CONNECTIVITY COMMITTEE MEETING

Thursday, December 16, 2021
1:00 p.m.
Meeting to be held electronically.

Agenda

1. Approval of Agenda
2. Adoption of September 9, 2021 Minutes
3. Disclosure of Pecuniary Interest and the General Nature Thereof
4. Presentation – IBI Engagement – Director of Information Technology Services
5. Presentation – Elgin County Broadband Recommendations – IBI
6. Discussion – Next Steps – Director of Information Technology Services
7. Correspondence
    a. Email from Gwen Tracey regarding SWIFT project in Middlesex County
8. New Business
9. Date of Next Meeting
10. Adjournment

Meeting: Connectivity Committee
Date: September 9, 2021
Time: 1:00 p.m.
Location: Council Chambers/Webex

The meeting was held in a hybrid in-person/electronic format with Committee Members and staff participating as indicated below.

Attendees: Tom Marks, Warden and Committee Chair (in-person)
Dominique Giguère, Councillor and Committee Vice Chair (electronic)
Duncan McPhail, Councillor (electronic – joined the meeting in progress)
Mike Andrews, Community Member (electronic)
Justin Pennings, Community Member (electronic)

Regrets: Joshua Kiirya, Community Member
Cecil Coxen, IT Manager – Township of Malahide

Staff: Julie Gonyou, Chief Administrative Officer (in-person)
Brian Lima, General Manager of Engineering, Planning & Enterprise (in-person)
Jeff Brock, Director of Information Technology Services (in-person)
Jeremy Sharkey, IT Coordinator (electronic)
Katherine Thompson, Supervisor of Legislative Services (in-person)
Jenna Fentie, Legislative Services Coordinator (in-person)
Carolyn Krahn, Legislative Services Coordinator (in-person)

MINUTES

1. Call to Order

The Connectivity Committee met this 9th day of September, 2021. The meeting was called to order at 1:00 p.m.

2. Approval of Agenda

Moved by: Justin Pennings
Seconded by: Mike Andrews

RESOLVED THAT the agenda be approved.

Recorded Vote

	Yes	No
Councillor Giguère	Yes	
Mike Andrews	Yes	
Justin Pennings	Yes	
Warden Marks	Yes	
	4	0

- Motion Carried.

3. Disclosure of Pecuniary Interest and the General Nature Thereof

None.

4. Elgin County Options Analysis Discussion - IBI

IBI presented an overview of the mapped survey results and led discussions on the tower co-location process and funding options.

5. Discussion of Next Steps – Director of ITS

The Director of ITS led the Committee in a discussion of next steps. The Committee requested that IBI present a discussion paper outlining their findings and draft recommendations to County Council. The Committee further requested that the draft recommendations be presented to the Committee prior to the Council presentation and that staff make the necessary arrangements to facilitate the presentation.

6. Correspondence

None.

7. New Business

None.

8. Date of Next Meeting

Staff will consult with IBI to determine report timelines, and the Chair will call the next meeting based on those timelines.

9. Adjournment

Moved by: Justin Pennings
Seconded by: Councillor McPhail

RESOLVED THAT the meeting be adjourned at 1:55 p.m.

Recorded Vote

	Yes	**No**
Councillor Giguère	Yes	
Councillor McPhail	Yes	
Mike Andrews	Yes	
Justin Pennings	Yes	
Warden Marks	Yes	
	5	0

- Motion Carried.

Julie Gonyou,
Chief Administrative Officer/Clerk.

Tom Marks,
Chair.

IBI Engagement

Jeff Brock, Director ITS

Presentation to Elgin County's Connectivity Committee

December 16, 2021

Background

- The County of Elgin has prioritized improving high-speed internet connectivity for it’s residents and businesses
- IBI Group was engaged to complete an analysis of current state and provide recommendations for future state
- The Final Report will be a valuable tool for all activities related to Internet Connectivity in Elgin County

Engagement Timeline

May 11\12 2021

Approval by Council and awarding of project to IBI

June 17 2021

Presentation of Report # 1

Analysis of Data and Local Resources and Methodology

July 22 2021

Presentation of Report #2a

Current State assessment.

August 26 2021

Presentation of Report #2b

Report 2a expanded upon to include more detail around technical and funding options

September 9 2021

Clarification of Funding Options as well as Tower Co-Locate Answers

Report #1

- Presented to Committee on June 17th 2021
- IBI provided analysis of data and local resources that would be used to establish current state. Introductions, project objectives and deliverables were reviewed .

- Committee expressed concerns about validity and accuracy of data.
- Additional survey was executed to gather updated and accurate data
- Data from survey was used to validate existing information

Report #2a

- Presented to Committee on July 22nd 2021
- IBI presented initial Current State assessment.
- Highlighted unserved and underserved premises and road segments

- Committee directed IBI to develop both technical and funding options to address the gaps that have been highlighted through the Current State Assessment

Report #2b

- Presented to Committee on August 26th 2021
- IBI presented Internet Connectivity and Broadband Analysis, Assessment, and Proposed Solutions.
- IBI outlined Technical Options which included fibre to every premise and fibre to fixed wireless towers
- IBI outlined Funding Options including Accelerated High Speed Internet Program (AHSIP)

- Committee expressed concern about co-locating on existing towers
- Requested clarification on the process
- Committee requested more information on accessing Funding
- County Staff completed Confidentiality Agreement in order to gain access to program

Report #2 Update

- Presented to Committee on September 9th 2021
- IBI presented a continuation of Internet Connectivity and Broadband Analysis, Assessment, and Proposed Solutions
- Information was presented on accessing towers
- Additional information around Funding Options was provided

- Committee requested that IBI finalize the discussion paper and presentation, and present to the committee for final feedback prior to presenting to Council

Next Steps

- IBI to present recommendations to the committee for review
- Committee to review recommendations and provide direction to IBI and Staff regarding any required changes
- IBI will update accordingly
- Recommendations will be presented to Council
- Report will be a valuable tool in all future initiatives regarding connectivity

Questions

?

ELGIN COUNTY BROADBAND RECOMMENDATIONS

PRESENTATION TO ELGIN COUNTY CONNECTIVITY COMMITTEE

DECEMBER 16, 2021

Agenda

1. Recap: Technical Options
   - Fibre to underserved areas
   - Fibre to Towers and deployment of fixed wireless
2. Recap: Funding Options
3. Ontario Connects Information
4. Recommendations (draft for committee discussion)

Background & Context

- The [draft] recommendations provided represents the final stage a report titled
- “Internet Connectivity and Broadband Analysis, Assessment, and Proposed Solutions”.
- Feedback from the Connectivity Committee will be used to finalize the Report.

Disclaimer: *Conceptual level planning and cost estimation has been performed for the purposes of identifying options. This is a ‘Class D’ estimate, with little or no site information, that indicates the approximate magnitude of cost of the proposed projects, based on broad requirements. This overall cost estimate is derived from unit costs in a similar area for a similar project. It is to be used to obtain approval in principle and for discussion purposes.*

Recap: Served vs. Underserved – County Summary

- Completed assessment of served vs. underserved at the municipality level.
- Assessed served vs. underserved based on premises and road network length.
- Some areas have been identified as requiring further investigation. Updates made since last report with input from M. Andrews.
  - Net result has been a slight increase in Served premises/ road kms
- Areas requiring further investigation are assumed as underserved for options analysis and planning purposes.

Served vs. Underserved – County Summary

MUNICIPALITY	PREMISE COUNT				ROAD LENGTH (KM)			
	Served		Under-Served		Served		Under-Served	
	Count	%	Count	%	Count	%	Count	%
West Elgin	1658	67.8%	788	32.2%	79.3	21.5%	288.7	78.5%
Dutton/ Dunwich	1194	62.6%	712	37.4%	69.7	20.6%	268.4	79.4%
Southwold	1146	56.0%	902	44.0%	85.1	24.2%	266.0	75.8%
Central Elgin	4128	74.8%	1392	25.2%	114.6	29.4%	274.6	70.6%
Bayham	1427	51.9%	1320	48.1%	81.0	26.1%	229.3	73.9%
Malahide	1824	47.6%	2006	52.4%	97.2	22.3%	338.9	77.7%
County Total	**11377**	**61.5%**	**7120**	**38.5%**	**527**	**24.0%**	**1665.9**	**76.0%**

While just over 60% of County premises are served with minimum broadband speeds, the gap to meet minimum speeds for underserved areas is roughly 1,666 km of underserved road segments, or roughly 76% of County road segments.

Technical Option – Fibre to Underserved Areas

- Fibre backbone to all underserved roads
- "Drops" to connect each underserved premises
- Average cost of $60/m backbone; plus $1000 per premise connection

Pro: High capacity and future proofed, long useful life (30 yrs)

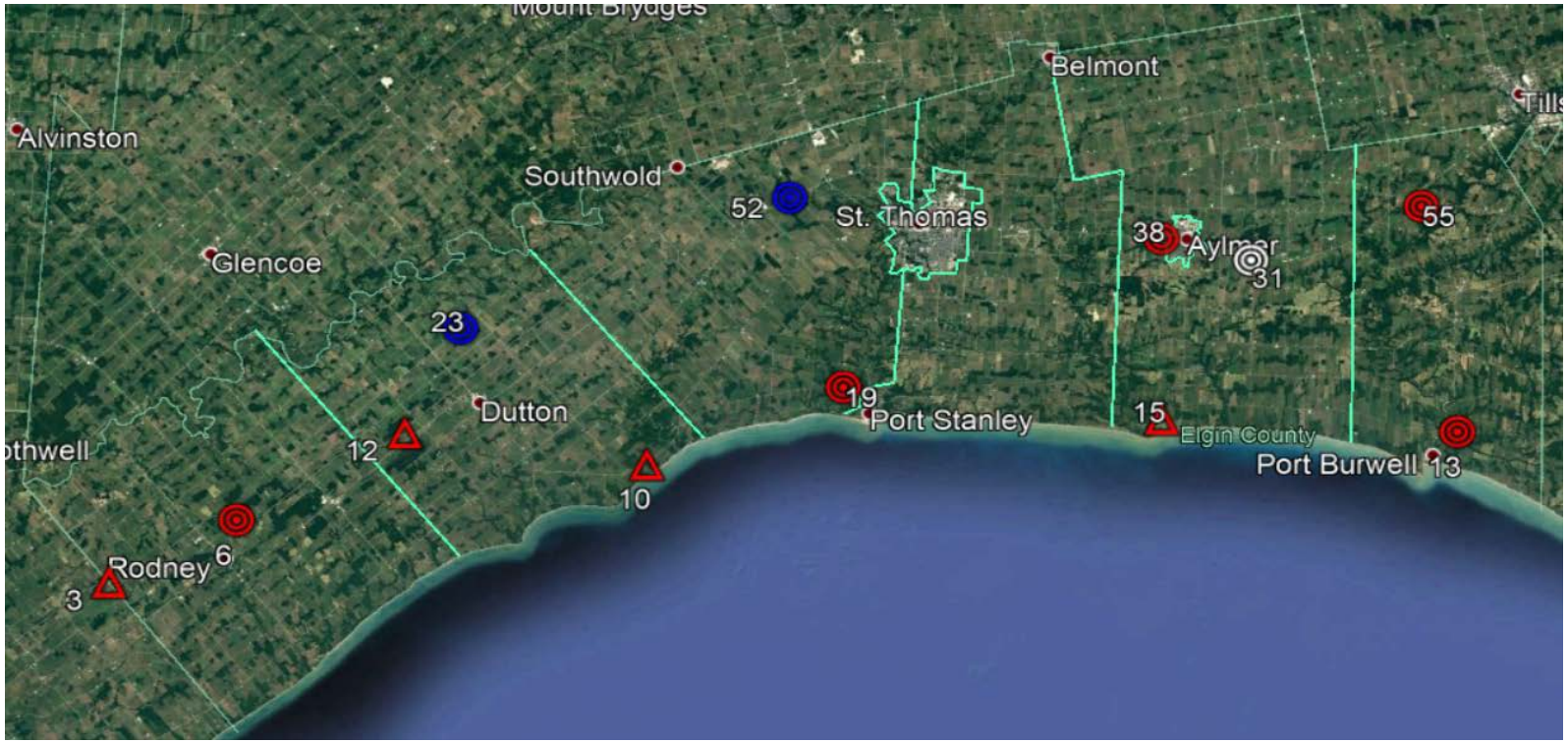
Con: High cost option, longer deployment timeframes

MUNICIPALITY	BACKBONE COST (Under-Served)	CONNECTION COSTS			
		Percentage of Under-Served Premises Connected			
		10%	50%	70%	100%
West Elgin	$ 17,322,000	$ 78,800	$ 394,000	$ 551,600	$ 788,000
Dutton/ Dunwich	$ 16,104,000	$ 71,200	$ 356,000	$ 498,400	$ 712,000
Southwold	$ 15,960,000	$ 90,200	$ 451,000	$ 631,400	$ 902,000
Central Elgin	$ 16,476,000	$ 139,200	$ 696,000	$ 974,400	$1,392,000
Bayham	$ 13,758,000	$ 132,000	$ 660,000	$ 924,000	$1,320,000
Malahide	$ 20,334,000	$ 200,600	$1,003,000	$1,404,200	$2,006,000
	$ 99,954,000	**$ 712,000**	**$3,560,000**	**$4,984,000**	**$7,120,000**

	COST SUMMARY Fibre Connectivity to Under-Served Premises			
	Take Rate			
	10%	50%	70%	100%
Total Capital Cost	**$100,666,000**	**$103,514,000**	**$104,938,000**	**$107,074,000**
Total Capital Cost/km	$ 60,427	$ 62,137	$ 62,992	$ 64,274
Total Capital Cost/Premise	$ 141,385	$ 29,077	$ 21,055	$ 15,038

Technical Option – Fibre Backbone to Fixed Wireless Locations

- Deploy fibre backbone to connect high value tower locations
- Premises along fibre path would be connected to fibre backbone
- Towers identified that are primary cellular providers (reduce overlap with existing fixed wireless providers)



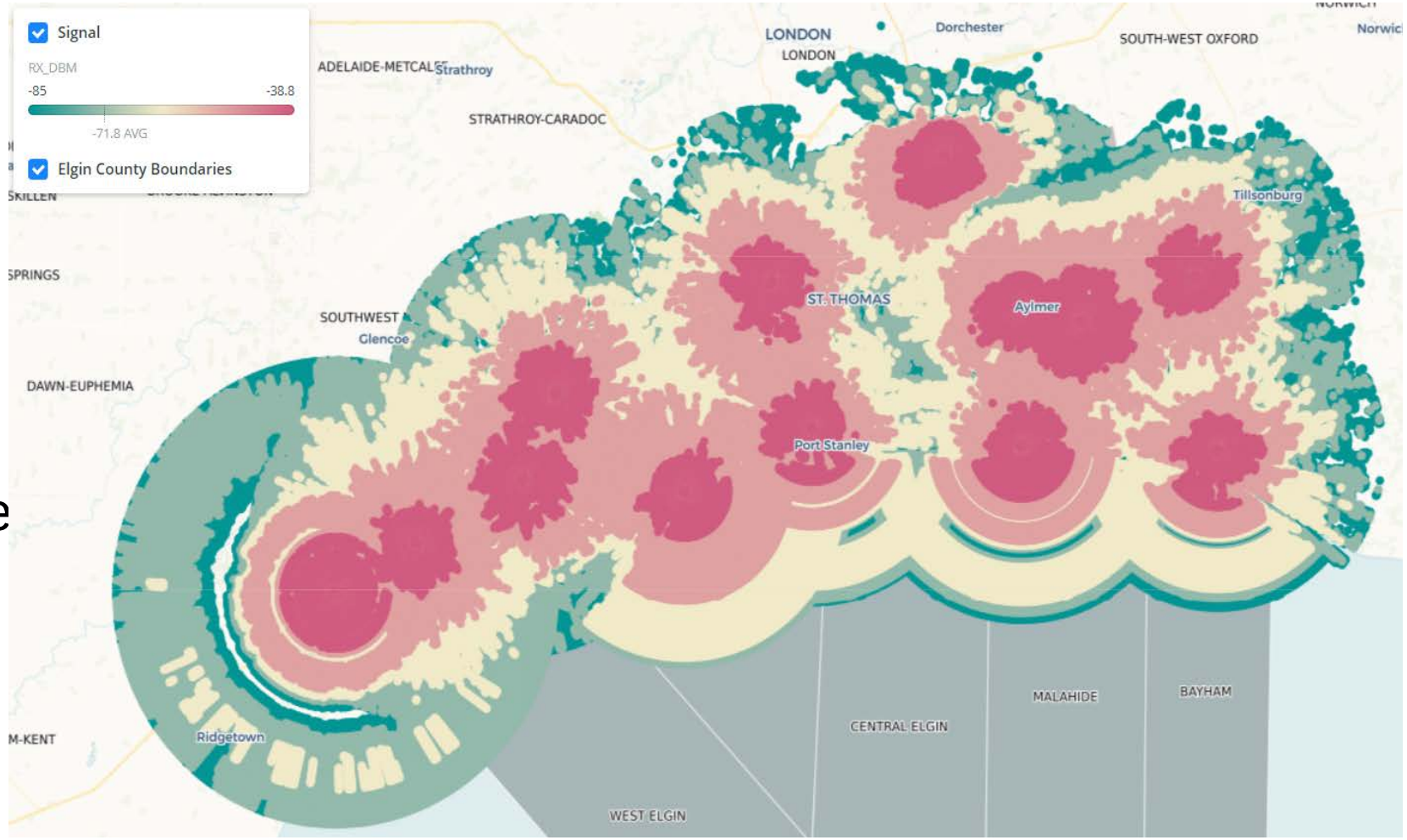
Technical Option – Fibre Backbone to Fixed Wireless Locations

- 12 Existing towers identified, with a 13th tower proposed in Belmont as a new build to fill in coverage
- Premises along fibre path would be connected to fibre backbone
- Towers identified that are primary cellular providers (reduce overlap with existing fixed wireless providers)

TOWER NUMBER	FIBRE CONNECTION LENGTH (M)	UNSERVED PREMISE COUNT ON SERVING FIBRE PATH	MUNICIPALITY
Tower 03	6,795	20	West Elgin
Tower 06	2,129	7	West Elgin
Tower 10	7,634	20	Dutton/Dunwich
Tower 12	4,392	17	Dutton/Dunwich
Tower 13	1,630	2	Bayham
Tower 15	158	0	Malahide
Tower 19	3,159	0	Southwold
Tower 23	5,797	10	Dutton/Dunwich
Tower 31	4,802	107	Malahide
Tower 38	1,677	0	Malahide
Tower 52	8,143	116	Southwold
Tower 55	3,686	17	Bayham
TOTAL	50,002	316	

Technical Option – Fibre Backbone to Fixed Wireless Locations

- Conservative RF propagation model based on 5.8 GHz radios
- Assumed subscriber radio at 5m height (roof top antenna mount)
- Full County coverage is predicted by this model



Technical Option – Fibre Backbone to Fixed Wireless Locations

- Fibre costs assumed at $60/m and $1000 per premises
- Tower radio costs estimated at $5000, subscriber radios at $500 each
- Tower colocation annual lease fees and other operating costs would be applicable

Number of Towers	Total Fibre Length (m)	Estimated Cost (Fibre)	Estimated Cost Tower Radio Equipment
12	50002	$ 3,000,120	$ 60,000
1	TBD	TBD	$255,000

Municipality	Tower Fibre Length	Under-Served Premise Count on Tower Fibre	Under-Served Road Length (km)	Remaining Municipality Premises Count Under-Served	Tower Cost	CONNECTION COSTS			
						Percentage of Under-Served Premises Connected			
						10%	50%	70%	100%
West Elgin	8924	27	288.7	761	$ 545,440	$ 40,750	$ 203,750	$ 285,250	$ 407,500
Dutton/ Dunwich	17823	47	268.4	665	$ 1,084,380	$ 37,950	$ 189,750	$ 265,650	$ 379,500
Southwold	11302	116	266	786	$ 688,120	$ 50,900	$ 254,500	$ 356,300	$ 509,000
Central Elgin	0	0	274.6	1392	$ 255,000	$ 69,600	$ 348,000	$ 487,200	$ 696,000
Bayham	5316	19	229.3	1301	$ 328,960	$ 66,950	$ 334,750	$ 468,650	$ 669,500
Malahide	6637	107	338.9	2006	$ 413,220	$ 105,650	$ 528,250	$ 739,550	$1,056,500
					$ 3,315,120	**$ 371,800**	**$1,859,000**	**$2,602,600**	**$3,718,000**

Technical Option – Fibre Backbone to Fixed Wireless Locations

Pros:

- Lower cost option; faster deployment time vs. full fibre build
- Flexibility to redeploy radios to alternative tower locations
- Fibre backbone can be expanded beyond tower locations

Con: Lower capacity and less future proof than fibre (5 yrs. Useful life for radio)

	COST SUMMARY Fibre Connectivity to Under-Served Premises			
	Take Rate			
	10%	50%	70%	100%
Total Capital Cost	$3,686,920	$5,174,120	$5,917,720	$7,033,120
Total Capital Cost/km	$ 2,213	$ 3,106	$ 3,552	$ 4,222
Total Capital Cost/Premise	$ 5,178	$ 1,453	$ 1,187	$ 988

Technical Options Cost Summaries

- Representative of the spectrum of total costs and cost per premise
- Recommend a long term vision of a fibre based network for the County with wireless as ‘interim’ steps to improve connectivity
- Identify opportunities to include fibre conduits in future road construction/ rehabilitation programs for future use (e.g ‘dig once’ approach*)
- Most grant programs and private investors are heavily biased towards funding fibre infrastructure

	COST SUMMARY Fibre Connectivity to Under-Served Premises			
	Take Rate			
	10%	50%	70%	100%
County Wide Fibre Deployment				
Total Capital Cost	**$100,666,000**	**$103,514,000**	**$104,938,000**	**$107,074,000**
Total Capital Cost/km	$ 60,427	$ 62,137	$ 62,992	$ 64,274
Total Capital Cost/Premise	$ 141,385	$ 29,077	$ 21,055	$ 15,038
Fibre Backbone to Fixed Wireless Locations				
Total Capital Cost	**$ 3,686,920**	**$ 5,174,120**	**$ 5,917,720**	**$ 7,033,120**
Total Capital Cost/km	$ 2,213	$ 3,106	$ 3,552	$ 4,222
Total Capital Cost/Premise	$ 5,178	$ 1,453	$ 1,187	$ 988

Regardless of which option or combination of options is chosen, an additional 10% of total capital should be planned for design and project management.

* See October 28,2020 report to Connectivity Committee, “Conduit in Road Allowances”

Grant Funding Options

Ontario Connects	Improving Connectivity for Ontario (ICON) Universal Broadband Fund (UBF)	Investing in Canada Infrastructure Program (ICIP)	Private Equity / Canada Infrastructure Bank
• Recently announced $4B program to connect all locations in Ontario • Reverse auction subsidy process • Targeted towards larger ISP	• Coordinated programs between gov't of Ontario and Canada • Targeted towards ISPs, Municipalities with ISP partners • Capital subsidy program funds, typically in the range of 50% up to 75% of infrastructure, balance (25% or more) contributed by applicant • Several funding announcements recently	• Federal infrastructure grant program • Broad range of infrastructure is eligible (e.g. roads, bridges, community recreation facilities) • Broadband infrastructure is eligible under this program • Capital subsidy program funds up to 75% of infrastructure, balance (25% or more) contributed by applicant	• Private equity players are now making investments in broadband infrastructure • Backed by institutional investors (e.g. pension funds) • Canada Infrastructure Bank can be a lending partner to private equity (lower interest long term debt) • Minimum project size is typically $50M, with typical projects of $200M size

Recent Announcements – Ontario Connects

Backgrounder

Infrastructure Ontario

November 30, 2021

Ontario Connects: Qualified Internet Service Providers (ISPs)

9314148 Canada Corp	Lakeland Energy Ltd.
Agilis Networks	Mornington Communications Cooperative Limited
Bell Canada	Multiboard Communications Inc. operating as Start.ca
Bh Telecom dba FlexNetworks	Netflash submitting as Continuum Online Services Limited
Bluewater Regional Networks Inc.	Nexicom Inc
Bragg Communications (operating as Eastlink)	North Frontenac Telephone Company
Brooke Telecom Co-operative Ltd.	NRBN Ltd
Bruce Telecom	NRTC Communications
CIK Telecom INC	NWIC Inc
Cloudwifi	Oshawa Power Group operating as Durham Broadband
Cogeco Connexion	Point to Point Communications
Community Network Partners	Quadro Communication
Connect Mobility Inc	ROCK Networks Inc
Cooptel	Rogers Communications Canada Inc.
Eh!tel Networks Inc	Shaw Business
ENVI Networks Ltd.	Storm Internet Services
Fibrenoire inc.	Tbaytel
GBTEL Inc	ThinkTel Communications Distributel
Gosfield North Communications Co-operative Limited	Tuckersmith Communications Cooperative Limited
Hay Communications	Utilities Kingston
HCE Telecom Inc	Vianet
Huron Telecommunications Co-operative Limited	WaveDirect Telecommunications
Hydro One Telecom Inc.	Wightman
IGS Hawkesbury Inc.	WTC Communications
Internet Access Solutions Ltd	Xplornet Communications Inc
Kingston Online Services	

Recommendations - Summary

(draft for Committee Discussion)

NUMBER	RECOMMENDATION	ESTIMATED BUDGET	UNDERSERVIED PREMESIS CONNECTED	TIMING	IMPACT OF ONTARIO CONNECTS PROGRAM
1	Advocacy, Strategic Purchasing & ISP Coordination	1 Senior Staff FTE	N/A	Immediately	Aligned – will provide maximum value to the County during this program
2	Fibre to the Home/ Business	$107M	7120	5-10 yrs.	Aligned: This program could advice timing and provide funding
3	Initial Fibre Build to Radio Towers	$7.0M	7120	3 yrs.	Overlap may need – delay or cancel this initiative pending auction results
4	Extend fibre connectivity to areas of interest / municipal locations	$10.8M	7120	3 yrs.	Overlap may need – delay or cancel this initiative pending auction results

Recommendations

(draft for Committee Discussion)

Recommendation 1: Advocacy, Strategic Purchasing & ISP Coordination
As a best practice, it is recommended that the County takes on a role of facilitating and advocating for investment in broadband infrastructure both from private industry as well as other levels of government. The County does not make a direct financial contribution to constructing infrastructure under this recommendation, but rather looks to encourage cooperation, partnerships and facilitate the investment through approaches such as the facilitation of economic development and collaboration forums, removing financial or municipal approval challenges to planning and permitting of fibre optic and radio tower infrastructure, as well as leveraging and coordinating the current connectivity requirements.

Budgetary Costs: 1 senior staff FTE salary
Underserved Premises Connected: N/A
Expected Timing: Immediately

Impact of Ontario Connects program: This recommendation is aligned and an important action as the Ontario Connects program proceeds through various stages of funding allocations and ISP selections(s).

Recommendations

(draft for Committee Discussion)

Recommendation 1: Advocacy, Strategic Purchasing & ISP Coordination
As a best practice, it is recommended that the County takes on a role of facilitating and advocating for investment in broadband infrastructure both from private industry as well as other levels of government. The County does not make a direct financial contribution to constructing infrastructure under this recommendation, but rather looks to encourage cooperation, partnerships and facilitate the investment through approaches such as the facilitation of economic development and collaboration forums, removing financial or municipal approval challenges to planning and permitting of fibre optic and radio tower infrastructure, as well as leveraging and coordinating the current connectivity requirements.

Budgetary Costs: 1 senior staff FTE salary
Underserved Premises Connected: N/A
Expected Timing: Immediately

Impact of Ontario Connects program: This recommendation is aligned and an important action as the Ontario Connects program proceeds through various stages of funding allocations and ISP selections(s).

Recommendations

(draft for Committee Discussion)

Recommendation 2: Long term vision: Fibre to the Home/ Business
We recommend the County adopt a long-term vision of achieving a fibre to the home infrastructure for its residents and business. This vision provides the best long-term benefits for residents and businesses and strategically positions the County for economic development growth, attracting and retaining businesses and residents. We recognize that this vision may not be immediately affordable the County and may take many years to budget and implement. The Ontario Connects program may provide a significant benefit to advance the implementation of this recommendation

Budgetary Costs: $107,074,000
Underserved Premises Connected: 7120
Expected Timing: 5-10 years, depending on timing of available funding

Impact of Ontario Connects program: This recommendation is aligned with the long term strategy and expected outcomes of the Ontario Connects program and it would be expected that significant funding could be secured through this program to accomplish this recommendation

Recommendations

(draft for Committee Discussion)

Recommendation 3: Initial Fibre Build to Radio Towers

We have identified several options in each municipality for the County to invest in a hybrid fibre/ wireless approach to improve broadband connectivity in the County. This hybrid approach would involve the implementation of a fibre optic infrastructure from high density areas (e.g. served) extending along roadways to connect radio towers and residents along the fibre route to high speed services. A further analysis of the County's existing water tower infrastructure indicates that these towers may be a suitable substitute to colocation on some 3rd party towers or any new radio tower construction.

This approach is the recommended first step for the County to prioritize to improve broadband connectivity, subject to the outcomes that will be achieved by the Ontario Connects program.

Budgetary Costs: $7,033,120
Underserved Premises Connected: 7120
Expected Timing: 3 years

Impact of Ontario Connects program: The Ontario Connects program would supersede the expected outcomes of this recommendation and therefore the implementation of this program should be deferred until outcomes of the Ontario Connects program are further understood, in mid-year 2022.

Recommendations

(draft for Committee Discussion)

Recommendation 4: Extend fibre connectivity to areas of interest / municipal locations

This recommendation builds on recommendation 3 and would provide for additional fibre optic connectivity to residents and businesses along the proposed fibre path, as well as achieving connectivity to municipal locations and land identified for future development to support specific economic development objectives. Please refer to the maps provided in Appendix C for additional details regarding this recommendation

Budgetary Costs: $7,033,120
Underserved Premises Connected: 7120
Expected Timing: 3 years

Impact of Ontario Connects program: The Ontario Connects program would supersede the expected outcomes of this recommendation and therefore the implementation of this program should be deferred until outcomes of the Ontario Connects program are further understood, in mid-year 2022.

Next Steps

- Receive feedback from the Connectivity Committee
- Finalize recommendations
- Final report and Elgin council presentation

DRAFT Report *for Connectivity Committee Review*

Internet Connectivity and Broadband Analysis, Assessment, and Proposed Solutions

Prepared for Elgin County
by IBI Group

December 6, 2021

Disclaimer

This document was prepared by IBI Group Professional Services (Canada) Inc. (“IBI”) for the benefit of Elgin County. (the “Client”) pursuant to a Consulting Services Agreement dated May 12, 2021 regarding Internet Connectivity and Broadband Analysis, Assessment, and proposed Solutions for the County of Elgin (the “System”). IBI has performed its services to the level customary for performing such services at the time and place where the services to our Client were provided. IBI makes or intends no other warranty, express or implied.

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Certain statements in this document may constitute “forward-looking” statements which involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of the System, to be materially different from any future results, performance or achievements expressed or implied by such statements. When used in this document, these statements reflect IBI’s interpretation or assessment of information and factors as of the date of this document and it should be noted that factors influencing the accuracy and completeness of the forward-looking statements will exist that are outside of the purview of IBI and that new risk factors may arise after the date of this document. Given these risks and uncertainties, the Client should not place undue reliance on forward-looking statements as a prediction of actual results. Although the forward-looking statements contained in this document are based upon what IBI believes to be reasonable assumptions, IBI cannot assure the Client that actual results will be consistent with these forward-looking statements and IBI makes no representations or warranty that the information in the document is sufficient to provide all the information, evaluations and analyses necessary to satisfy the needs of the Client.

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Disclaimer Cost Estimate Accuracy

Conceptual level planning and cost estimation has been performed for the purposes of identifying options. This is a ‘Class D’ estimate, with little or no site information, that indicates the approximate magnitude of cost of the proposed projects, based on broad requirements. This overall cost estimate is derived from unit costs in a similar area for a similar project. It is to be used to obtain approval in principle and for discussion purposes.

Document Control Page

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DIGITAL MASTER:	SharePoint
ORIGINATOR:	Jason McBeath, Ian Nelson, Keith Ponton, John George
REVIEWER:	Keith Ponton
AUTHORIZATION:	Keith Ponton
CIRCULATION LIST:	Client Project Team
HISTORY:	0.1 – Initial Draft (Current State Assessment) 2021-07-13
	0.2 – Revised Draft (Options) 2021-08-18
	0.3 – Revised Draft (Recommendations) 2021-10-01
	1.0 – Draft for Connectivity Committee Review

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1 Executive Summary

Access to the internet is driving social and economic progress on a transformational scale. Elgin County residents rely on access to reliable, affordable, high-speed internet to participate in essential aspects of society. The COVID-19 pandemic has highlighted the need for internet access to support personal and professional communications, to allow residents to apply for jobs, receive education and do homework and to access government services. Businesses need reliable and affordable high speed internet access in order to grow and flourish, and the County has taken an active role, through the Connectivity Committee to focus on challenges that need to be addressed relating to (i) Availability, (ii) Affordability, (iii) Speed and (iv) Awareness.

This report provides an in-depth assessment of the current state of internet access within the County and goes on to explore several options for the County to consider as steps to address the challenges that currently exist. Technical options, namely fibre optic and wireless infrastructure are presented along with conceptual cost estimates related to investing in this infrastructure are presented. Recommendations have been provided in terms of appropriate next steps for the County to consider to address the connectivity challenges that have been identified.

It is noted that as this report was being finalized the Ontario government has launched the provincial Ontario Accelerated High Speed Internet Program (OAHSIP), also know as Ontario Connects. Details regarding the specific details and timing of the Ontario Connects program are emerging as this report is being finalized (December 2021). This program, and outcomes of planned reverse auctions planned for mid 2022 to allocate provincial broadband subsidies have the potential to substantially impact the recommendations presented in this report. We have provided commentary regarding the expected impact of the Ontario Connects program with each recommendations.

Current State

The current state assessment detailed herein reviews available information and datasets relating to ISP and Internet speeds in Elgin County. Best efforts have been made to collect as much data as possible within the project scope and time frame, with independent 3rd party data sources used to provide a composite picture of the current state of broadband infrastructure in the County over the time period of June and July, 2021.

The initial current state review finds that 53.4% of premises are served, while 32.1% are underserved based on the CRTC minimum broadband speeds of 50 Mbps download and 10 Mbps upload. Roughly 14.5% of premises require further investigation.

While just over half of County premises are served with minimum broadband speeds, the gap to meet minimum speeds for underserved areas is challenging with roughly 1,500 km of underserved road segments, or roughly 71% of County road segments.

The following Table 1-1 summarizes the key broadband metrics for the County:

Table 1-1 Elgin County Broadband Key Metrics

BROADBAND SERVICE STATUS	PREMISES		ROAD NETWORK (KM)	
Served	9884	53%	442	20%
Underserved	5940	32%	1563	71%
Further Investigation	2673	15%	188	9%
Total:	**18497**	**100%**	**2193**	**100%**

Options

County Wide Fibre Deployment

The County-Wide Fibre Deployment option involves the deployment of buried and aerial backbone fibre along all County roads in un/underserved areas of the County, with drops installed to each premise, (home/business), connecting to the network.

The benefits of this infrastructure are primarily that premises are connected via fibre optic cable, providing a secure access, with highest possible speeds, and that the connection is future-proofed, to the extent that with updated electronics in the future, speeds could be further increased. Based on the performance and longevity of existing fibre optic infrastructure that has been deployed globally, it would be expected that a fibre optic infrastructure would have a useful life of 30 years or greater.

The drawbacks of this option are primarily related to the option's high costs, estimated to be between $100M and $107M.

Fibre Backbone and Fixed Wireless

This option is comprised of deploying fibre backbone to connect 12 tower sites across the County that would provide suitable wireless coverage, and then utilizing radio technology to connect premises within each tower's coverage area. Premises along the fibre paths would be served with fibre.

The benefits of such an approach are primarily financial, with costs in the $3.6 to $7M range underscored by shorter deployment timelines. The drawbacks relate to upgradability of the system to higher speeds in the future, as well as the potential for signal degradation based on the density of foliage as well as other environmental factors.

Recommendations

[All recommendations are presented here in draft subject to review and feedback from the Elgin County Connectivity Committee]

Recommendation 1: Advocacy, Strategic Purchasing & ISP Coordination

As a best practice, it is recommended that the County takes on a role of facilitating and advocating for investment in broadband infrastructure both from private industry as well as other levels of government. The County does not make a direct financial contribution to constructing infrastructure under this recommendation, but rather looks to encourage cooperation, partnerships and facilitate the investment through approaches such as the facilitation of economic development and collaboration forums, removing financial or municipal approval challenges to planning and permitting of fibre optic and radio tower infrastructure, as well as leveraging and coordinating the current connectivity requirements.

It is expected that 1 additional senior staff full time equivalent (FTE) would be required from the County to provide strategic leadership, facilitate coordination and collaboration forums, and lead the advocacy initiatives with other levels of government. While a staff role is preferred, this role could also be assumed by a contractor/ consultant until recruitment and hiring can take place.

Impact of Ontario Connects program: This recommendation is aligned and an important action as the Ontario Connects program proceeds through various stages of funding allocations and ISP selections(s).

Budgetary Costs: 1 senior staff FTE salary

Underserved Premises Connected: N/A

Expected Timing: Immediately

Recommendation 2: Long term vision: Fibre to the Home/ Business

We recommend the County adopt a long term vision of achieving a fibre to the home infrastructure for its residents and business. This vision provides the best long term benefits for residents and businesses and strategically positions the County for economic development growth, attracting and retaining businesses and residents. We recognize that this vision may not be immediately affordable the County and may take many years to budget and implement. The Ontario Connects program may provide a significant benefit to advance the implementation of this recommendation.

.

Budgetary Costs: $107,074,000

Underserved Premises Connected: 7120

Expected Timing: 5-10 years, depending on timing of available funding

Impact of Ontario Connects program: This recommendation is aligned with the long term strategy and expected outcomes of the Ontario Connects program and it would be expected that significant funding could be secured through this program to accomplish this recommendation

Recommendation 3: Initial Fibre Build to Radio Towers

We have identified several options in each municipality for the County to invest in a hybrid fibre/ wireless approach to improve broadband connectivity in the County. This hybrid approach would involve the implementation of a fibre optic infrastructure from high density areas (e.g. served) extending along roadways to connect radio towers and residents along the fibre route to high speed services. A further analysis of the County's existing water tower infrastructure indicates that these towers may be a suitable substitute to colocation on some 3rd party towers or any new radio tower construction.

This approach is the recommended first step for the County to prioritize to improve broadband connectivity, subject to the outcomes that will be achieved by the Ontario Connects program.

> **Impact of Ontario Connects program**: The Ontario Connects program would supersede the expected outcomes of this recommendation and therefore the implementation of this program should be deferred until outcomes of the Ontario Connects program are further understood, in mid-year 2022.

Budgetary Costs: $7,033,120

Underserved Premises Connected: 7120

Expected Timing: 3 years

Recommendation 4: Extend fibre connectivity to areas of interest / municipal locations

This recommendation builds on recommendation 3 above and would provide for additional fibre optic connectivity to residents and businesses along the proposed fibre path, as well as achieving connectivity to municipal locations and land identified for future development to support specific economic development objectives. Please refer to the maps provided in Appendix C for additional details regarding this recommendation

> **Impact of Ontario Connects program**: The Ontario Connects program would supersede the expected outcomes of this recommendation and therefore the implementation of this program should be deferred until outcomes of the Ontario Connects program are further understood, in mid-year 2022.

Budgetary Costs: $10,761,120

Underserved Premises Connected: 7120

Underserved Premises Connected: 785

Expected Timing: 1-3 years

Funding Options

This report identifies a number of federal and provincial grant funding options, along with various project structures (County Owned, Direct Subsidy, P3 with private investment) that may be considered to facilitate and manage the investment in broadband infrastructure.

All of the funding options identified in this report are somewhat superseded by the announcement of the provincial Ontario Accelerated High Speed Internet Program (OAHSIP), [Ontario Connects Program].

Note that at the time of writing this report, the Ontario Connects program was initially announced with program objectives as follows:

- Facilitate speed of delivery of high-speed internet services and 100% coverage at a minimum service level of 50/10 Mbps for approximately 700,000 unserved or underserved homes by the end of 2025
- Leverage existing utility infrastructure and rights of way to reduce required subsidies and compress delivery timelines
- Attract broad market participation of quality counterparties that is inclusive of smaller and local players
- Ensuring infrastructure lasts and can be upgraded as needed

The program has committed $4B to connect every region in Ontario to reliable, high speed internet by the end of 2025. It is expected to support accelerated broadband expansion in the Province. While little detailed information is known, the Province has stated that the process will enable Internet Service Providers (ISPs) to bid for provincial subsidies through a series of reverse auction events, with winning bids meeting the defined coverage and deployment requirements at the most reasonable price.

The program in very early stages of formulation, and few details are known regarding the eligibility for ISPs and/or municipalities to participate directly in the program.

Benefits and Risks

The program announcement represents the most amount of funding that any provincial government has committed to improving broadband connectivity. The reverse auction process that is described would tend to favor incumbent ISPs with existing infrastructure in the County that can cost-effectively compete for subsides in a reverse auction subsidy format. If successful, the program would provide a significant incentive to existing ISPs to invest in infrastructure to serve all underserved areas of the County.

Risks of the program include the ability of the program to have sufficient budget fund connectivity to all underserved areas in the County, the ability of small and medium size local ISPs to participate in the program due to the level of financial commitments from ISPs that are required, as well as the province's ability to execute on the program in the stated timeframe.

Since little detailed information regarding this program is known, we continue to describe other funding solutions in the following sections, assuming that they may be required in a coordinated and complementary fashion to fund areas within the County where the Ontario Connects program may not be eligible or have sufficient funding budget to adequately address.

Guiding Principles

It is recommended that the County adopt a set of guiding principles that will help shape recommendations and next steps. These guiding principles would include:

1. The County does not want to duplicate the investments of the private sector and will therefore look to make investments in geographic areas where the private sector has not invested and has no short-term plans to invest.
2. The County will work collaboratively with private ISPs that operate, or plan to operate within the County to ensure that investment barriers within the County's control are removed, and that the County's objectives with respect to improved connectivity for residents and business is know and understood by all parties.
3. The County will work closely with all levels of government, both lower tier and upper tier to ensure that strategies with respect to grant funding to support infrastructure investment in the County are aligned and coordinated.
4. The County's investments are utilized to remove the barriers of investment and market entry for all ISPs and create a level playing field that encourages retail competition. All ISPs will be able to access County funded investments on equal open access terms and conditions.

The County has several alternatives to consider as it considers next steps. It is important to keep in mind that the County must make some determinations on the degree it can afford to invest, while at the same time weighing the socio-economic benefits of investment and benefits to the County in terms of economic development, attraction and retention of businesses and residents.

While a county wide fibre optic infrastructure is the long-term vision, this may need to be considered over many years to be affordable as a direct investment by the County.

2 Current State Assessment

This section of the report provides an overview and understanding of the current state of broadband in Elgin County.

2.1 Summary of Data Sources

Data for this analysis was sourced from federal, provincial, and local agencies. The agencies and their respective datasets are identified and explained below:

A. Innovation, Science and Economic Development Canada (ISED) – Federal – Governmental

ISED maintains the datasets used for evaluation of broadband service across the country. The data extracted for this report was available in two formats, hexagonal polygons and road segment polylines. The hexagonal data was used to show coverage maps of Internet Service Providers and the technologies they used. The road segment data gave more detailed insight into Data Speed Classification throughout the county, mapping each road in 250m sections.

The following data was reviewed from ISED:

a. Data Speed Classification – Hexagon

b. Data Speed Classification – 250m Road Segments

c. Internet Service Provider (ISP) provided data

d. Available Communication Technologies

B. Ontario Data Catalogue – Provincial - Governmental

The Province of Ontario maintains an extensive GIS database. For this report, point address, municipal border, road and highways, railway, land use classification and other broad economic data was used to verify data from other sources.

C. County of Elgin – Local – Governmental

The County provided an extensive dataset for the purpose of this report. Administrative Boundaries, Roads and Highways, Railways, Existing telecommunication lines and tower infrastructure (Partial), Municipal Buildings, Land-Use Types, Parcel Map, Civic Address Points. Additionally, the result dataset of a local broadband survey that was completed in 2020 was provided for analysis.

The County also provided a list of In-Process/Potential Fibre Builds in Elgin County. See Appendix A for a complete list recently updated in July 2021. While this list is not exhaustive, it is understood to capture most of the known or planned activity as of the date received.

D. Southwestern Integrated Fibre Technology (SWIFT) – Local/Regional initiative funded by three levels of government

SWIFT provided insight into current and future broadband projects that are planned within the County borders. This information is also available on their website at:

https://swiftruralbroadband.ca/projects/approved-projects/

E. Regional and Rural Broadband – (R2B2) – Federal - Non-Profit

R2B2 provided summaries of their historic broadband related survey results from the region. Notably, it was not in a spatially presented format due to data privacy barriers.

F. Local Resources

Various sets of data and information were shared from local residents. This data includes a visually conducted inventory of radio towers with estimated ranges and anecdotal reports of known and lacking infrastructure. The information was interpreted and used to estimate current state, for use when classifying broadband status by County.

All available data noted above was used in the review of the County's current state assessment.

2.2 Analysis Methodology

2.2.1 Overview

The datasets were collected and applied to a spatial project for evaluation, data verification, and analysis. The datasets were vetted for duplication of attributes, over-complexity, and accuracy. If multiple datasets were available with overlapping data, they were cross verified to confirm validity and one "master" dataset was selected. Once the data was deemed acceptable, a review and analysis were performed.

2.2.2 Data Deficiencies

There is a level confidence in the data used for review and analysis. However, it is important to note that not all the data provided will be accurate. The following potential shortcomings have been noted:

<u>ISED Hexagons</u>

There are industry known limitations to the ISED published hexagon data. If there is one data point within the predefined polygon then it becomes a positive data point. For example, if all residents have <50Mbps download, but one resident within the polygon has 50Mbps+ download, then the polygon is counted as served. For this reason, the road network level data for Internet speeds is used for analysis. For all other datasets (such as provider or technology data) the hexagon is used.

<u>Internet Speed Tests</u>

County residents were asked to confirm Internet speeds as part of the County's broadband survey. The results provided by residents were independent and cannot be confirmed to be accurate. A challenge with these self tests is that there could be limitations unknowingly imposed by the resident to limit speeds. For example, residents may be running their test device off a home Wi-Fi network that limits speeds or perhaps not set up in a favourable location.

<u>Number of Speed Test</u>

205 speed test results were received. Given there are 21,116 premises on record in Elgin County, this translates to less than a 1% response rate. This is a low rate when considering an analysis.

There is an ongoing follow up Internet speed test survey to supplement this report. It is anticipated to be complete by August 6, 2021.

<u>Fixed Wireless Radio Towers</u>

Fixed wireless solutions have provided many with access to broadband. However, fixed wireless comes with limitations and is generally not consider an ultimate solution to meet CRTC standards. Limitations include the following:

- Radio transmission challenges across varying topology and existing foliage within the County may limit data transmission rates;
- Towers may not have high capacity backhaul to support all users from a single tower;
- Number of active users on a single radio tower often create bottle necks for network equipment at the tower location.

As such, tower location and advertised subscriber data rates cannot be taken at full value and presents it challenging to confirm broadband information for those who have access to fixed wireless radio solutions.

2.3 Data Review

The following section provides a summary of the relevant data and information gathered from the data sources noted above.

The current state of broadband within Elgin County was evaluated by assessing the available data and correlating the data for a detailed look at what areas of the County are served and what areas of the County are not served.

The Canadian Radio-television and Telecommunications Commission (CRTC) has set a target of 50 Mbps upload and 10 Mbps download for fixed Internet service to be classified as served. For purposes of this report, this target also applies. Anything less is deemed to be underserved. The following table provides further clarity.

Table 2-1: Broadband Classification

DOWNLOAD SPEED	UPLOAD SPEED	BROADBAND CLASSIFICATION
Less than or equal to 50 Mbps	Less than or equal to 10 Mbps	Underserved
Less than or equal to 50 Mbps	Greater than or equal to 10 Mbps	Underserved
Greater than or equal to 50 Mbps	Less than or equal to 10 Mbps	Underserved
Greater than or equal to 50 Mbps	Greater than or equal to 10 Mbps	Served

The following sections provide a summary of findings and analysis that will be used in determining next steps.

2.3.1 Internet Service Providers & Technologies

The following Table lists Internet Service Providers operating within the county and their respective technologies for broadband delivery, based on ISED data:

Table 2-2: ISP and Associated Available Technologies

ISP NAME	TECHNOLOGY
Bell	Fixed Wireless High Capacity Transport Services Mobile Wireless DSL Fibre to the home
Cogeco Connexion	Fibre to the home
Eastlink	Coaxial Cable High Capacity Transport Services DSL
Execulink	Fixed Wireless
Falcon Internet Services	Fixed Wireless
Freedom Mobile	Mobile Wireless
KWIC Internet	Fixed Wireless
NFTC	Fibre to the home

ISP NAME	TECHNOLOGY
Present	High Capacity Transport Services
Rogers	High Capacity Transport Services Coaxial Cable Mobile Wireless
TekSavvy Solutions	Fixed Wireless
TekSavvy Solutions	High Capacity Transport Services
Telus	Mobile Wireless
Xplornet	Fixed Wireless Satellite

See Appendix B for detailed maps of ISP and Technology coverage by provider and type. While these maps should not be considered to be an exhaustive representation, it is deemed to be reliable as of the date of the information provided by Industry Science and Economic Development Canada

2.3.2 Fixed Wireless Radio Towers

There are several fixed-wireless radio towers within the borders of Elgin County. Mobile wireless towers are not considered in this review because this is a considered a separate function and not within the classification of fixed broadband solutions. This dataset was compiled from various sources and the tower transmission range should be used for illustration purposes only, as it does not factor any environmental conditions.

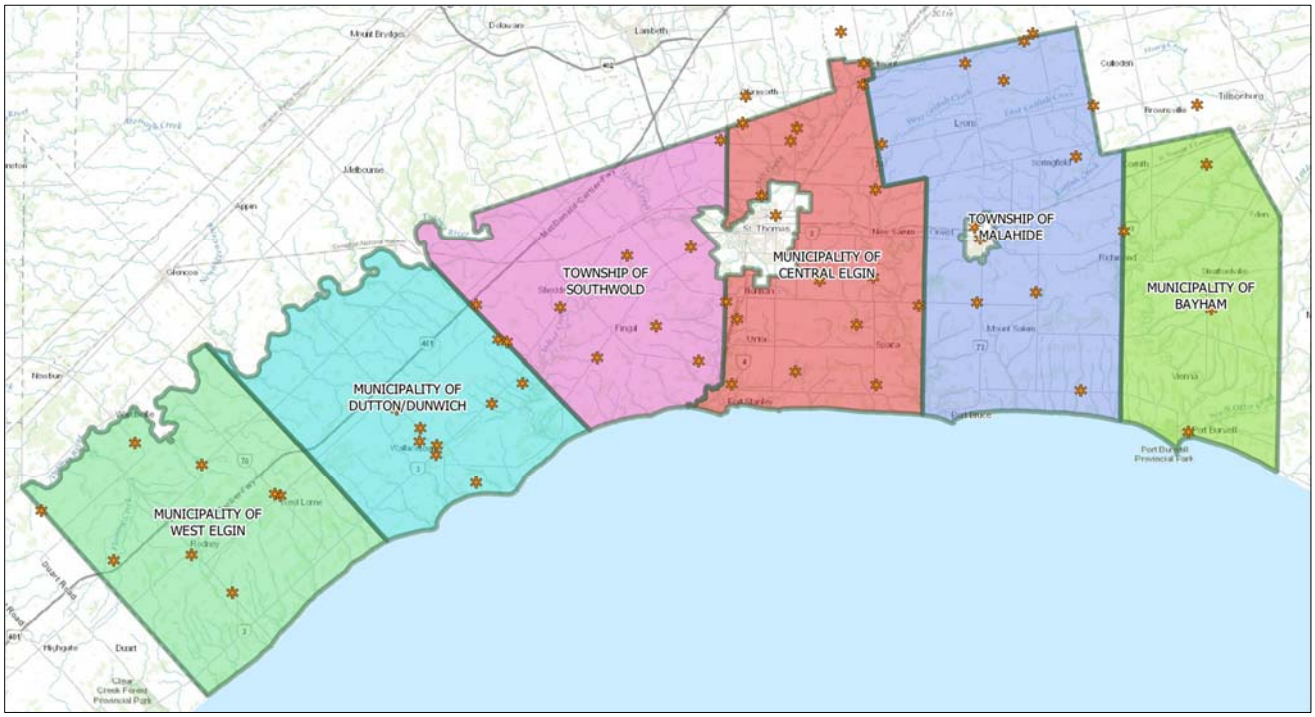


Figure 2-1: Elgin County Fixed Wireless Towers

2.3.3 Served and Underserved Premises

The following maps and commentary are broken out by each lower-tier municipality. The details provided include:

- Current understanding of fixed wireless tower infrastructure;
- Current understanding of known fibre optic cable infrastructure;
- ISED road classification compared to Internet speed survey results;
- Confirmed premises meeting CRTC minimum broadband speed standards;
- Current understanding of served and underserved areas based on road segments;
- Numbers and percentages of served and underserved based on premises and road segment lengths.

Discussion on each municipality follows the figures. Key metrics to be carried over into subsequent sections of this report are the number and percentage of premises and road segment lengths considered served versus underserved. This information will enable an understanding of the magnitude of the broadband challenge, help provide cost estimates, and ultimately strategies on how to address the gaps.

It is understood that the most effective way to validate the various datasets is to have local site-specific data speed tests. The previously completed survey results have been used to validate the datasets. By validating Elgin County survey results against ISED road segments, a picture of the true broadband status throughout the county has been developed.

A percentage has been identified as requiring further investigation. Reasons for this include the following:

- Conflicting known infrastructure data, ISED data, and local Internet speed test results;
- Conflicting data regarding current or future infrastructure in the area;
- Actual ability of infrastructure owners to provide services along “backhaul” or “feeder” routes;
- Anecdotal reports of lacking service or lacking infrastructure.

Municipality of West Elgin

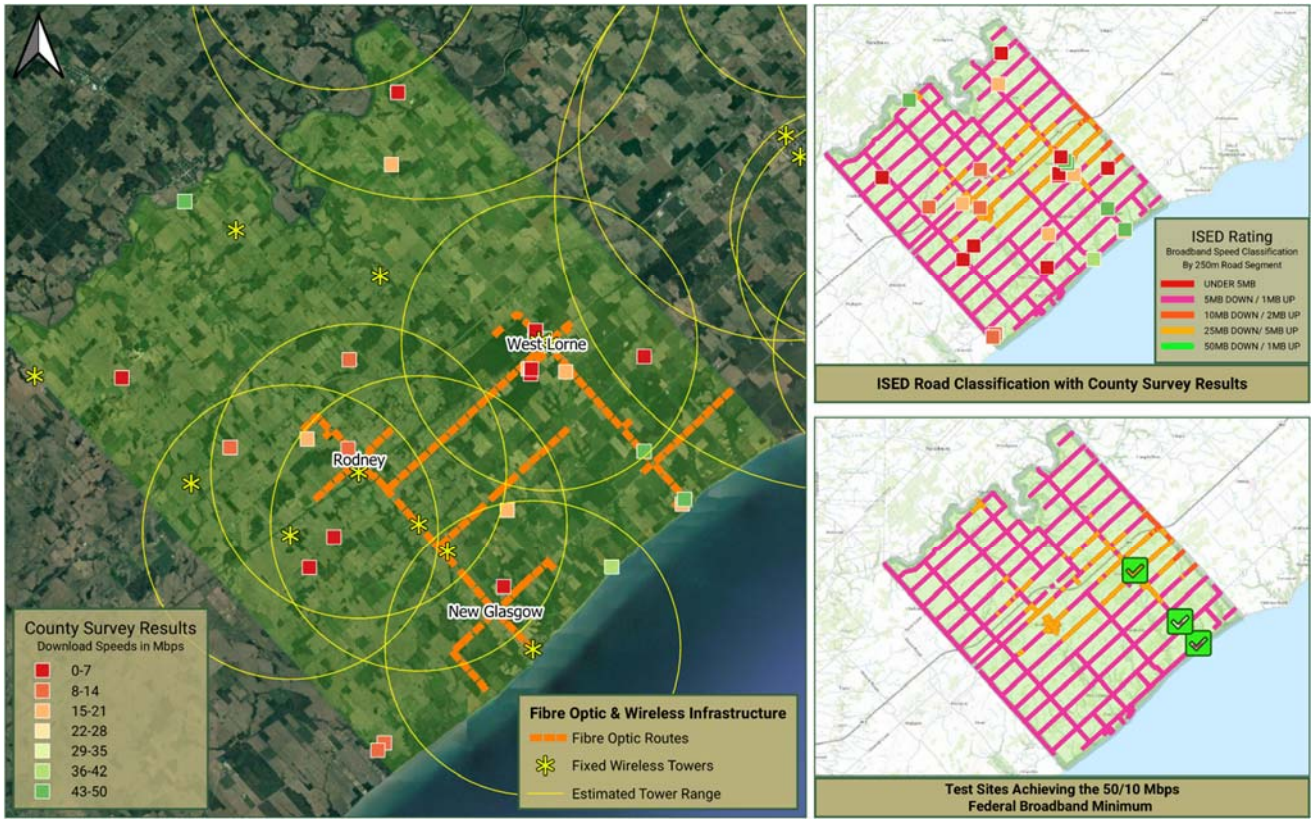
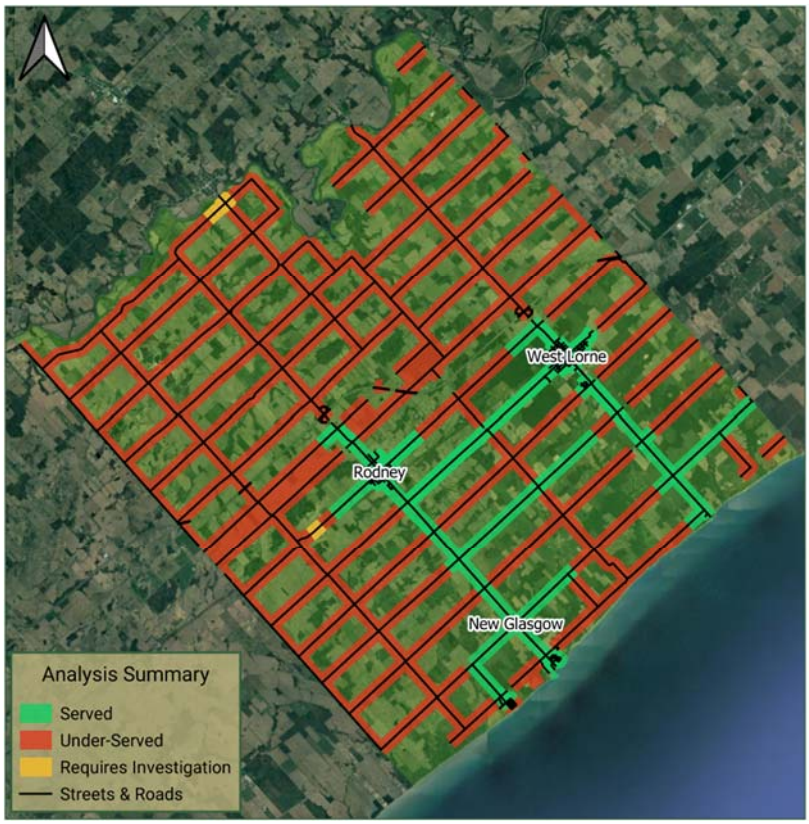
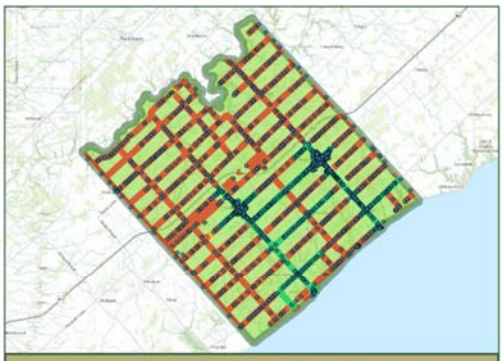


Figure 2-2: Current State of Broadband Infrastructure within West Elgin





Premise Distribution in West Elgin

West Elgin Premise		
Total Premise Count	**2446**	
Served	1655	67.7%
Under-Served	785	32.1%
Requires Investigation	6	0.2%

West Elgin Roads		
Total Road Length (Km)	**368.0**	
Served	79.3	21.6%
Under-Served	286.5	77.8%
Requires Investigation	2.2	0.6%

Figure 2-3: Current Understanding of Served and Underserved Areas within West Elgin

West Elgin primarily has fibre optic infrastructure in and between the communities of West Lorne, Rodney, and New Glasgow. There are a number of fixed wireless towers in and just west of the municipality that serve residences and businesses as well.

Correlating ISED and Internet speed test data, premises along the path of fibre infrastructure are confirmed to meet CRTC broadband minimum speeds. Future SWIFT funded NFTC fibre build is considered to meet the minimum speeds as well.

Areas theoretically covered by fixed wireless towers do not meet the CRTC speed minimums. This is validated with local speed test results.

For perceived underserved areas in the municipality, ISED data is confirmed against the local survey data that properly represents the underserved area.

Confirmed served premises account for 67.7% of total premises, while underserved premises represent 32.1% of total premises. 0.2% requires further investigation.

Based on road segment lengths, 21.6% is considered served while 77.8% is considered underserved. 0.6% requires further investigation.

Municipality of Dutton Dunwich

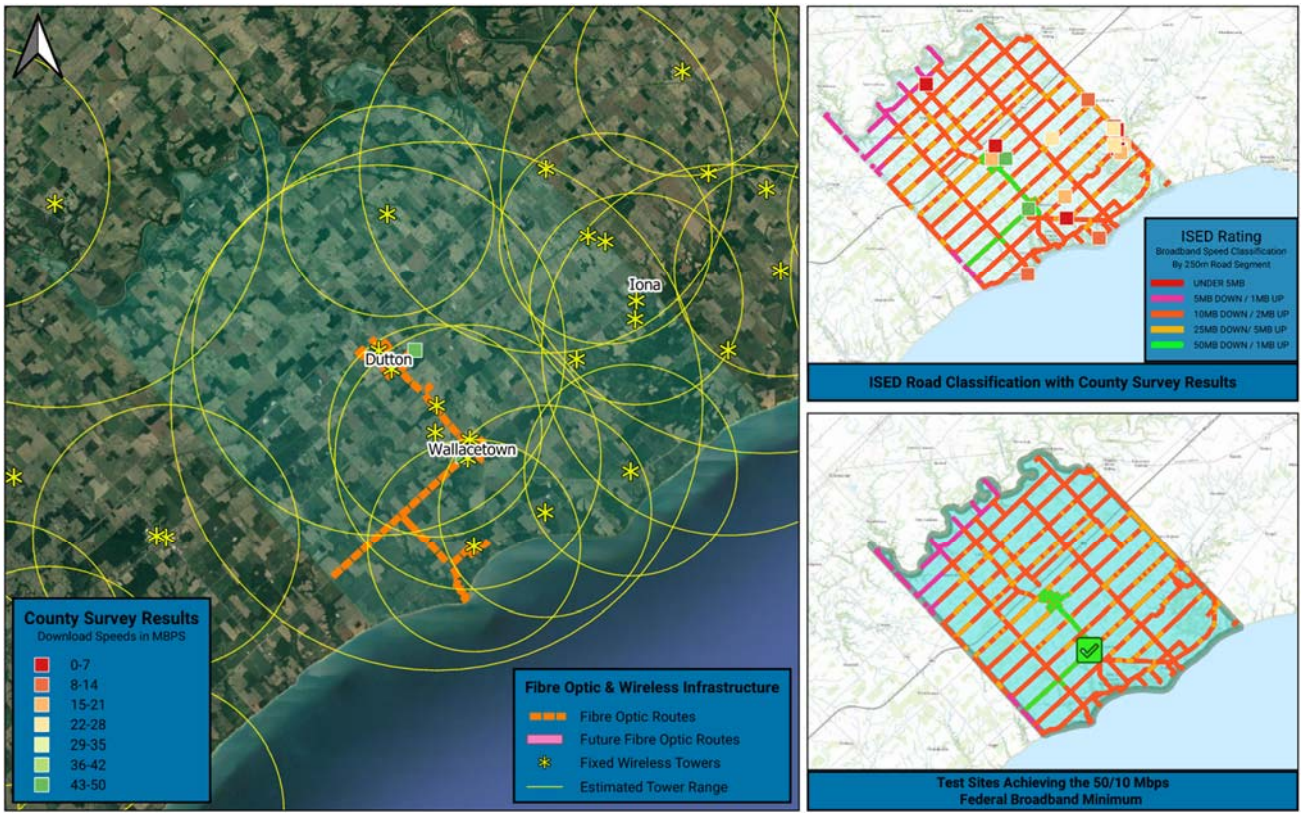
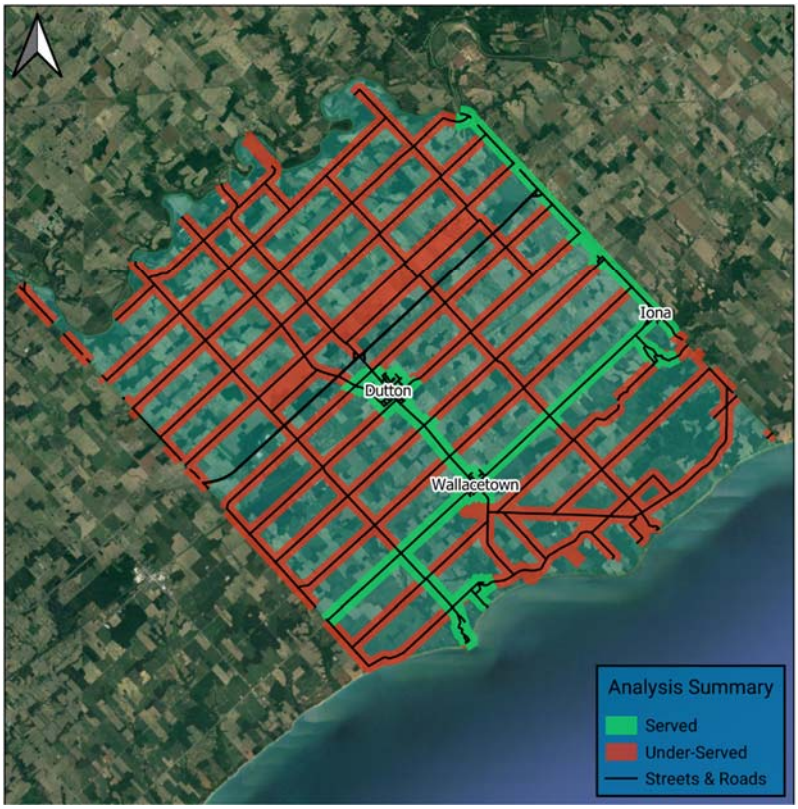
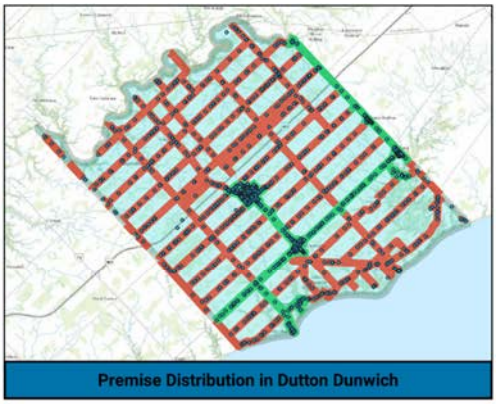


Figure 2-4: Current State of Broadband Infrastructure within Dutton Dunwich





Dutton/Dunwich Premise		
Total Premise Count	**1906**	
Served	1194	62.6%
Under-Served	712	37.4%
Requires Investigation	0	0.0%

Dutton/Dunwich Roads		
Total Road Length (Km)	**338.1**	
Served	69.7	20.6%
Under-Served	268.4	79.4%
Requires Investigation	0.0	0.0%

Figure 2-5: Current Understanding of Served and Underserved Areas within Dutton Dunwich

Dutton Dunwich primarily has fibre optic infrastructure in and between the communities of Dutton and Wallacetown. There is additional fibre that extends out from these communities, and includes committed fibre builds funding by SWIFT. There are several fixed wireless towers in and just west of the municipality that serve residences and businesses as well.

Correlating ISED and Internet speed test data, premises along the path of fibre infrastructure provide confidence that residences and business have access to CRTC broadband minimum speeds.

Areas theoretically covered by fixed wireless towers do not meet the CRTC speed minimums. This is validated with local speed test results.

For perceived underserved areas in the municipality, ISED data is confirmed against the local survey data that properly represents the underserved area.

Confirmed served premises account for 62.6% of total premises, while underserved premises represent 37.4% of total premises. 0% requires further investigation.

Based on road segment lengths, 20.6% is considered served while 79.4% is considered underserved. 0% requires further investigation.

Township of Southwold

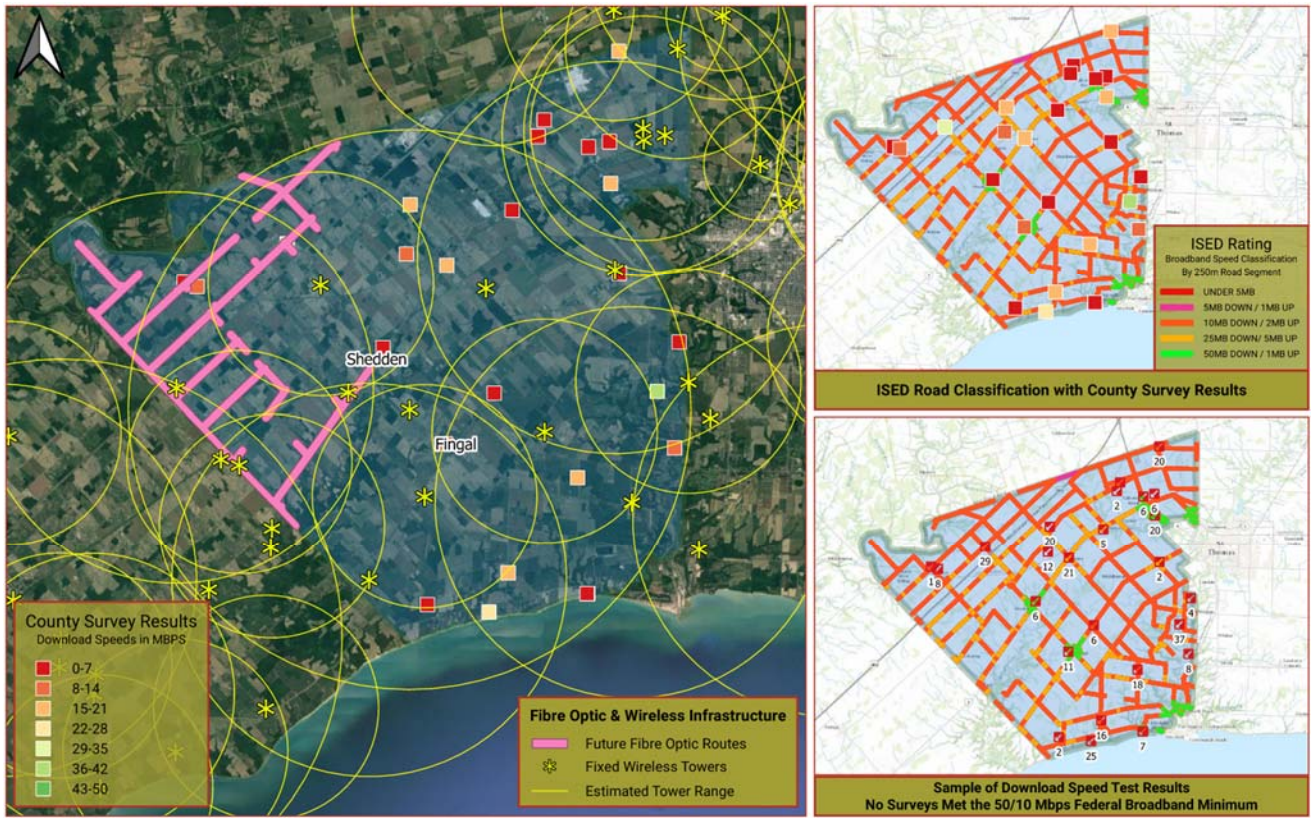
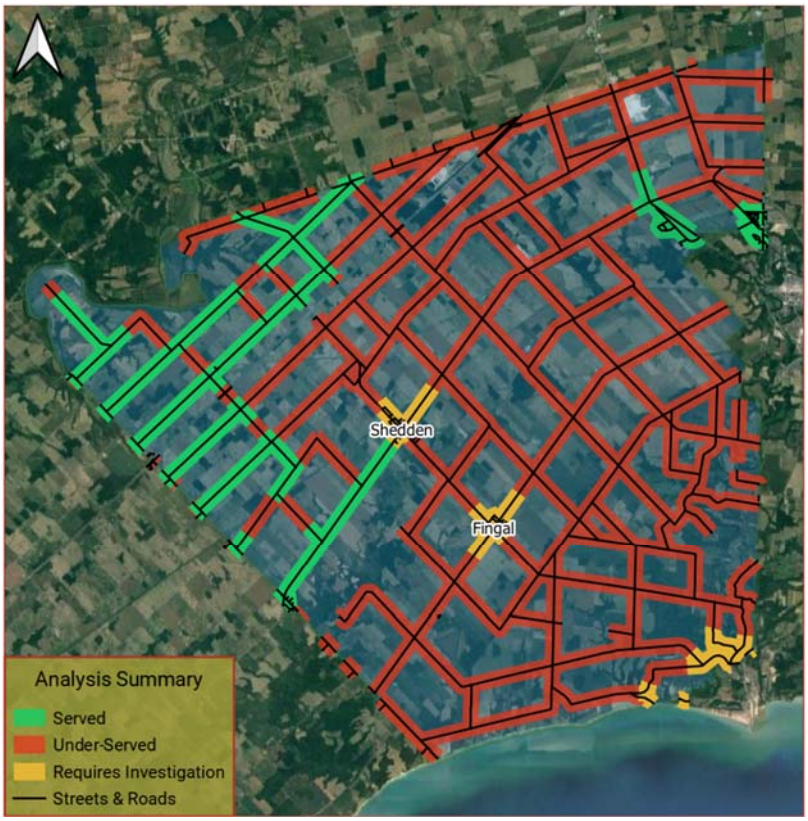


Figure 2-6: Current State of Broadband Infrastructure within Southwold



Premise Distribution in Southwold

Southwold Premise		
Total Premise Count	**2048**	
Served	787	38.4%
Under-Served	811	39.6%
Requires Investigation	450	22.0%

Southwold Roads		
Total Road Length (Km)	**351.1**	
Served	67.5	19.2%
Under-Served	264.6	75.4%
Requires Investigation	19.0	5.4%

Figure 2-7: Current Understanding of Served and Underserved Areas within Southwold

There is limited broadband within the boundaries of Southwold. Connectivity primarily is comprised of fixed wireless radio towers of which there is no premises with minimum Internet speeds confirmed. There is committed SWIFT funded fibre infrastructure being built around Iona, Iona Station, and Lawrence Station.

Correlating ISED and Internet speed test data, there are pockets of areas considered served outside of St. Thomas and Port Stanley. There is conflicting data in communities of Fingal and Shedden.

Areas theoretically covered by fixed wireless towers do not meet the CRTC speed minimums. This is validated with local speed test results.

Confirmed served premises account for 38.4% of total premises, while underserved premises represent 39.6% of total premises. 22.0% requires further investigation.

Based on road segment lengths, 19.2% is considered served while 75.4% is considered underserved. 5.4% requires further investigation.

Municipality of Central Elgin

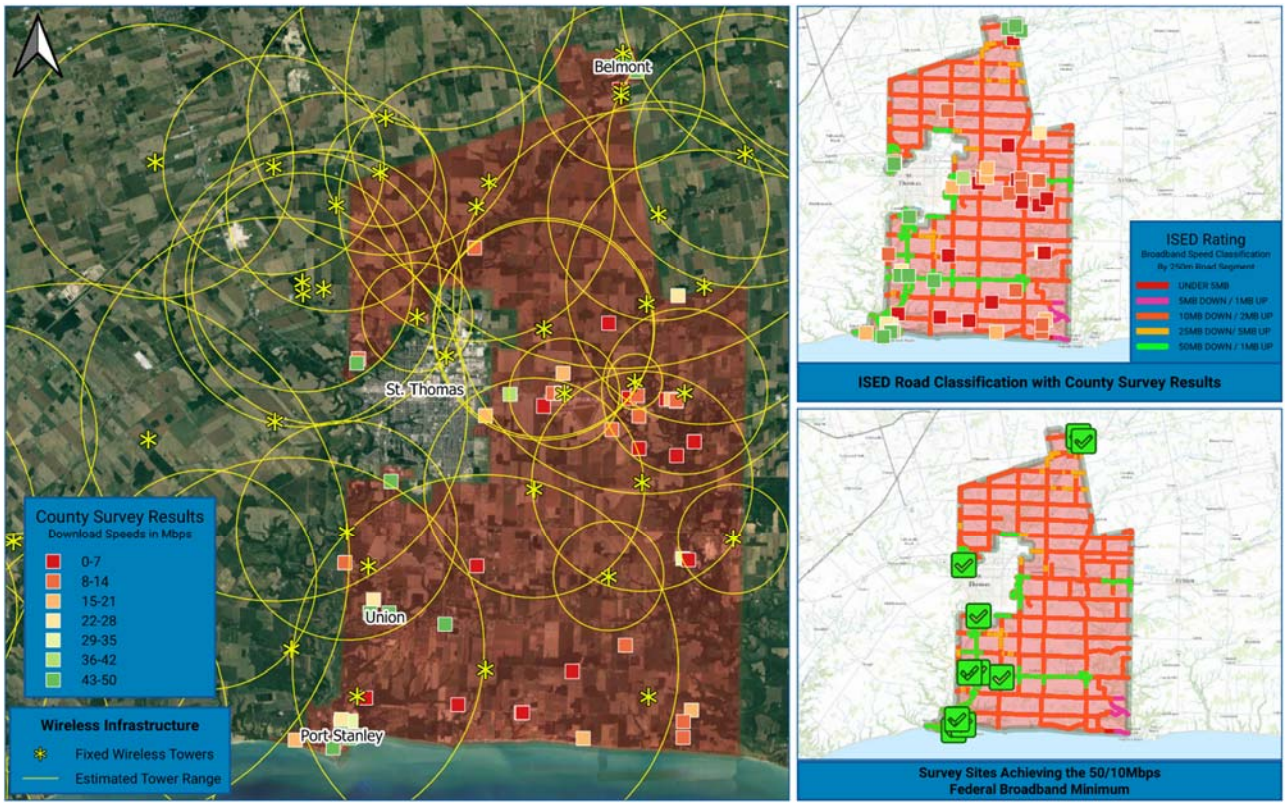
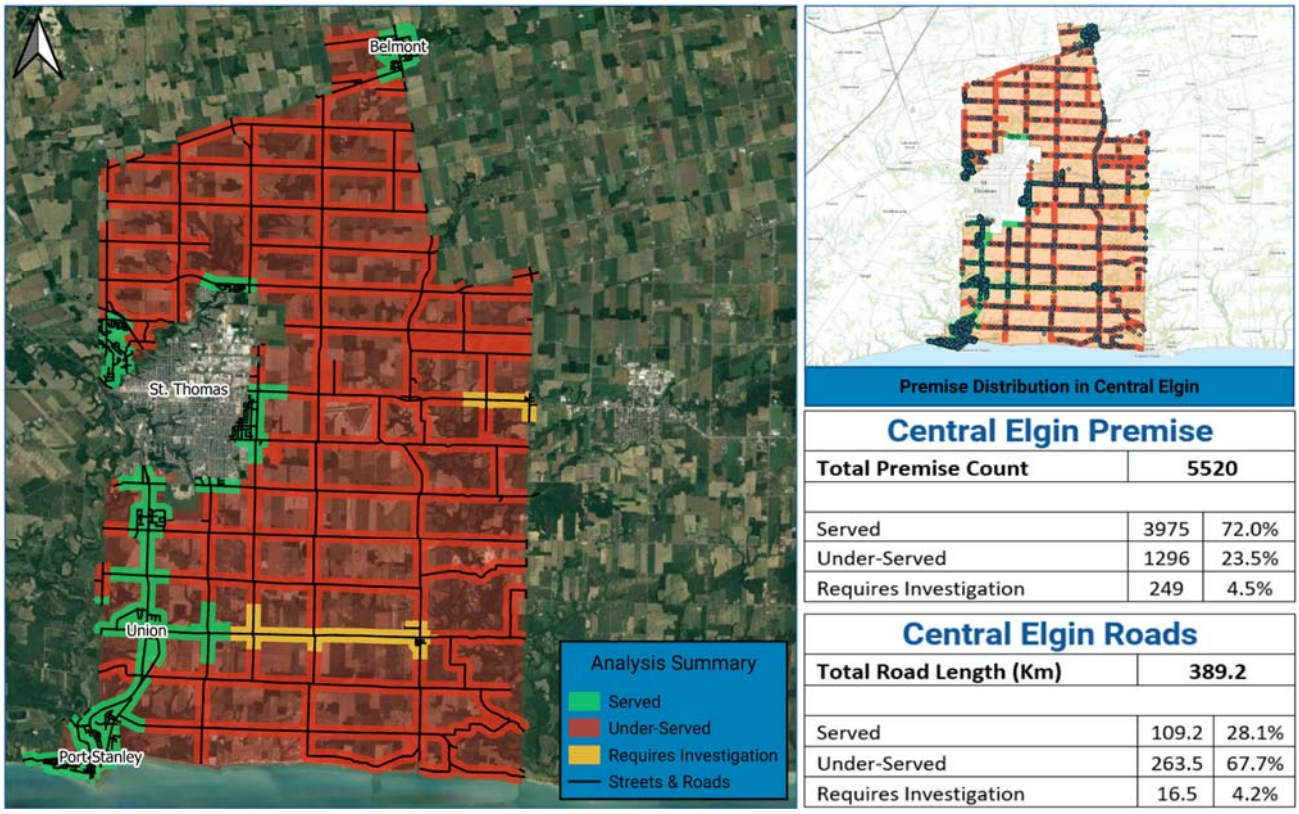


Figure 2-8: Current State of Broadband Infrastructure within Central Elgin



Central Elgin Premise		
Total Premise Count	**5520**	
Served	3975	72.0%
Under-Served	1296	23.5%
Requires Investigation	249	4.5%

Central Elgin Roads		
Total Road Length (Km)	**389.2**	
Served	109.2	28.1%
Under-Served	263.5	67.7%
Requires Investigation	16.5	4.2%

Figure 2-9: Current Understanding of Served and Underserved Areas within Central Elgin

Central Elgin primarily has physical broadband infrastructure in and between the communities of Port Stanley, Union, heading into St. Thomas. There is also infrastructure east-west between Lawton's Corner and Sparta.

Correlating ISED and Internet speed test data, premises along the path of physical broadband infrastructure provide confidence that residences and business have access to CRTC broadband minimum speeds.

Areas theoretically covered by fixed wireless towers do not meet the CRTC speed minimums. This is validated with local speed test results.

For perceived underserved areas in the municipality, ISED data is confirmed against the local survey data that properly represents the underserved area.

Confirmed served premises account for 72.0% of total premises, while underserved premises represent 23.5% of total premises. 4.5% requires further investigation.

Based on road segment lengths, 28.1% is considered served while 67.7% is considered underserved. 4.2% requires further investigation.

Township of Malahide

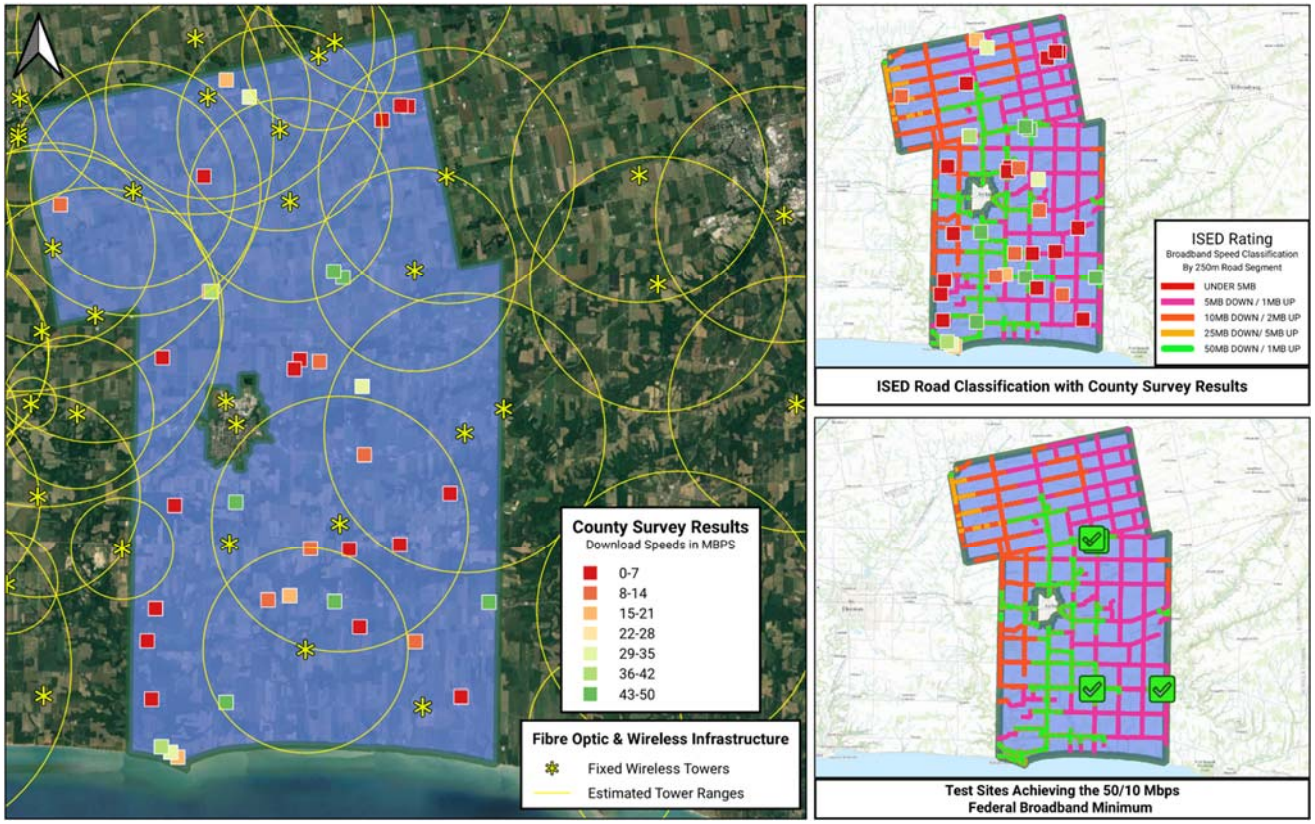
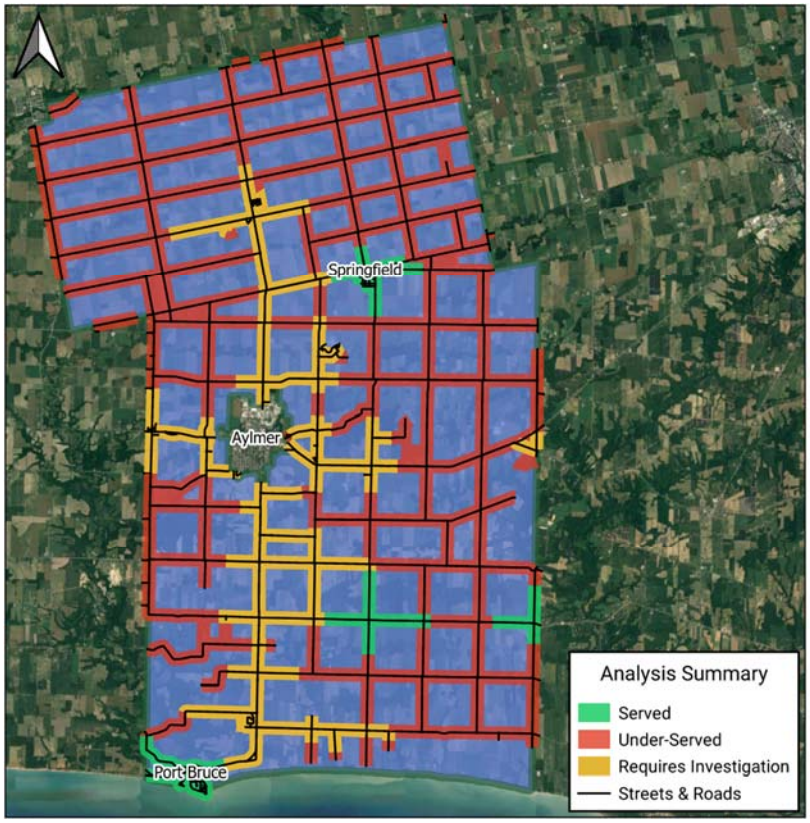


Figure 2-10: Current State of Broadband Infrastructure within Malahide



Premise Distribution in Malahide

Malahide Premise		
Total Premise Count	**3830**	
Served	846	22.1%
Under-Served	1639	42.8%
Requires Investigation	1345	35.1%

Malahide Roads		
Total Road Length (Km)	**436.1**	
Served	35.4	8.1%
Under-Served	296.7	68.0%
Requires Investigation	104.1	23.9%

Figure 2-11: Current Understanding of Served and Underserved Areas within Malahide

The Township of Malahide has fibre optic infrastructure spurring out of Aylmer. Notably infrastructure down into Port Bruce, into Fairview, and up into Lyons. There are several fixed wireless towers in and around the Township that serve residences and businesses as well.

Correlating ISED and Internet speed test data, premises along the path of fibre infrastructure provides minimal confidence that residences and business have access to CRTC broadband minimum speeds.

Areas theoretically covered by fixed wireless towers do not meet the CRTC speed minimums. This is validated with local speed test results.

For perceived underserved areas in the municipality, ISED data is confirmed against the local survey data that properly represents the underserved area.

Confirmed served premises account for 22.1% of total premises, while underserved premises represent 42.8% of total premises. 35.1% requires further investigation.

Based on road segment lengths, 8.1% is considered served while 68.0% is considered underserved. 23.9% requires further investigation.

Municipality of Bayham

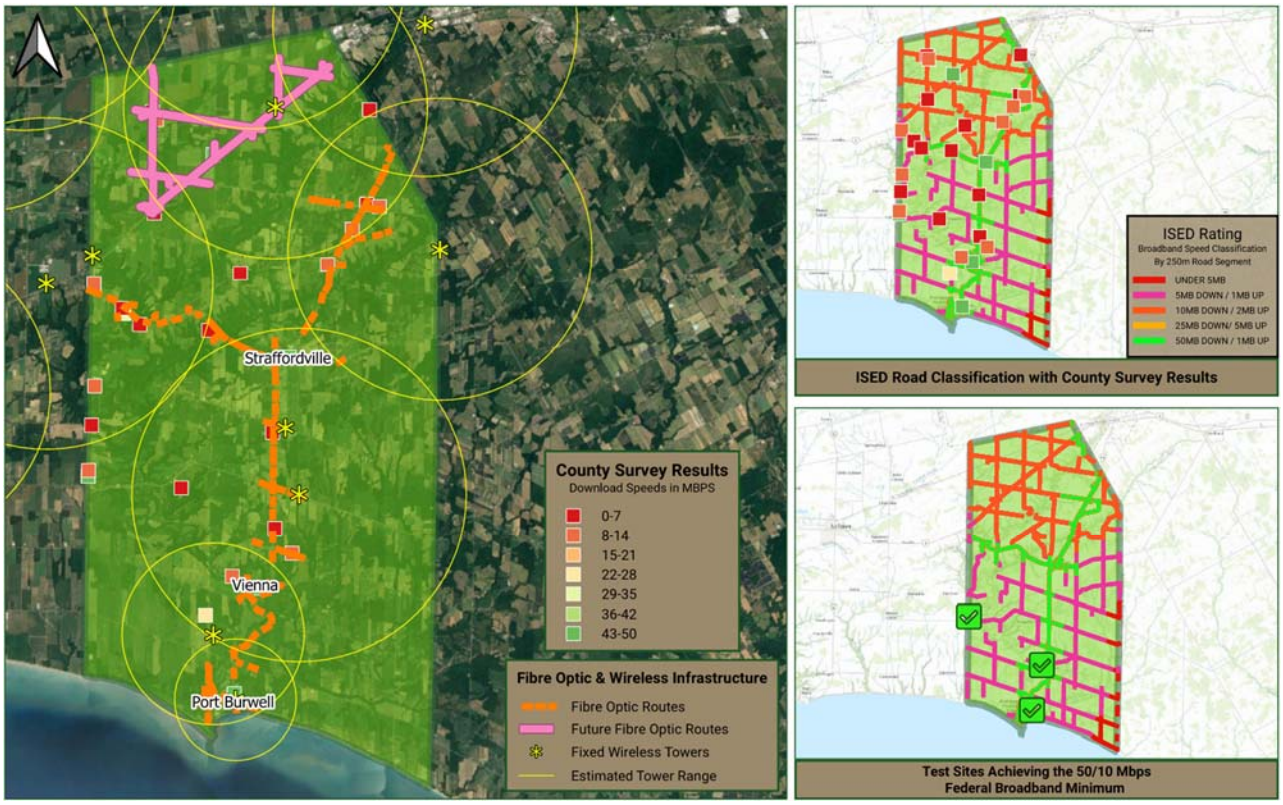
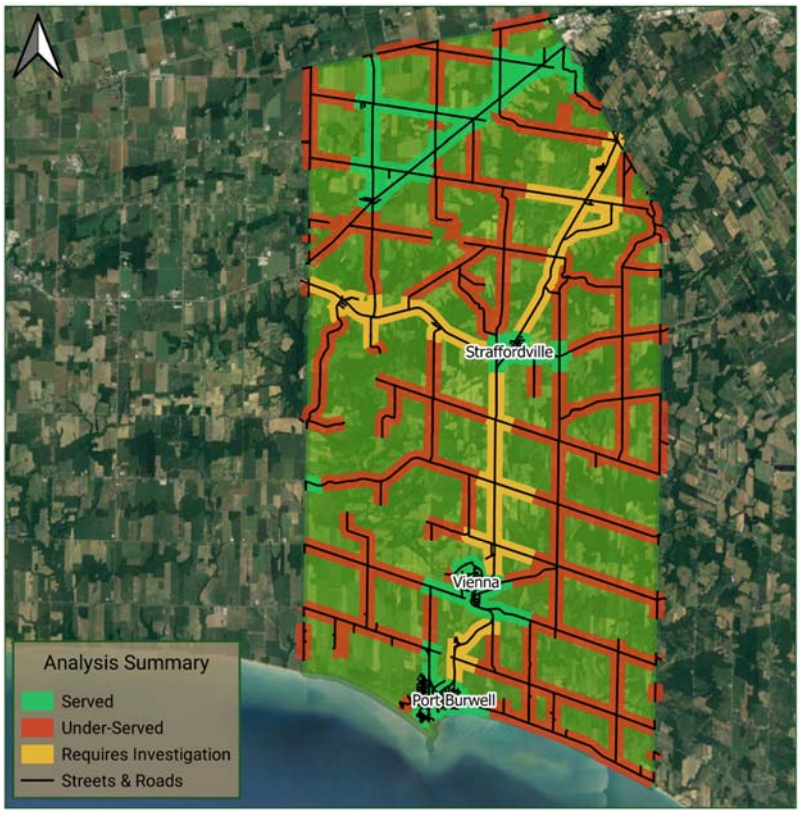
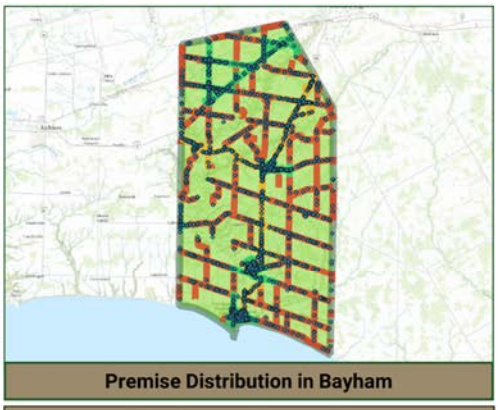


Figure 2-12: Current State of Broadband Infrastructure within Bayham





Bayham Premise		
Total Premise Count	**2747**	
Served	1427	51.9%
Under-Served	697	25.4%
Requires Investigation	623	22.7%

Bayham Roads		
Total Road Length (Km)	**310.2**	
Served	81.0	26.1%
Under-Served	183.3	59.1%
Requires Investigation	46.0	14.8%

Figure 2-13: Current Understanding of Served and Underserved Areas within Bayham

The Municipality of Bayham primarily has fibre optic infrastructure in and between the communities of Port Burwell, Vienna, and Straffordville. There is additional fibre that extends out from these communities as well. SWIFT has a confirmed funded fibre build in and around North Hall and Corinth. There are several fixed wireless towers in and around the municipality that serve residences and businesses as well.

Correlating ISED and Internet speed test data, premises along the path of fibre infrastructure provide confidence in some areas that residences and business have access to CRTC broadband minimum speeds. The exception here is the route between Vienna and Straffordville and the fibre path running west out of Straffordville. Internet speed test data conflicts ISED road network data in these cases.

Areas theoretically covered by fixed wireless towers do not meet the CRTC speed minimums. This is validated with local speed test results.

For perceived underserved areas in the municipality, ISED data is confirmed against the local survey data that properly represents the underserved area.

Confirmed served premises account for 62.6% of total premises, while underserved premises represent 37.4% of total premises. 0% requires further investigation.

Based on road segment lengths, 20.6% is considered served while 79.4% is considered underserved. 0% requires further investigation.

County Summary

Premises served vs. underserved and served area by road segments are two key metrics to further review. The following table provides a summary of served and underserved premises in Eglin County.

MUNICIPALITY	PREMISES SERVED (COUNT / PERCENTAGE)		PREMISES UNDERSERVED (COUNT / PERCENTAGE)		PREMISES REQUIRES FURTHER INVESTIGATION (COUNT / PERCENTAGE)	
West Elgin	1655	67.7%	785	32.1%	6	0.2%
Dutton Dunwich	1194	62.6%	712	37.4%	0	0.0%
Southwold	787	38.4%	811	39.6%	450	22.0%
Central Elgin	3975	72.0%	1296	23.5%	249	4.5%
Malahide	846	22.1%	1639	42.8%	1345	35.1%
Bayham	1427	51.9%	697	25.4%	623	22.7%
County Total	**9884**	**53.4%**	**5940**	**32.1%**	**2673**	**14.5%**

*Totals do not equal 100% because there are areas that have been identified as requiring further investigation.

The following table provides a summary of served and underserved areas of the County based on length of road segment.

MUNICIPALITY	SERVED AREA BY ROAD SEGMENT (LENGTH / PERCENTAGE)		UNSERVED AREA BY ROAD SEGMENT (LENGTH / PERCENTAGE)		AREAS REQUIRING INVESTIGATIONS BY ROAD SEGMENT (LENGTH / PERCENTAGE)	
West Elgin	79.3 km	21.6%	286.5 km	77.8%	2.2 km	0.6%
Dutton Dunwich	69.7 km	20.6%	268.4 km`	79.4%	0.0 km	0.0%
Southwold	67.5 km	19.2%	264.6 km	75.4%	19.0 km	5.4%
Central Elgin	109.2 km	28.1%	263.5 km	67.7%	16.5 km	4.2%
Malahide	35.4 km	8.1%	296.7 km	68.0%	104.1 km	23.9%
Bayham	81.0 km	26.1%	183.3 km	59.1%	46.0 km	14.8%
County Total	**442.1 km**	**20.2%**	**1563.0 km**	**71.3%**	**187.8 km**	**8.6%**

The above two tables indicate that roughly 53.4% of the County has access to Internet speeds of at least 50 Mbps download and 10 Mbps upload. On the other hand, roughly 32.1% of County premises do not have access to minimum broadband speeds.

In contrast, roughly one third of premises underserved account for more than 70% of the County geographic area as represented by length of road. This is reflective of the rural broadband challenges that the County is facing.

The Township of Aylmer was reviewed for broadband services and deemed to be served.

3 Options Analysis and Recommendations

3.1 Technical Options

3.1.1 County Wide Fibre Deployment

Further investigation of the suspect areas enabled the requalification of all road segments and premises to either “Served” or “Under-Served".

The County-Wide Fibre Deployment option involves the deployment of buried and aerial backbone fibre along all County roads in un/underserved areas of the County, with drops installed to each premise, (home/business), connecting to the network.

The benefits of this infrastructure are primarily that premises are connected via fibre optic cable, providing a secure access, with highest possible speeds, and that the connection is future-proofed, to the extent that with updated electronics in the future, speeds could be further increased. Based on the performance and longevity of existing fibre optic infrastructure that has been deployed globally, it would be expected that a fibre optic infrastructure would have a useful life of 30 years or greater.

The cons of such an approach are primarily related to the option’s cost.

MUNICIPALITY	PREMISE COUNT				ROAD LENGTH (KM)			
	Served		Under-Served		Served		Under-Served	
	Count	%	Count	%	Count	%	Count	%
West Elgin	1658	67.8%	788	32.2%	79.3	21.5%	288.7	78.5%
Dutton/ Dunwich	1194	62.6%	712	37.4%	69.7	20.6%	268.4	79.4%
Southwold	1146	56.0%	902	44.0%	85.1	24.2%	266.0	75.8%
Central Elgin	4128	74.8%	1392	25.2%	114.6	29.4%	274.6	70.6%
Bayham	1427	51.9%	1320	48.1%	81.0	26.1%	229.3	73.9%
Malahide	1824	47.6%	2006	52.4%	97.2	22.3%	338.9	77.7%
County Total	**11377**	**61.5%**	**7120**	**38.5%**	**527**	**24.0%**	**1665.9**	**76.0%**

For purposes of costing analysis, it was assumed that backbone fibre would be installed across all underserved roads, with drops only installed to the backbone, based on the assumed take-rates. Average costs of $60/m for construction of rural backbone fibre, and $1,000 per drop (connecting a premise to the backbone), were then used to estimate costs, based on various take-rates.

MUNICIPALITY	BACKBONE COST (Under-Served)	CONNECTION COSTS			
		Percentage of Under-Served Premises Connected			
		10%	50%	70%	100%
West Elgin	$ 17,322,000	$ 78,800	$ 394,000	$ 551,600	$ 788,000
Dutton/ Dunwich	$ 16,104,000	$ 71,200	$ 356,000	$ 498,400	$ 712,000
Southwold	$ 15,960,000	$ 90,200	$ 451,000	$ 631,400	$ 902,000
Central Elgin	$ 16,476,000	$ 139,200	$ 696,000	$ 974,400	$1,392,000
Bayham	$ 13,758,000	$ 132,000	$ 660,000	$ 924,000	$1,320,000
Malahide	$ 20,334,000	$ 200,600	$1,003,000	$1,404,200	$2,006,000
	$ 99,954,000	**$ 712,000**	**$3,560,000**	**$4,984,000**	**$7,120,000**

Summarizing all costs by Take Rate, including backbone and connection costs, it can be seen that the cost of connecting all underserved areas ranges from $100M @ 10% take rate, to approximately $107M @ 100% take rate. More dynamically, and perhaps at a rate more

meaningful to individual constituents, the cost per premise-connected varies from $141,385, to $15,038, as the take rate increases from 10% to 100%, underscoring the importance of marketing and communications activities prior to construction.

	COST SUMMARY Fibre Connectivity to Under-Served Premises			
	Take Rate			
	10%	50%	70%	100%
Total Capital Cost	**$100,666,000**	**$103,514,000**	**$104,938,000**	**$107,074,000**
Total Capital Cost/km	$ 60,427	$ 62,137	$ 62,992	$ 64,274
Total Capital Cost/Premise	$ 141,385	$ 29,077	$ 21,055	$ 15,038

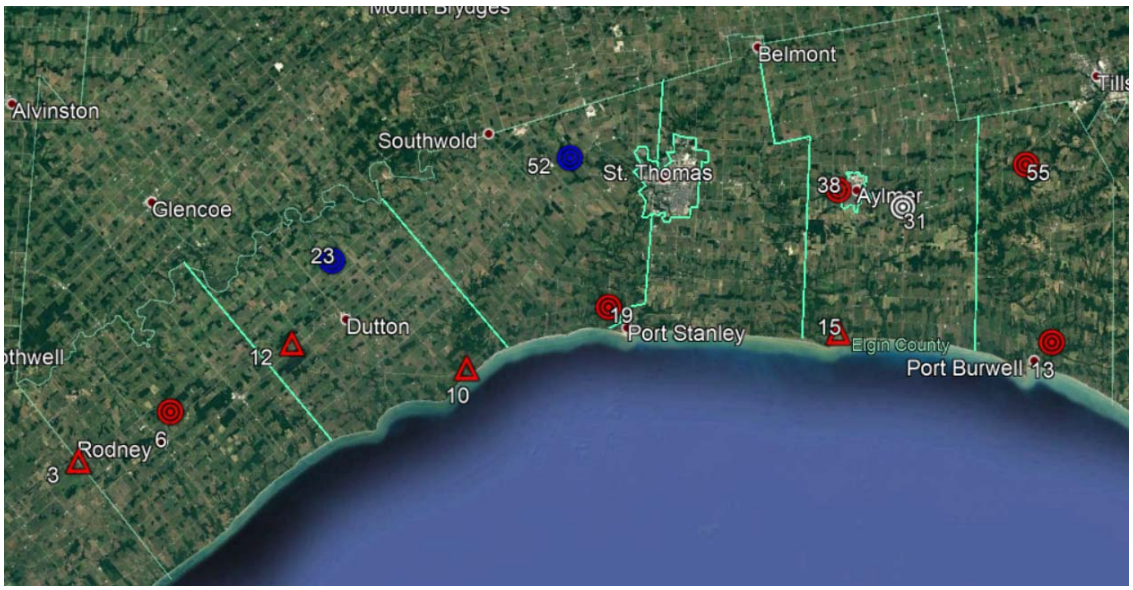
3.1.2 Fibre Backbone to Fixed Wireless Locations

This option is comprised of deploying fibre backbone to connect 12 tower sites across the County that would provide suitable wireless coverage, and then utilizing radio technology to connect premises within each tower's coverage area. Premises along the fibre paths would be served with fibre.

The benefits of such an approach are primarily financial, underscored by shorter deployment timelines. The cons relate to upgradability of the system to higher speeds in the future, as well as the potential for signal degradation based on the density of foliage as well as other environmental factors.

For evaluation purposes, the ISED database was scanned to provide a list of all towers within Elgin County. The data provided tower height, spatial position, and owner. It was assumed that towers owned by service providers such as TekSavvy, Xplornet, and others are likely used to provide wireless broadband, and therefore, to position new antennas on those towers, would not have any impact on advancing towards the goal of expanding broadband coverage. 12 cellular towers (detailed in the following table), dispersed across the county, were then selected from which to model wireless broadband coverage.

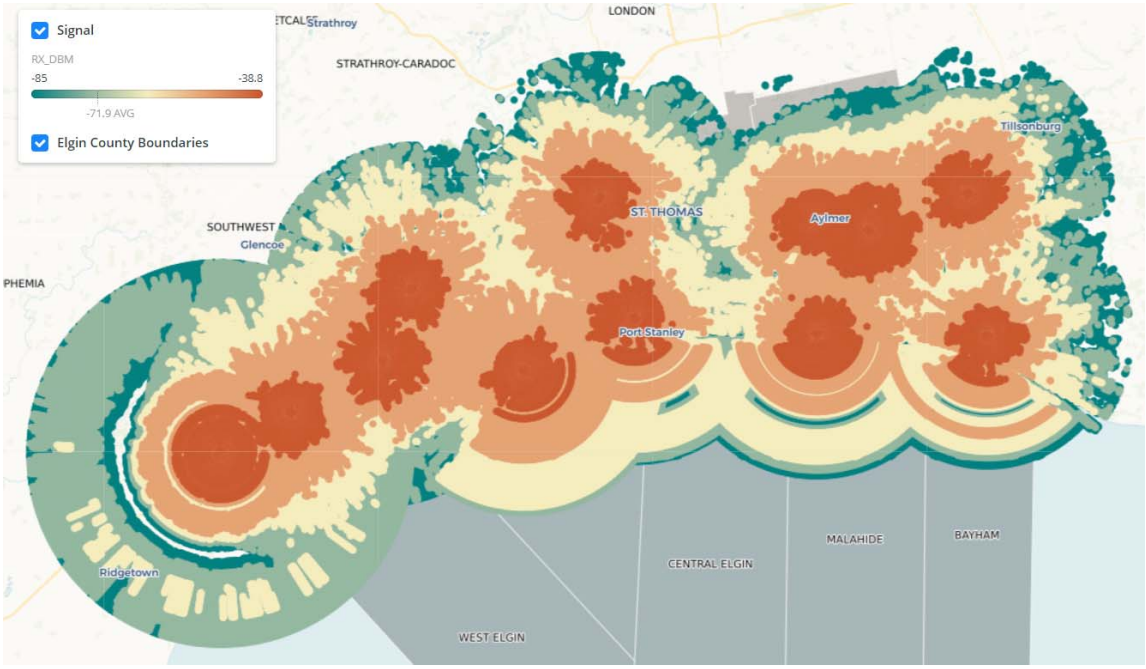
Google Earth Tower ID	Latitude	Longitude	Tower Height	Structure Type	Company	Owner Antenna Count	Total Tower Antenna Count	Percent Owner Antennas on Tow
3	42.55138889	-81.76555556	60 m	KDSS	Rogers Communications Canada Inc.	2	2	1
6	42.58972222	-81.67583333	60 m	Guyed	Rogers Communications Canada Inc.	8	8	1
10	42.62986111	-81.37727778	65 m	KDSS	Rogers Communications Canada Inc.	2	2	1
12	42.63944444	-81.55611111	61 m	KDSS	Rogers Communications Canada Inc.	2	2	1
13	42.66111111	-80.78194444	90 m	Guyed	Rogers Communications Canada Inc.	8	12	0.6667
15	42.66472222	-81.00027778	80 m	KDSS	Rogers Communications Canada Inc.	2	2	1
19	42.67833333	-81.235	80 m	Silo	Rogers Communications Canada Inc.	2	2	1
23	42.70666667	-81.52	62 m	Guyed	Bell Mobility Inc.	8	8	1
31	42.76111111	-80.93388889	80 m	Guyed	CHPD RADIO	1	1	1
38	42.77202778	-81.00161111	45 m	Monopole	Rogers Communications Canada Inc.	4	4	1
52	42.79066667	-81.27952778	91 m	Guyed	Bell Mobility Inc.	6	6	1
55	42.79527778	-80.8075	90 m	Guyed	Rogers Communications Canada Inc.	18	18	1



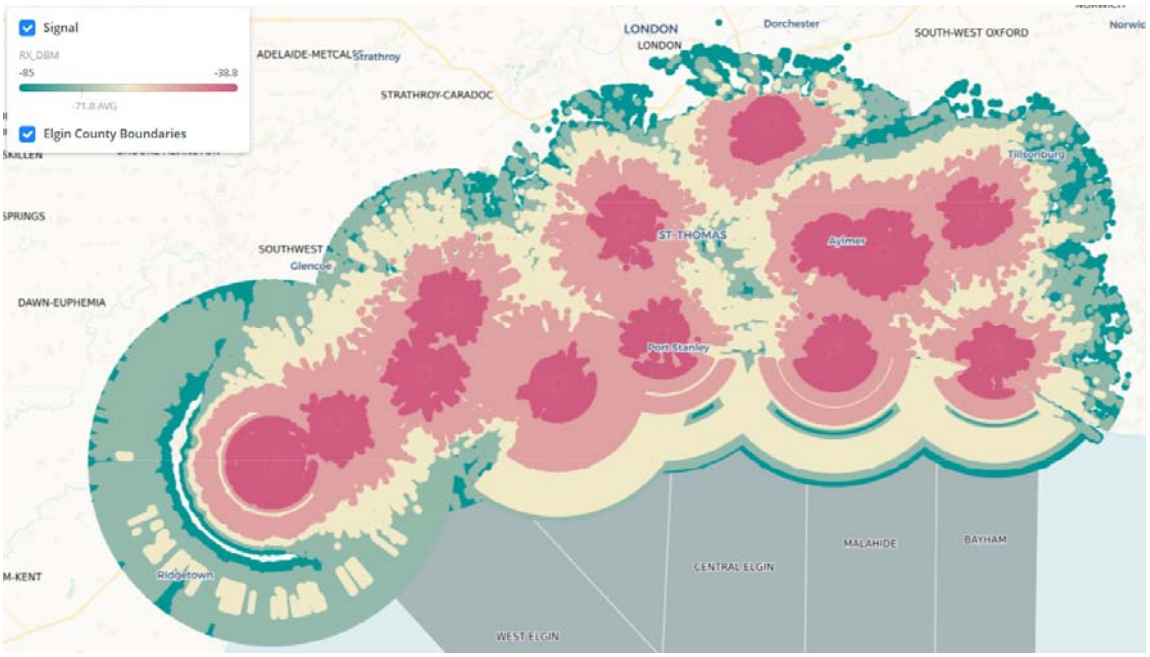
The towers were then connected, via fibre optic connections, run from the nearest served area, and premises counted along the serving fibre routes, as identified in the following table.

TOWER NUMBER	FIBRE CONNECTION LENGTH (M)	UNSERVED PREMISE COUNT ON SERVING FIBRE PATH	MUNICIPALITY
Tower 03	6,795	20	West Elgin
Tower 06	2,129	7	West Elgin
Tower 10	7,634	20	Dutton/Dunwich
Tower 12	4,392	17	Dutton/Dunwich
Tower 13	1,630	2	Bayham
Tower 15	158	0	Malahide
Tower 19	3,159	0	Southwold
Tower 23	5,797	10	Dutton/Dunwich
Tower 31	4,802	107	Malahide
Tower 38	1,677	0	Malahide
Tower 52	8,143	116	Southwold
Tower 55	3,686	17	Bayham
TOTAL	50,002	316	

A conservative RF propagation model was built, based on 5.8GHz radios, with omni-directional antennas placed at the tops of the towers, for simplicity. Coverage predictions were then run, using the Radio Mobile online tool, with receive omni-directional, 9 dBi antennas mounted at an elevation of 5m, simulating rooftop antenna mounts.



Coverage from the 12 towers was found to blanket the majority of the County, with the exception of the far north end of Malahide, and the Belmont area. By finding a suitable site in the Belmont area, and establishing a 13th tower, coverage of the county was significantly enhanced. For the purposes of this report, a new tower in close proximity to the Belmont water tower site was chosen, with a 32m tower modeled, as depicted below.



As can be seen in the above coverage prediction model, the 13 towers modeled should provide adequate signal strength, covering virtually all of the County. Lower frequency radio technologies would improve coverage and signal strength. Areas for further examination in the detailed design phase, would be selection of radio equipment and coverage in the areas between St Thomas and Aylmer, as well as the far north end of Malahide.

For purposes estimating costs of serving towers, the same cost assumption ($60/m) for fibre and ($1000/ connection) were used as with the first option of deploying fibre to all underserved roads. The cost of radio equipment and antennas was estimated at $5,000 per tower, and the cost to build a new tower was estimated at $250,000.

Number of Towers	Total Fibre Length (m)	Estimated Cost (Fibre)	Estimated Cost Tower Radio Equipment
12	50002	$ 3,000,120	$ 60,000
1	TBD	TBD	$255,000

Similar to the all-fibre option, connection costs for those premises along the fibre serving the towers are estimated at $1,000 per connection, and $500 per connection for those using the wireless infrastructure.

Municipality	Tower Fibre Length	Under-Served Premise Count on Tower Fibre	Under-Served Road Length (km)	Remaining Municipality Premises Count Under-Served	Tower Cost	CONNECTION COSTS			
						Percentage of Under-Served Premises Connected			
						10%	50%	70%	100%
West Elgin	8924	27	288.7	761	$ 545,440	$ 40,750	$ 203,750	$ 285,250	$ 407,500
Dutton/ Dunwich	17823	47	268.4	665	$ 1,084,380	$ 37,950	$ 189,750	$ 265,650	$ 379,500
Southwold	11302	116	266	786	$ 688,120	$ 50,900	$ 254,500	$ 356,300	$ 509,000
Central Elgin	0	0	274.6	1392	$ 255,000	$ 69,600	$ 348,000	$ 487,200	$ 696,000
Bayham	5316	19	229.3	1301	$ 328,960	$ 66,950	$ 334,750	$ 468,650	$ 669,500
Malahide	6637	107	338.9	2006	$ 413,220	$ 105,650	$ 528,250	$ 739,550	$1,056,500
					$ 3,315,120	**$ 371,800**	**$1,859,000**	**$2,602,600**	**$3,718,000**

Summarizing all costs by Take Rate, including fibre to connect towers and premise connection costs, it can be seen in the following table, that the cost of connecting all underserved areas ranges from $3.7M @ 10% take rate, to approximately $7.1M @ 100% take rate. More dynamically, and perhaps at a rate more meaningful to individual constituents, the cost per premise-connected varies from $5,178, to $988, as the take rate increases from 10% to 100%.

	COST SUMMARY Fibre Connectivity to Under-Served Premises			
	Take Rate			
	10%	50%	70%	100%
Total Capital Cost	**$3,686,920**	**$5,174,120**	**$5,917,720**	**$7,033,120**
Total Capital Cost/km	$ 2,213	$ 3,106	$ 3,552	$ 4,222
Total Capital Cost/Premise	$ 5,178	$ 1,453	$ 1,187	$ 988

3.1.1 Cost Summary

Cost estimates for both options are compared in the table below, with the more robust option carrying the higher price tag.

	COST SUMMARY Fibre Connectivity to Under-Served Premises			
	Take Rate			
	10%	50%	70%	100%
County Wide Fibre Deployment				
Total Capital Cost	**$100,666,000**	**$103,514,000**	**$104,938,000**	**$107,074,000**
Total Capital Cost/km	$ 60,427	$ 62,137	$ 62,992	$ 64,274
Total Capital Cost/Premise	$ 141,385	$ 29,077	$ 21,055	$ 15,038
Fibre Backbone to Fixed Wireless Locations				
Total Capital Cost	**$ 3,686,920**	**$ 5,174,120**	**$ 5,917,720**	**$ 7,033,120**
Total Capital Cost/km	$ 2,213	$ 3,106	$ 3,552	$ 4,222
Total Capital Cost/Premise	$ 5,178	$ 1,453	$ 1,187	$ 988

Regardless of which option or combination of options is chosen, an additional 10% of total capital should be planned for design and project management.

3.2 Recommendations

[All recommendations are presented here in draft subject to review and feedback from the Elgin County Connectivity Committee]

Preface: Impact of Ontario Connects program

Details regarding the specific details and timing of the Ontario Connects program are emerging as this report is being finalized (December, 2021). We have provided commentary regarding the expected impact of the Ontario Connects program with each recommendation.

Summary of Recommendations

The following table is provided to summarize the recommendations provided in this section, with additional details provided regarding each recommendation:

NUMBER	RECOMMENDATION	ESTIMATED BUDGET	UNDERSERVIED PREMESIS CONNECTED	TIMING	IMPACT OF ONTARIO CONNECTS PROGRAM
1	Advocacy, Strategic Purchasing & ISP Coordination	1 Senior Staff FTE	N/A	Immediately	Aligned – will provide maximum value to the County during this program
2	Fibre to the Home/ Business	$107M	7120	5-10 yrs.	Aligned: This program could advice timing and provide funding
3	Initial Fibre Build to Radio Towers	$7.0M	7120	3 yrs.	Overlap may need – delay or cancel this initiative pending auction results
4	Extend fibre connectivity to areas of interest / municipal locations	$10.8M	7120	3 yrs.	Overlap may need – delay or cancel this initiative pending auction results

Recommendation 1: Advocacy, Strategic Purchasing & ISP Coordination

As a best practice, it is recommended that the County takes on a role of facilitating and advocating for investment in broadband infrastructure both from private industry as well as other levels of government. The County does not make a direct financial contribution to constructing infrastructure under this recommendation, but rather looks to encourage cooperation, partnerships and facilitate the investment through approaches such as the facilitation of economic development and collaboration forums, removing financial or municipal approval challenges to planning and permitting of fibre optic and radio tower infrastructure, as well as leveraging and coordinating the current connectivity requirements and spending of the (i) the County, (ii) lower tier municipalities and (iii) MUSH sector agencies with service providers. This coordination approach through procurement and strategic negotiations can help the County achieve its long term broadband goals without direct financial investment in infrastructure or subsidy programs.

It is expected that 1 additional senior staff full time equivalent (FTE) would be required from the County to provide strategic leadership, facilitate coordination and collaboration forums, and lead

Impact of Ontario Connects program: This recommendation is aligned and an important action as the Ontario Connects program proceeds through various stages of funding allocations and ISP selections(s).

the advocacy initiatives with other levels of government. While a staff role is preferred, this role could also be assumed by a contractor/ consultant until recruitment and hiring can take place.

Budgetary Costs: 1 senior staff FTE salary

Underserved Premises Connected: N/A

Expected Timing: Immediately

Recommendation 2: Long term vision: Fibre to the Home/ Business

We recommend the County adopt a long term vision of achieving a fibre to the home infrastructure for its residents and business. This vision provides the best long term benefits for residents and businesses and strategically positions the County for economic development growth, attracting and retaining businesses and residents. We recognize that this vision may not be immediately affordable the County and may take many years to budget and implement. There is the opportunity with coordinated infrastructure planning and construction to cost share the construction cost of fibre optic infrastructure with other County linear infrastructure such as roads and municipal water/ wastewater systems in order to offset some of the construction costs identified. The County should actively pursue all forms of advocacy both with ISPs as well as higher tier levels of government in order to identify grant funding programs that will help accelerate the implementation of this long term vision. The Ontario Connects program may provide a significant benefit to advance the implementation of this recommendation.

Impact of Ontario Connects program: This recommendation is aligned with the long term strategy and expected outcomes of the Ontario Connects program and it would be expected that significant funding could be secured through this program to accomplish this recommendation

.

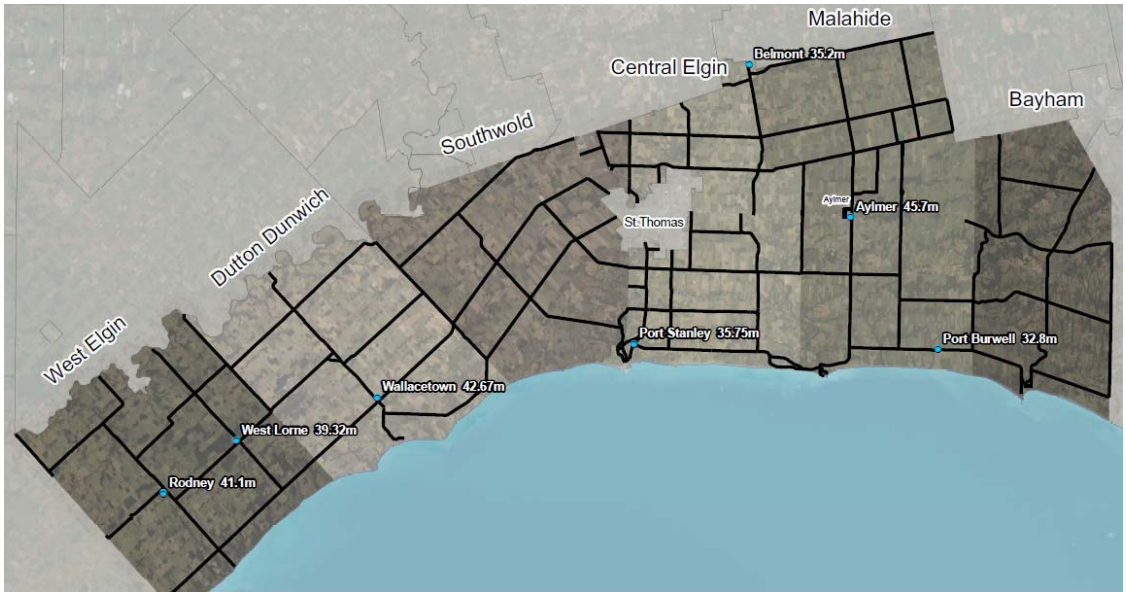
Budgetary Costs: $107,074,000

Underserved Premises Connected: 7120

Expected Timing: 5-10 years, depending on timing of available funding

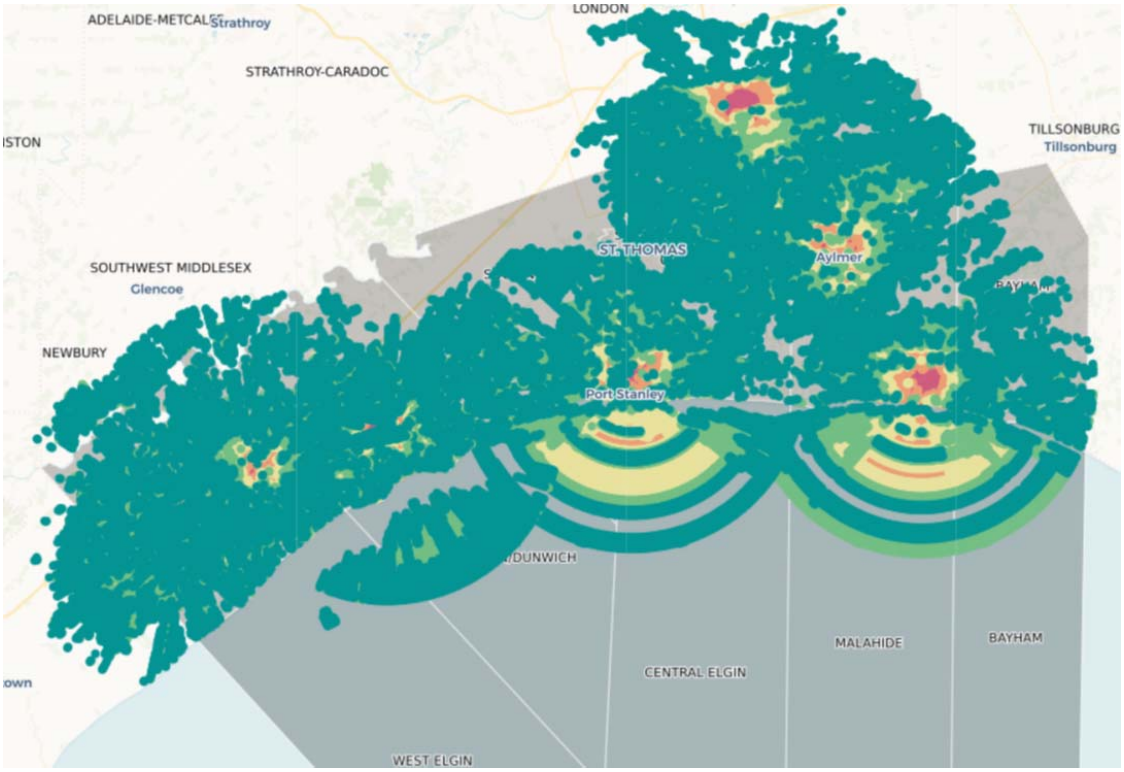
Recommendation 3: Initial Fibre Build to Radio Towers

We have identified several options in each municipality for the County to invest in a hybrid fibre/ wireless approach to improve broadband connectivity in the County. This hybrid approach would involve the implementation of a fibre optic infrastructure from high density areas (e.g. served) extending along roadways to connect radio towers and residents along the fibre route to high speed services. A further analysis of the County's existing water tower infrastructure indicates that these towers may be a suitable substitute to colocation on some 3rd party towers or any new radio tower construction.

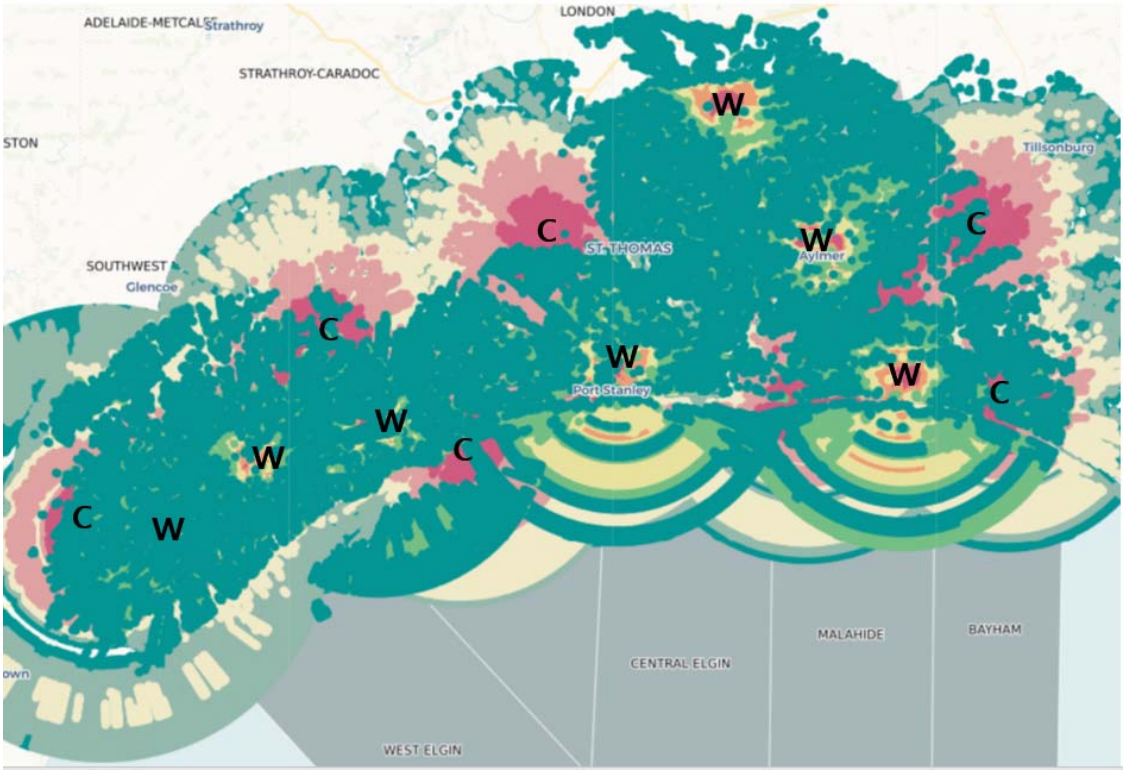


Elgin County Water Towers

Coverage predictions based on placing radios and antennas on the seven water towers, show reduced coverage areas from those of the colocation towers, due to the reduced relative height of the towers.



When overlaying coverage from the water towers on that from the previously proposed colocation towers, it can be seen that by deploying radios on existing water towers, (typically within served areas with connectivity readily available), the number of colocation towers required to fill out coverage could be reduced by approximately 50%. The following depiction shows coverage areas from water towers (W) and colocation towers (C).



As part of the detailed design phase, coverage predictions should be verified, based on radio and antenna technologies selected. Coverage and signal strength will vary, based on the radio technology, frequencies and use of higher-gain directional antennas, better focusing signals to where they are needed. The reduction of colocation towers, reduces the monthly fees related to tower space leases.

This approach is the recommended first step for the County to prioritize to improve broadband connectivity, subject to the outcomes that will be achieved by the Ontario Connects program.

Impact of Ontario Connects program: The Ontario Connects program would supersede the expected outcomes of this recommendation and therefore the implementation of this program should be deferred until outcomes of the Ontario Connects program are further understood, in mid-year 2022.

Budgetary Costs: $7,033,120

Underserved Premises Connected: 7120

Expected Timing: 3 years

Recommendation 4: Extend fibre connectivity to areas of interest / municipal locations

This recommendation builds on recommendation 3 above and would provide for additional fibre optic connectivity to residents and businesses along the proposed fibre path, as well as achieving connectivity to municipal locations and land identified for future development to support specific economic development objectives. Please refer to the maps provided in Appendix C for additional details regarding this recommendation

> **Impact of Ontario Connects program**: The Ontario Connects program would supersede the expected outcomes of this recommendation and therefore the implementation of this program should be deferred until outcomes of the Ontario Connects program are further understood, in mid-year 2022.

Budgetary Costs: $10,761,120

Underserved Premises Connected: 7120

Note that there are $3,728,000 incremental fibre costs relative to Recommendation 3 as identified in the table below:

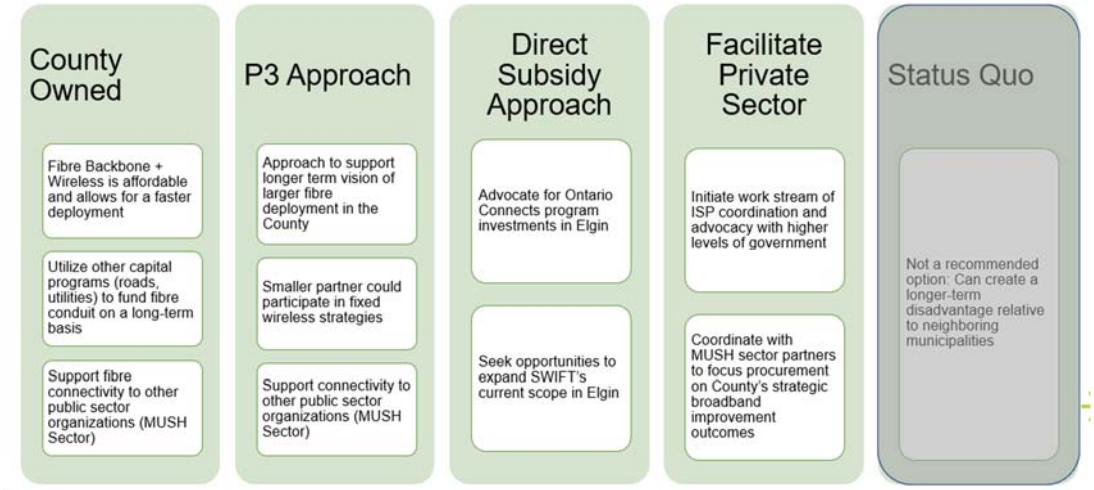
Municipality	Fibre Segment Name	Under-Served Premise Count on Fibre	Fibre Segment Length (km)	Estimated Budget
Malahide	Aylmer – Richmond	74	5.57	$408,200
Malahide	Aylmer - Springfield	79	7.98	$557,800
Malahide	St. Thomas - Aylmer	68	2.54	$220,400
Central Elgin	St. Thomas - Aylmer	172	9.66	$751,600
Central Elgin	Fairview Rd - Sparta	136	7.26	$571,600
Southwold	Shedden – St. Thomas	128	8.02	$609,200
Southwold	Shedden – Talbotville Royal	128	8.02	$609,200
Totals		**785**	**49.05**	**$3,728,000**

Underserved Premises Connected: 785

Expected Timing: 1-3 years

3.3 Governance / Funding Options

The following sections describe the governance and funding options available for the County as summarized in the figure below. We begin this summary with some preliminary information regarding the Ontario Connects program



3.3.1 Ontario Connects: Ontario's Accelerated High-Speed Internet Program

Note that at the time of writing this report, the Ontario Connects program was initially announced with program objectives as follows:

- Facilitate speed of delivery of high-speed internet services and 100% coverage at a minimum service level of 50/10 Mbps for approximately 700,000 unserved or underserved homes by the end of 2025
- Leverage existing utility infrastructure and rights of way to reduce required subsidies and compress delivery timelines
- Attract broad market participation of quality counterparties that is inclusive of smaller and local players
- Ensuring infrastructure lasts and can be upgraded as needed

The program has committed $4B to connect every region in Ontario to reliable, high speed internet by the end of 2025. It is expected to support accelerated broadband expansion in the Province. While little detailed information is known, the Province has stated that the process will enable Internet Service Providers (ISPs) to bid for provincial subsidies through a series of reverse auction events, with winning bids meeting the defined coverage and deployment requirements at the most reasonable price.

The program in very early stages of formulation, and few details are known regarding the eligibility for ISPs and/or municipalities to participate directly in the program.

Benefits and Risks

The program announcement represents the most amount of funding that any provincial government has committed to improving broadband connectivity. The reverse auction process that is described would tend to favor incumbent ISPs with existing infrastructure in the County that can cost-effectively compete for subsides in a reverse auction subsidy format. If successful,

the program would provide a significant incentive to existing ISPs to invest in infrastructure to serve all underserved areas of the County.

Risks of the program include the ability of the program to have sufficient budget fund connectivity to all underserved areas in the County, as well as the province's ability to execute on the program in the stated timeframe.

Since little detailed information regarding this program is known, we continue to describe other funding solutions in the following sections, assuming that they may be required in a coordinated and complementary fashion to fund areas within the County where the Ontario Connects program may not be eligible or have sufficient funding budget to adequately address.

3.3.2 County Owned

This scenario sees the County taking the initiative in making an investment in building fibre optic networks to provide universal connectivity to all residents and business that are currently underserved. The County would seek grant funding from higher levels of government (e.g. Ontario and Canada) through programs such as ICON (Improving Connectivity for Ontario) and the UBF (Universal Broadband Fund). The County would be expected to contribute a percentage of project costs directly (usually 25% to 50%) as part of the conditions of the grant funding program.

Recent (August 2021) funding announcements from the governments of Ontario and Canada related to the ICON and UBF programs have committed the following amounts to fund $1.344B in broadband projects. It is unclear of the amounts of funding provided from Ontario and Canada, nor if the Ontario contribution is part of the $4B funding announced under the Ontario Connects program.

REGION	FUNDING AMOUNT ($M)
North East Ontario	$170
North West Ontario	$148
Eastern Ontario	$362
Golden Horseshoe Region	$73
Central Ontario	$230
Telesat (Satellite)	$109
South West Ontario	$252
Total	$1,344

It is unclear at the time of writing the amount of funding that has been allocated for projects within Elgin County.

Using County and lower-tier municipal operational connectivity requirements as will as working closely with other public sector organizations, commonly referred to as the MUSH sector (Municipalities, Universities, Schools and Hospitals) as a network anchor / backbone client, these organizations could recover some of the upfront capital costs of construction through long term savings on connectivity costs currently paid to 3rd party providers. By installing additional conduit and fibre capacity at the time of construction, incremental extensions to the municipal network can be made. The County would facilitate retail service deliver through partnerships

with retail and wholesale Internet Service Providers (ISPs) to enable the delivery of retail telecommunications services to business and residents.

Benefits and Risks

This option provides the benefit of stimulating and increasing competition for broadband services at a retail level. Incumbents may respond in the form of additional network investments and capacity to maintain their existing market share. The County retains local control over its assets. This model may not stimulate the wholesale / reseller telecommunications market (even if wholesale services are offered at reasonable discounted rates) as some resellers may be wary of trying to compete with the County for commercial and residential clients. Risks with this model are both financial and operational. There is a high degree of risk in securing grant funding from higher levels of government as the process to apply for grants is highly competitive and available funding for grants is highly oversubscribed by the requests for grant funding that are received.

The cost of construction presents a risk that can be managed through diligent procurement and construction management, however there is a longer term risk of demand for retail services not meeting initial forecasts, or competitive forces creating price pressure on retail services. This may result in underutilized or stranded network investment in the longer term. The County does not have the expertise to operate retail telecommunications services, so there is some risk in terms of creating operational partnerships with ISPs willing to take on this role.

3.3.3 P3 approach

Under this scenario, the County would engage potential partners in the investment and operations of the network by publishing long range plans and soliciting partner interest through a Request for Proposal (RFP) process. Potential partners could participate in the form of providing financing, construction and/or operational expertise to build and operate the network. Depending on the nature of the partnership, the County may contribute to the partnership in the form of capital contribution, long term commitments to purchase telecommunications services or a combination of both. This model is more expensive than direct ownership of assets since private sector partners will want to receive a return (profit) from their investments.

Benefits and Risks

This option has the benefit of leaving options open for the County that is unwilling to commit to a build program or lacks the available capital to invest in broadband infrastructure. Partners may bring needed construction and/ or operational expertise that the County may require for such a network. This model creates a shared risk reward scenario for the County and the partner. Risks involved with this approach include the ability to attract a suitable partner for various reasons (size of the investment, market conditions, etc), as well as the risk of losing some local control over the implementation of the network, uneven network coverage, etc. Since these arrangements are normally over a period of 10 to 30 years in order to allow for investment recovery and profit, it is important to ensure that long term vision of the partner is aligned with the County to prevent partnership conflicts. Exit strategies for both the County and the partner must be carefully thought through as part of forming the partnership.

3.3.4 Direct Subsidy Approach

This approach, modeled after the SWIFT program that is currently active in Elgin County would have the County look to contribute one time funding to provide capital subsidies to existing ISPs as an incentive to invest in the construction of broadband infrastructure that would connect areas of the County that are currently underserved.

In this model, the County would allocate funds to be provided to service providers through a procurement process that is focused on specific outcomes in geographic areas (e.g. premises served, fibre route meters deployed).

Benefits and Risks

This model differs from the County Owned model in that the County does not retain long term ownership of the assets, nor has the obligations to maintain the assets over their asset life. Risks of this approach include the County not having a long term control and little influence or ability to ensure that service levels to residents and businesses are provided and affordable pricing is maintained in the long term. In order to ensure that the Municipal Act is followed in terms of unfairly biasing or subsidizing a private sector organization, this subsidy approach would need to be done through an arms length origination such as SWIFT, of which Elgin County is already a participating member.

It should be noted that the Ontario Connects program appears take a very similar approach with the reverse auction subsidy model, with 7 year financial holdback provisions to have some trailing influence to ensure that ISPs maintain commitments to service quality and pricing.

3.3.5 Facilitate Private Sector Investment

In this approach, the County takes on a role of facilitating and advocating for investment in broadband infrastructure both from private industry as well as other levels of government. The County does make a direct financial contribution, but rather looks to encourage cooperation, partnerships and facilitate the investment through approaches such as the facilitation of economic development and collaboration forums, removing financial or municipal approval challenges to planning and permitting of fibre optic and radio tower infrastructure, as well as leveraging and coordinating the current connectivity requirements and spending of the (i) the County, (ii) lower tier municipalities and (iii) MUSH sector agencies with service providers, providing this committed revenue stream as a mechanism to encourage ISP investment in underserved areas. This coordination approach through procurement and strategic negotiations can help the County achieve its long term broadband goals without direct financial investment in infrastructure or subsidy programs.

Benefits and Risks

The primary benefit of this approach is that it can be executed with minimal incremental costs and should be undertaken as a best practice from a strategic procurement as well as a County economic development and advocacy perspective. Risks with this approach include that without direct investment from the private sector and higher levels of government this approach is unlikely to be successful, or result in a short term improvement. The County has little direct influence or control of outcomes, service levels or timelines with this approach.

3.3.6 Status Quo

Under this scenario, the County would take a passive role, leaving investment in broadband infrastructure to the private sector with any grant subsidies the private sector is able to secure from higher levels of government. The County would continue to purchase the services it requires from commercial telecommunications providers, at the broadband speeds and prices currently available in the current marketplace without coordinating procurement efforts with other public sector entities.

Benefits and Risks

This option has the benefit of no investment being required, however there is a risk that places the County at comparative disadvantage in the long run if commercial telecommunications providers do not make investments in fibre optic infrastructure to support the needs of the County as well as local businesses and residents.

3.4 Guiding Policies

[All recommendations/ policies are presented as draft subject to review and feedback by County Administration and the Elgin County Connectivity Committee]

In order to develop recommendations, it is important to ensure that there is a policy framework to guide the recommendations and next steps that the County will undertake in order to improve broadband connectivity for its residents and businesses. The following guiding policies are recommended to provide the basis of recommendations and next steps.

3.4.1 Guiding Policies:

It is recommended that the County adopt a set of guiding principles that will help shape recommendations and next steps. These guiding policies would include:

5. The County does not want to duplicate the investments of the private sector and will therefore look to make investments in geographic areas where the private sector has not invested and has no short-term plans to invest.
6. The County will work collaboratively with private ISPs that operate, or plan to operate within the County to ensure that investment barriers within the County's control are removed, and that the County's objectives with respect to improved connectivity for residents and business is know and understood by all parties.
7. The County will work closely with all levels of government, both lower tier and upper tier to ensure that strategies with respect to grant funding to support infrastructure investment in the County are aligned and coordinated.
8. The County's investments are utilized to remove the barriers of investment and market entry for all ISPs and create a level playing field that encourages retail competition. All ISPs will be able to access County funded investments on equal open access terms and conditions.

The County has several alternatives to consider as it considers next steps. It is important to keep in mind that the County must make some determinations on the degree it can afford to invest, while at the same time weighing the socio-economic benefits of investment and benefits to the County in terms of economic development, attraction and retention of businesses and residents.

While a county wide fibre optic infrastructure is the long-term vision, this may need to be considered over many years to be affordable as a direct investment by the County.

3.4.2 Technology Options Analysis

The following table summarizes the technology options available to the County to consider as strategies to improve broadband connectivity to residents and businesses. These options must also be reviewed with the governance/ funding options that are presented.

OPTION NUMBER	TECHNICAL OPTION	PRO	CON
Option 1	Fibre Optic Infrastructure (Fibre to the Home/ businesses)	• High capacity • Long useful life (30 years) • Scalable to support faster speeds in the future • Supports future 5G wireless deployments • Eligible for grant funding under many programs	• High Cost • Longer time to implement
Option 2	Fibre Optic Infrastructure to Fixed Wireless Tower Locations; Wireless connections to homes/ businesses	• Lower Cost • Homes/ Businesses along fibre path benefit from fibre connection • Shorter time to implement • Achieves CRTC minimum service standard for all residents/ businesses • Can utilize some existing County water towers to reduce costs to build new towers and/or collocate on 3rd party radio towers • Wireless technology can be redeployed at different locations as required (as fibre infrastructure increases)	• Lower capacity that fibre to the home/ business • Not scalable due to limited radio spectrum • Shorter useful life (5 yrs.) • Some restrictions on grant funding eligibility for some wireless technology
Option 3	Option 2 plus fibre extensions to connect population centers and	• Serves additional residents/ businesses with	• Higher cost than Option 2

OPTION NUMBER	TECHNICAL OPTION	PRO	CON
	additional residents along fibre path	fibre infrastructure • Provides for connectivity for County operations between population centers • Provides for a progressive path to Option 1 (over time)	

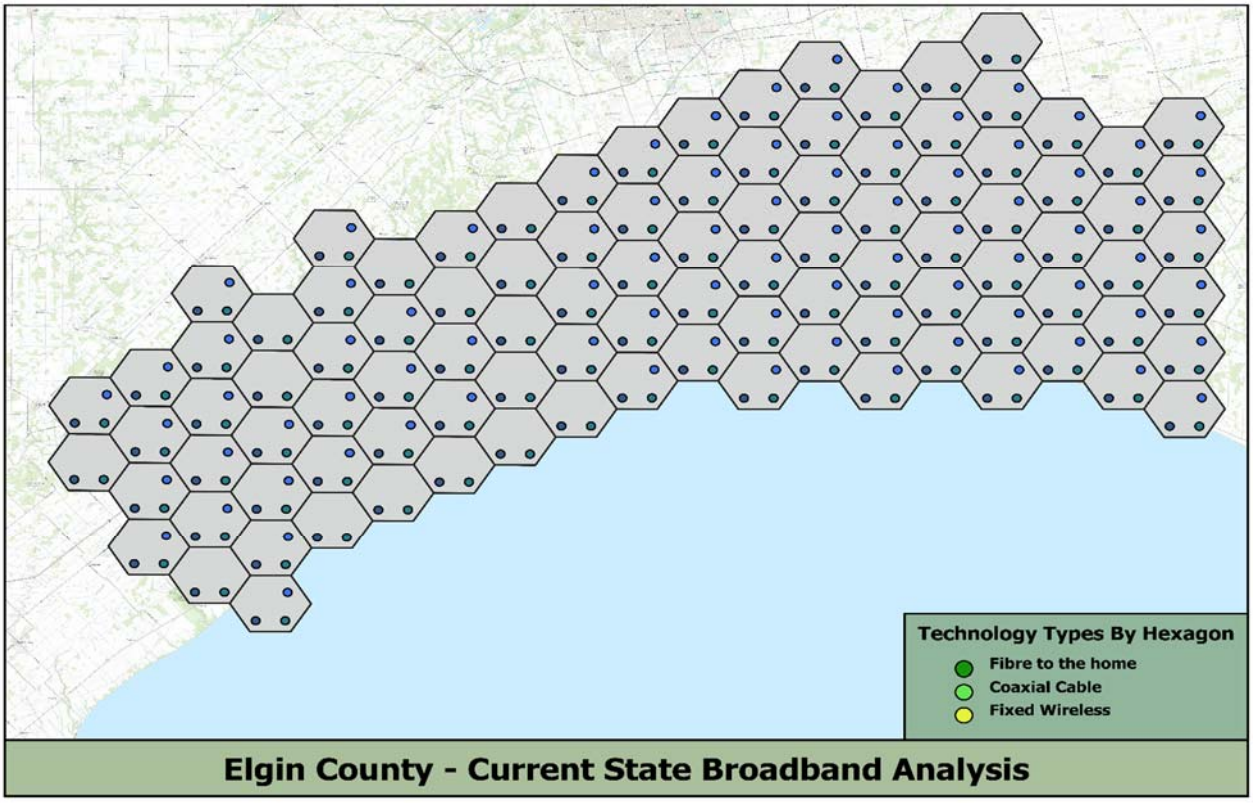
Appendix A – In-Process/ Potential Fibre Builds in Elgin County

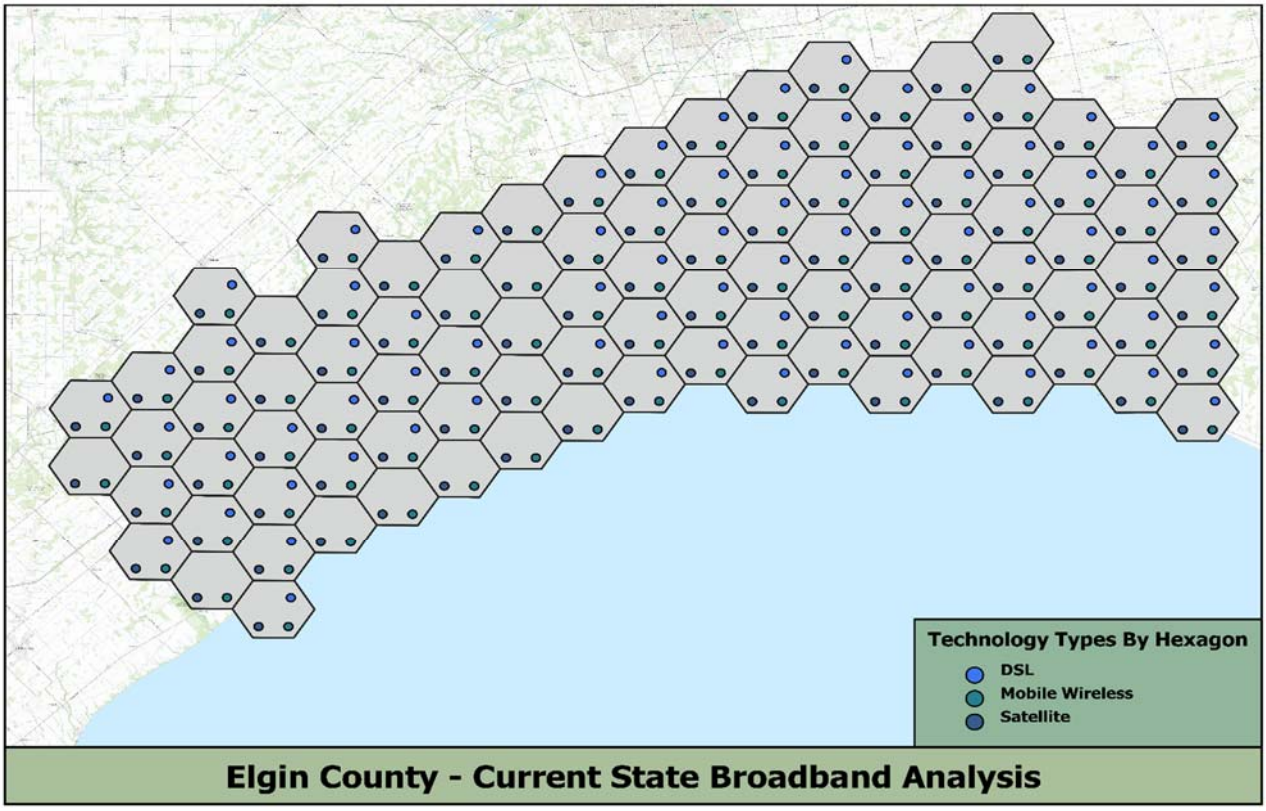
MUNICIPALITY/ISP	POTENTIAL BUILDS
Municipality of Bayham	• **North Frontenac is in the midst of a project installing fibre along Plank Rd from our north end (New England) through to Port Burwell. NFTC is currently working with the County and Municipality to ensure documents are in order.** • **Xplornet has received municipal concurrence for 2 towers in Bayham on private lands.** • **Execulink Telecom has approved a project for Corinth/North Hall. Expected completion Dec 2022 as noted on the SWIFT website.**
Municipality of Central Elgin	• **Uplink Communications is planning for a fibre build in the New Sarum area**
Municipality of Dutton Dunwich	• **There are no in-process or proposed fibre builds that Dutton Dunwich is aware of at this time.** • **TekSavvy is proposing to install a tower in north Dunwich**
Town of Aylmer	• **Two ISP's – EastLink and NetFox** • **Fiber installed to Town Hall** • **Examining potential of broadening fiber through SCADA RFP**
Township of Malahide	• **Malahide has had a few queries from third-party wireless ISPs.** • **Uplink Wireless has approached Malahide to install fibre in Avon and along some rural roads in order to feed future towers when developed** • **Malahide itself had initiated an RFP in January for a feasibility study on a Township lead wireless project. It was to consider the installation of 3-5 towers in different areas of the Township, specifically on land the Township of Malahide is owner. Determination of height requirements and associated costs were to be detailed for these sites. In addition to this, a preferred solution of municipal tower use only (i.e. connect municipal sites) or one where this could be accomplished along with providing opportunity for a third party provider access for new services in this area. This was report has been delayed but expected to be available in the next few weeks.**
Township of Southwold	

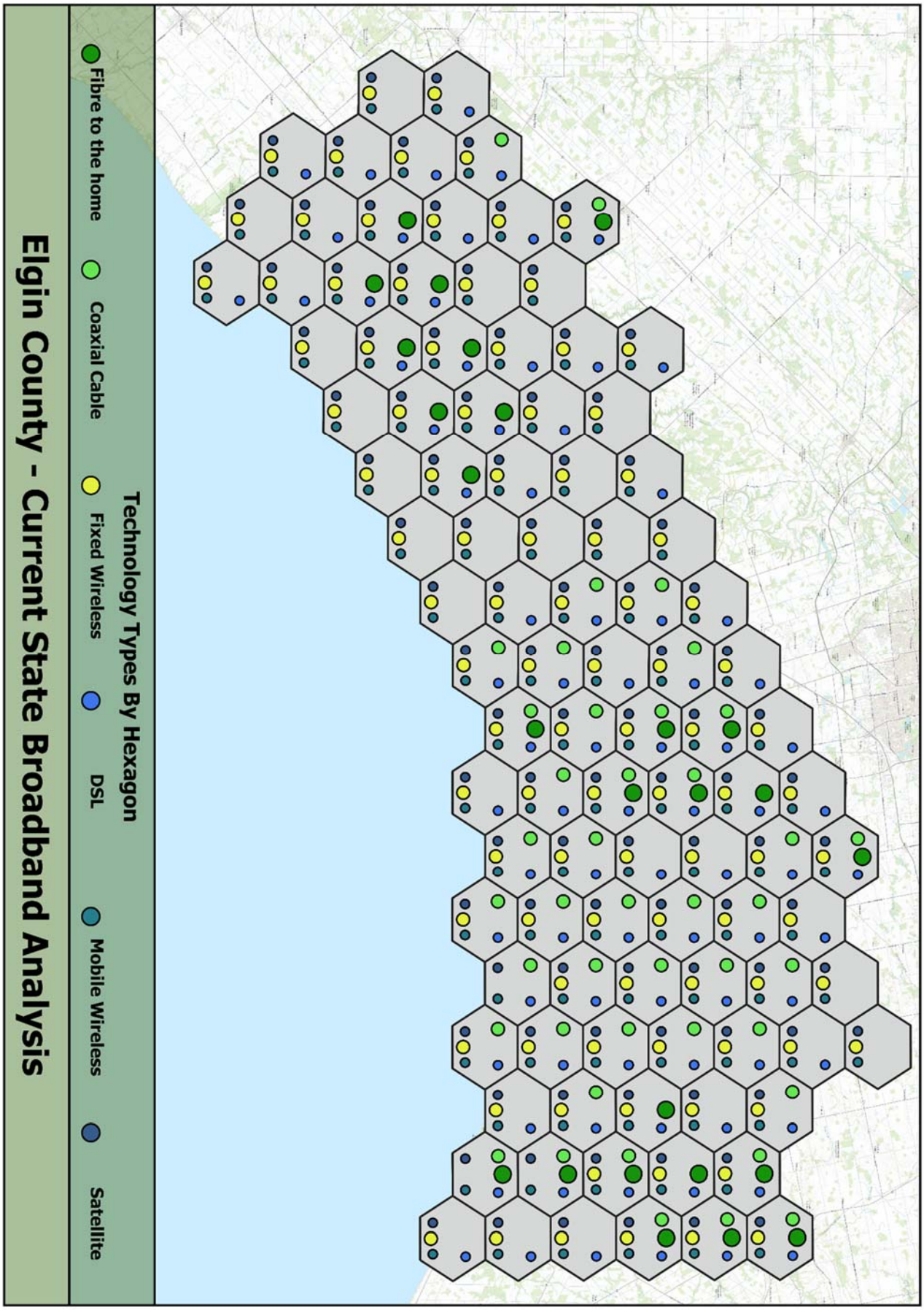
Municipality of West Elgin	• **Packet works completed work in 2019 to install Fiberoptic lines in the most condensed areas of West Lorne and Rodney. Just recently, in August-2020 a new wireless service provider installed wireless equipment and offered services to rural residents.** • **We received information that Packet works is now extending fiber service to the residents in New Glasgow along Furnival Road.**
North Frontenac Telecom Company	• **The Warden provided North Frontenac Telecom Company with a letter of support for their application to the Universal Broadband Fund Rapid Response Stream on January 15, 2021.** • **This application is in regards to an area near Rodney, towards the southwest corner of Elgin County.**
Xplornet	• **Elgin County will consider providing a letter of support to Xplornet for their application to the Universal Broadband Fund due on February 14, 2021.** • **This application is in regards to the proposed building of hundreds of kilometres of new fibre, establishing a robust backbone for Xplornet's 5G wireless broadband network, with existing sites in Elgin County connected to fibre. Once completed, this project will enable rural households in communities such as North Hall, Corinth, New Sarum, Iona Station and Crinan to enjoy affordable and accessible 1 Gbps fibre services**
Bell Canada	• **Bell has no fibre projects planned in Elgin at this time. Bell has decided that if they are unable to connect at least 100 houses with their new builds that they are not worth the investment. This even relates to the proposed ICON application that Elgin County provided a letter of support for in August.**

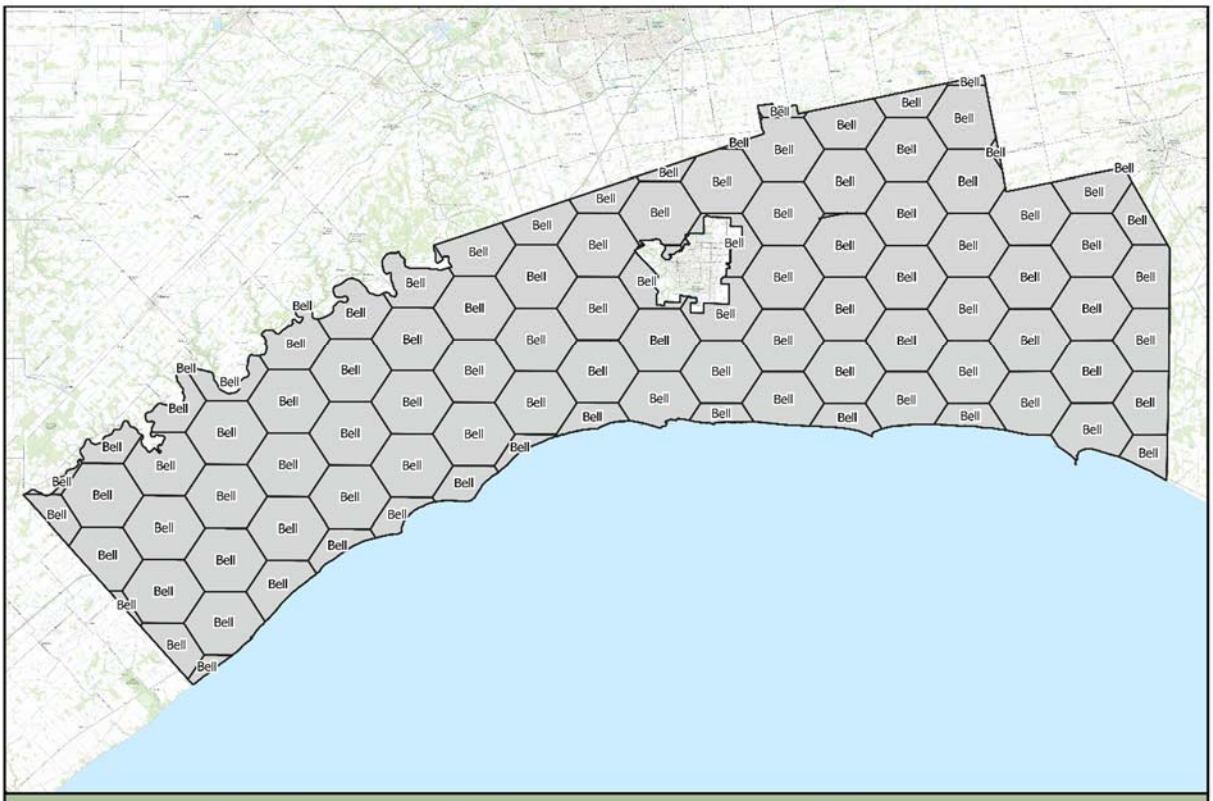
Appendix B – Internet Service Providers and Technologies

Note to reader: These maps should not be considered to be an exhaustive representation, however they are deemed to be reliable as of the date of the information provided by Industry Science and Economic Development Canada as of the date indicated.

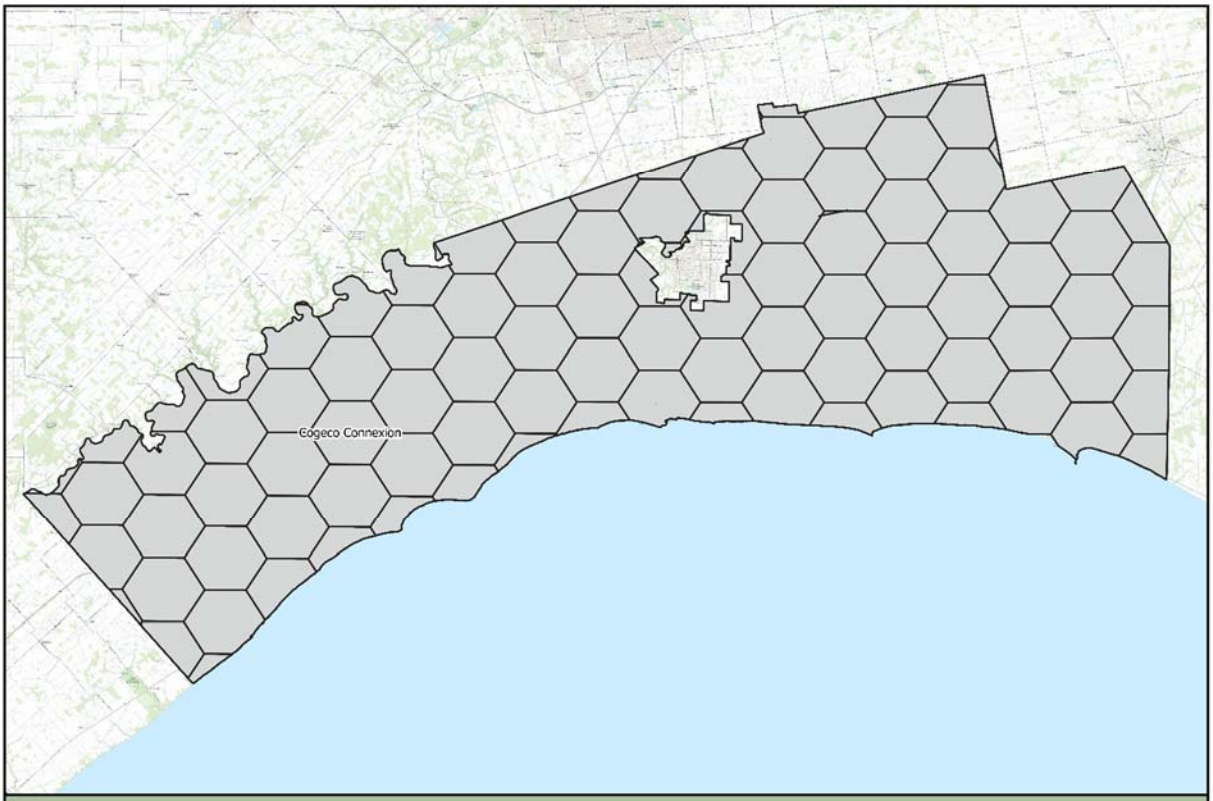





Technology Types By Hexagon
Fibre to the home
Coaxial Cable
Fixed Wireless
DSL
Mobile Wireless
Satellite
Elgin County - Current State Broadband Analysis



Elgin County - ISP Coverage Areas by ISED Hexagon



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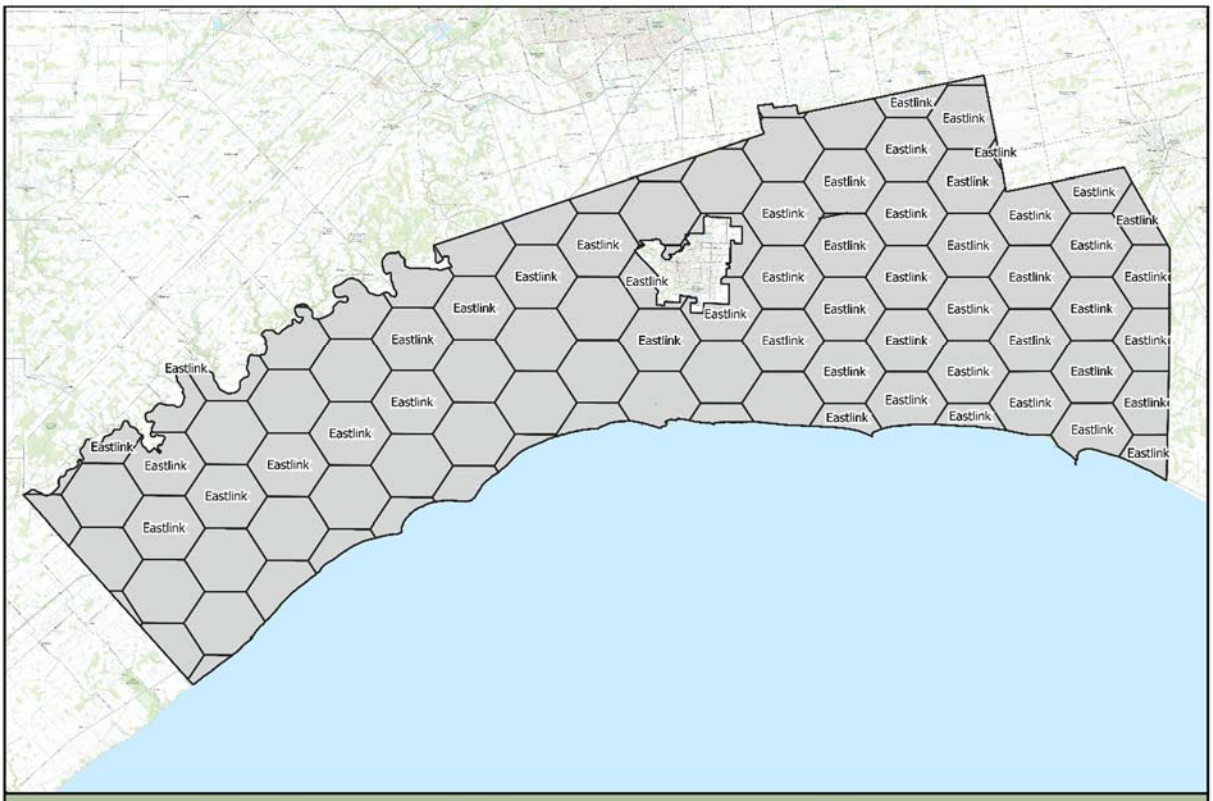
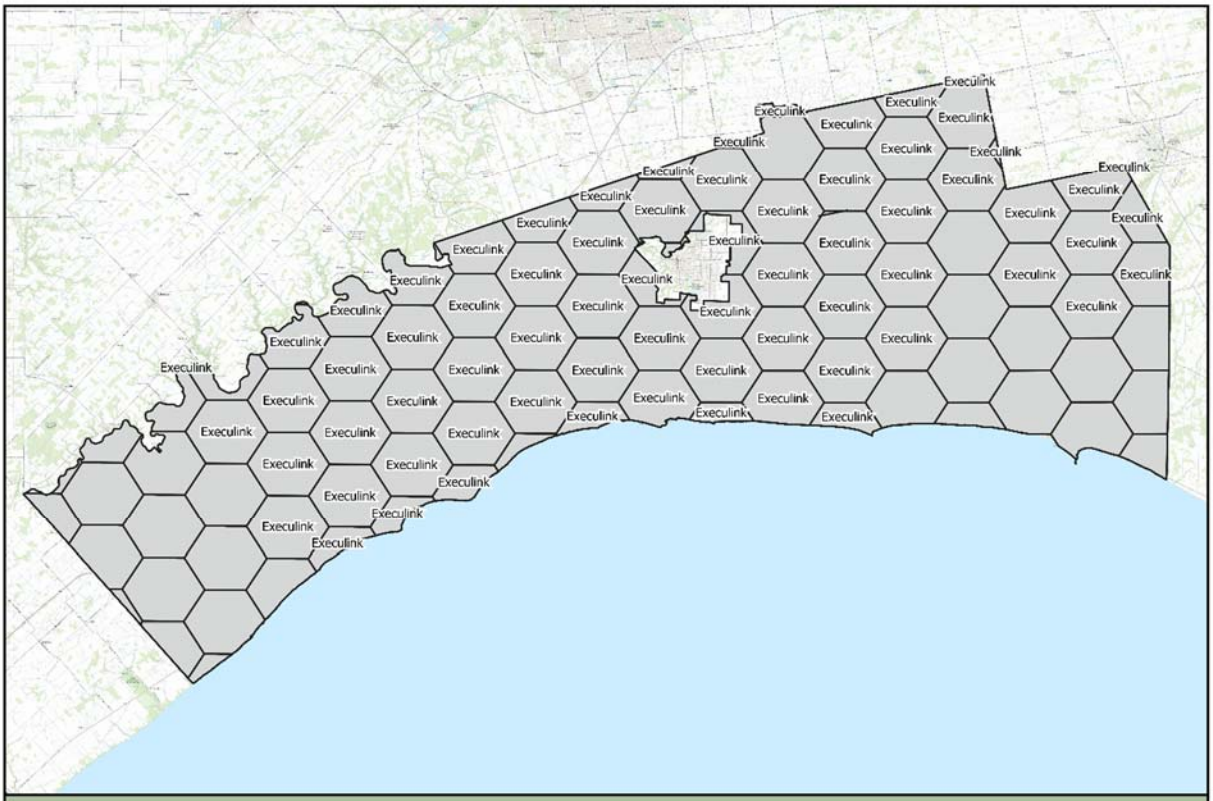


Elgin County - ISP Coverage Areas by ISED Hexagon



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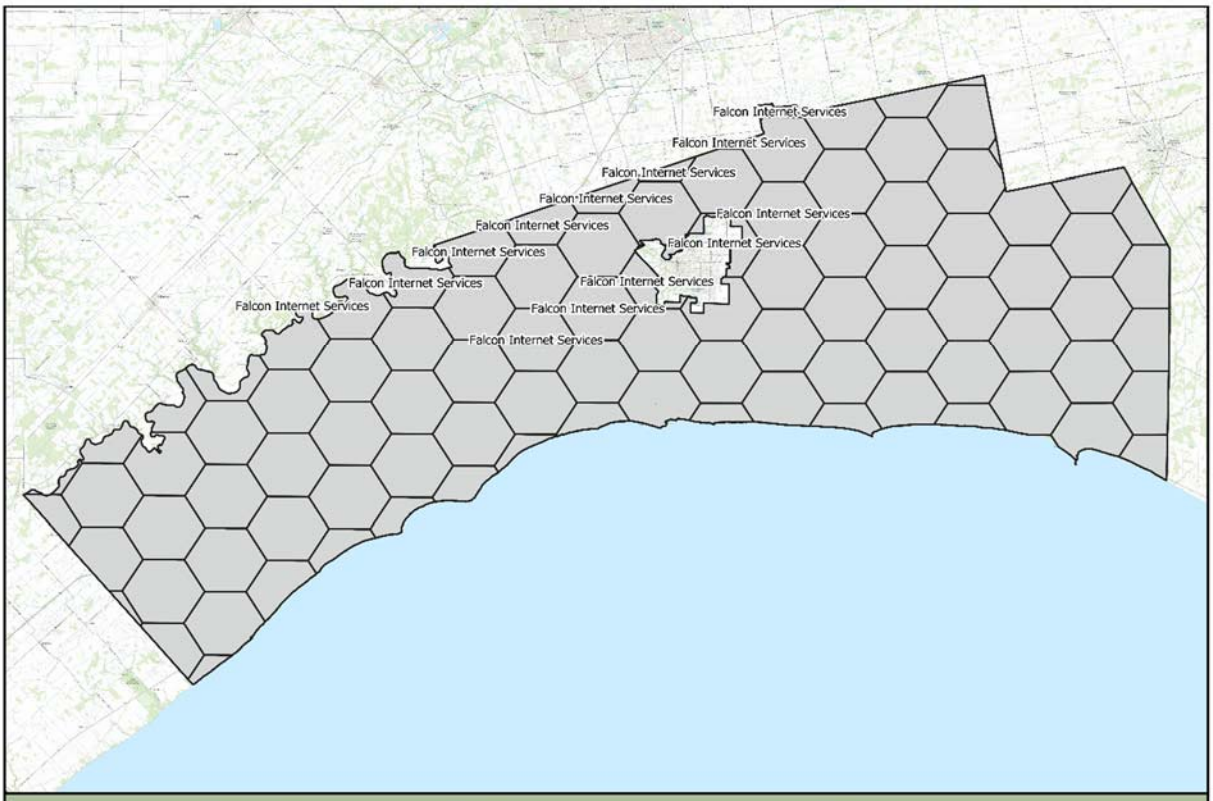

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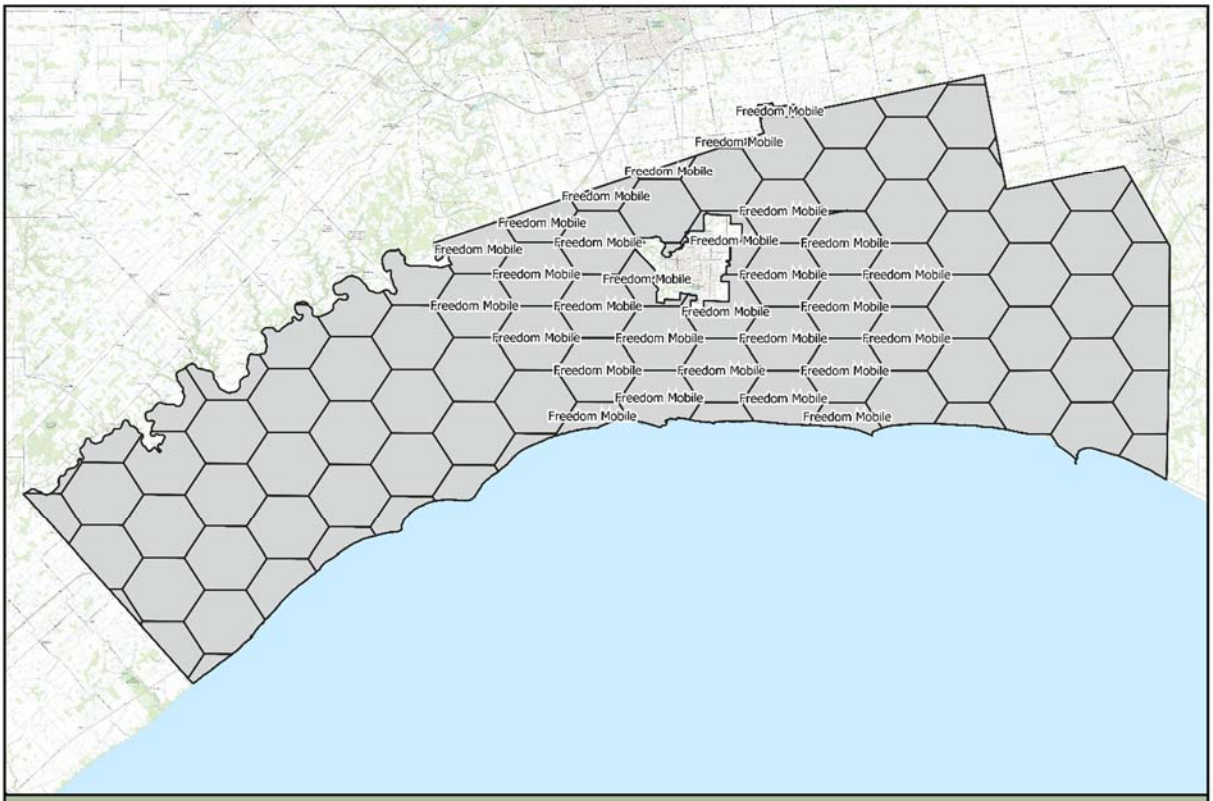

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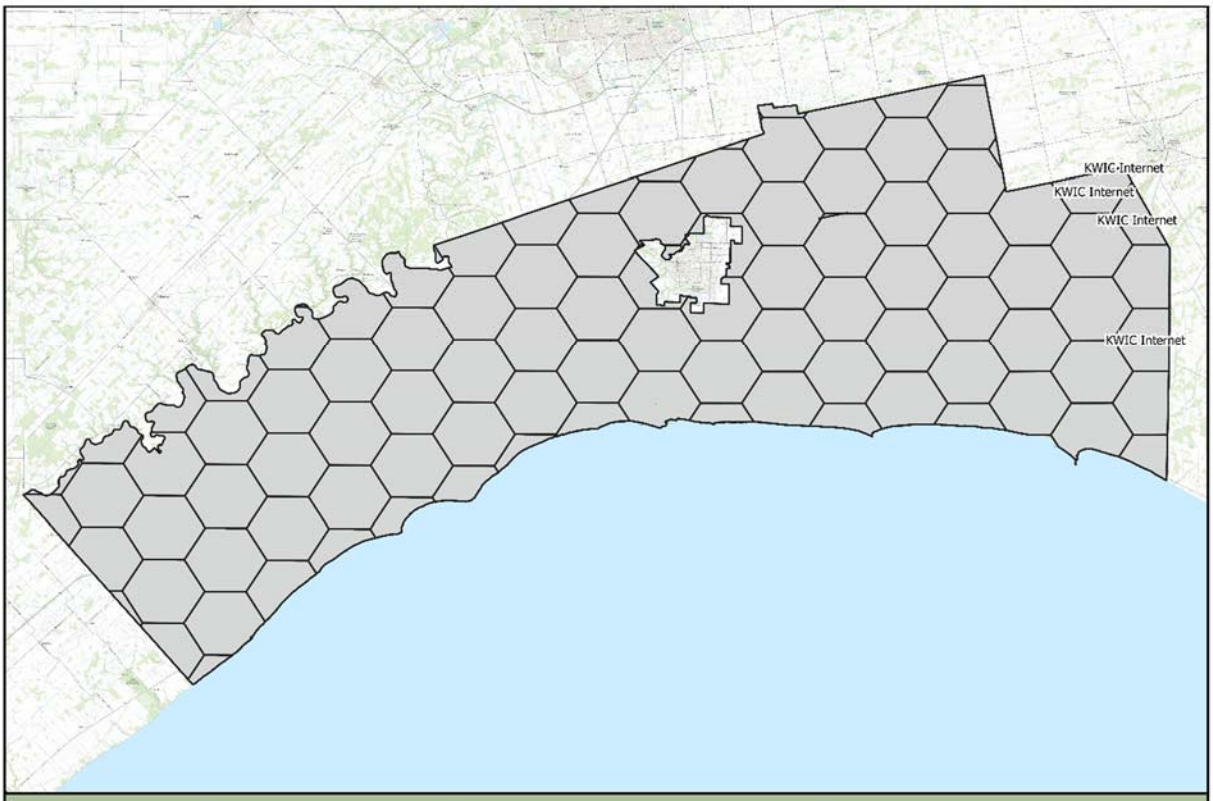

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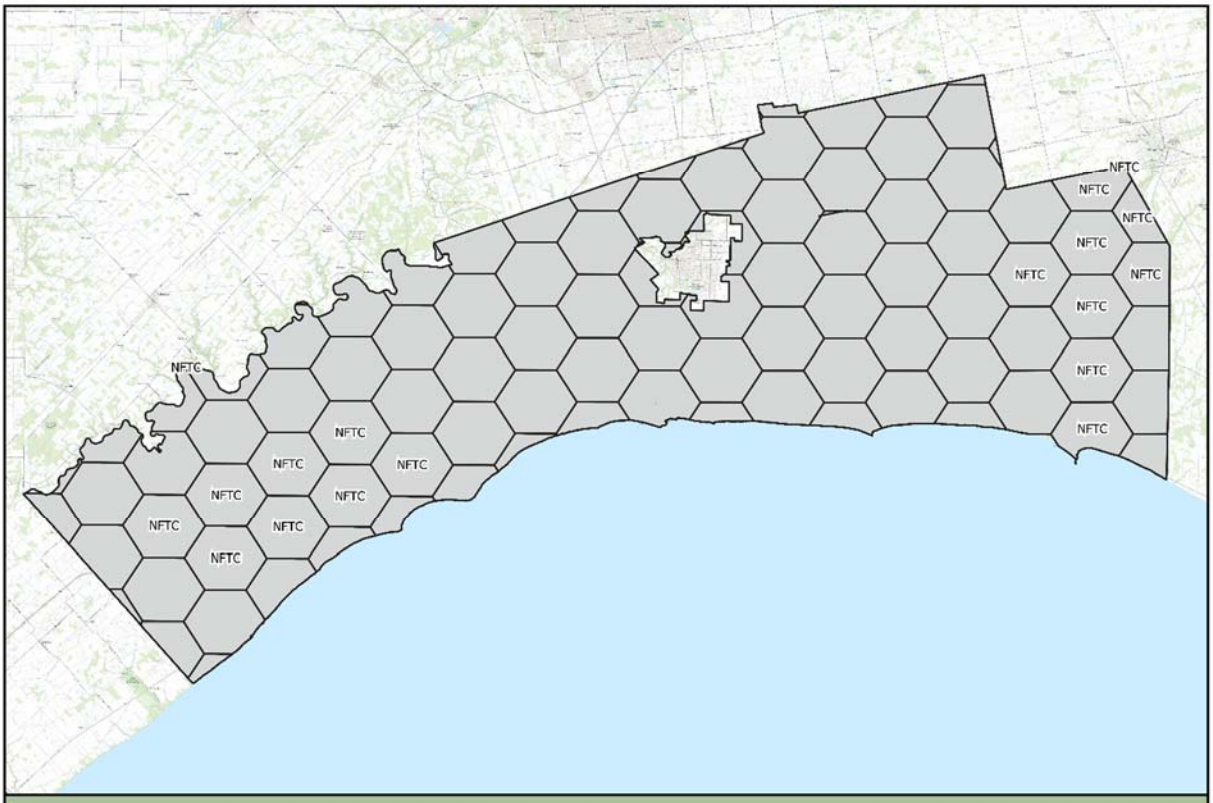

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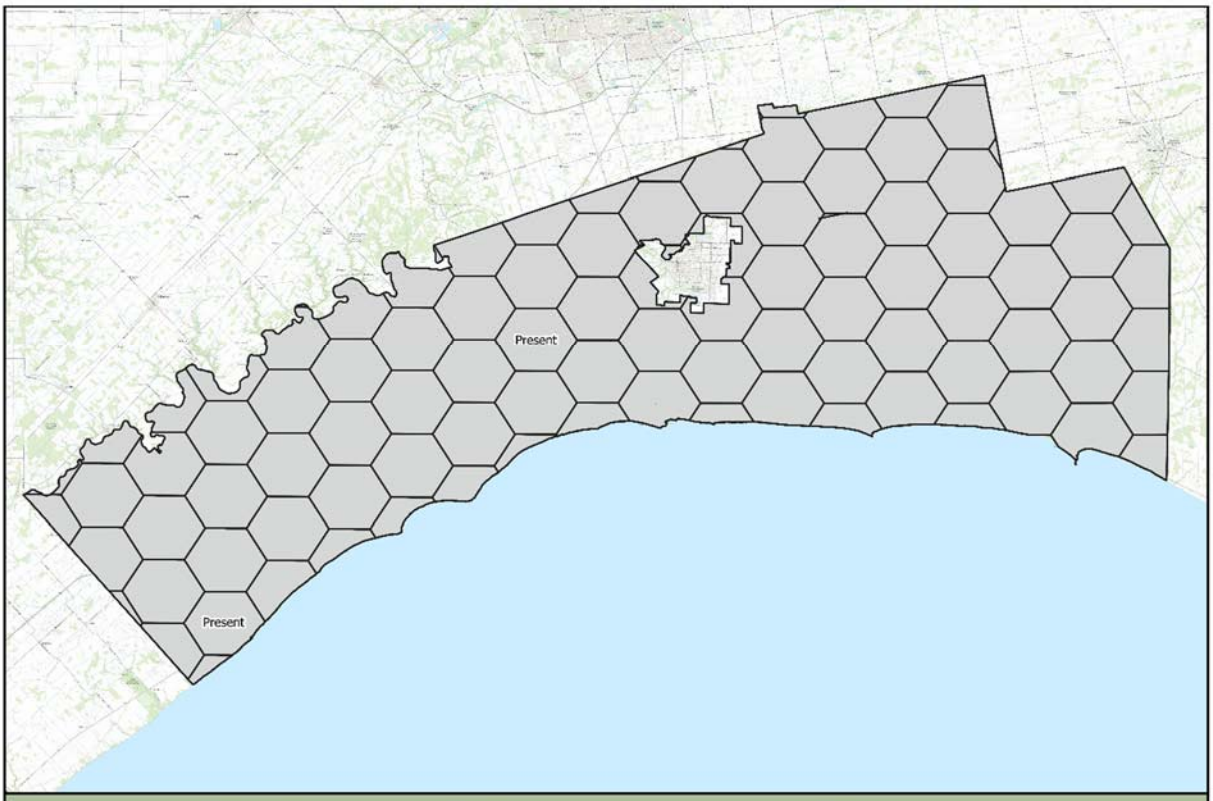

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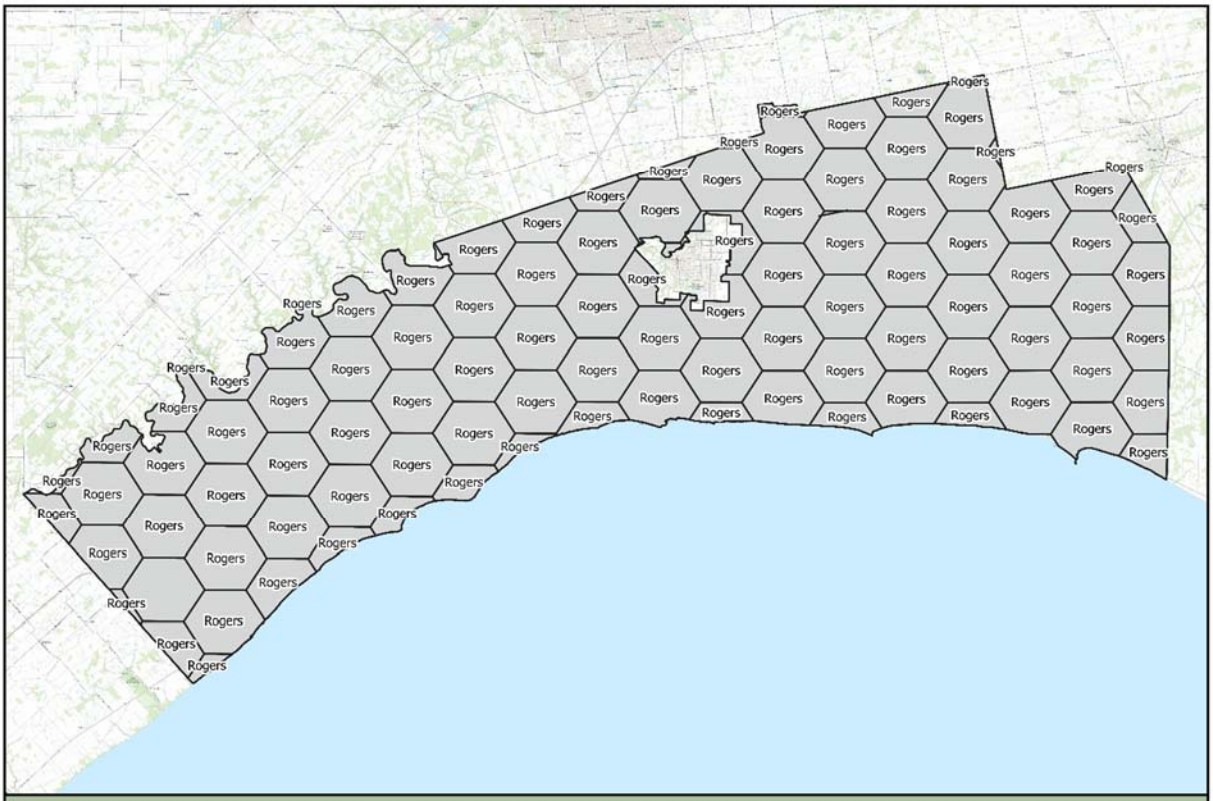

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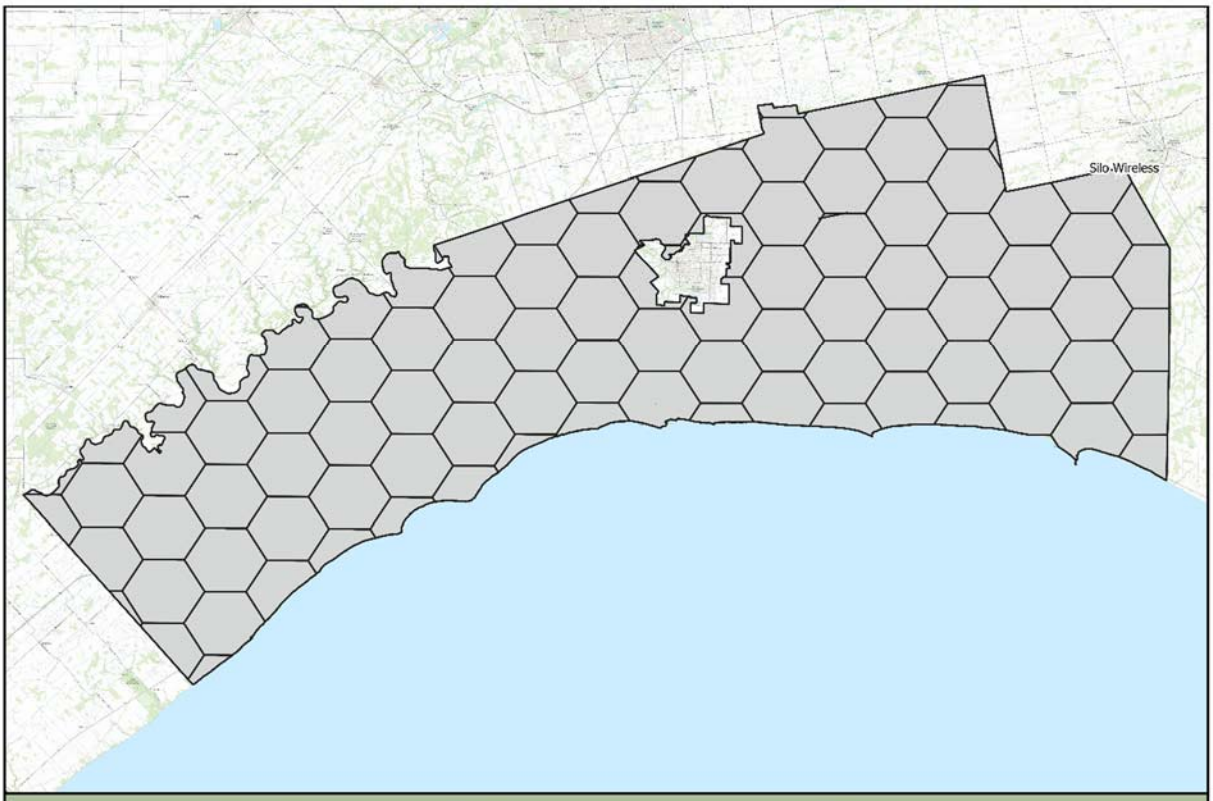

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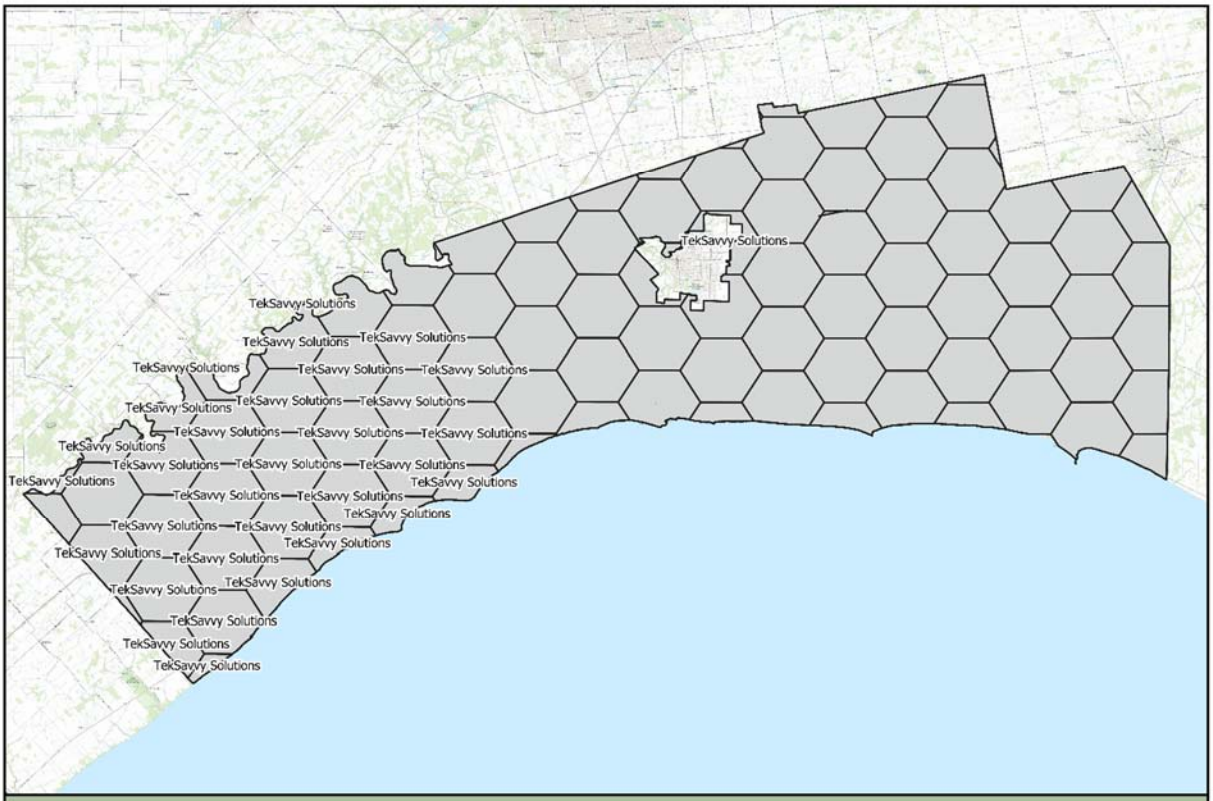

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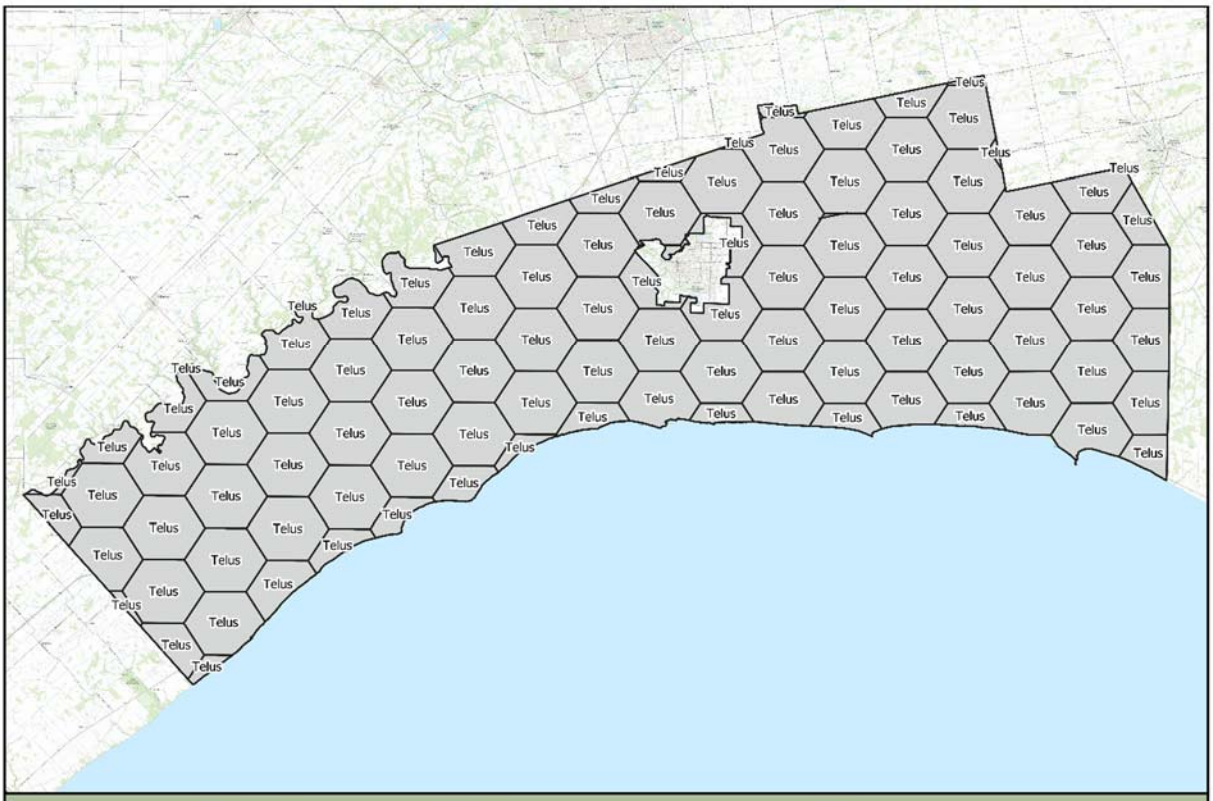
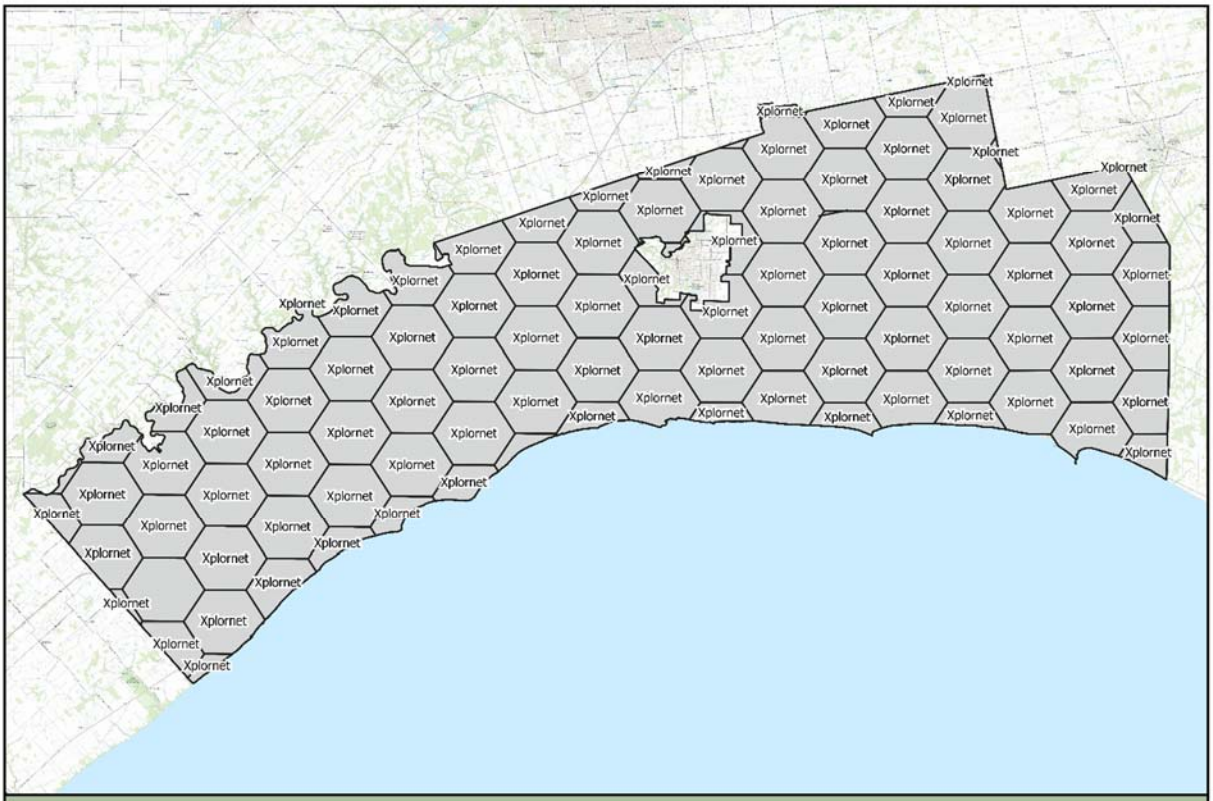
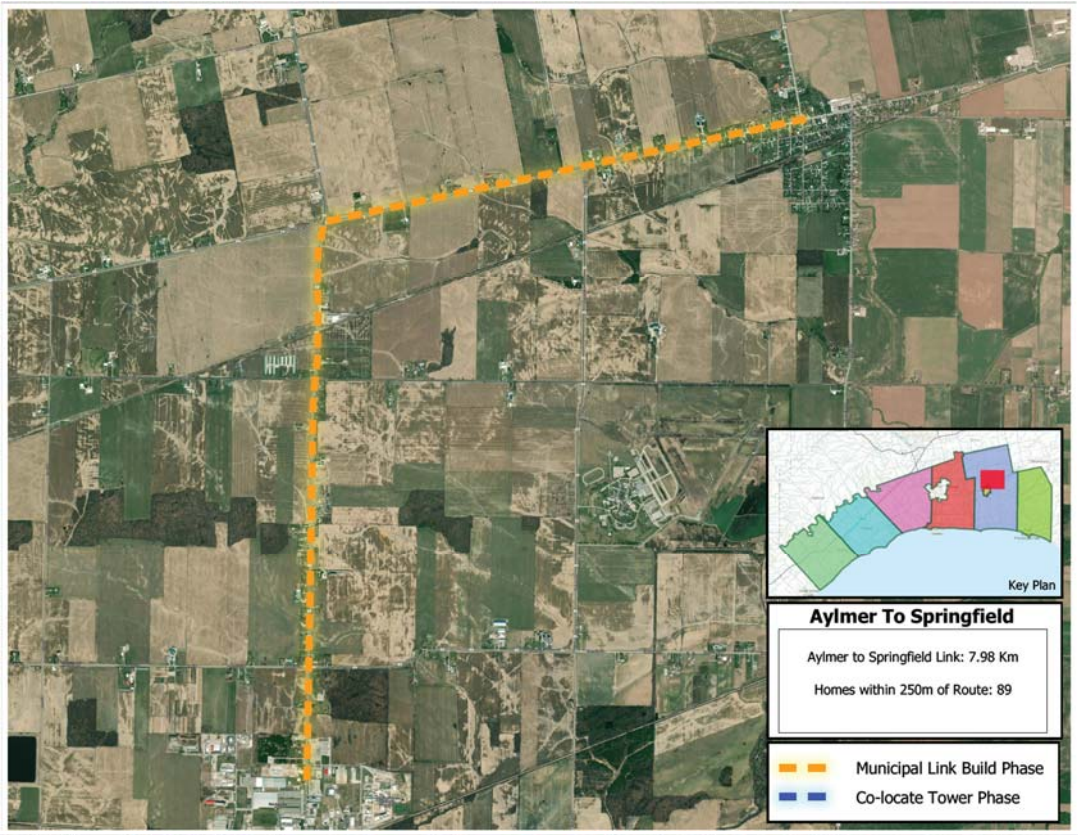


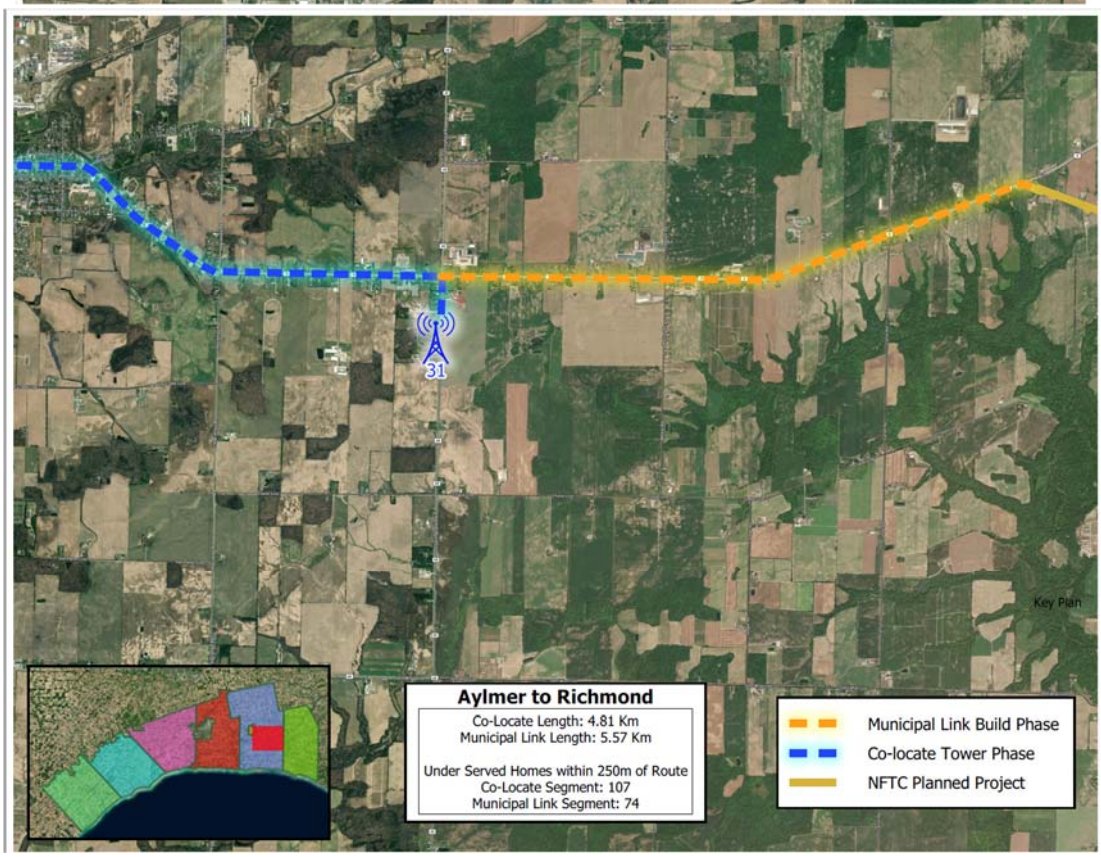
Elgin County - ISP Coverage Areas by ISED Hexagon

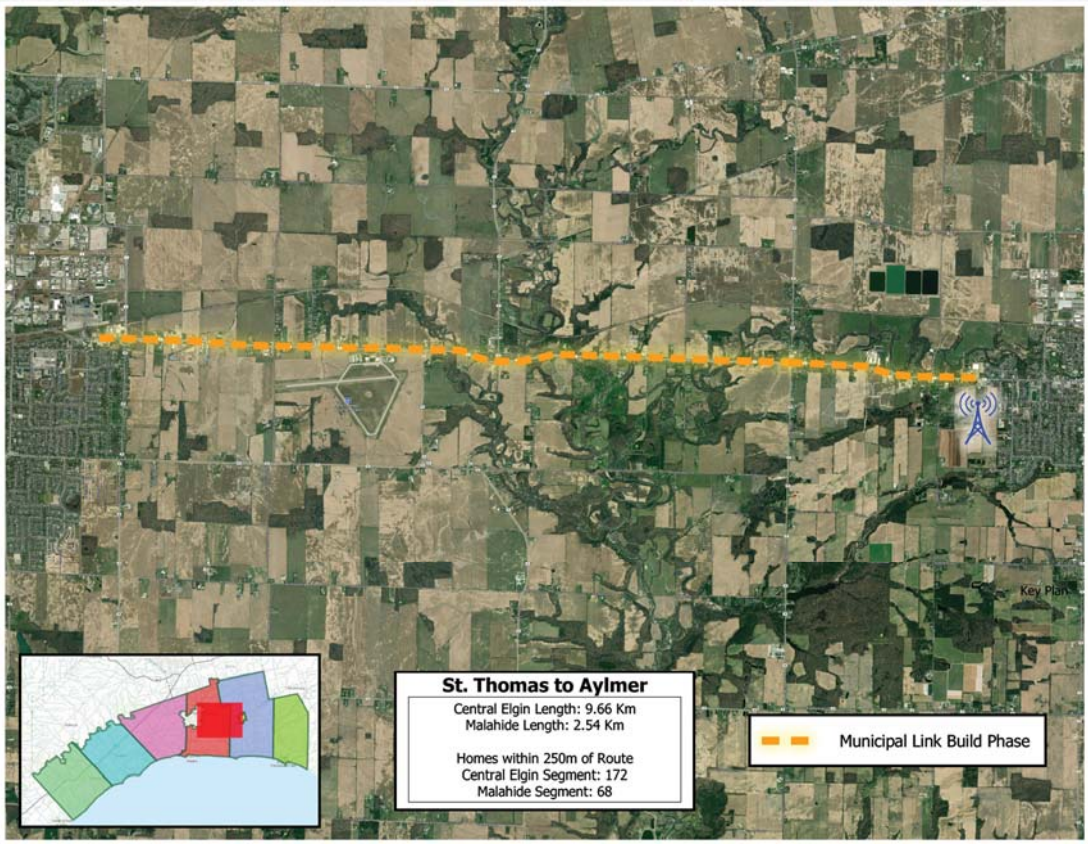


Elgin County - ISP Coverage Areas by ISED Hexagon

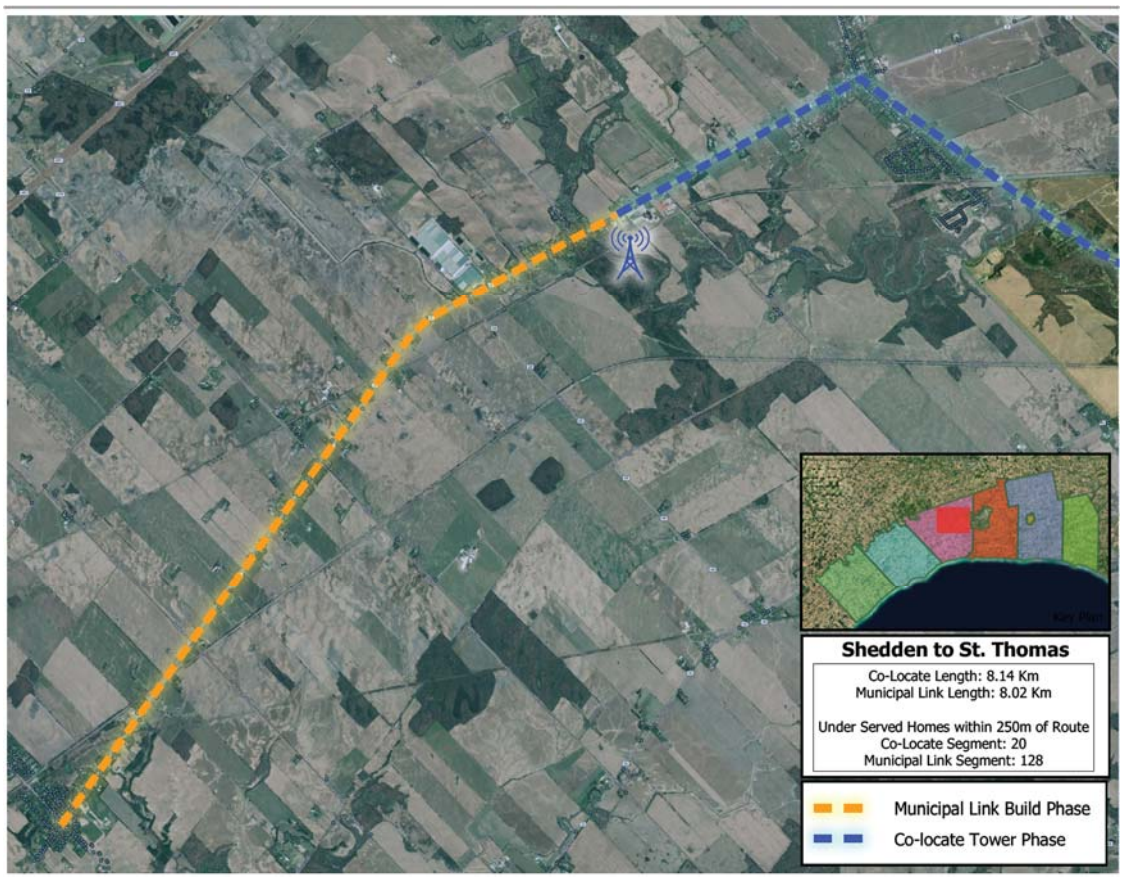
Appendix C – Maps of Fibre Connectivity to Areas of interest / municipal locations

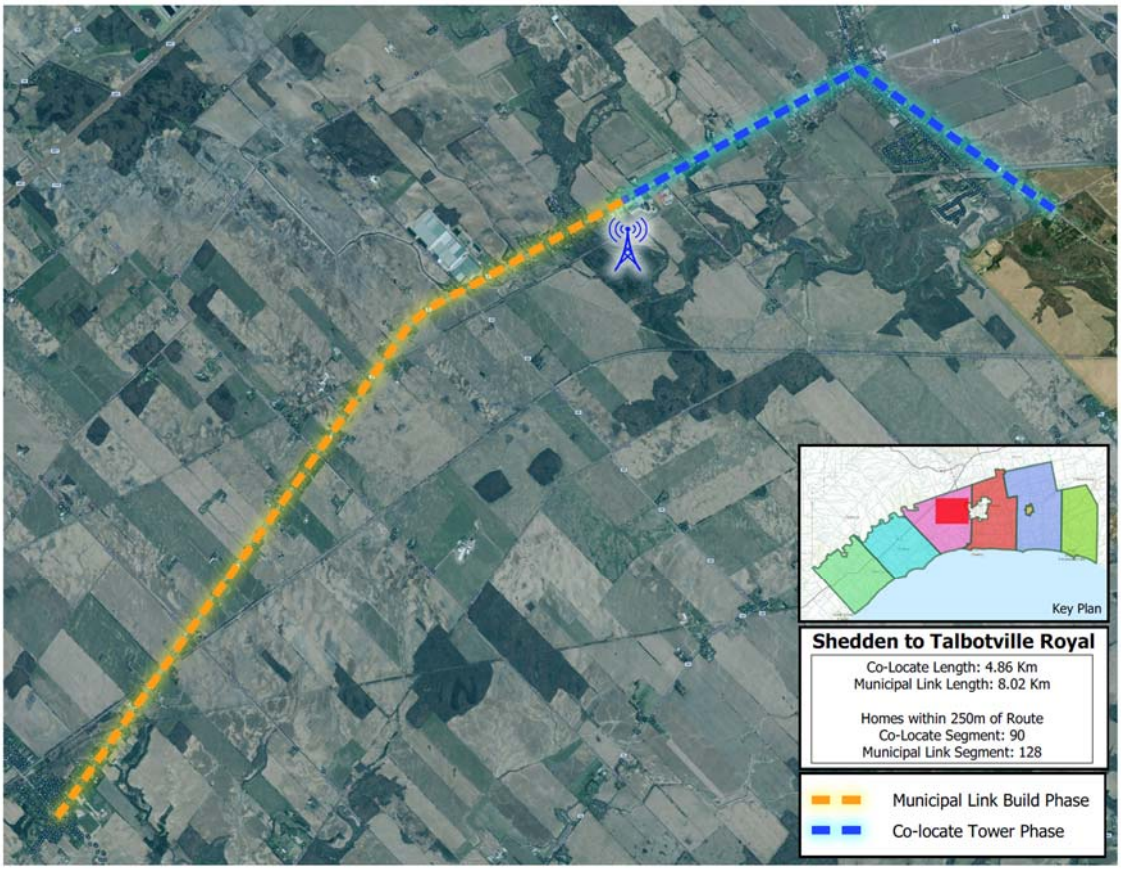

Key Plan
Aylmer To Springfield
Aylmer to Springfield Link: 7.98 Km
Homes within 250m of Route: 89
Municipal Link Build Phase
Co-locate Tower Phase

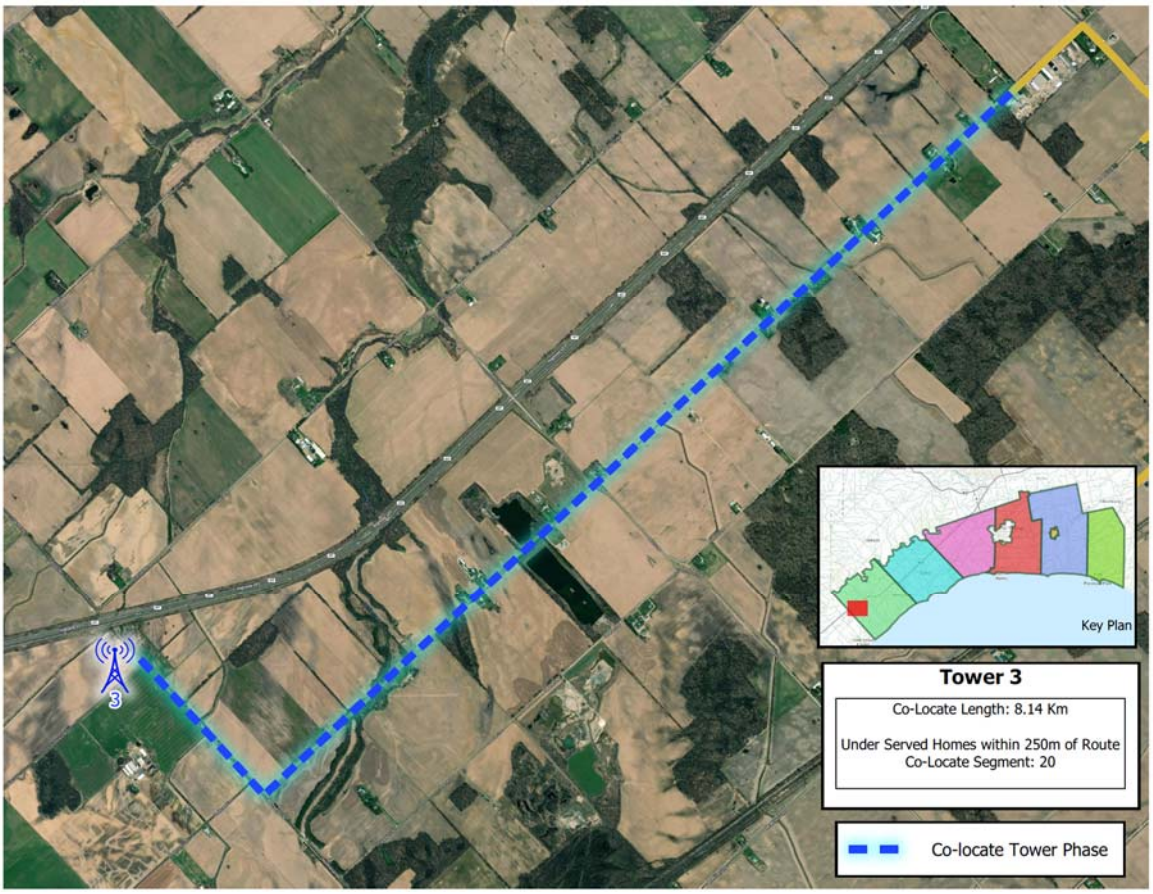

31
Key Plan
Aylmer to Richmond
Co-Locate Length: 4.81 Km
Municipal Link Length: 5.57 Km
Under Served Homes within 250m of Route
Co-Locate Segment: 107
Municipal Link Segment: 74
Municipal Link Build Phase
Co-locate Tower Phase
NFTC Planned Project

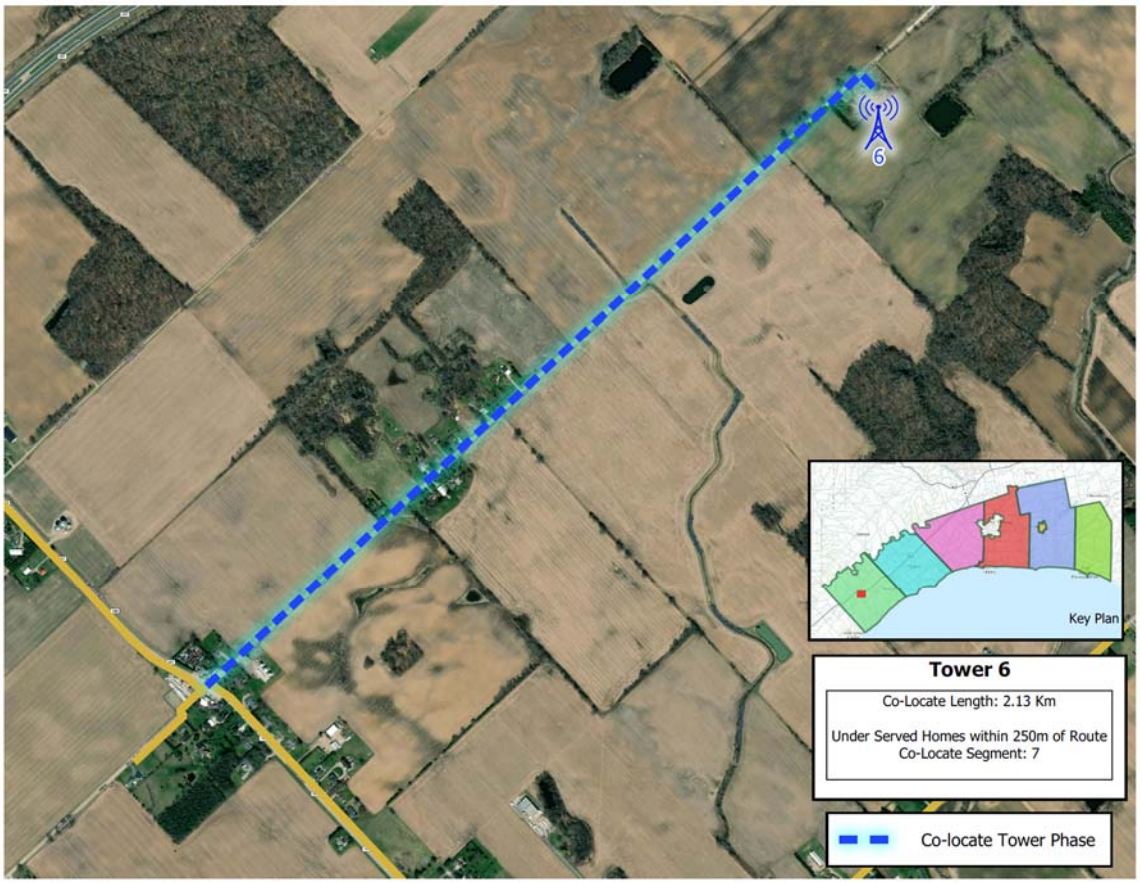

St. Thomas to Aylmer
Central Elgin Length: 9.66 Km
Malahide Length: 2.54 Km
Homes within 250m of Route
Central Elgin Segment: 172
Malahide Segment: 68
Municipal Link Build Phase
Key Plan

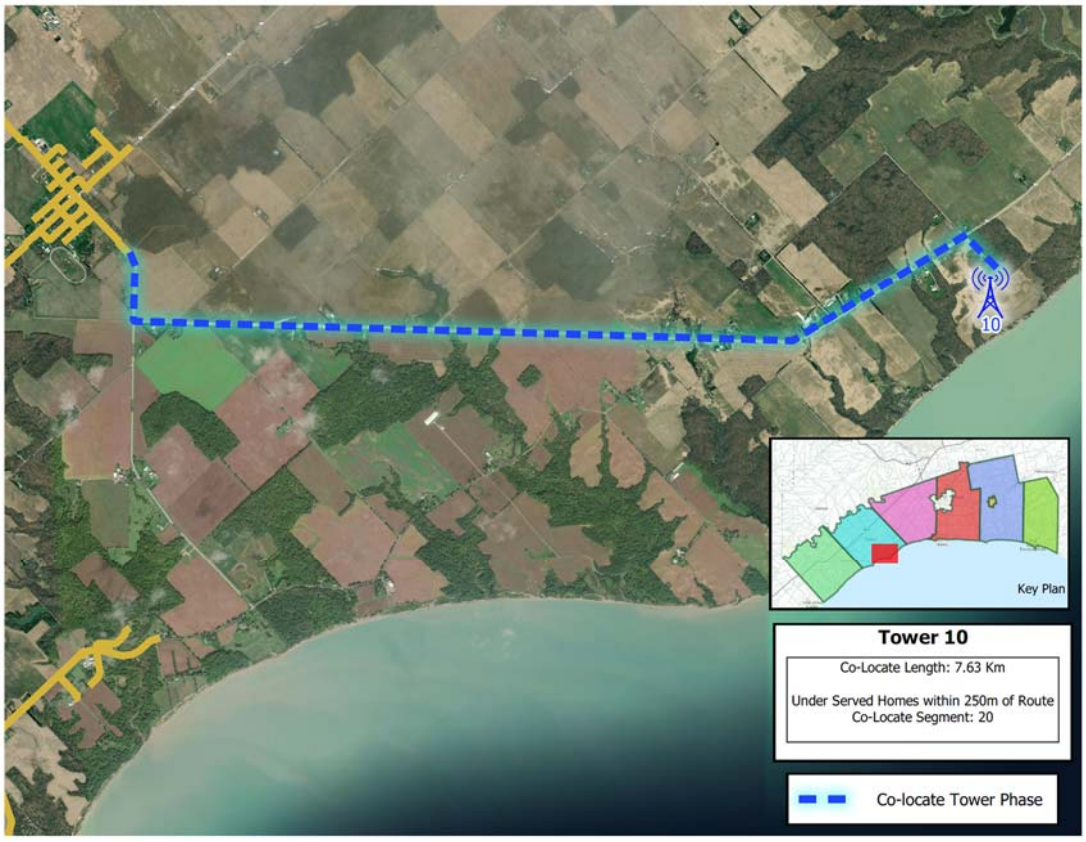

Farview Road to Sparta
Link Length: 7.26 Km
Homes within 250m of Route: 136
Municipal Link Build Phase
Key Plan

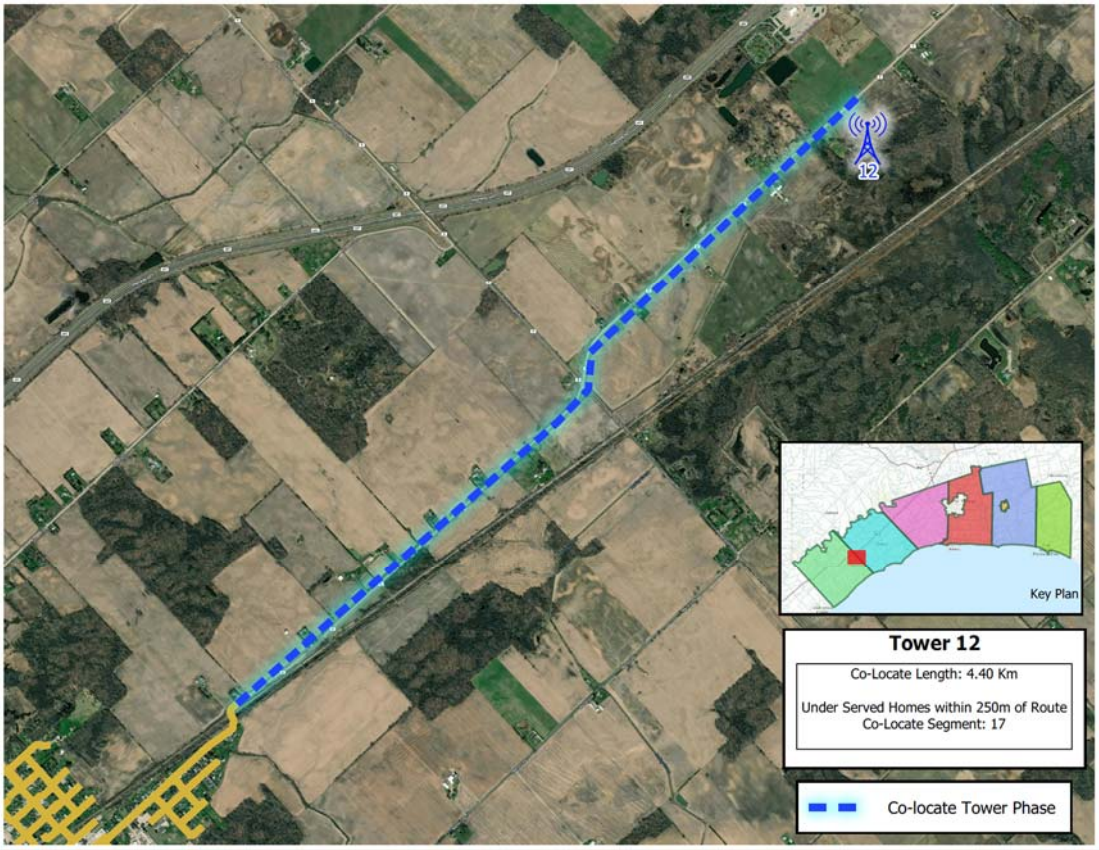

Shedden to St. Thomas
Co-Locate Length: 8.14 Km
Municipal Link Length: 8.02 Km
Under Served Homes within 250m of Route
Co-Locate Segment: 20
Municipal Link Segment: 128
Municipal Link Build Phase
Co-locate Tower Phase

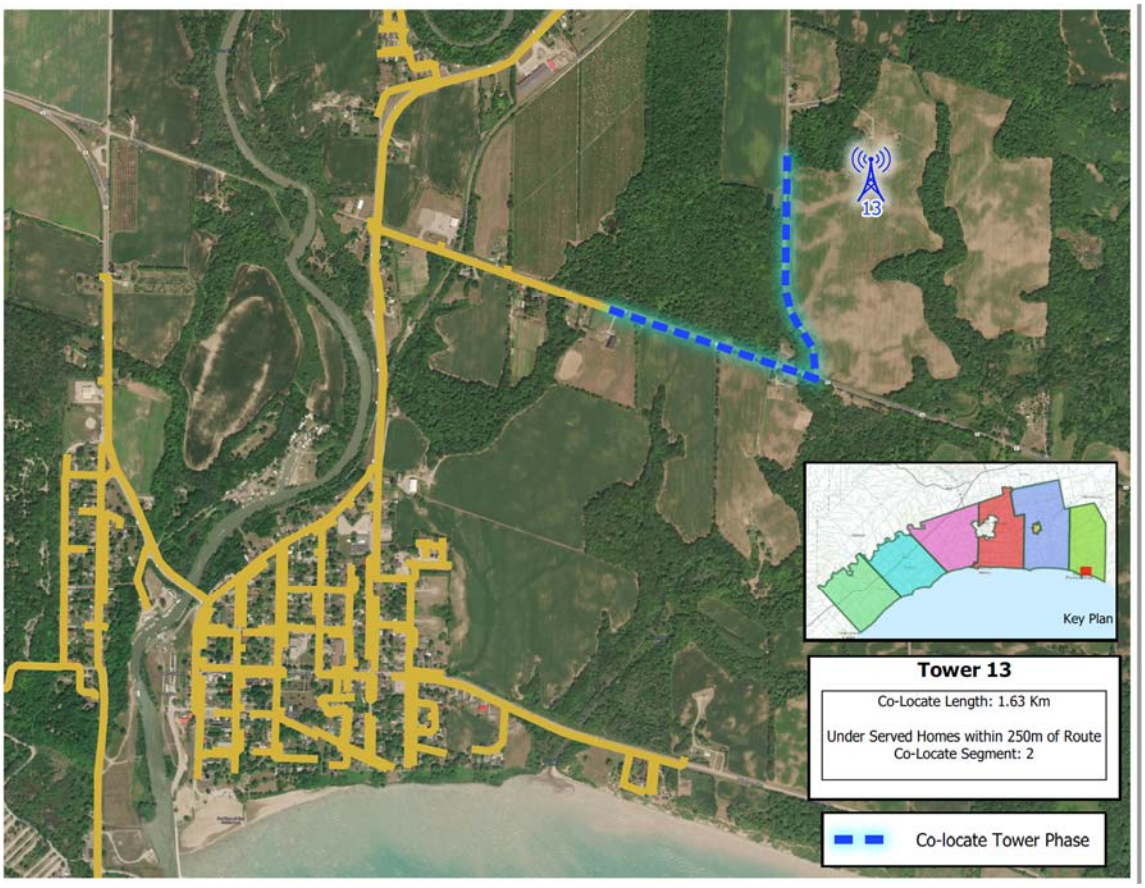

Key Plan
Shedden to Talbotville Royal
Co-Locate Length: 4.86 Km
Municipal Link Length: 8.02 Km
Homes within 250m of Route
Co-Locate Segment: 90
Municipal Link Segment: 128
Municipal Link Build Phase
Co-locate Tower Phase

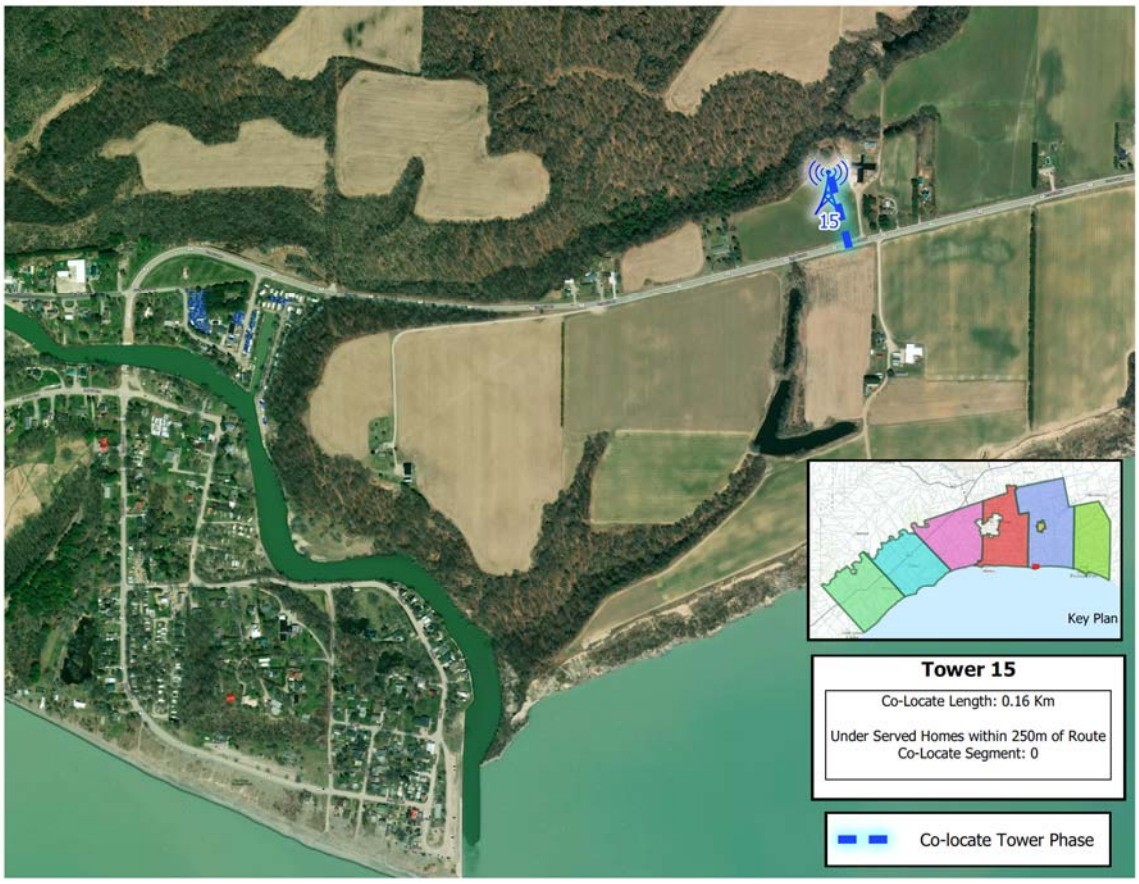

3
Key Plan
Tower 3
Co-Locate Length: 8.14 Km
Under Served Homes within 250m of Route
Co-Locate Segment: 20
Co-locate Tower Phase

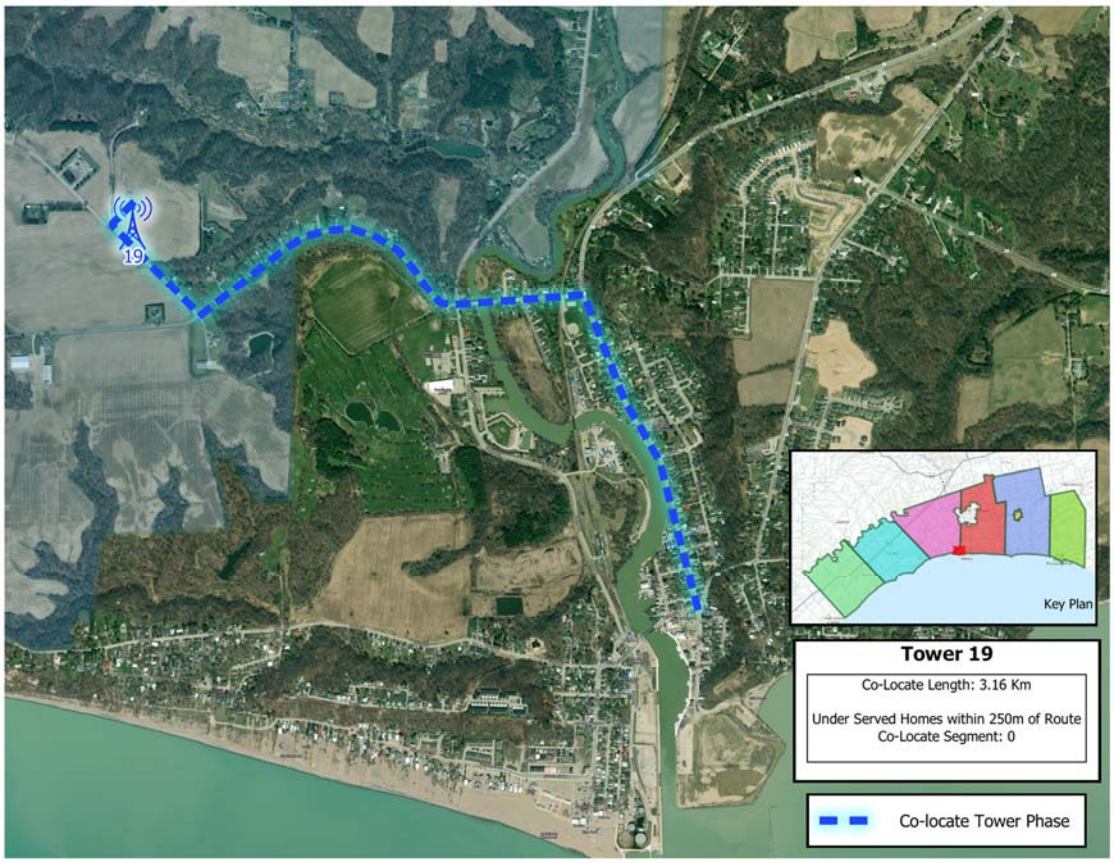

6
Key Plan
Tower 6
Co-Locate Length: 2.13 Km
Under Served Homes within 250m of Route
Co-Locate Segment: 7
Co-locate Tower Phase

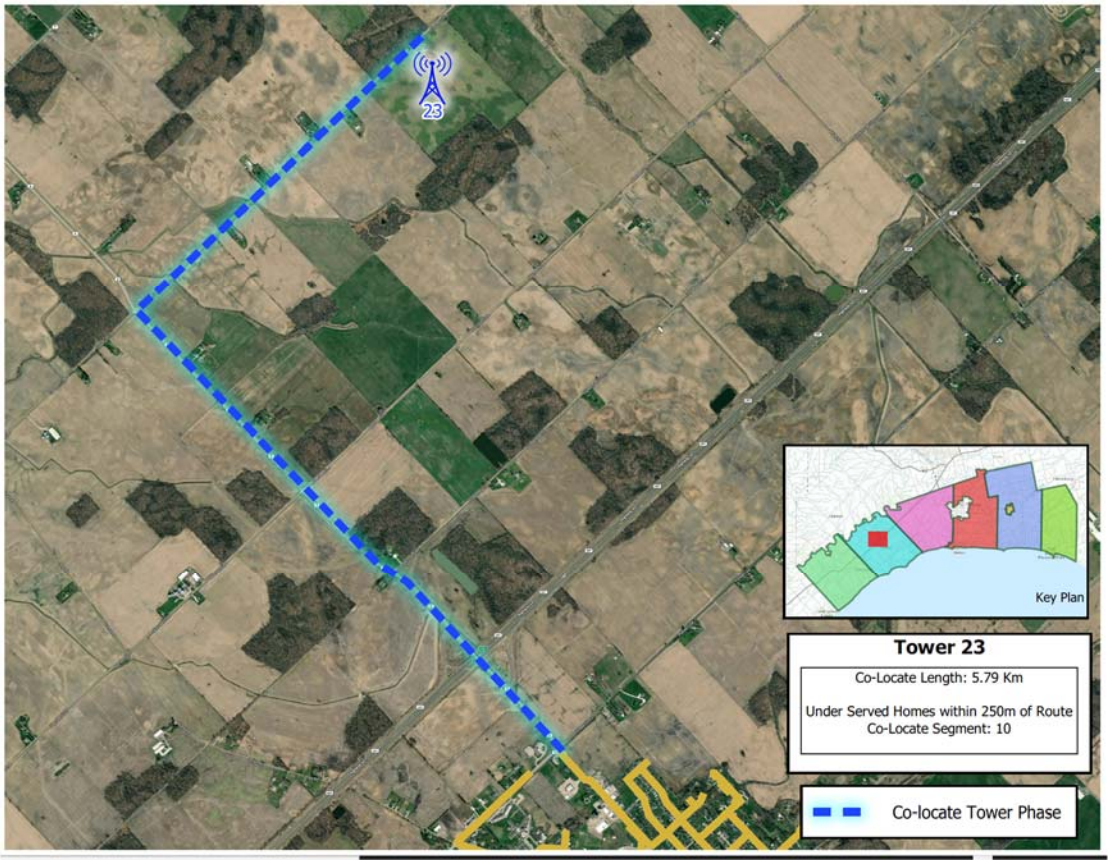

10
Key Plan
Tower 10
Co-Locate Length: 7.63 Km
Under Served Homes within 250m of Route Co-Locate Segment: 20
Co-locate Tower Phase

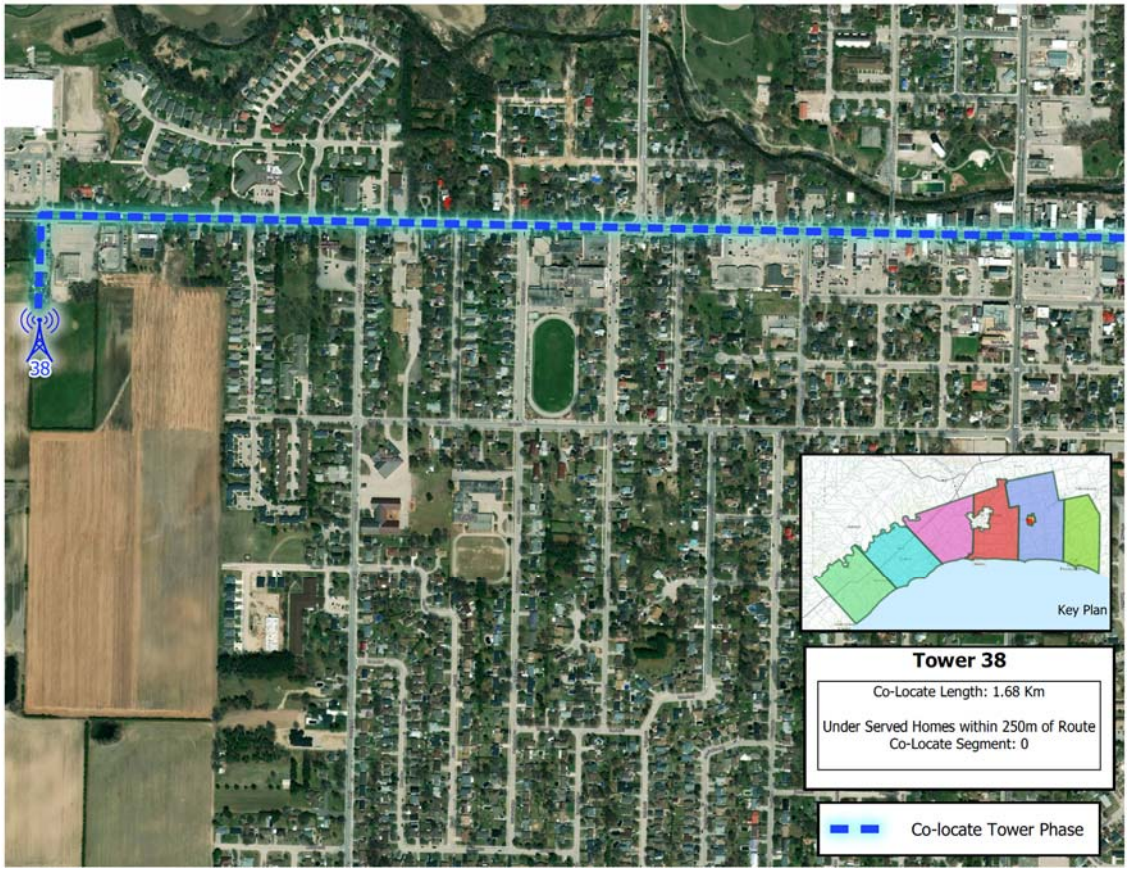

12
Key Plan
Tower 12
Co-Locate Length: 4.40 Km
Under Served Homes within 250m of Route Co-Locate Segment: 17
Co-locate Tower Phase

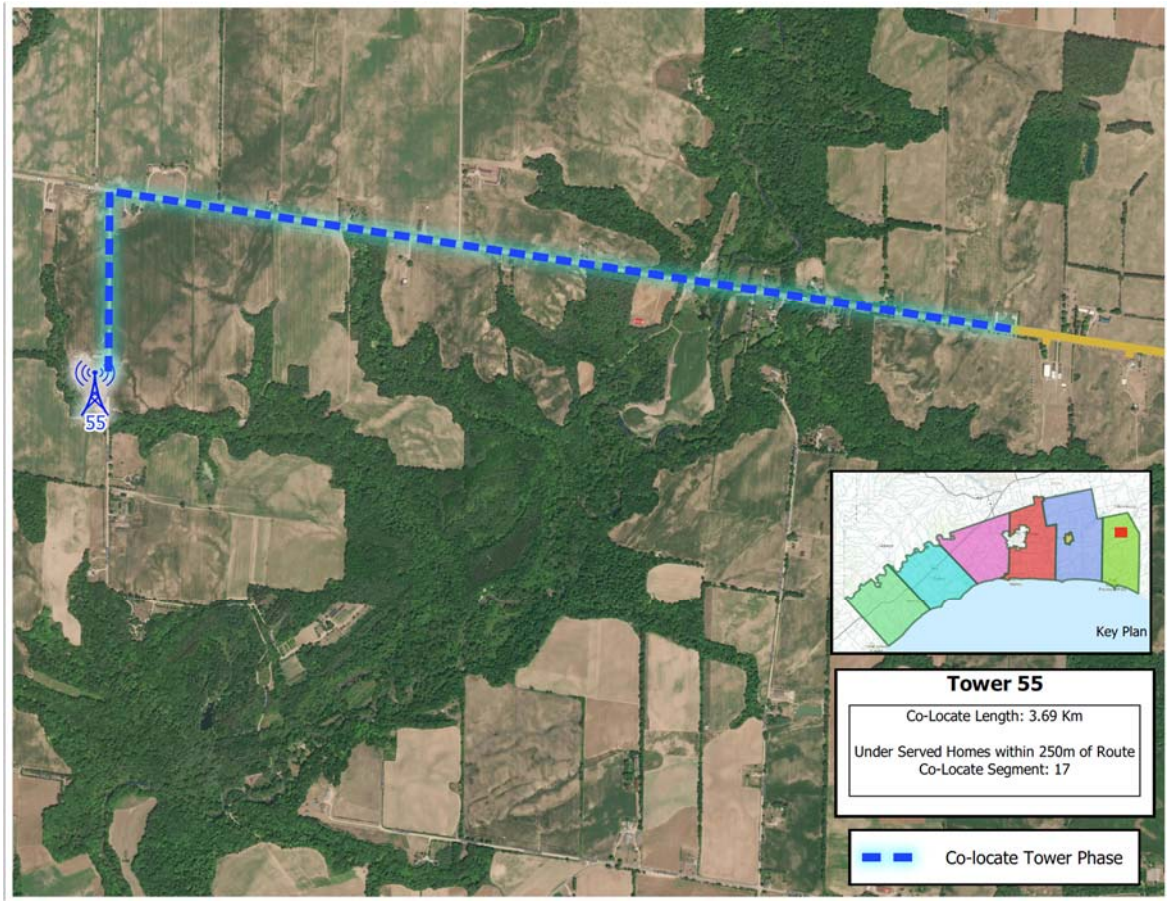

13
Key Plan
Tower 13
Co-Locate Length: 1.63 Km
Under Served Homes within 250m of Route
Co-Locate Segment: 2
Co-locate Tower Phase


15
Key Plan
Tower 15
Co-Locate Length: 0.16 Km
Under Served Homes within 250m of Route
Co-Locate Segment: 0
Co-locate Tower Phase


19
Key Plan
Tower 19
Co-Locate Length: 3.16 Km
Under Served Homes within 250m of Route Co-Locate Segment: 0
Co-locate Tower Phase


23
Key Plan
Tower 23
Co-Locate Length: 5.79 Km
Under Served Homes within 250m of Route Co-Locate Segment: 10
Co-locate Tower Phase


38
Key Plan
Tower 38
Co-Locate Length: 1.68 Km
Under Served Homes within 250m of Route
Co-Locate Segment: 0
Co-locate Tower Phase


55
Key Plan
Tower 55
Co-Locate Length: 3.69 Km
Under Served Homes within 250m of Route
Co-Locate Segment: 17
Co-locate Tower Phase

On Dec 9, 2021, at 11:27 AM, Gwen Tracey wrote:

Good morning Dave and Dominique. This has nothing to do with my position at Malahide but is a concern as a resident of Malahide and the County of Elgin. Attached is a screenshot of the map showing where the recently announced hispeed internet is coming to the above Villages. This is the link to the full map https://swift.maps.arcgis.com/apps/webappviewer/index.html?id=a37be42c85dd4029a35a76f78d8634e6.

What seems to be missing is that while all of the other Villages in the project are in Middlesex County only, the Village of Avon is partially in Middlesex County and partially in Elgin County. This plan splits our community because this project does not extend into Elgin County. As my residence is across from Tarandowah Golfers Club on Putnam Road (within the first mile south of the intersection that is Avon, and we do not have stable internet, and because I just spoke to Jeff Yurek's office, I am contacting you on his recommendation as members of Elgin County Council. Jeff's staff advised that the County would be looking into the pockets where possible the project could/should be extended to. I would therefore request that you add this to your long list of considerations as members of County of Council.

Thank you for your consideration.

Gwen Tracey, CHRL
Human Resources Manager &
Emergency Services Assistant