CENGN

Northern Project #4

Innovative Use of Tree POPs and FTTH in City of Kenora - Northern Lake Area

Nov.8, 2021

Northern Project #4 – Problem Statement

Looking for a Northern Ontario community that needs to extend broadband service from a part of the community that is well served in a down-town, or a more-densely populated area, to an underserved area in one or more out-lying lower-density residential areas greater than 5 km out, but still within the municipal boundaries of the host community.

City of Kenora Project

Downtown Area

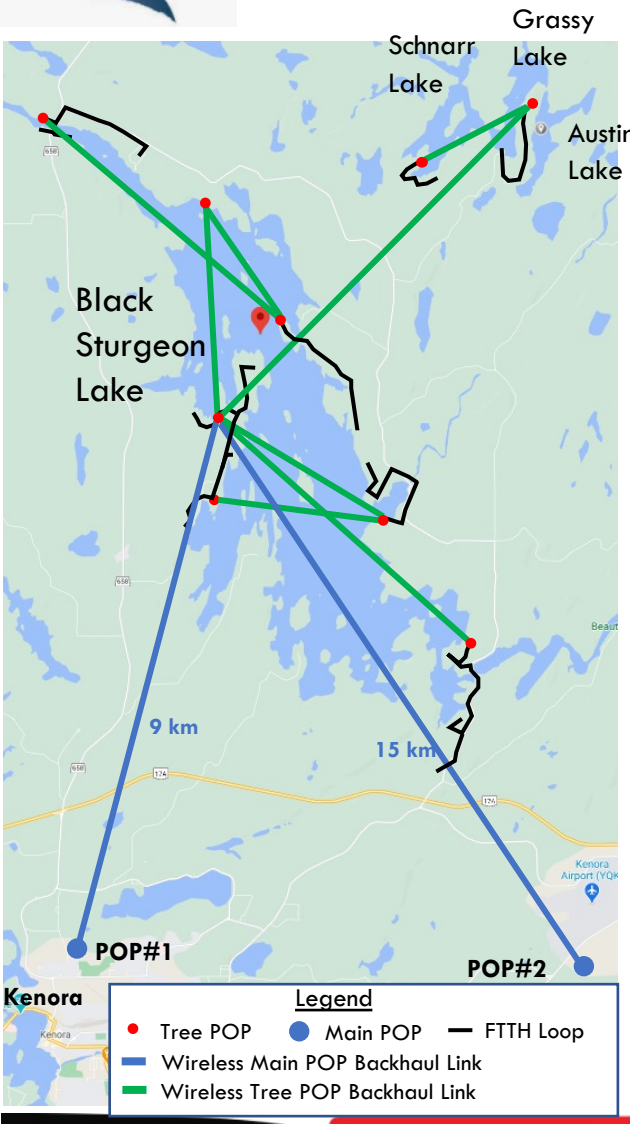
Black Sturgeon Lake Area

Schnarr Lake Area

Grassy Lake Area

Austin Lake Area

Network Design to Support 4 Lake Regions within the Municipality



- **Good Match** for Problem Statement
- **High Reliability** - Mesh Architecture, and Redundant Internet Access
- **Low-cost Radio Distribution Network,** limits fibre deployments to last km only
- **Using Trees instead of Metal Towers** to bring internet access to different lake community areas.
- **No Impact to Natural Tree-line Views** of lakefront properties, no towers required, no lighting required for tree POPs*
- **Fast Network Deployment Times** using tree mounted radios with ground cabinets

- **500+ residences** across the 4 lakes.
- **All 4 Lake Areas Supported**
- **Strong Resident Organization Support** for tree-based radio network
- **Fibre Optic Cabling to the Homes** addresses challenges of winding roads through heavily treed hilly lake areas
- **Future Proof Network** will support increasing data requirements over fibre to the home as required
- **Easy Expansion Model** can be used to support residents in other underserved parts of the community

*POP – Point of Presence - high speed internet access point for an Internet Service Provider

Camp Communications

- **Strong Local Presence** in Kenora Area
- **Extensive Experience in using Natural Landscape and Trees** in wireless distribution networks in the Lake of the Woods area.
- **Trained / Licensed Climbers and Arborists are** part of the installation crew.
- **Proven Willingness to Provide Innovative Solutions** and adjust design to scale to changes in available budget
- **Strong Local Relationship with Hydro One staff** which will ensure pole access permitting goes smoothly. Also contracting Manitoba Hydro International for professional and respected surveying and engineering of poles.
- **Established Local Relationship with Municipal staff** which will ensure work permitting and network rollout will go smoothly.
- **Strong Local Relationships with local Resident Organizations** which will ensure network rollout will go smoothly and subscriber take up will be high.

Key Innovation – Tree POPs

Radio distribution using tree POPs instead of conventional steel self-supporting or guyed Telecommunication Towers. This approach allows fast and low-cost rollout of fixed wireless distribution using tree POPS to support fibre-to-the-home (FTTH) segments along lake-side communities.

Key Advantages of Tree POPs vs Towers

- **Eliminates permit approval delays** - eliminates 3 to 4 month, Nav Canada, Transport Canada, and ISED application and approval process per tower.
- **Eliminates public hearings** – no longer need to support the cost of publicly posting and administering public tower consultations, responses, and hearings over 2 months.
- **Eliminates resident resistance** to towers and required lighting on towers in pristine wilderness and cottage areas.
- **Dramatically lower cost,** with elimination of towers (Up to $150,000 to $300,000 per tower in cost savings)
- **Dramatically lower time to deploy,** 1 day site installation vs up to 6 months to get permits, install foundation, and build tower.

Wireless Technology Used

airFiber 60 GHz Radio System Featuring Wave Technology with True Duplex Gigabit Performance for PtP Links over 12 km Distances

AF60 LR is a 60GHz radio designed for high-throughput connectivity over an extended range. The airFiber 60 LR features the integrated high-gain dish antenna for high speed, long-range performance Point-to-Point (PtP) links. New WaveTechnology enables incredible long-range performance within the 60GHz spectrum.

Includes a built-in Bluetooth management radio for easy setup.

Backhaul

- 60GHz Point – Point High-Capacity Microwave Radios
  - With either 24GHz or 5GHz Backup
- Used to backhaul for internet access to the main POP in Kenora

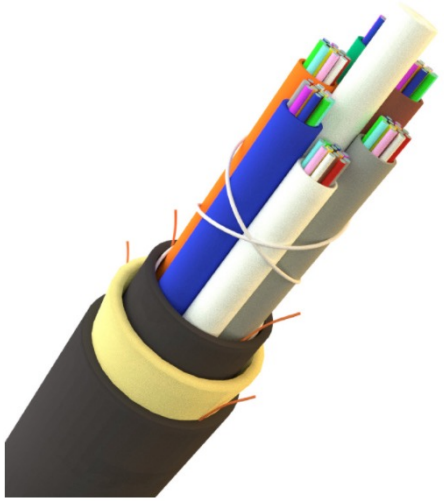
MICROPOP PERFECTED

The Mimosa N5-360 antenna is designed to pair exclusively with the Mimosa A5c access point, and incorporates quad-panel 180 degree overlapping vertical and horizontal antenna polarizations. The innovative antenna design boosts throughput by providing balanced dual-stream coverage over 360 degrees of azimuth, exploiting beamforming gain, and extends the range of the MicroPoP deployments up to 60% compared with Mimosa's A5 integrated solution. Responding to customer demand for extended frequency range, the N5-360 operates from 4.9 GHz to 6.4 GHz without compromising performance.

Distribution

- 5 GHz Point to Multi-point – Microwave Radios
- Used to distribute to Tree POPs
- Can also be used to provide temporary FWA service until FTTH is installed and operational

Optical Technology Used



Pole Hung Fibre
Total 10km of Fibre
(9 short segments)
Using total of 150 Hydro One Poles

Standard ADSS Fiber Optic Cable

Features:

- Suitable for use on distribution and high voltage transmission lines
- Requires no messenger wire -- fully self-supporting
- Single pass installation -- no messenger, no lashing wire -- faster and lower cost
- Cable is water-blocked using dry core technology, therefore no messy flooding compounds
- Design details for span lengths up to 1500ft (457m) and fiber counts up to 432
- Custom designs available for larger span lengths or other fiber counts
- Full line of attachment hardware available for a "system" solution
- Track-resistant outer jacket available for installations on high voltage lines where space potentials reach up to 25kV
- Gel-filled buffer tubes are S-Z stranded for easy mid-span access

CENGN will target funding toward the two wireless backhaul links, eight wireless distribution links, as well as the optical cable distribution from the tree POPs using the hydro poles in front of the lakeside residences. Camp Communication will fund the optical connections from poles to the residences and any other optical customer premise equipment.

Service Offering/Project Costs

Service Offerings

- **Minnow**– Download speeds **up to 50 Mbps, Upload speeds up to 10 Mbps, Unlimited Data**	**$64.99/month**
- **Walleye**– Download speeds up to 100 Mbps, Upload speeds up to 20 Mbps, Unlimited Data	$84.99/month
- **Muskie**– Download speeds up to 150 Mbps, Upload speeds up to 30 Mbps, Unlimited Data	$104.99/month

- Home phone could also be installed with this solution for $100 Install fee and $24.99 monthly with unlimited North American calling

Total Project Cost: CENGN Contribution = $125,000, **Camp Communications Contribution = $143,108.00**

Total Project Cost ~ $268,000

Benefits to the Community

- **Future-proof FTTH Internet Access** for Lake-shore residents
- **Preservation of the lakeshore vista** for residents and seasonal visitors.
- **Fast deployment** to meet needs of pandemic internet work at home, learn at home demands.
- **Access to 50/10 Mbps and up to 150/30 Mbps** Internet Access Service with **no data caps**.
- **Proven cost-effective method for expanding improved internet services** to other nearby communities.
- **Wider 50/10 Mbps service** to remote parts of the Municipality.
- **Can phase in full fibre backhaul later** to remote parts of the community in affordable phases later as required.

CENGN

THANK YOU!