Calumet County
November 2022 Report

BUG TUSSEL EXPLODES IN GROWTH

A funny thing happened on Steve Schneider's way to retirement: He says he found "the secret sauce" for rural broadband expansion.

If you want to learn more about Steve's "Retirement Project" and the mission that Bug Tussel has undertaken, visit btussel.com/news/bug-tussel-explodes-in-growth to see the full Green Bay Press Gazette Article.

NOVEMBER BUG TUSSEL UNIVERSITY CLASSES

- Internet Safety | 11/15 | Brillion Public Library

Learn about our upcoming classes at btussel.com/free-tech-education/attend-a-class

COUNTY PARTNERSHIP

Bug Tussel is a proud partner of Calumet County!
- 2021 Bond

The project, **R.O.A.D. to Digital Equality**, will equip the county with fixed wireless sites to facilitate rapid expansion, with options for expansion available as agreed upon by Bug Tussel and the county. These fiber project will cover more than 75 miles throughout the county and will provide a catalyst for future last-mile expansion.

SUBSCRIPTIONS

Over 650 fixed wireless subscriptions.

MARKETING & SALES

Ads & Sponsorships
- Daily Facebook wireless internet ads
- WPKR studio sponsor and two monthly ads
- Print and email banner ads in Insight on Business Magazine
- TV commercials streaming on Fox 11 WLUK

YOUR SALES REPRESENTATIVES

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Towers

On Air: 7

- Tower construction and installation complete.
- Internet is live and operational.
- Customers are ready to be connected, with unique installation for each connection taking additional time.

Construction: 2

- Design and plan the tower build (civil construction).
- Construct tower by stacking from bottom to top.
- Install utilities such as equipment, antenna and lines.
- Integrate connections to internet network.

Zoning: 0

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

Site Acquisition: 1

- Search for and determine tower site.
- Negotiate and sign lease in cooperation with landowner.

For Bug Tussel University Classes, Meet & Greets, Community Events, and Ribbon Cutting Events:
Follow us on our website, BTussel.com/events, or on Facebook @btusselcom.
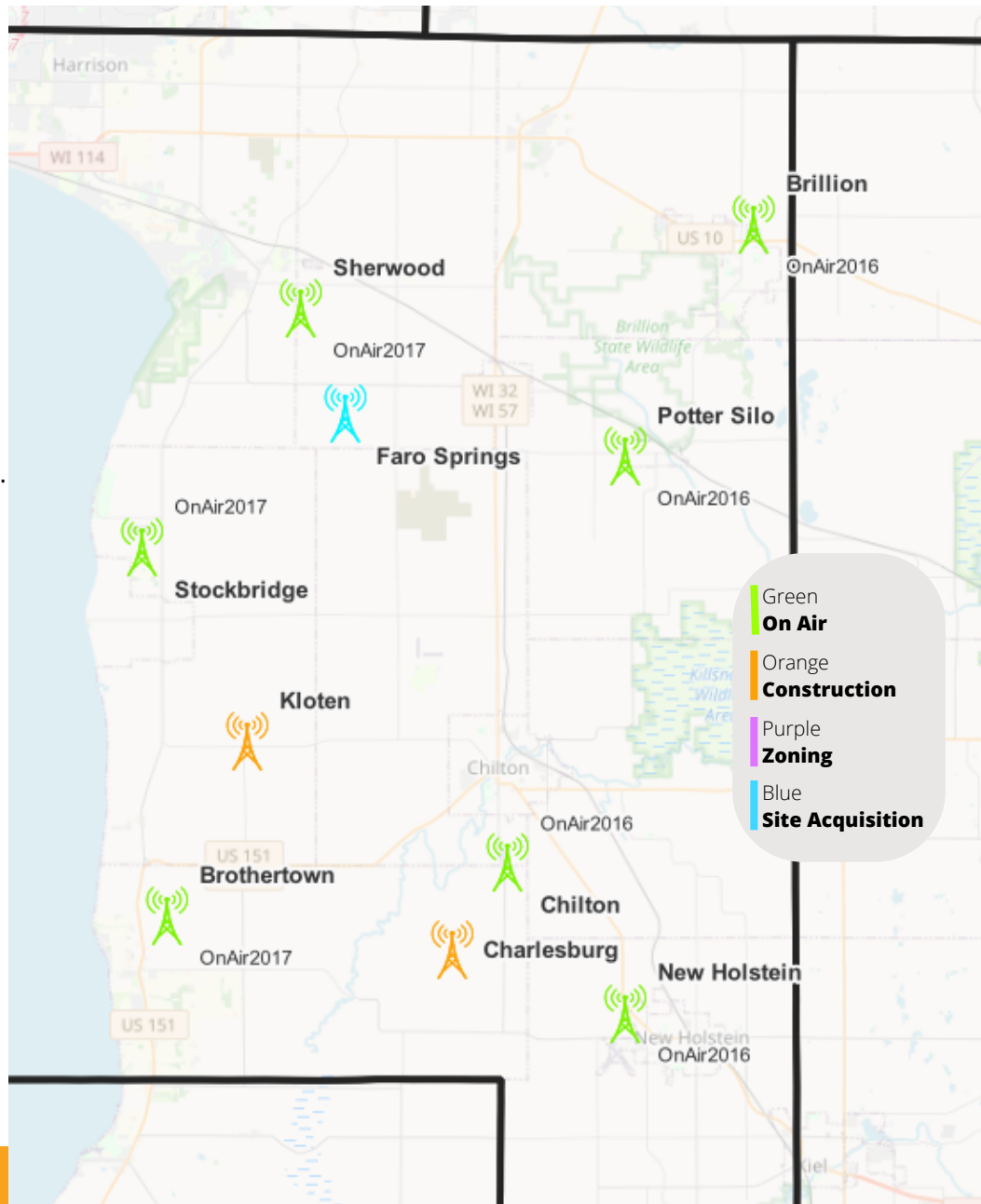
UPDATES

Site Acquisition
Final leasing details need to be completed at Faro Springs before permits are submitted.

Construction
Civil construction (planning and designing) for Charlesburg will begin mid-January. Civil construction for Kloten is complete. Utility work is currently in progress. Kloten tower will be stacked early next year due to permit delays.

Tower height for Charlesburg has been reduced due to permitting regulations. Plans to build a shorter tower are in progress.

Green
On Air

Orange
Construction

Purple
Zoning

Blue
Site Acquisition

*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

Fiber

Connected:

- Fiber network is complete and connected.
- Internet is live and operational.
- Customers are ready to be connected, with unique installation for each connection taking additional time.

Fiber:

- Fiber is sent through installed 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:

- Conduit, the protection cable that will house the fiber, is installed via boring (with a drill) or plowing.
- Access hatches that house utilities and connections (such as handholes, flowerpots, and cabinets) are installed.
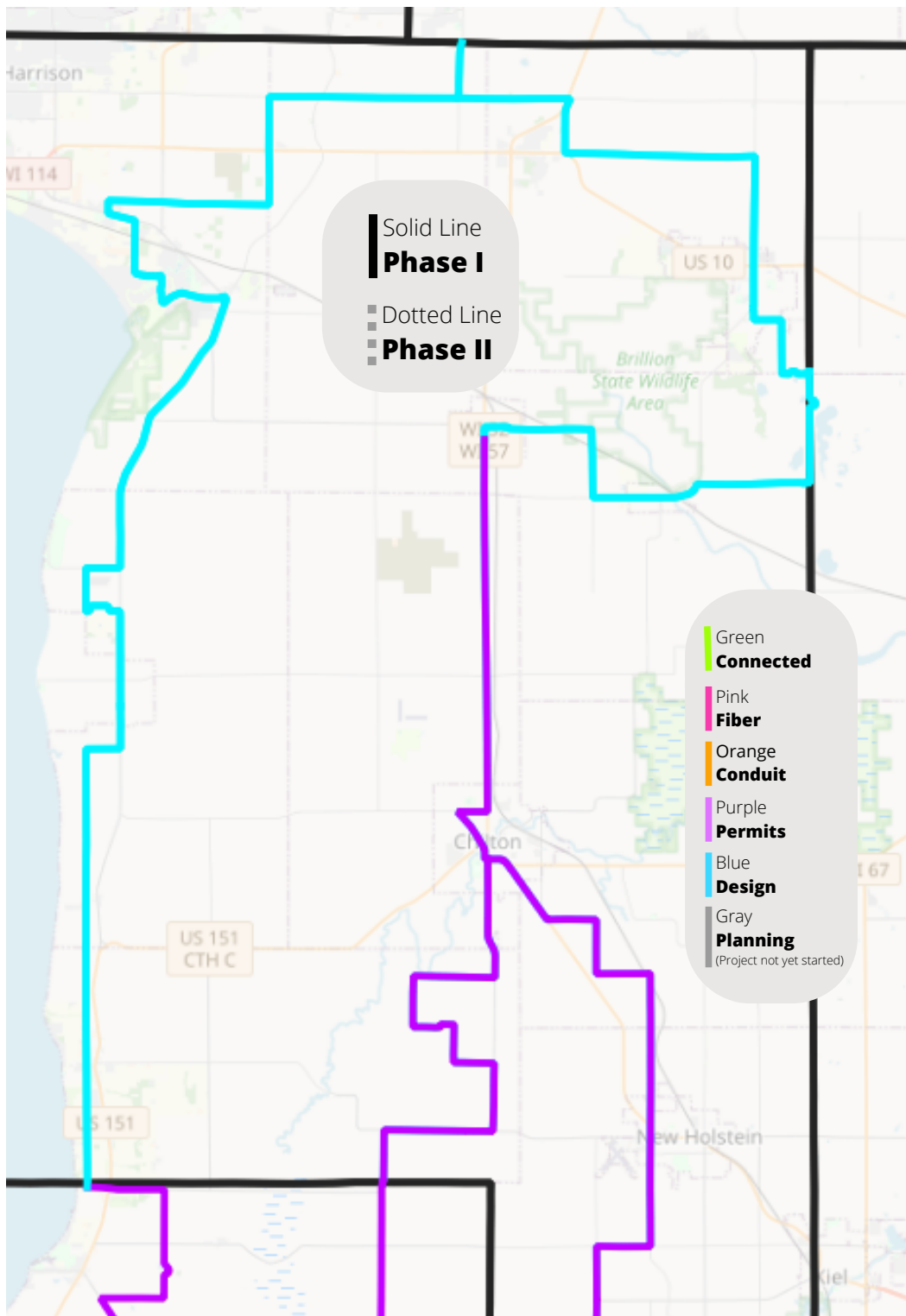
Permits: 20 miles completed

- Permits for work in areas along the route are submitted.
- Awaiting approval from local and federal agencies.

Design: 85 miles completed

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

UPDATES

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

Solid Line
Phase I

Dotted Line
Phase II

Green
Connected

Pink
Fiber

Orange
Conduit

Purple
Permits

Blue
Design

Gray
Planning
(Project not yet started)

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

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.