you will still have a cable run to your house or business, which will give you the option to easily establish service at a later date. The cable will end in a small plastic box attached to the outside of your structure, near the power meter and telephone connections. If and when you choose to subscribe, you will be provided with a cable to plug into the box, route into your home or business, and connect to an indoor network terminal and Wi-Fi router that the Town will provide for a connection fee.

If you decline having the Town run a cable to your house or business during network construction but change your mind later, you will be responsible for some or all of the cost to run the cable. Every property is different, but the total cost could be in the several thousand dollar range.

**60. Should I keep my Verizon telephone landline service, or save money and cancel it?**

It's up to you. You can keep your Verizon landline service, move your number to the fiber service, or keep your landline number and get a new number for the fiber service. The phone service offered through the fiber network will have the same quality or better than currently available. If you are worried about power interruptions and the existing eight-hour battery backup isn't sufficient for your needs, you can install a bigger battery, set up a generator, or keep Verizon landline service.

**61. Is there a minimum subscription period and can I do a seasonal suspension of service?**

This is a consideration that can be determined by the Town. The current assumptions allow for seasonal disconnect/reconnect however the disconnect/reconnect fees are set at a level sufficient to recapture the lost revenues of six months of service.

**62. Can I pay with a credit card or a check?**

The Town expects that both of these forms of payment will be accepted.

**63. Is there a credit check required or a deposit to start the service?**

This is a consideration that can be determined by the Town. At this time, the Town does not intend to require credit checks.

**64. Any reduced costs for low income or elderly?**

This is a consideration that can be determined by the Town. The current assumptions do not have elderly or low income cost tiers.

**65. Will I receive a paper invoice in the mail or is it just online billing?**

The Town expects that customers will be able to choose either or both.

# Broadband Project FAQs

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## Alternatives to the Proposed Fiber Network

*See Appendix B for additional information on fiber alternatives.*

### **66. Is satellite internet service a reasonable alternative to fiber?**

You can choose to subscribe to satellite service, if you prefer. The major providers are Excede and HughesNet. Satellite broadband service is typically limited to about 15-20 Mbps download (50 times slower than the fiber option), 1-2 Mbps upload (500-1,000 times slower), and has very high latency. Latency is the time required for the signal to go up to the satellite, back down to Earth, and return back up and down to you with the reply or website content you were looking for. High latency makes it nearly impossible to do things that require real time connectivity, like voice or video chat. Bad weather can also interfere with satellite service. With respect to cost, satellite plans generally include significant data caps and overage fees. For example, Excede charges up to \$160/month for 25Mbps service with a 30 GB monthly data cap<sup>1</sup>. Use of streaming services, such as Netflix, can quickly reach data caps. For example, Netflix consumes 0.7 GB/hour for SD video, up to 3 GB per hour for HD video, and 7 GB per hour for Ultra HD video. Using satellite or other data-capped services to stream videos uses a lot of data.

### **67. Is LTE mobile data, like from Verizon Wireless, AT&T, T-Mobile, or Sprint a reasonable alternative to fiber?**

LTE is great for mobile use, but under data plans commonly offered, there are downsides for households and businesses that want to rely on it for primary internet access. LTE data plans often come with data caps, and users that exceed those caps pay extra. Home and business monthly internet consumption commonly exceeds the usage allowance on many mobile plans. Even “unlimited” wireless data plans may slow down or “throttle” usage that exceeds a certain monthly data threshold. There may also be limits to the amount of data that can be shared with other internet devices in the home, such as home computers through mobile phone “tethering.” In fact, many mobile phone users control their monthly mobile data consumption by using in-home or in-business Wi-Fi when it is available, an option that works best when that Wi-Fi is connected to robust home or business internet service. The proposed fiber network is designed to provide truly high-speed service without any usage caps. Use of streaming services can use a lot of data; Netflix consumes 0.7 GB/hour for SD video, up to 3 GB per hour for HD video, and 7 GB per hour for Ultra HD video.

In addition, cellular providers on Block Island use a microwave link to the mainland, which gets overwhelmed in the summertime. One of the benefits of the proposed network will be better, fiber-fed service to home, business, and public Wi-Fi hotspots. Offloading more of the data traffic from mobile phones from cell towers to Wi-Fi can reduce congestion on cellular networks, and provide a better experience for all cellular users.

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<sup>1</sup> Data accessed from Excede’s website on 21 Feb 2017

## Broadband Project FAQs

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**68. Can the Town just make a deal with one of the wireless operators like AT&T or Verizon and give everyone a discount deal on service?**

The wireless operators still use their own microwave links to provide backhaul connectivity to the mainland, with the available bandwidth being only a tiny fraction of what is available on the subsea fiber. During times of peak use, the service would still encounter the same problems it always does. While it's possible that providers might be interested in buying capacity on the fiber, they have not indicated a desire to do so. Also, wireless carriers usually impose highly limiting data caps. Lastly, these companies are not likely to be interested in such a deal. They already have people on the Island paying top dollar for highly variable service. It is unlikely that they would want to contractually reduce their revenue in exchange (presumably) for committing to an expensive buildout of services.

**69. What about a coaxial cable system like those used by Cox or the old Block Island Cable Co? Wouldn't that be cheaper?**

Modern cable networks actually use fiber optic cables extensively, and only the last part of the network connecting to the customer is not fiber. With upgrades, cable companies can deliver fiber-like speeds over coaxial cable systems, so companies that already have these networks built often find it is cost-effective to extend and upgrade them instead of replace them. Building a new coaxial cable system, however, is not less expensive than building a new all-fiber network and an all-fiber network can deliver even greater capacity.

**70. What about having Verizon or Cox build out their networks on the Island?**

When the Working Group issued its RFI for internet services, it included a potential operating model, targeted at Verizon and Cox, where the respondent could build, own, and operate its own network and use the Town's subsea fiber strands for connectivity to the mainland. Neither Verizon nor Cox responded. The Town had reached out to Verizon many times and each time the response was that Verizon cannot make a business case for replacing its existing infrastructure. Verizon also expressed its unwillingness to provide service over the subsea fiber leased by the Town, indicating that their policy is to control their own fiber. Verizon chose not to respond to the Town's RFI. On the other hand, Cox did initially express its intent to respond to the Town's RFI, but after evaluating the business case for building out a network, they also declined to respond.

**71. Nantucket is an example of an island with good internet connectivity. Why can't we do what they did?**

Nantucket has existing service primarily from Xfinity/Comcast and Verizon. Those companies have built their networks on Nantucket in accordance with their own internal profitability requirements. Block Island is not within Comcast's franchise area, so it cannot offer service on the island. Verizon has already indicated it is uninterested in building out further capacity on Block Island. A small percentage of Nantucket residents can also get Sovernet DSL, which is capped at 1 Mbps.

# Broadband Project FAQs

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## Other Technical Questions

**72. Can I obtain a fixed public routable internet Protocol address? Is there a charge for this?**

Residents who subscribe to a business plan can obtain a static IPv4 address and/or a static block of IPv6 address space. While a single static IPv4 address is expected to be provided at no additional charge, we will be negotiating with Crocker on pricing for static blocks of IP address space. We will update pricing as negotiations proceed and rates are finalized.

**73. Are there any restrictions to running services such as web hosting or an email server?**

The Town expects that the agreement with the Network Operator will not restrict subscribers from running servers, with the proviso that any such servers should not be used for illegal activities. Users that are determined through network monitoring to use high bandwidth levels on a sustained basis may be required to upgrade to a business plan. Actual levels will be defined as this project progresses. Also, if a server interferes with the network or its operation, the Network Operator will need to have the right to limit or manage that user, including suspending access, until the required remediation is accomplished. The goal is to ensure that equitable service is provided to all subscribers.

**74. Will the Network Operator offer content filtering or blocking of IP ports or services?**

The Town does not expect the Network Operator to offer content filtering or blocking, and will prohibit content blocking or filtering at the network level.

**75. Will the Network Operator allow me to register a PTR record in its reverse DNS for my IP addresses?**

Internet Service Providers typically register the appropriate A and PTR records pointing to their own domain and identifying the IP address as part of a dynamic pool. They usually do not provide custom reverse DNS for dynamically-assigned addresses. People who purchase static addresses can usually implement custom records, and can often choose whether to have the ISP manage those records on their behalf.

**76. Will the service ever have congestion? Are services prioritized?**

The Town expects the network to be operated in a manner consistent with network neutrality. Services are not prioritized, though the Network Operator may take steps to ensure that subscribers experience consistently high quality phone calls. The Network Operator will also take the steps necessary to avoid network congestion that will impact the users' experience, so all users experience a reliable and fast connection.

**77. How much bandwidth will be available in aggregate across the undersea cable? How much of that is available as actual internet connection bandwidth?**

The Town has the right to use eight strands of fiber in the 24-strand subsea cable. There is no theoretical limit to the throughput available in a single strand. The Town will procure network equipment capable of providing potentially hundreds of gigabits per second across the subsea cable. The current plan is for an initial 10 Gbps connection on the subsea cable, easily expandable as the need arises. The Town is investigating options for seasonal bandwidth increases to avoid congestion in the summer months.

## Broadband Project FAQs

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Crocker peers with multiple Tier 1 providers at 1 Summer Street in Boston. There is as much bandwidth available as the Town may need for the foreseeable future and beyond.

**78. Will the Town ensure that priority services are available for community institutions (e.g. Police, Fire, School, Medical Center) in case of congestion?**

Although services will not be prioritized on the network, the Town anticipates operating essential municipal services on a separate virtual network, via use of a separate wavelength on the on-Island and subsea fiber that does not share capacity with the main network. One of the advantages of the fiber network is the ability to readily expand capacity as usage increases and *avoid* congestion.

### Other Project Questions

**79. Why isn't the Town proposing to implement this project in phases?**

The Town is proceeding with the entire project as a single phase. The risk with a multi-phase project is that Block Island winds up with a partially-built system, and the Town wants to avoid that risk.

**80. If the Town offers phone service on this network, will Verizon leave the Island as a phone provider?**

Currently, Verizon is legally required to provide landline phone service to all premises on Block Island that request it. This is called being the "provider of last resort." They cannot leave the Island. However, there is no guarantee that these policies will remain in place indefinitely into the future, even if the Town does not build a network. Should Verizon be relieved of provider-of-last-resort obligations, the Town's proposed network would provide a ubiquitous network on the Island capable of delivering telephone service.

**81. Will the Library continue to offer free Wi-Fi?**

This is up to the Library, but the Town does not expect any reductions in service. To the contrary, it is anticipated that improved speeds and connectivity will improve the Library's free Wi-Fi offering.

**82. Will there be Wi-Fi hotspots on the Island for visitors or other non-subscribers? Will there be a charge for this?**

Some public Wi-Fi is contemplated in the network design and cost models, particularly in the downtown area. The specifics have yet to be determined. The Town contemplates access for existing broadband subscribers to be free of charge, while there would be a charge for others.

**83. Are there back up links?**

The existing Verizon landline and cellular providers operate independent links to the mainland, which provide some redundancy for Internet and phone service. The Town initially contemplated building a backup microwave connection for the fiber network, but due to cost considerations does not currently plan to do so. The Town will continue to investigate grant opportunities for funding this.

## Broadband Project FAQs

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**84. Will privacy protections be in place so the Town or Network Operator or maintaining authority will not be able to see my internet use?**

Neither the Network Operator nor the Town will monitor or log residents' internet use aside from the extent necessary to provide service and troubleshoot. Crocker's privacy policy is available on its website, [www.crocker.com](http://www.crocker.com).

**85. Does the Town intend to eliminate its own use of Verizon's terrestrial voice and data services? How much money will / could the Town save annually by doing so? Does this include the School and Library?**

The Town does intend to migrate to the Town-owned voice and data systems. The timing of those changes will be structured to minimize contract termination fees. It is expected that the Town's migration (including the library) will be cost-neutral but with significantly improved service, although there may be additional costs for new equipment. Current costs for Town voice and data service is approximately \$50,000 annually. A solution for the School is still being developed since its needs and funding sources are unique and explicitly regulated.

# Broadband Project FAQs

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## Appendix A. Project History

The Town's Broadband Initiative grew out of ongoing frustration on the part of residents, businesses, Town government and visitors with the limited and unreliable internet service available on Island. As available and common internet speeds continue to rise on the mainland, Block Island has been stuck in a time warp, where speeds of 512K to 728K that were long ago considered "high speed" are the norm here. Those wanting to live, work and/or play on Block Island have had to forego the many internet capabilities taken for granted on the mainland, including eGovernment, telemedicine, long distance education, entertainment options, business-grade video-conferencing and many others. This has negatively impacted School curriculum and testing requirements, impacted Public Safety and Town government operations, limited health services and at times even impacted Medical Center billing and Town payroll processing.

The Town has engaged in many activities over the course of several years to improve internet service to the Island, beginning formally in 2009 when it participated in an effort by the Ocean State Higher Education Economic Development and Administrative Network (OSHEAN) to prepare and submit an application to the National Telecommunications and Information Administration (NTIA) for a Federal Broadband Technologies Opportunities Program (BTOP) stimulus grant to bring vastly increased capacity to the Town's community anchor institutions (schools, libraries, universities, community colleges, hospitals and government agencies) in Rhode Island and Bristol County, MA. OSHEAN won an over \$26 million award to build what is known as the Beacon 2.0 fiber optical network backbone networks, completed in August 2013 and connecting over 125 regional CAI facilities.

Unfortunately, these did not include any on Block Island. Block Island was removed from the grant application prior to submission to NTIA because OSHEAN did not deem a connection to the mainland feasible at that time.

For many years, the Town, School and Police Department experienced frequent and often lengthy outages, as did local residents and visitors staying here. Verizon repeatedly failed to acknowledge a problem, were unable to properly identify the problem and/or were unable to bring the appropriate resources to bear on a resolution. Residents and summer rental managers began bringing their complaints to Town Hall as well. The Town persistently provided evidence and raised our concerns to Verizon managers, and requested help from the PUC. Finally in 2010, Michele Cinquegrano, Regional Director, Verizon Government Affairs, began working closely with the Town to investigate and facilitate resolution of Island customer complaints. The Town succeeded in getting two on Island Verizon technicians and the response to outages gradually improved. Yet the quality of internet access did not improve for many.

Along with our successes with Verizon came disappointment, as it became increasingly apparent that making significant internet speed improvements was not in Verizon's short or long term business plans. Modest changes were made to increase capacity of Verizon's microwave link to the mainland, but that was only to accommodate additional usage volume in the spring of 2015; however the DSL download speed cap of 728K (< 1 Mbps) remains to this day. While the FCC definition of "broadband" was 3 or 4Mbps (Megabits per second) at that time, that definition has now increased to 25Mbps.

## Broadband Project FAQs

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In 2012, the Town began discussions with Deepwater Wind to secure a lease for fiber as part of the wind farm project, and subsequently negotiated with Deepwater to receive eight strands of fiber as part of payment for an easement granted across the town beach for the undersea transmission cable.

In the fall of 2013, the Town reached out to Senator Reed's Office for assistance and was introduced to Stuart Freiman, then the State's Broadband Program Director. With an initial phone call between the Town Manager, our IT Consultant and Stuart, our broadband direction changed forever. The Town received expert guidance from Stuart that focused Town efforts and brought additional resources to the cause. Broadband RI hosted a New Shoreham Broadband Exploratory meeting at the RI Department of Administration with the State Digital Officer (and later CIO) Thom Guertin, OSHEAN CEO David Marble, and representatives from the RIPUC and EA Engineering attending. In January 2014, the Town Manager brought all Town efforts together in the form of a Broadband Working Group, with representatives from a cross-section of residents and business. The Town conducted formal speed tests throughout the Island in May and July 2014 and analyzed these with the assistance of EA Engineering.

Through the efforts of Stuart Freiman and Thom Guertin, New Shoreham was included in a Broadband Study of Aquidneck Island conducted by Tilson Technology, a Maine-based broadband consulting and engineering firm having experience with Island broadband initiatives. Tilson delivered their report to the Council in January 2015. Based upon information available and assumptions made at that time, the cost of building an on-Island fiber network was estimated to be in the \$4.3 million range. Though a less expensive hybrid wireless solution was also presented, it would require erection of additional tall towers on the Island in locations that would have a significant impact on viewsheds, and this solution was not deemed suitable by the Broadband Working Group, and that seemed to be the consensus during discussion during Tilson's presentation to Council.

The Town successfully negotiated with National Grid for a 20 year fiber lease agreement that was signed in the fall of 2015. Though National Grid held firm for many months on limiting the Town to four fiber strands (in spite of Deepwater's commitment), the Town ultimately secured the eight strands at a cost of \$20 over 20 years. The agreement includes a provision for cooperating in good faith to discuss renewal of the agreement one year prior to its expiration.

Following delivery of the Broadband Study report, the Town engaged Tilson to assist with development of a Request for Information (RFI) for Broadband Services. This RFI process resulted in selection of Crocker Communication as the Town's selected broadband partner. Tilson also conducted a preliminary field study and mid-level engineering design that was used to prepare a project cost estimate. Where the initial estimate had assumed 80% overhead and 20% underground runs, the field work indicated 80% underground runs, which are more expensive than aerial. Current cost estimates, along with underlying assumptions are presented later in this document.

At a September 2016 Financial Town Meeting, voters approved the purchase of two-thirds controlling interest the Block Island Power Company (BIPCO). In addition to enabling the ratepayers to control and manage BIPCO operating and investing decisions, this purchase may offer the Town and BIPCO a unique opportunity to coordinate in support of Island-wide broadband initiatives.

## Broadband Project FAQs

### Appendix B. Comparison of Broadband Network Alternatives

The following table, though not intended to be exhaustive, includes available alternatives that were considered at the beginning of this project. It also includes one solution that has recently been mentioned that is not operational yet and cannot be properly evaluated. Comparison of monthly costs to the consumer for each of these solutions is difficult due to the many variables involved. Among these are specific service provider, “bundled” plan options, and charge for data cap overages. The Town is working to gather this information and will provide in a future information update.

Technology	Characteristics	Maximum Speeds	Challenges	Data Caps / Overage Charges?
<b><i>Technology Solutions That Are Available on Block Island Today</i></b>				
DSL (Verizon)	DSL in most regions beats fiber in price but not necessarily in value, because fiber offers a faster, more reliable connection for a price that is not astronomically higher than DSL.	On Block Island, 768Kbps down / 384kps up Can support only basic online activities such as simple web browsing, email, file downloads. Streaming video generally unavailable.	DSL runs on Verizon aging copper infrastructure using microwave backhaul to the mainland. Verizon is unwilling to invest in significant improvements to on island infrastructure or consider partnering with the Town for use of the subsea fiber for backhaul. Upload speeds limited.	No
Satellite	Requires an outside antenna for data to travel over the airwaves. Latency is typically high, which causes interruptions of any streaming applications.	200 Kbps – 8 Mbps Actual speed limited by provider plan; data usage caps and overage charges apply	Excessive latency (delay) precludes use of many broadband applications, such as streaming video, video conferencing. Upload speeds limited.	Yes
4G Cellular	As with fixed wireless, signals degrade with distance from a tower which results in spotty on island coverage. Backhaul is currently limited by carrier’s microwave links to the mainland.	2 Mbps – 18 Mbps Actual speed limited by carrier plan; data usage caps and overage charges apply	RI 5G project excluded Block Island	Yes

## Broadband Project FAQs

Technology	Characteristics	Maximum Speeds	Challenges	Data Caps / Overage Charges?
T1 (Verizon)	T1 service is not available in all areas of Block Island; cost for single T1 service is in the range of \$500 month. The Town Hall is serviced by a single T1 and the School is served by 3 bonded T1s. T1s are a 1980s-technology designed for businesses of that era.	1.5 Mbps (more with bonded T1s)	Limited availability and high cost per Mbps. Special network equipment required to connect to Ethernet.	No
<b><i>Technology Solutions That Could Be Implemented On Block Island Today</i></b>				
Fiber	Fiber provides the most mature technology option for reliability and speed and once the fiber infrastructure is build, offers a lower cost to deliver each Mbps as compared to other technologies. The availability of fiber broadband service is expected to have favorable impacts on the local economy, property values and quality of life.	1Gbps – 1,000Gbps 1Gbps planned initially, though planned equipment supports 7 times that on 1 fiber strand. Supports music / video downloads/streaming; online gaming, connecting many devices (computers, mobile devices, smart TVs, household devices, VOIP telephones); upload speeds typically match download speeds.	Initial construction costs higher than other technologies.	No
Fixed Wireless	Requires relatively tall and visible towers on the island. Technical limitations of wireless prevent it from scaling to meet growing bandwidth requirements. Lack of spectrum limits speed and capacity. Weather and	1 Mbps – 1.5 Gbps	Although initial investment may be less for a wireless network, the cost to deliver each Mbps to a customer can be significantly higher. Currently available wireless	Yes

## Broadband Project FAQs

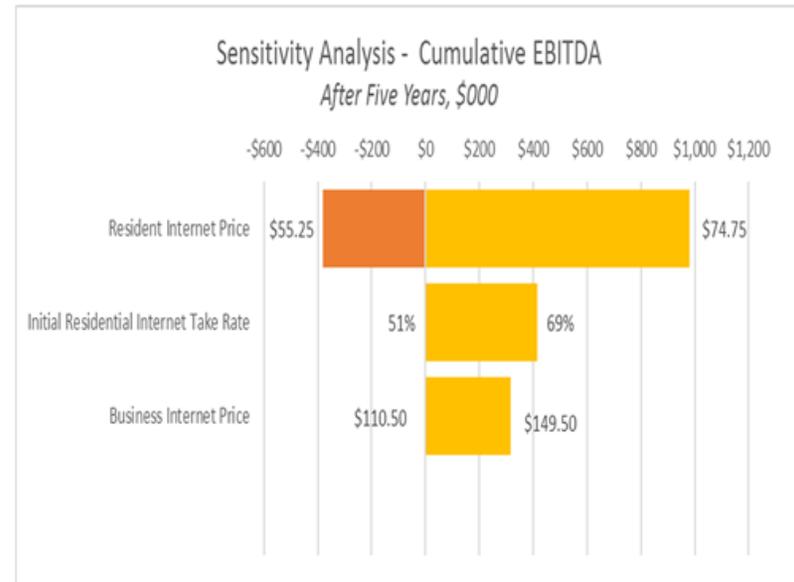
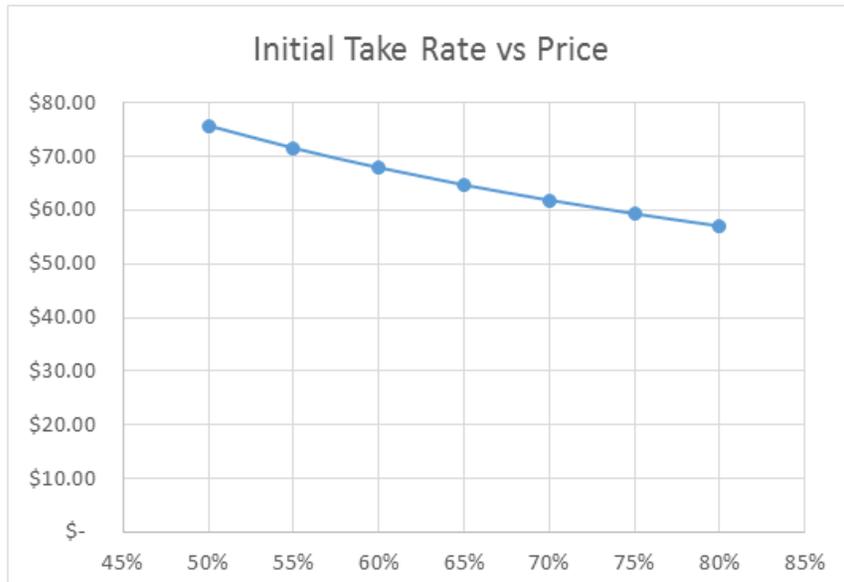
Technology	Characteristics	Maximum Speeds	Challenges	Data Caps / Overage Charges?
	terrain reduce the effect of (attenuate) wireless signals, limiting availability and reducing reliability. Wireless signal strength influenced by distance from tower. Wireless technologies are not economically scalable to higher broadband speeds		technology still has inherent limitations in terms of speed, latency, capacity and reliability. Impact on views sheds for required towers is also a disadvantage. Upload speeds limited.	
Cable (DOCSIS 3.0)	Cable service is not currently available to the island.	1 Mbps – 150 Mbps	RI cable providers (Cox, FullChannel) are not willing to invest in the buildout of a cable network on Block Island.	Yes, in some markets
<b><i>Technology Solutions That Cannot Be Implemented On Block Island Today</i></b>				
AT&T AirGig	This solution is in the experimental stage and not commercially available at this time. It uses plastic antennas along power lines to send broadband signals to homes and businesses. Field trials scheduled for fall 2017 (only 1 planned for the US) planned to evaluate effects of rain, snow and high winds, as well as determine cost. In 2016, AT&T stated it was “cautiously optimistic” for commercial availability around a 2020	1 Gbps projected	At this stage of development, weather effects, commercial viability and cost have yet to be determined.	To Be Determined

# Broadband Project FAQs

## Appendix C. Broadband Operating Revenue and Expense Model

Operating and equipment replacement costs will be funded through subscriber fees. Capital construction of the \$8.3 million infrastructure will be funded through the Town's tax base (See Question 51).

Year	0	1	2	3	4	5
<b>Avg. Take Rate</b>		<b>64%</b>	<b>70%</b>	<b>77%</b>	<b>80%</b>	<b>80%</b>
<b>Average Subscribers</b>	-	1,020	1,127	1,234	1,283	1,283
<b>Operating Revenue</b>	\$0	\$1,022,725	\$1,176,709	\$1,283,792	\$1,286,008	\$1,286,008
<b>Operating Expenses</b>	\$0	\$947,465	\$991,866	\$1,031,604	\$1,051,644	\$1,054,866
<b>Capital Equipment Replacement Reserve</b>	\$0	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
<b>EBITDA</b>	<b>\$0</b>	<b>\$25,260</b>	<b>\$134,843</b>	<b>\$202,188</b>	<b>\$184,363</b>	<b>\$181,141</b>
<b>Cumulative EBITDA</b>	\$0	\$25,260	\$160,103	\$362,292	\$546,655	\$727,797



Initial take rate ramps up to 80% after three years. Price is the computed price necessary with the take rate to produce an EBITDA (Earnings Before Interest, Taxes and Amortization) of zero in the first year (breakeven). Note that future year cash flows are forecast to be significantly greater than zero in these cases, due to the extreme sensitivity of the model to subscriber pricing and the general upward trend in take rate, ramping up to 80%.

## Broadband Project FAQs

### Appendix D. Preliminary Broadband Services Price Sheet and Cost Calculator

#### Preliminary Broadband Services Price Sheet

Services	Monthly Cost	Assumptions
<b>Residential Service (includes Small Businesses)</b>		
Service Connect (One time)	\$ 100.00	Fiber connected to ONT on house
Internet - 1Gbps	\$ 70.00	60% take rate upon commencement with gradual increase to 80% within 3 years; Cost will be for full year, as disconnect/reconnect fees will equalize.
Telephone	\$ 25.00 per line	½ internet customers also take phone service; many rental property owners will opt to keep a house phone in service.
<b>Business Service</b>		
Service Connect (One time)	\$ 100.00	Fiber connected to ONT on building
Internet – 1Gbps	\$ 140.00	
Telephone	\$ 25.00 per line	
<b>Taxes, Surcharges and Fees</b>		
RI Sales Tax	7% all charges	
Federal Excise Tax	3% local phone service charges	
Federal Universal Service Fund	10.8383% certain long distance charges	Includes International calls, Calling Card, Toll Free state-to-state, Directory Assistance and Operator Services.
RI State 911 Surcharge	\$ .26 per standard line \$ .13 per DID (e.g. Fax) line	
RI School and Library Fund (RITEAF)	\$ .26 per line	
RI Public Service Corp Tax	5% per line	

## Broadband Project FAQs

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### Preliminary All-In Broadband Cost Calculator

#### Sample Residential Subscriber & Taxpayer

<b>Monthly Subscriber Fees</b>		
Internet Base Price	\$70.00	
Phone Base Price (1 Line)	\$25.00	
Taxes, Surcharges & Fees	\$11.27	
Total	\$106.27	
<b>Annual Property Tax Bill, Monthly Basis</b>		
\$885,000 Mean Property Value	\$19.58/monthly	
<b>All-In Broadband Capital &amp; Operating Costs, Monthly Basis</b>		
Mean Residential Property	\$125.85/monthly	

This example is designed to provide an approximation of costs associated with service on a prospective New Shoreham Broadband network. Actual taxes and fees will be calculated on a per-subscriber basis by the Town and its hired Network Operator. Actual property taxes will be assessed by the Town of New Shoreham.