October 2022

Waushara County

bugtussel

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

October Classes

4 Classes, Over 10 attendees

- **Tech Help** | October 6 | Leon Saxeville Library
- **Tech Help** | October 12 | Coloma Public Library
- **Email Basics** |October 20 | Wautoma Public Library
- **Fun With Photos: How to Save, Share, and Edit Photos with your Smartphone** | October 26 | Coloma Public Library

Upcoming Classes:

Spread the word!

- **Facebook for Beginners** | 11/15 | 9:00 a.m. | Waushara County Aging Department
- **Smartphone Basics** | 11/21 | 2:00 p.m. | Waushara County Aging Department
- **Using the Internet to Keep Your Brain Healthy** | 11/23 | 1:00 p.m. | Coloma Public Library
- **Internet Safety** | 12/1 | 9:30 a.m. | Patterson Memorial Library
- **Tech Help** | 12/7 | 1:00 p.m. | Coloma Public Library
- **Fun With Photos: How to Save, Share, and Edit Photos with your Smartphone** | 12/8 | 2:00 p.m. | Leon Saxeville Library
- **Email Basics | 12/13 | 12:00 p.m. | Waushara-Wautoma Senior Citizen Center**
- **How to Shop Safely Online** | 12/14 | 12:00 p.m. | Wautoma Public Library

SALES & MARKETING

Ads

- **Facebook** ads promoting wireless internet and Bug Tussel University classes targeted the county during the month of October.
- Bug Tussel ran ads in **Insight on Business Magazine** (both print and online editions) during the month of October.

Sponsorships

- A **Beer Walk** on October 22 was sponsored in Wautoma.

Subscriptions

- Over 1250 fixed wireless subscriptions

"Thank you for all your effort"
-10/6 Class Attendee

Sign up or ask questions at (920) 940-0114:

Your sales representatives

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Business Development Manager
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TOWER STATUS

On Air:**

*Includes AT&T only towers

18

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

Construction:

3

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

Zoning:

2

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

Site Acquisition:

3

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

Green
On Air

Orange
Construction

Purple
Zoning

Blue
Site Acquisition

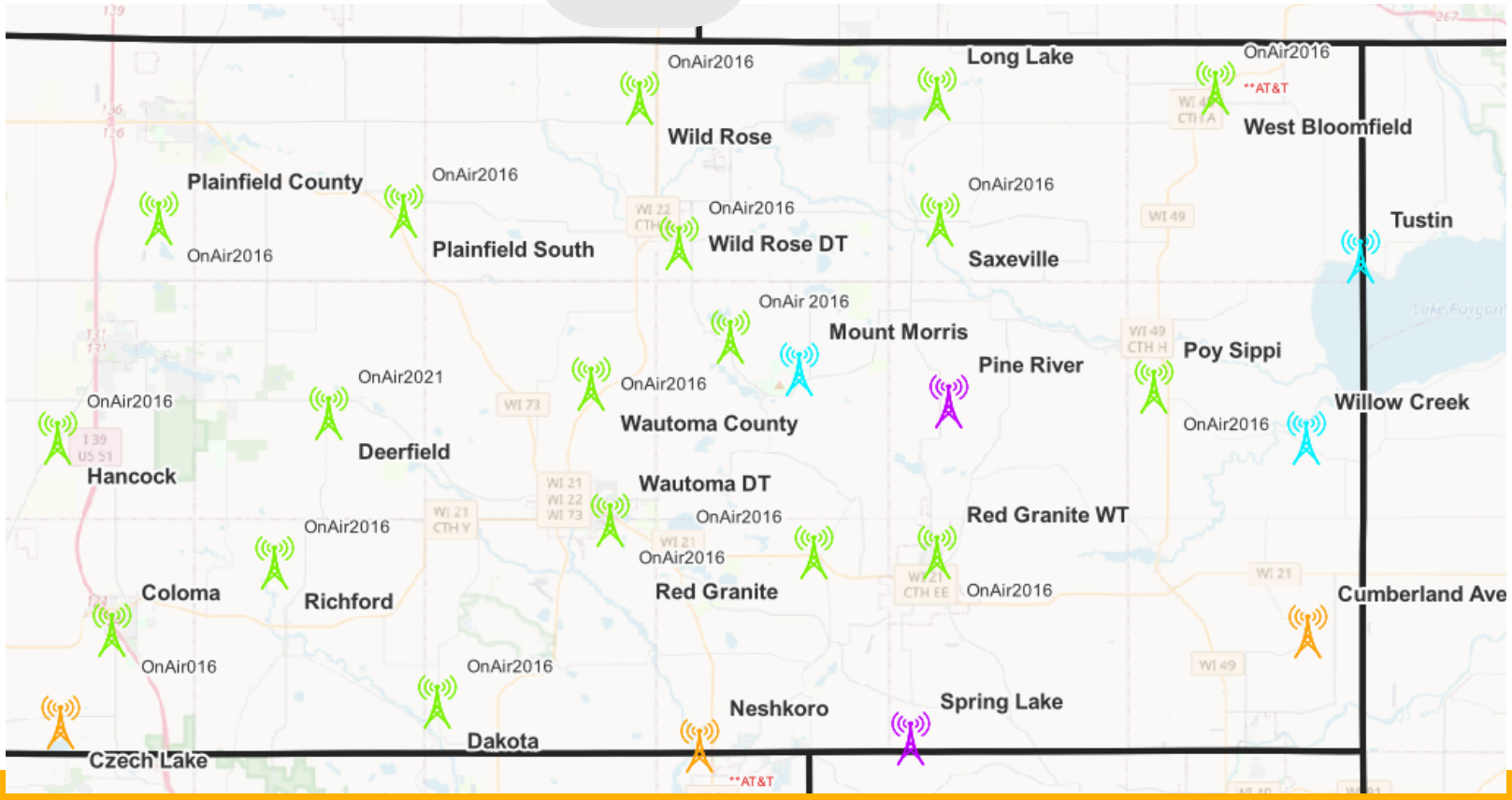
UPDATES

Long Lake has been launched, with Bug Tussel team members working on some changes to add additional capacity.

Civil construction (design and planning) has begun for Czech Lake and Cumberland Avenue.

Civil construction is expected to begin in Pine River this December.

The current Mount Morris site hosts live broadband. A new site is being pursued to continue providing service once the lease for the current site is up.



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 municpalities, 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.

bugtussel BTUSSEL.COM/ABOUT-US/PARTNERSHIPS

UPDATES

Contractors M.J. Electric & J & R Construction are making progress deploying conduit and installing fiber along the route.

Progress has been made installing fiber. Fiber is inserted into the conduit through a process called "fiber blowing", a technique that sends fiber through conduit with a machine that travels through the conduit by bursts of air. After deploying fiber, sections of fiber will be spliced together with an optical laser.

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

FIBER STATUS

Connected

- Internet is live and operational.
- Connections can be made to customers in up to 3 weeks depending on customer and route location.
-

Fiber

50 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

75 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

220 miles complete

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

Green
Connected

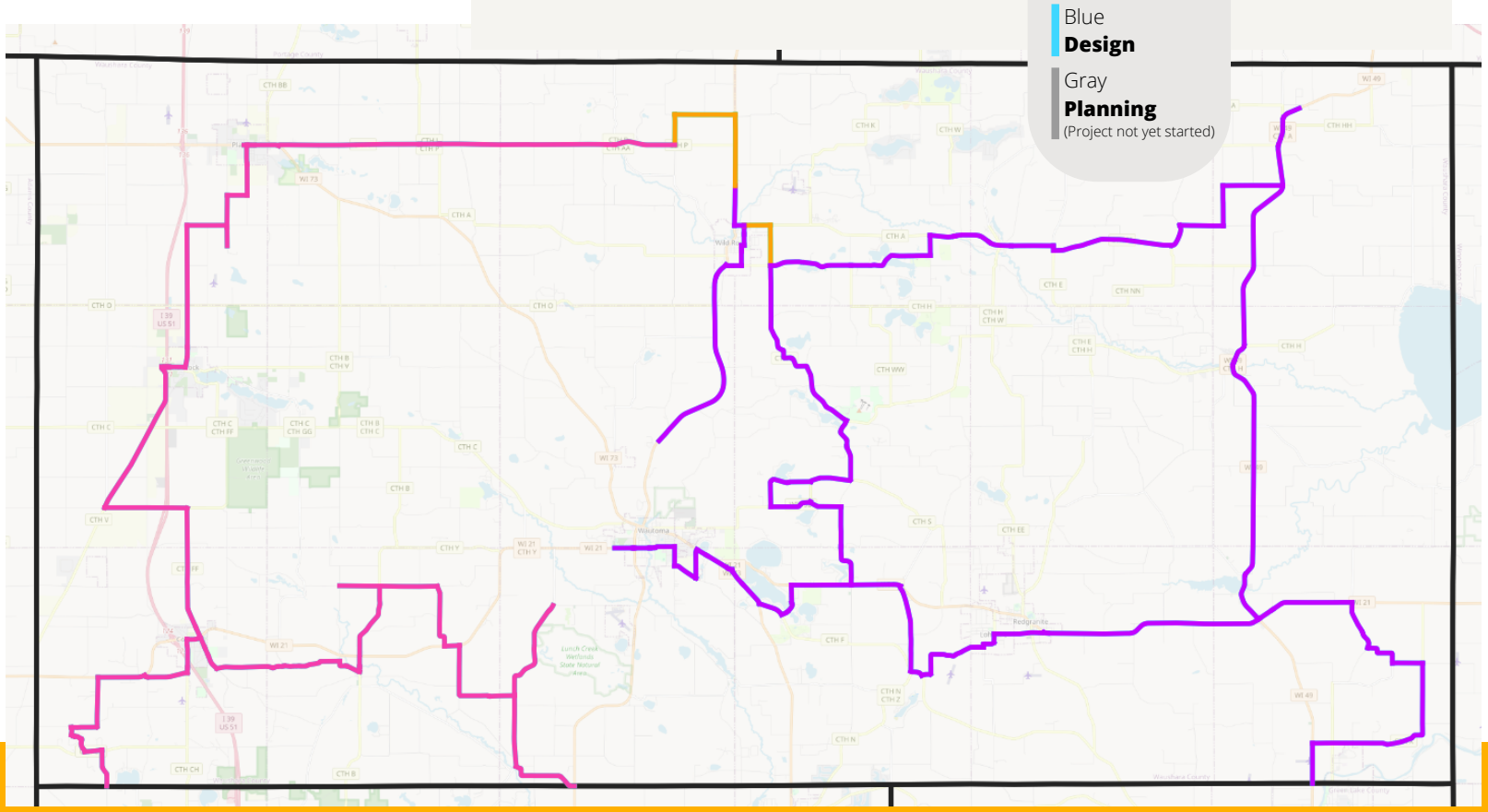
Pink
Fiber

Orange
Conduit

Purple
Permits

Blue
Design

Gray
Planning
(Project not yet started)



**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.