

Bug Tussel & Marathon County Partnership

BUG TUSSEL WAS AWARDED A BROADBAND EXPANSION GRANT FOR A PROJECT IN MARATHON COUNTY!

As of July 2022, Bug Tussel was awarded a grant to expand its fiber optic network in Marathon County, providing fiber-to-the-home for portions (FTTH) of the Town of Guenther, Town of Knowlton, and Village of Kronenwetter. More details coming in future reports.

THE PARTNERSHIP

Bug Tussel Wireless is proud to be partnered with Marathon County through a bond that was issued in December of 2021. The project will primarily take place during the fiscal year 2022, with Bug Tussel's goal to have towers completed and online by January of 2023 and fiber connections to follow.

THE PROJECT

The project, **ROAD to Digital Equality: Marathon County** is designed to equip Marathon County with a fiberoptic backbone network and wireless internet access through rural areas in Marathon County. Bug Tussel will install 22 towers (in addition to 3 towers already in Marathon County) and 350 miles of fiber within 1-3 years, with options for expansion available as agreed upon by Bug Tussel and the county.

BUG TUSSEL UNIVERSITY *Providing Core Education to Rural Communities*

Bug Tussel University is a free educational program for adults who want to improve their basic technology skills, learn about computers, and more! Regular attendee and class host, Coloma Public Library Director Deborah Sadowski says, "Thanks to Bug Tussel for offering these classes! It's such a big thing for our little community." Class attendees have learned how protect their privacy on Facebook, how to search better online, and more.

Request a class in your area by calling us at **920-940-0158** or emailing us at bugtusseluniversity@bugtusselwireless.com.

SALES & MARKETING

Bug Tussel ran Facebook ads targeting the county during the month of July.

Bug Tussel partnered with the Wausau Cyclones Hockey team to run ads from July 2022-June 2023.

Check out our comic book!



The Boys & Girls Club of Greater Green Bay and Bug Tussel Wireless partnered to create a unique comic book that tells the story of Buford, a local hero to communities and Bug Tussel mascot, as he explains the importance of the internet and connecting rural Wisconsin. Read the comic book online by scanning the QR code or visiting this web address:



https://www.documentcloud.org/documents/22076279-bugtussel-comic1_output?responsive=1&title=1

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TOWER STATUS



On Air: 3

- Tower construction and installation complete.
- Internet is live and operational.



Under Construction: 7

- Establish tower foundation.
- Construct tower by stacking from bottom to top.
- Install antenna, lines, and integrate network.



Zoning: 7

- Submit permits and receive approval from local and federal agencies.



Site Acquisition: 6

- Search for and determine tower site.
- Obtain lease from landowner.

TOWER SITES IN PROGRESS

Lease agreements for sites Milan, March Rapids, Pontiatowski, Stettin, Rozellville, and Ringle Road are still in process.

Edgar, Bass Lake, Knowlton, Glandon, Mann, Rainbow Drive, and Mud Lake remain in zoning status while final regulatory steps are completed. Zoning status is the process of submitting permits and awaiting approval from various local and federal government agencies. The projected date when approval will be received to move forward with construction for these sites varies from late August to early November.

Big Bass Lake, Stratford, Shepard Road, Eau Plane Park, and Hamburg are at the beginning stages of construction. Tower builds for Big Bass Lake, Stratford, and Hamburg are expected to begin in August. Tower builds for Eau Plane Park and Shepard Road are projected to begin this fall.

Construction of towers Sunset and Evergreen is nearly complete. Crews are waiting for equipment to be delivered. Equipment delivery is expected this August.



On Air



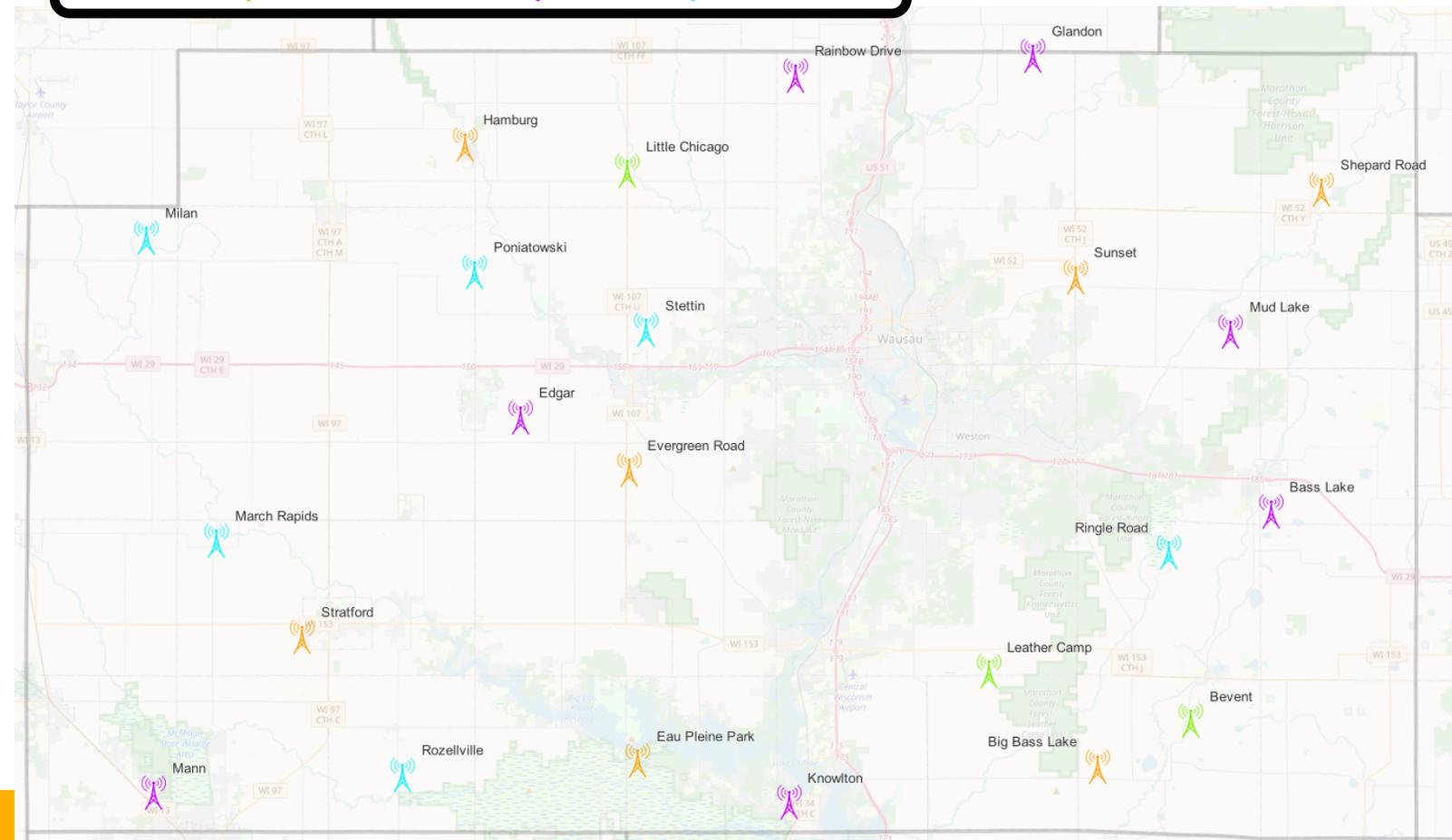
Under Construction



Zoning



Site Acquisition



*This map includes a rough estimate of site locations and may not accurately reflect actual tower placement.

FIBER NETWORK

Nearly 30 Miles of Conduit Complete

Construction has been underway since early May. Approximately 30 miles of conduit have been deployed. Contractor M.J. Electric is working on this section. This includes conduit along the route as well as handholes, which are underground utility boxes where fiber connections to homes are made when setting up internet.

Looking Ahead to Adding Fiber

Crews began deploying fiber at the very end of the month. Approximately 3 miles of fiber have been installed thus far. Fiber is placed inside the conduit through a process called "fiber blowing", a technique sends fiber through conduit using a machine that pushes the fiber through the conduit with forced air. This technique reduces friction and the risk of damage to the fiber.

Rock and Underground Utility Protection Slow Progress

Progress on the route is being slowed down by two challenges: rock conditions and underground utility protection delays. Construction crews are running into hard rock, which requires use of a directional drill. In addition, USIC locators (workers with the company USIC who scan the ground to locate underground utilities in order to prevent damage) are overwhelmed and have limited staff time available. This causes a challenge for USIC locators to cover areas early enough before the construction crew catches up. Bug Tussel and USIC staff are working on a solution.

FIBER STATUS



On Air: 0 miles

- Fiber is installed.
- Connections to towers are complete.
- Internet is live and operational.



Under Construction: 30 miles

- Conduit, the protection cable that will house the fiber, is installed via Boring (with a drill) or Plowing.
- Handholes, Flowerpots, and Cabinets, access hatches that house utilities and connections, are installed.
- Fiber is sent through the conduit via Fiber Blowing, a technique using a machine on wheels that blows air to push the fiber through the cable.
- Sections of fiber are connected to each other via Splicing, the fusion of fiber pieces with an optical laser.



Zoning: 159 miles

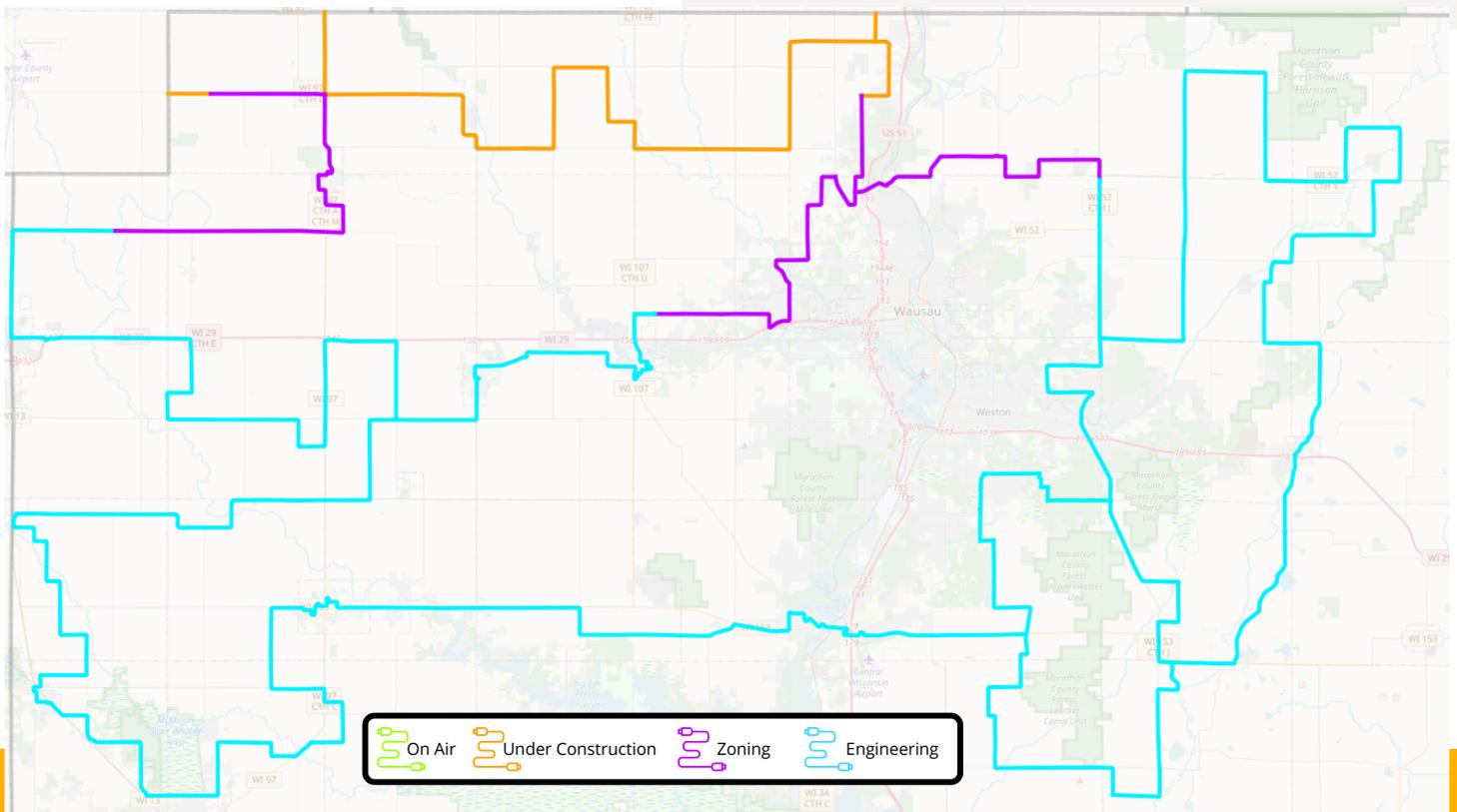
- Permits for work in areas along the route are submitted.
- Permits are approved by appropriate parties.



Engineering: 378 miles*

*Includes the Last Mile, sections of the route that branch off of the main route to neighborhoods, business areas, and residential areas.

- Fiber route is mapped.
- Route is traveled to determine equipment and landscape needs.
- Sections are Re-designed as needed.



*This map includes a rough estimate of the fiber network and may not accurately reflect final route.

How is a Fiber Network Created?

Did you know? A fiber network is like a highway system.

The **First Mile** is like an *expressway* connecting main points across very large areas together. This is the *core* network that hooks up internet connections from state to state and, on a larger scale, country to country.

 The **Middle Mile** is like a *highway* connecting cities together. This is the *backbone* that connects cities, counties, and states and creates a national network.

The **Last Mile** is like a *road* that travels from the highway to individual neighborhoods. This is the *distribution* that connects the internet network to customer's homes, businesses, and government agencies. This is often the costliest and most challenging part of the network to create.

*Bug Tussel specializes in building Middle Mile and Last Mile networks.

Installing a fiber network requires 4 major steps:

DESIGN THE ROUTE, OBTAIN PERMITS, INSTALL FIBER, AND CONNECT TO CUSTOMERS.

DESIGN THE ROUTE *(Engineering)*

Map the Route

Determine the best route for the network and outline in mapping software.

Travel the Route

Travel the route to determine equipment and route needs based on the landscape. For example, areas with hard rock conditions will require specialized equipment such as a directional drill.

Re-Design

Re-design the route as needed based on landscape requirements, permit needs, etc.



OBTAIN PERMITS *(Zoning)*

Submit Permits

Submit permits to local and federal agencies in order to obtain authorization before beginning installation.

Await Approval

Await approval and re-submit or re-design if approval is denied.

INSTALL FIBER *(Construction)*

Deploy Conduit

Install conduit (a protective cable that will house the fiber) into the ground via plowing or boring (with a directional drill).

Install Access Hatches

Place access hatches in areas (often underground) where intersections will be made, the route changes direction, or fiber will be dispersed. These hatches (which include handholes, flowerpots, and cabinets) will act as utility boxes where fiber connections can be made.

Insert Fiber

Run fiber through the conduit. The most common way to insert fiber is through a process called fiber blowing, which uses a machine to move the fiber through the cable via bursts of air. This reduces friction and the risk of damage to the fiber.

Connect Fiber

Connect sections of fiber to one another by splicing, the process of fusing pieces of fiber together with an optical laser.

Connect to the Internet

Connect the fiber route to the internet, often by hooking up to the larger worldwide network via connection to a switch, a mobile tower, or another connecting point.



CONNECT TO CUSTOMERS *(On Air)*

Connect to Customer

Install fiber from the closest access point (a handhole) to the customer's home or business.

Set Up Internet

Customer connects router and modem to internet cables to establish home network.

