

## The Partnership



### PROJECT

Bug Tussel is a proud partner of Waushara County through a bond originating in December 2021. The project, **R.O.A.D. to Digital Equality**, will equip Waushara County with a fiberoptic backbone network and wireless internet access.



### PRODUCT

Bug Tussel will use fixed wireless sites to facilitate rapid expansion, followed by multiple phases of fiberoptic cable. These fiber projects will cover more than 100 miles throughout Waushara County and will provide a catalyst for future last-mile expansion. Standard packages for fiber will range from 300 Mbps to 1 Gbps download and upload speed. Standard packages for wireless will be 25 Mbps download and 5 Mbps upload speed.



### TIMELINE

Bug Tussel has 17 fixed wireless sites (including AT&T only sites) throughout Waushara County, with 9 additional sites (including AT&T only sites) in progress. Fiberoptic backbone/middle mile network construction is underway and will be online later next year.

## BUG TUSSEL UNIVERSITY

### Bug Tussel University Taught 4 Classes this September!

- **Tech Help** on September 14 at the Coloma Public Library.
- **Internet Safety** on September 15 at the Wautoma Public Library.
- **Smartphone Basics** on September 21 at the Wautoma Public Library.
- **Search Smarter** on September 22 at the Leon Saxeville Library.
- **How to Video Chat** on September 28 at the Coloma Public Library.

### Attend a Class This Fall!

Registration Recommended. Call (920) 940-0158 or visit our [webpage](#) to sign up!

- Tech Help** | 10/12 | 1:00 p.m. | Coloma Public Library
- Email Basics** | 10/20 | 12:00 p.m. | Wautoma Public Library
- Fun With Photos: How to Save, Share, and Edit Photos with your Smartphone** | 10/26 | 1:00 p.m. | Coloma Public Library

Request a class in your area by calling us at **920-940-0114** or emailing us at [bugtusseluniversity@btussel.com](mailto:bugtusseluniversity@btussel.com)



## Your sales representatives



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## GET IN TOUCH

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 Website: [bugtusselwireless.com](http://bugtusselwireless.com)

## SALES & MARKETING

### Ads

- Bug Tussel ran Facebook ads targeting the county during the month of September.
- Bug Tussel ran ads in Insight on Business Magazine (both print and online editions) during the month of September.

### Canvassing

- Door hangers advertising Bug Tussel services were distributed to residents throughout the county.

### Subscriptions

- Over 1250 fixed wireless subscriptions
- Over 300 interested in fiber

# TOWER STATUS



**On Air: 17\***

*\*Includes AT&T only towers*

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



**Under Construction: 3**

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



**Zoning: 3**

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



**Site Acquisition: 3**

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

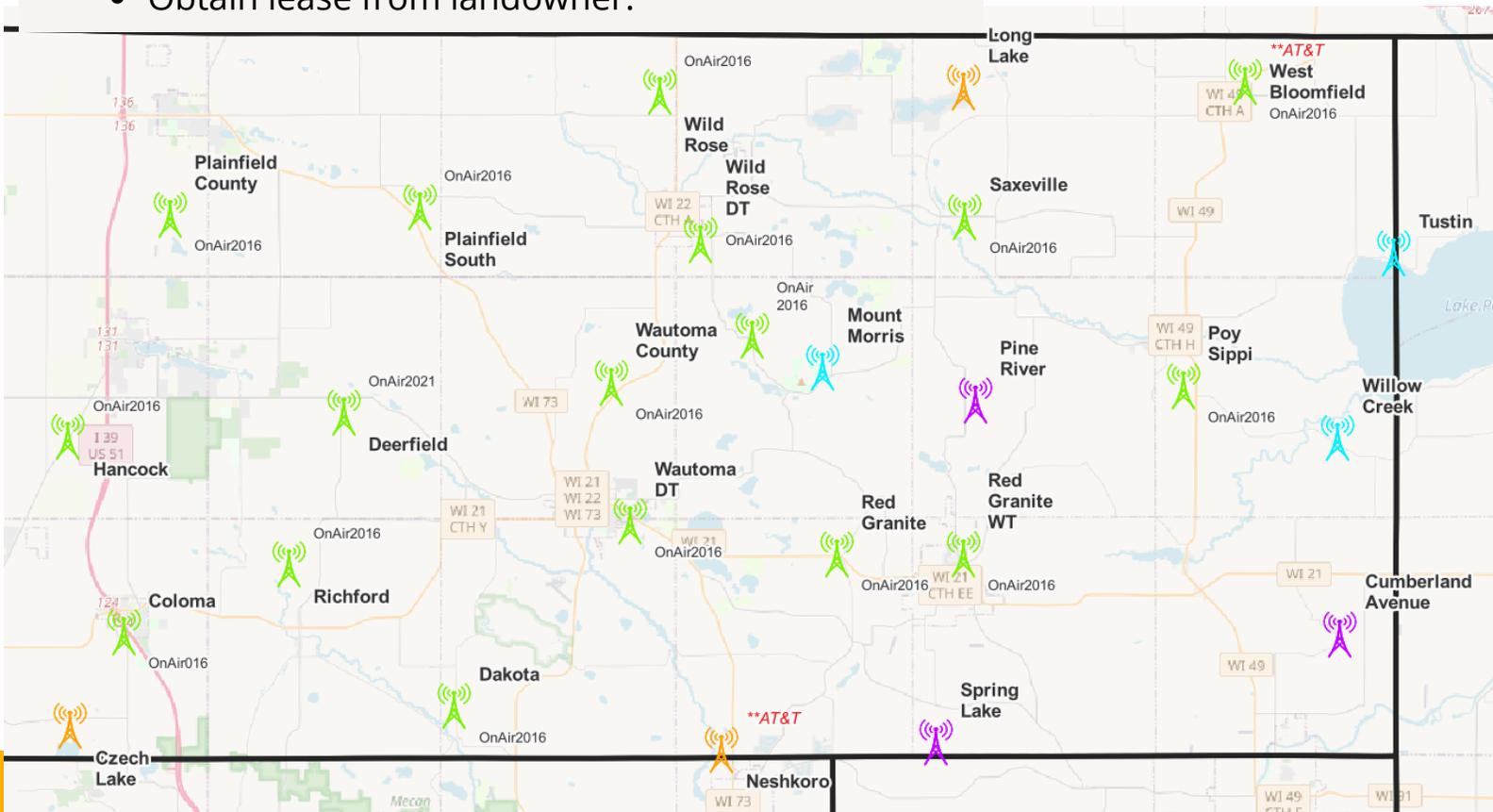
# TOWER PROGRESS

## Czech Lake Construction to Begin Soon

Approvals for the Czech Lake (latitude 43.99435, longitude -89.551703) site are finalized. Construction is expected to begin soon.

## Long Lake Making Progress

Construction on Long Lake (latitude 44.224651, longitude -89.104009) is complete. Next steps include integration and hooking up internet connections.



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

# Site Acquisition Timeline



6-12 MONTHS

## BOND EFFORT

Meet with county and municipalities, plan funding, provide due diligence, plan county network (towers and fiber). Several votes with different county committees. Final county board vote (often requires supermajority).



1-3 MONTHS

## SEARCH

Connect with property owners within a search ring (about 1 month). Evaluate properties, choose preferred location (about 1 month).



1-3 MONTHS

## LEASING

Work with landowner to agree to tower layout, lease terms, address title issues, etc. Often requires attorney review.



6-12 MONTHS

## GOVERNMENT APPROVALS

Obtain local permits (driveway permit, address, zoning/conditional use permit, etc). Often requires public notice and hearings.

Obtain federal regulatory approval, including from FAA, FCC, EPA, and other entities. Requires on-site soil, archeological, geologic, historical, etc. studies.

# FIBER NETWORK

## 78 Miles Conduit Installed

Contractor, M.J. Electric, is making progress installing conduit along the western part of the route ranging from the Dakota to Wild Rose areas.

## Progress Slowed Due to Utility Locators

While moving steadily, progress is slowed due to delays from USIC: Underground Utility Location and Damage Prevention, who scan the ground to locate underground utilities in order to prevent damage. USIC is currently overwhelmed with work and staff scheduling difficulties. This causes a challenge for USIC locators to cover areas early enough before the construction crew catches up.

**Completion of the Middle Mile (backbone) and Last Mile (distribution) in the county is anticipated in late summer 2023.**

# FIBER STATUS



## Connected

- Internet connections are complete.
- Internet is live and operational.
- Customers are connected.



## Fiber: 15 miles 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 with an optical laser.



## Conduit: 78 miles installed

- 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.



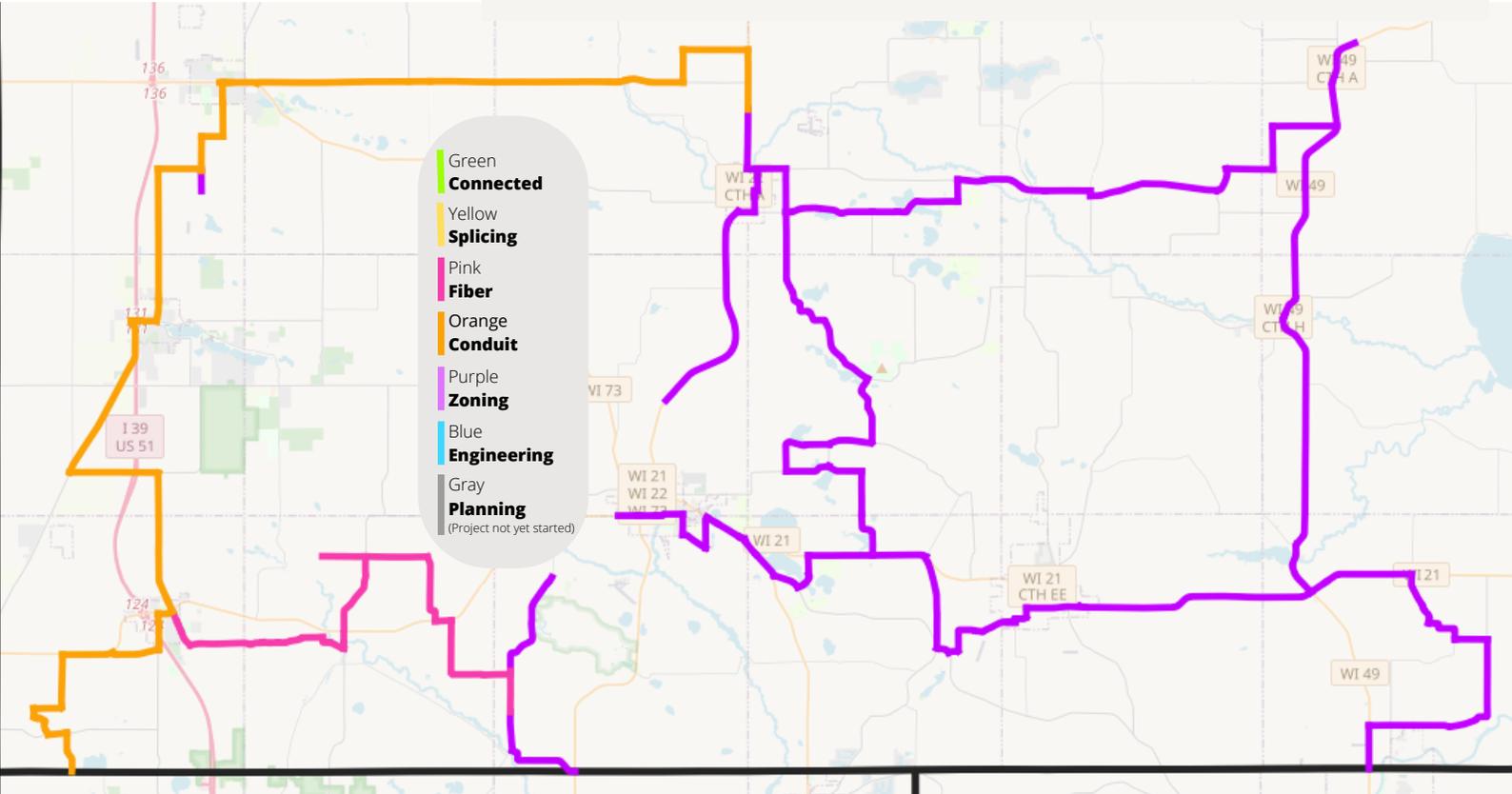
## Permits: 190 miles approved

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



## Design: 190 miles complete

- 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. 

**Long Haul Fiber** 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, including FTTH (fiber-to-the-home), FTTP (fiber-to-the-premises), etc. 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 advanced 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.

### Update Design

Route design is then updated 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 customer's ONT (optical network terminal, which converts light signals to electrical signals) in their home or business.

### Set Up Internet

Customer sets up home network system through router and ONT connections.

