

# Town of Middlefield Municipal Light Plant

## Middlefield Wireless Broadband FAQ

### **Q: What is broadband?**

**A:** In 2015, the Federal Communications Commission voted to raise its benchmark speed for broadband internet access from 4 to 25 megabits per second (Mbps) for downloads, and from 1 to 3 Mbps for uploads. This is roughly 10 times the speed of Middlefield's DSL service, and five times the speed of our Town Hall network, with 13 secure computers, plus the library computers, plus the auditorium computers, plus public Wi-Fi.

### **Q: What is wireless broadband?**

**A:** It's a way to bring Internet access and telephone service using advanced radio technology. There are different wireless designs but they all have Access Points (APs) from which the signal is broadcast out to transceivers on customer premises. The town's APs will be on the transfer station tower, and on poles of varying heights as required, much like telephone poles.

### **Q: What is the Middlefield Municipal Light Plant?**

**A:** Middlefield Town Meeting votes on May 7, 2011 & August 8, 2011 established the Middlefield Municipal Light Plant (MMLP) to create a last mile broadband network connecting Middlefield homes and businesses. The Town, acting through the MMLP, will own the infrastructure and contract with third parties to maintain and operate the network.

### **Q: Why was Middlefield the first town selected by the Baker team for last mile implementation?**

**A:** After persistent lobbying for a low cost wireless alternative for Middlefield, the Massachusetts Broadband Institute (MBI) hired Fred Goldstein of the Interisle Consulting Group to do a study of our options. We then secured a planning grant from the MBI for Fred to deliver a comprehensive budgetary design and cost estimate for a fixed wireless network. Thus, we were the only town to arrive at the May 10 meeting with Governor Baker with a comprehensive and viable plan.

### **Q: What did you present to Governor Baker?**

**A:** We told him that the Middlefield project will be:

- A template for multiple towns,
- Fully funded by state grants,
- Provide town-wide 25/3 Mbps service, and,
- A public-private partnership.

### **Q: What will the installation at a home or business entail?**

**A:** A radio-antenna combination, typically resembling a satellite dish but smaller, will be mounted on the outside of the house, and a wire will be brought inside. The service is then usable via Ethernet or across the house via Wi-Fi.



**Figure 1: Typical CPE radio (Cambium Force 200).**

**Q: How much will service cost?**

**A:** We're estimating that high-speed Internet service will cost about \$65 per month, and phone service \$25 per month. We'll have a better idea once the bids for the operator/service provider come in. The town could institute tiered pricing, for different levels of service.

**Q: Is there a cap on the amount of data I can use, as there is with satellite service?**

**A:** No.

**Q: Can I keep my existing internet or phone service?**

**A:** Yes, nobody is required to sign up.

**Q: If I sign up later on, will I be penalized?**

**A:** No. There is not a significant added cost to provide service to another location, so unlike fiber plans proposed to date, you can sign up at any time without incurring a late arrival penalty.

**Q: What services will be offered?**

**A:** The network will offer:

- Affordable Internet
- High quality phone service (unlike Vonage and other VoIP services that must compete with movies or video games).
- No Cable TV. Those who wish can keep their dish, or subscribe to Netflix, Sling, YouTube, etc.

**Q: How will signals be carried to my home?**

**A:** The network will employ a mix of radio frequencies to optimize performance to each home, depending on the terrain and extent of tree cover.

**Q: What infrastructure will the town deploy?**

**A:** The basic infrastructure will employ:

- A 90' tower at the transfer station.

- Approximately 11-14 wooden poles along town roads.
- Each pole will have 2-8 antennas.
- The Chester Fire Tower



Figure 2: Antennas on top of 50' pole in Royalston.

**Q: Can I subscribe to a higher level of service?**

**A:** Yes, if you are within line of sight of an AP on the transfer station tower or one of the poles, higher speed service will be available. As technology is continuously improving, chances are speeds offered will increase with time. So while we should be able to deliver 25 Mbps service to everyone, even higher speed service may be available in certain areas.

**Q: According to project requirements of the MBI, we only have to cover 96% of the homes – who will we leave out?**

**A:** Nobody. That's the MBI's minimum requirement – we plan to cover everyone who wants to subscribe – 100%.

**Q: WiredWest says that wireless is “slow and ill-equipped for modern applications” and “subject to interference from weather and signal obstacles including foliage.” Is this true?**

**A:** No. While a number of attempts to provide wireless in rural/wooded towns have failed in the past, wireless technology has evolved rapidly in recent years. Successful wireless projects in our region include Hilltown Networks, the Royalston Broadband Network, and Warwick Broadband. Unlike mobile wireless, fixed wireless is installed in place to MMLP specifications.

As for weather, see “Wireless might be fine on a sunny day ...” below.

**Q: If wireless works, why do we need a pilot?**

**A:** The trial locations will be selected in order to evaluate the real-world performance of the latest equipment in terms of coverage, effective speed, ease of deployment, and ability to penetrate foliage. The results of the tests will then be used in the final calibration of our propagation model, so as to optimize the town-wide rollout.

**Q: What are the benefits of using the Chester Fire Tower?**

**A:** Access to the Chester Fire Tower will:

- Provide line-of-sight to dozens of homes, lowering the cost of access equipment.
- Allow us to reach two poles on River Road, so we won't need to run a half-mile fiber past Glendale Falls (or plant a large monopole in granite near the environmentally-sensitive site), for a savings of \$25K.
- Provide our most economical path to West Worthington (instead of via Peru for \$6K more), where a redundant connection to the MBI fiber could be provisioned.
- Facilitate backhaul between poles and towers. (See, "What is backhaul?" below.)
- Allow for the use of shorter poles at other locations, and possibly to use one fewer new pole, saving about \$20K.
- Foster regional solutions via access to locations in North Chester & Worthington.

All told, access to the high location would save thousands of dollars in construction costs, foster regional rationalization, and simplify the installation of high-quality access across the Town.

**Q: What are the chances that we will be able to use the fire tower?**

**A:** Very good, according to the MBI. They had let their access agreement with DCR expire, but they are working to renew it.

**Q: Will our network have to receive service through MBI's network – we heard that it's very expensive?**

**A:** It had been a requirement that service had to be provided through the MassBroadband 123 network. That condition has been dropped, so we are free to look into alternatives. For example, our Transfer Station tower will have line-of-sight connectivity to the Access Plus tower near Washington Mountain, giving us access to reliable service at a lower cost.

**Q: Will we provide service to customers in other towns?**

**A:** Yes. As radio waves don't respect town lines, we are looking to serve customers in the adjacent towns of Worthington, Chester, Peru, Washington, and especially Becket, who will not yet have access to broadband. We will also be able to provide commercial service to select locations as soon as the transfer station tower is up.

**Q: Are we working with other towns?**

**A:** Yes. Our Communications Committee has visited a number of towns and we are an active participant in the Hybrid-Wireless Working Group. We also have a member on the WiredWest board.

**Q: What is "backhaul" service?**

**A:** Backhaul refers to the connections between the pole that services the subscriber and the rest of the Internet. Within Middlefield, dedicated high-speed point-to-point links will provide backhaul to all of the poles, with some redundant paths to improve reliability. From there, service goes out via Massbroadband 123 or an alternative route, such as Access Plus, to the global network. For example, the Leverett network subscribes to 2 Gbps (2K megabits) of service, although the daily peak usage for all of their 640 customers combined is between 550 and 800 Mbps, or less than 1 Gbps.

**Q: Wireless might be fine on a sunny day, but aren't rain, snow, and worse yet, ice going to degrade my service?**

**A:** In general, no. The radio frequencies we will use are too low to suffer from meaningful rain fade. Snow does not impact radio reception. Under some unusual circumstances, ice may have a minor impact on service, but this is rare.

**Q: What happens in a hurricane, when trees come crashing down?**

**A:** Our tower will be engineered to withstand the strongest gusts anticipated here (110 MPH). If a tree crashes onto one of our poles, it may knock out an antenna or, under extreme circumstances, the pole. A repair crew will then be dispatched. Frankly, wireless fares much better under these circumstances than fiber or old copper telephone lines, which can break when trees fall on them.

**Q: Won't I lose service when the power goes out?**

**A:** All of our tower and pole equipment will have battery backup. The equipment at your home can be configured with an uninterruptible power supply if necessary. For customers who use our service as their primary telephone service, we expect to make battery backup for the home available too.

**Q: We heard that the bids to put up the transfer station monopole came in at \$50K over the estimate – what gives?**

**A:** Part of the blame is ours, as we didn't give ourselves enough slack under pressure from the MBI to keep our estimates down. The larger problem was Town Counsel's insistence that the erection of the monopole was a "public works project," subject to prevailing wage, insurance, and other requirements that caused all but two potential bidders not to participate. Since we had to follow stringent "Invitation for Bid" procedures and were not allowed to negotiate with potential bidders, site preparation and excavation work that might have been done by the town had to be part of the bid, resulting in a low bid that included \$62K for the concrete foundation and grounding. (The tower itself is only \$18K.)

**Q: If the monopole foundation alone is more than the original tower estimate, can't we find a less costly alternative?**

**A:** Yes, a standard 90' guyed tower would put us *under*, rather than over our pilot budget estimate. The tower itself costs less, and it would not require a massive foundation or a crane to put up. (It consists of 10' triangular sections that are erected using a "gin pole" with a pulley or block and tackle on its upper end.)

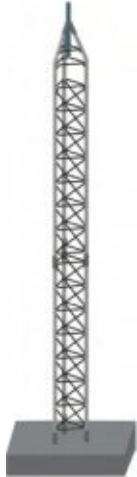


Figure 3: Typical guyed tower.

**Q: That takes care of the tower, but won't we have to go through the same "invitation for bid" procedures with the network operator/service provider contract?**

**A:** Fortunately, no. Even if Town Counsel argues that our service agreement is another "public works project," (even though it's for professional services), the Municipal Modernization Bill signed by Governor Baker on August 9 increases municipal procurement thresholds, allowing greater control over our funds. The new law will apply to the guyed tower as well.

**Q: What is Middlefield's share of last mile broadband funds?**

**A:** Middlefield's share of the last mile broadband funds is \$580K, As we presented to Governor Baker – that's more than enough to cover our entire project, at no cost to Middlefield taxpayers.

**Q: Oh sure, but won't the MBI only give us \$310K for "construction"?**

**A:** That's the \$270K question. According to the January 2016 presentation of the MBI Board of Directors, Middlefield's share of the last mile broadband funds is \$580K. However, when we turn to Middlefield's "Initial Model of Infrastructure & CAPEX" in the MBI Last Mile Town Profiles of April 2016, we see that the "Professional Services Costs Funded by MBI" is \$270K, or 17% of the "Estimated Total Network Cost" of \$1,590K. Note that these numbers only make sense for a Fiber-to-the-Home network! The estimated cost of our wireless network is about one-third of that. Apparently, the MBI intends to withhold \$270K to pay their staff for unspecified "professional services" – a whopping 47% of our funds.

Since the MMLP is managing the project and we would never spend anywhere near that amount on professional services, we must be allowed to allocate our \$580K grant allotment according to the construction and professional service requirements of our wireless project.

**Q: How can we proceed with the town-wide rollout without assurance that we can use our entire \$580K share of last mile broadband funds?**

**A:** We can't, unless Middlefield taxpayers are willing to put "skin in the game," – to use a favorite phrase of MBI.

**Q: How can we be assured that we can access our entire \$580K, so the town-wide rollout can go forward?**

**A:** So far, we have only received vague assurances from MBI that “everything is on the table” – not something we can take to the bank. We have the backing of Senator Downing and Representative Kulik, so now is the time to insist on concrete assurance from the Baker administration that we will have the funding necessary to complete our project.

Since the Governor has appointed a new broadband leadership team with a mandate to implement a range of technologies, and as Middlefield was chosen to serve as the model for other towns looking to implement wireless solutions, we are optimistic that this issue will be favorably resolved.

Stephen E. Harris  
Manager, Middlefield Municipal Light Plant

**Note:** This document is a work in progress that will be updated as new questions arise.