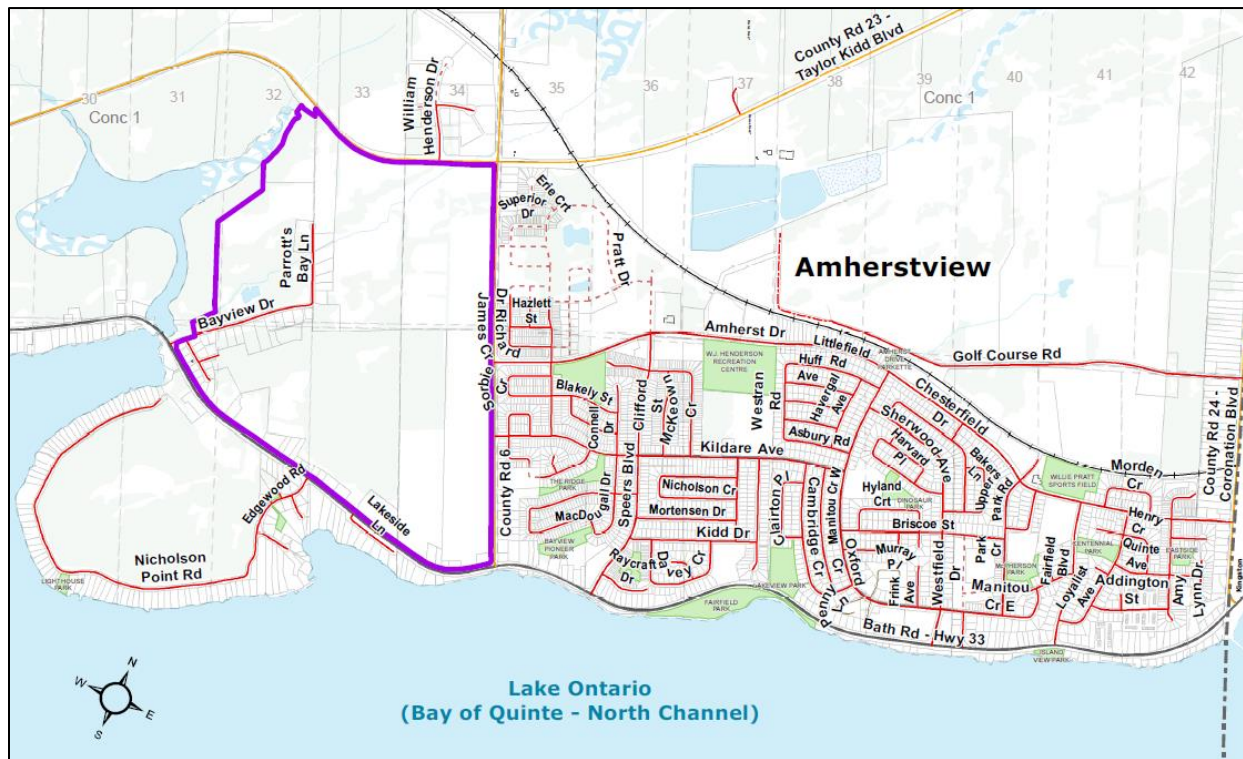




Amherstview West Secondary Plan Composite Utility Servicing Report

DECEMBER 08, 2022

FINAL





Amherstview West Secondary Plan Composite Utility Servicing Report

Loyalist Township

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Revision History

First issue

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Signature

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Date

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A CORRESPONDENCE



1 Introduction

1.1 Background

The Loyalist Township is a lower-tier municipality located in the County of Lennox and Addington in Eastern Ontario. It has a land area of approximately 341.02 km² (2016 Census) and consists of several communities, including Amherstview; Bath, Amherst Island; Odessa; the hamlets of Millhaven, Morven, Stella, Violet, and Wilton; and surrounding agricultural, rural, and residential communities.

The Loyalist Township is undertaking a Secondary Plan for Amherstview West. The Secondary Plan will provide a policy and implementation framework to guide the future growth and development of this area for the next 25 years. The Secondary Plan will address the extension of Amherstview to the west, to accommodate future growth and development in the community for the next 25 years. It will consider future needs and priorities for the new community, including housing types, urban design, community amenities, protection of the natural environment, and transportation, as well as active transportation. As shown in Figure 1-1, the Secondary Plan study area is located to the west of County Road 6 and the existing built-up area in Amherstview. In addition, the study area is situated between Taylor Kidd Boulevard (County Road 23) to the north and Bath Road (Highway 33) to the south.

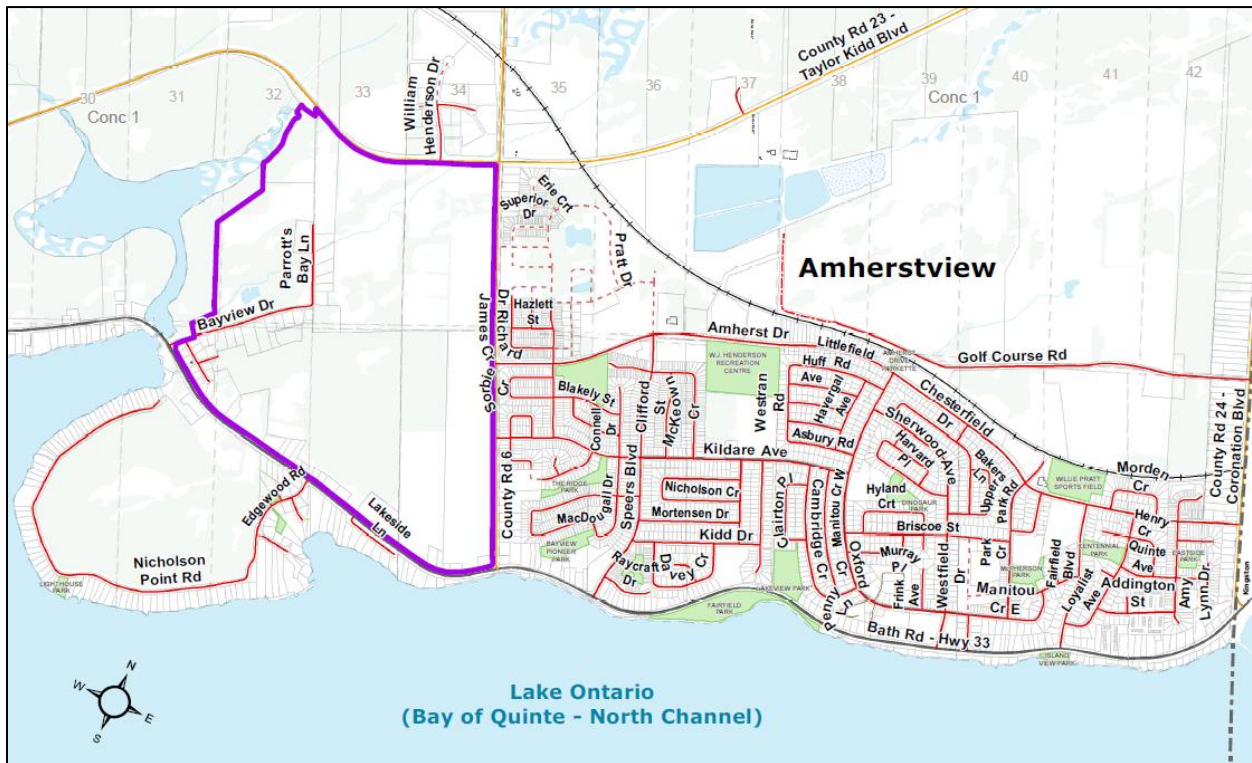


Figure 1-1: Amherstview West Secondary Plan - Study Area



1.2 Report Scope

The composite utility servicing report includes a review of external connection points for natural gas, electrical, cable, and other telecommunication lines to service the proposed Secondary Plan area. Correspondence with the respective agencies that service these utilities was conducted following a review of existing infrastructure.

This report includes the estimated demand for electrical power, using rules and tables in the Ontario Electrical Safety Code (OESC) and based on the size, type, and purpose of the residential, commercial, public, and utility buildings in the study area. WSP approached Hydro One and completed a calculation on the estimated supply of electrical power required for the area for servicing based on the provider's requirements. The findings from the calculation indicate the degree of distribution system upgrades and servicing requirements.

The demand estimate for natural gas using energy modeling and previous average natural gas use information is also summarized in the report. Through discussions with Enbridge/Union Gas (company name in transition) the report includes connected gas loading calculations of the areas for the utility's incorporation into their area models and determination of adequacy/required upgrades.

The report also summarizes the telecommunication providers in the area and identifies the available connection points to the Secondary Plan area. The report then summarizes the next steps for telecommunications servicing and design.

1.3 Amherstview West Secondary Plan Growth Projection

The Secondary Plan area includes the following projection of proposed dwellings and land.

- 1000 residential dwellings:
 - Single/semi-detached (low density): 550 dwellings
 - Rowhouses (medium density): 410 dwellings
 - Apartments (high density): 40 dwellings
- 1.65 hectares of commercial land area
- 2 hectares of land for a new school



2 Supply of Electrical Power

2.1 Coordination with Hydro One Distribution

As detailed below, the electrical demand of the Secondary Plan area upon full build-out is estimated at 9.2 MW/10.2 MVA. WSP has reached out to Hydro One and requested to assess the capacity of the facilities in the area to supply the Secondary Plan area. Hydro One's complete response is provided in Appendix A. The main points proceeding are as follows:

- Currently, two (2) nearby 44 kV feeders, on the north and east sides, have the capacity to supply the expected electrical load of the Secondary Plan area.
- Hydro One does not reserve capacity and therefore, the situation might change in the future.
- The most likely connection points are illustrated in Figure 2-1.
- Once the official connection request is received by Hydro One, the timeline and fees required for connection will be determined.

2.2 Connection Points

Electrical Power connection points are to be determined based on which section of the Secondary Plan Area develops first and in relation to ongoing development along the perimeter of the study area near Loyalist Business Park and other subdivision development. Available transmission and distribution connections to the Secondary Plan area are shown in Figure 2-1.

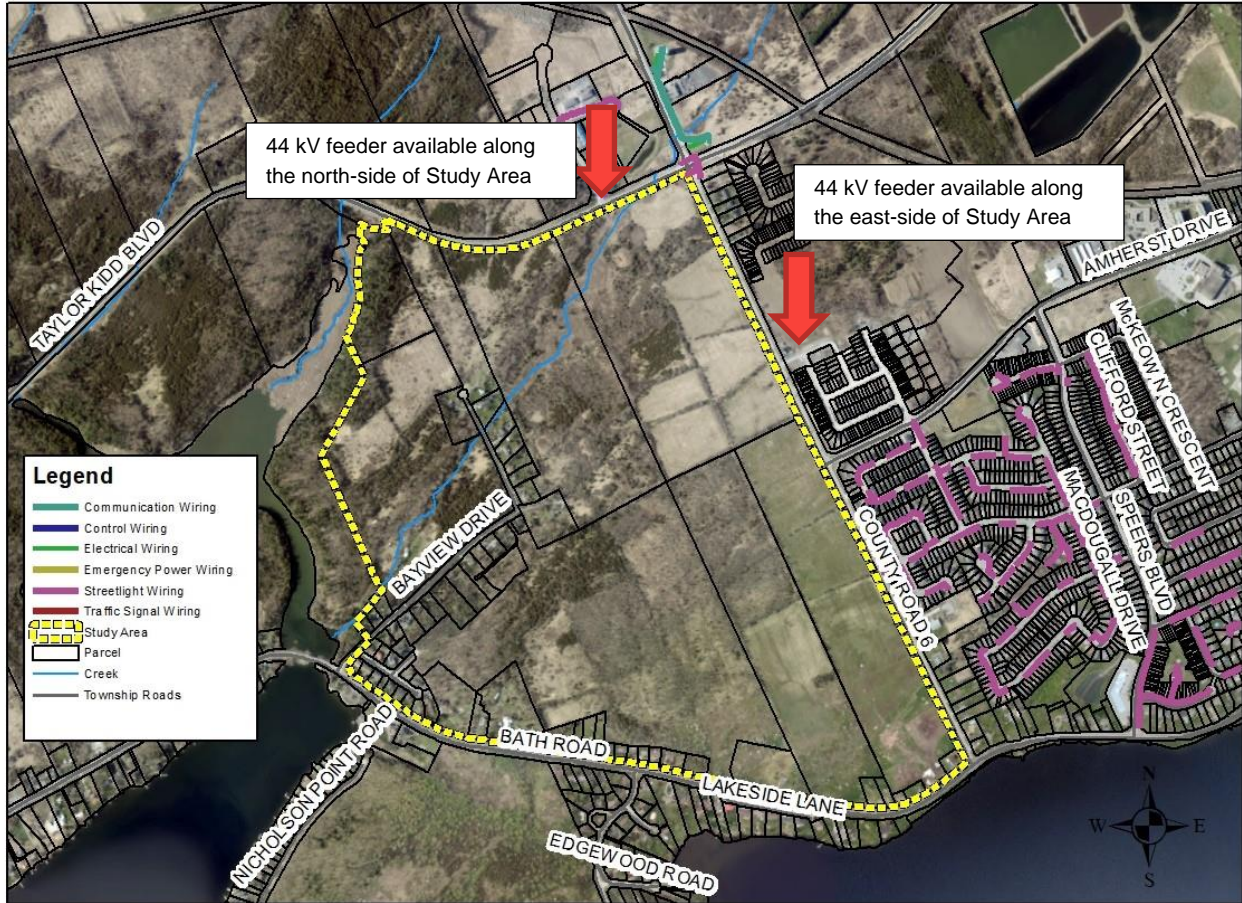


Figure 2-1: Electrical Transmission and Distribution - Connections



3 Electrical Power Demand Calculations

3.1 Assumptions

The calculation of the electrical power demand for Amherstview West is based on the rules and formulas in Section 8 of the Ontario Electrical Safety Code (OESC) and the following assumptions based on researched rates used in the industry for similar size projects:

- I. Heating will be provided by natural gas
 - II. Cooling will be provided by electrical air conditioning
 - III. 20% of the dwellings will have electrical vehicles (EV)
 - IV. Power factor of the electrical loads: 0.9
 - V. Peak load will occur in the summer
-

3.2 Calculations

3.2.1 Residential Dwellings

Single/semi-detached

- 550 dwellings of 185 m²
- Demand of a single unit: 13.5 kW
- Air conditioning: 4 kW
- EV charger: 5 kW based on average EV charger (Note: individual EV chargers can be up to 11.5 kW, such as Tesla/Ford)
- Electrical load diversity based on 11 blocks with 50 dwellings in each block
- Peak electrical demand per block: 448 kVA
- Peak electrical demand of 11 blocks: 4932 kVA

Row Houses

- 410 dwellings of 140 m²
- Demand of a single unit: 13.5 kW
- Air conditioning: 2.5 kW



- EV charger: 5 kW based on average EV charger (Note: individual EV chargers can be up to 11.5 kW, such as Tesla/Ford)
- Electrical load diversity based on 4.1 blocks with 100 dwellings in each block
- Peak electrical demand per block: 649 kVA
- Peak electrical demand of 4.1 blocks: 2661 kVA

Apartments

- 40 dwellings of 70 m²
- Demand of a single unit: 12.5 kW
- Air conditioning: 1.5 kW
- EV charger: 5 kW based on average EV charger (Note: individual EV chargers can be up to 11.5 kW, such as Tesla/Ford)
- Electrical load diversity based on one (1) apartment building with 40 dwellings
- Peak electrical demand: 253 kVA

Total Electrical Demand for Residential Dwellings

Single/semi-detached:	4,932 kVA
Row houses:	2,661 kVA
Apartments:	253 kVA
Total:	7,846 kVA

3.2.2 Commercial Buildings

Area	16,500 m ²
Demand	50 W/m ²
Total (excluding AC)	825 kW
AC stores	417 kW
AC restaurant/other	73 kW
Total commercial	1,316 kW
Total commercial	1,462 kVA



3.2.3 Estimated Total Electrical Demand for the New Development Within the Secondary Plan Area Upon Full Build-out.

Residential	7,061 kW / 7,846 kVA
Commercial	1,316 kW / 1,462 kVA
Other loads (10%)	838 kW / 931 kVA
Total	9,215 kW / 10,239 kVA



4 Supply of Natural Gas

4.1 Coordination with Enbridge Inc.

Within the next section, the load for the new development area is estimated based on a development area of around 30 ha. WSP has discussed the situation with Phil Antoniak, the Enbridge representative who oversees the area of development and has recently worked with the township for other developments.

Through discussions with Enbridge, they are not able to determine feed locations or future construction costs of the area in question. This determination will depend on which areas are developed first, other developments in the area, and other factors which they would have to weigh during the setup process. For a preliminary review of this type, they are not currently able to provide this information.

The following additional information was provided by Enbridge:

- There are existing Natural Gas mains and plausible tie-in points located opposite to Taylor Kidd Blvd and County Rd 6 of the planned development. (See Figure 4-1)
- Enbridge would need to further conduct their own detailed cost/analysis feasibility studies to determine how to best service the area based on the final land use design and natural gas demand calculations as shown in Section 5.

4.2 Connection Points

Natural Gas connection points are to be determined based on which section of the Secondary Plan area develops first and in relation to ongoing development along the perimeter of the study area near Loyalist Business Park and other subdivision development. Figure 4-1 shows the approximate locations of Natural Gas main connections.

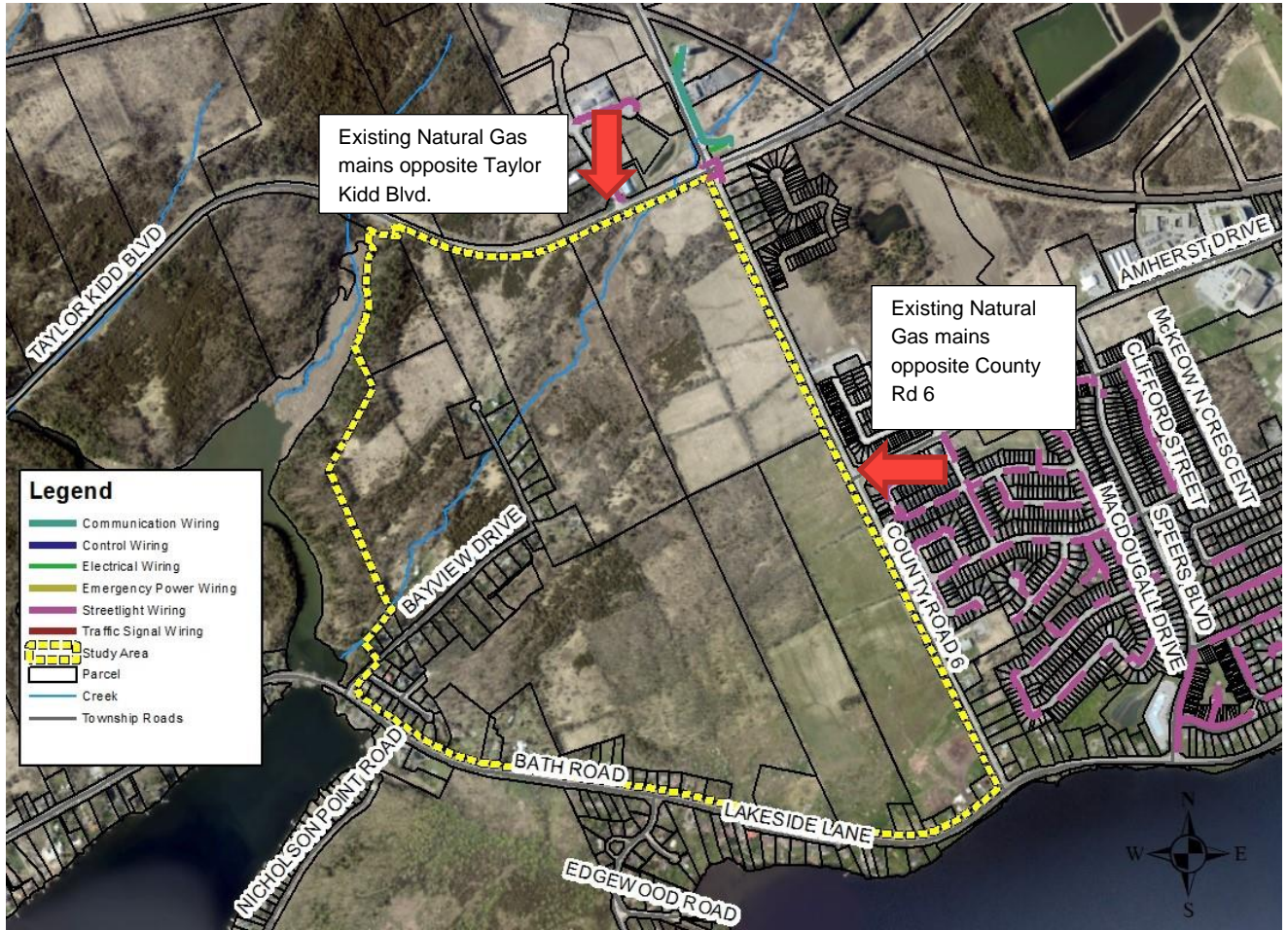


Figure 4-1: Natural Gas - Connections



5 Natural Gas Demand Calculations

5.1 Assumptions

The calculations for natural gas demand for Amherstview West are based on the following assumptions are based on researched rates used in the industry for similar size projects:

- I. Heating will be provided through natural gas
 - II. Hot water will mainly be provided through natural gas
 - III. Some of the houses will have fireplaces and natural gas BBQs (estimated 50%)
-

5.2 Calculations

5.2.1 Residential Dwellings

Single/semi-detached

550 dwellings at 170 MBh connected gas load

Row Houses

410 dwellings at 150 MBh connected gas load

Apartments

40 dwellings of at 120 MBh connected gas load

Total Natural Gas Demand for Residential Dwellings

Single/semi-detached: 93.5 MMBh

Row houses: 62 MMBh

Apartments: 4.8 MMBh

Total: 160.3 MMBh total connected load.

5.2.2 Commercial Buildings

16,500 m² of department stores, restaurants, general services – 9.5 MMBh

Potential Pumping Station Generators – 2 MMBh (should not be included in the main load as many gas fired items will not operate during a power failure necessitating the generator use).



Potential Highschool – Assumed to be 2.5 MMBh (tremendously variable based on size, kitchen requirements, and whether the building will be designed to be net-zero carbon.)

Total Natural Gas Demand for Residential Dwellings

Department Stores/Restaurants/Services:	9.5 MMBh
Highschool:	2.5 MMBh
Total:	12 MMBh total connected load.

5.2.3 Estimated Total Natural Gas Demand for the New Development Within the Secondary Plan Area Upon Full Build-out

Residential	160.3 MMBh
Commercial	12 MMBh
Total	172.3 MMBh



6 Telecommunications

6.1 Coordination with Telecommunication Utility Providers

With the Amherstview West proposed development for residential and commercial use and projected population growth, there is a requirement for reliable communication infrastructure networks for safety, business, and personal use.

The general surrounding area has existing Bell and Cogeco infrastructure, likely Fiber or Coaxial/Copper Cable or a combination of both. Telecommunication carriers generally do not design their infrastructure networks with extra capacity in mind; an expansion on their existing network would be required to service the potential new customers. The following steps would need to be taken:

- The Township would need to notify the incumbent carriers (Bell/Cogeco/etc.) regarding the planned development/expansion/permits/etc. in advance of the detailed design.
- There is existing infrastructure and plausible tie-in points located on Taylor Kidd Blvd, County Rd 6 and Bath Rd of the planned development. (See Figure 6-1)
- The carriers would need to further conduct their own detailed cost/analysis feasibility studies to determine how to best service the area based on the final land use design.

6.2 Connection Points

Telecommunication connection points are to be determined based on which section of the Secondary Plan Area develops first with multiple tie-in point locations available along the perimeter of the study area. Figure 6-1 provides further details on the locations of these connection points.

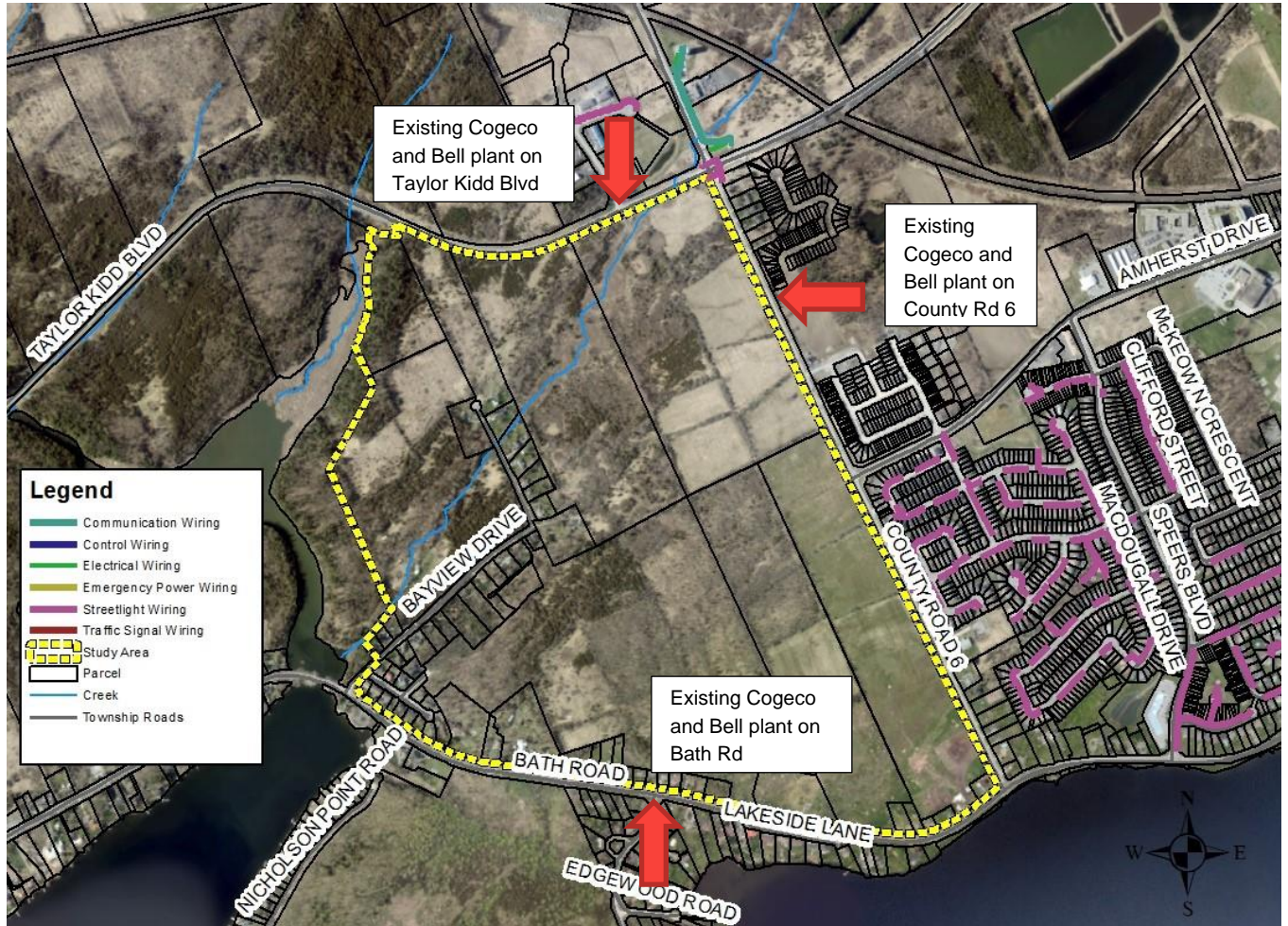


Figure 6-1: Telecommunications - Connections



7 Conclusion

The composite utility servicing report consists of a summary of existing external connection points for natural gas, electrical, cable, and other telecommunication lines to service the proposed Secondary Plan area. The Amherstview West Secondary Plan growth projection proposes 1,000 residential dwellings, 1.65 ha of commercial land area, and 2 ha of land for a new school.

Coordination with Hydro One Distribution determined that the electrical demand of the proposed area upon full build-out is approximated at 9.2 MW/10.2 MVA. The expected electrical load of the Secondary Plan area can be supported by two nearby 44 kV feeders on the north and east sides of the site; however, Hydro One notes that the 44 kV feeders' capacity is not reserved and as such, the situation may change. Enbridge Inc. were unable to determine final feed locations or future construction costs for the natural gas, however there are plausible connections across from Taylor Kid Blvd. and CR6. The estimated total natural gas demand for the new development within the Secondary Plan upon full build-out is 172.3 MMBh. Coordination with Telecommunication Utility providers determined existing Bell and Cogeco infrastructure connection points in the general surrounding area. The final connection locations would be based on their own detailed cost/analysis feasibility studies to determine how to best service the land use design.

Appendix

A CORRESPONDENCE



Klein, Meir

From: SYED Mohammad Hasan <MohammadHasan.Syed@HydroOne.com>
Sent: October 8, 2021 4:23 PM
To: Klein, Meir
Cc: Flowers, Michael; KINGSTON DX ASSET MANAGEMENT; PROV LINE SUBDIVISION; KRISHNAPILLAI Vyke
Subject: RE: Supply to a new subdivision in Eastern Ontario

Good Afternoon Meir,

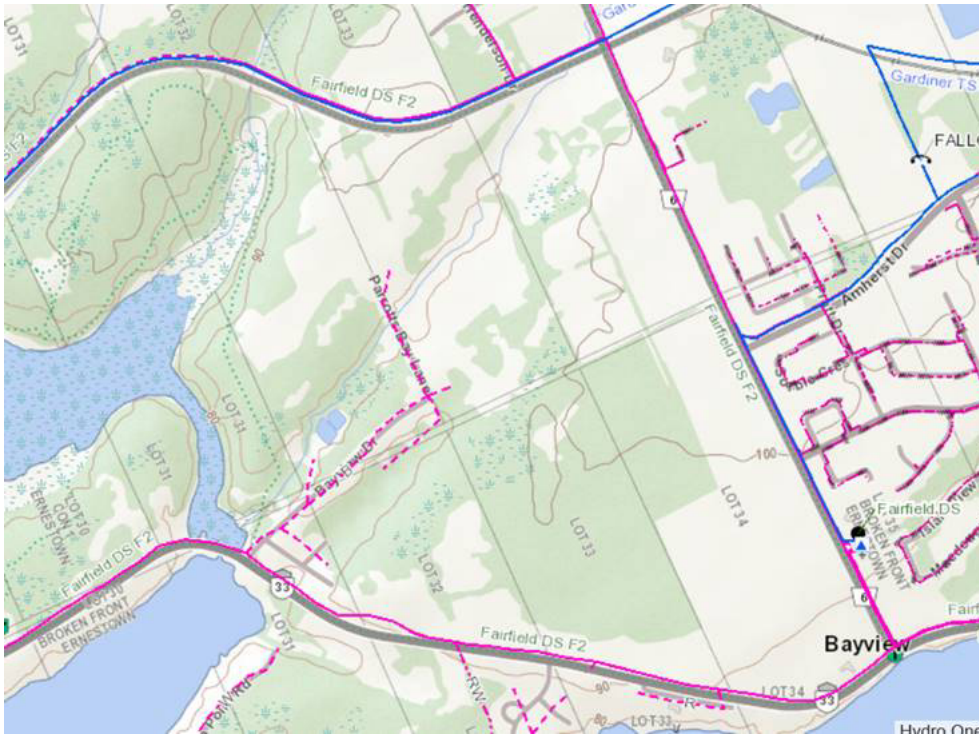


Figure 1: 8kV & 44kV map of Amherstview West Boundary

Figure 2: Amherstview West

Legend:
44kV – Blue Line
8kV – Pink Line

Currently, Hydro One does not have enough capacity on the existing 8kV feeders to supply a new total electrical demand of 10.2MVA. However, we do have capacity on the 44kV feeders. The 44kV feeder on the north side of the boundary (along Taylor Kidd Blvd) has enough capacity to supply the electrical demand of 10.2MVA. Although, we will likely need to carry out investments to supply the residential and commercial developments. Hence, it is important to keep Hydro One informed of the timelines of new loads going in and their electrical demand.

Regarding the service point entry, the north side of the boundary is likely the best location. However, we may supply the area with other service point entries as well.

Please note that this information is based on the current information and condition of the distribution system, and can change without notice. The timing and funding required for connection will be determined once the official connection request is received by Hydro One and will be in accordance with Hydro One's Conditions of Service, which you can find located on our website at www.hydroone.com.

Finally, please note that Hydro One does not reserve capacity and the capacity is allocated based on a first come/first serve basis, once we receive a formal request. This request is not considered to be a formal request.

Regards,

Mohammad Hasan Syed

Asst. Network Officer, Distribution Invest Planning
Hydro One Networks Inc.
Cell: (905) 599-0806
Email: Mohammad.Syed@HydroOne.com

From: Klein, Meir <Meir.Klein@wsp.com>
Sent: Monday, September 20, 2021 8:36 PM
To: SYED Mohammad Hasan <MohammadHasan.Syed@HydroOne.com>
Cc: Flowers, Michael <Michael.Flowers@wsp.com>
Subject: RE: Supply to a new subdivision in Eastern Ontario

***** Exercise caution. This is an EXTERNAL email. DO NOT open attachments or click links from unknown senders or unexpected email. *****

Hi Syed,

First, thank you; your fast reply is much appreciated.

- 1) The location of the study area is shown in the attachment
- 2) We estimate the total electrical demand at 10.2 MVA
- 3) The plan for the area includes residential and commercial developments, as described below:
At this point it is a high level plan and I don't have more detailed information.

Residential

The above dwelling type proportions were then applied to the allocation of 1,000 residential units for Amherstview West (to 2046) as provided by Hemson in their April 21, 2021 email to determine the number of dwelling unit demand by type:

- Single/Semi-detached Dwellings (Low Density Residential) – 55% * 1,000 units = 550 units
- Rowhouses (Medium Density Residential) – 41% * 1,000 units = 410 units
- Apartments (High Density Residential) – 4% * 1,000 units = 40 units

Based on the Township’s residential density ratios and assumptions, the results of the residential land demand analysis for Amherstview West are summarized in **Table 10**.

Table 10: Residential Land Demand Analysis - Amherstview West (Unplanned Parcels)

Residential Designation (Dwelling Types)	Dwelling Type Proportion	Residential Land Demand		
		Dwelling Units (of 1,000)	Max. Gross Density (units/net ha)	Land Requirement (net ha)
Low Density	55%	550	37.5	14.67
Medium Density	41%	410	75	5.47
High Density	4%	40	120	0.33
Net Residential Land Demand			20.47 net ha	
Gross Residential Land Demand greater 25%)			25.89 ha	

*The net area applies to a gross-up factor of 25% for infrastructure, parks, etc. Figures are rounded.

Commercial

A 25% gross-up factor is added to the above land area to account for associated infrastructure and buffering, based on best practices. The net commercial land area is calculated below.

- 1.32 net hectares * 0.25 = 0.33 hectares
- 0.33 hectares + 1.32 hectares
= 1.65 gross hectares of commercial land area

4) The plan does not specify development phases

5) To complete WSP’s report to the Township, we would like to know

- Does the distribution/transmission system in the area have the capacity to supply the area’s load?
- If not what upgrades will be required and the approximate cost
- Where would be the best location for the service entry point?

Please let me know, if you need any more information.

Thank you
Meir



Meir Klein, M. Eng., P. Eng.
T&D Senior Planning Engineer

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