

# GTA West Region Scoping Assessment Outcome Report

August 8, 2019

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# Scoping Assessment Outcome Report Summary

**Region:** GTA West

**Start Date:** May 10, 2019

**End Date:** August 8, 2019

# 1 Introduction

This Scoping Assessment Outcome Report is part of the Ontario Energy Board's ("OEB" or "Board") Regional Planning process. The Board endorsed the Planning Process Working Group's Report to the Board in May 2013 and formalized the process and timelines through changes to the Transmission System Code and Distribution System Code in August 2013.

The first cycle of the Regional Planning process for the GTA West region was completed in January 2016. A number of needs were identified in the near-, medium-, and long-term timeframes. A number of solutions were recommended to address the near- and medium-term needs, some of which are now in service while need dates are being tracked for the remainder.

The second cycle of the Regional Planning process for the GTA West region was initiated in March 2019 with the Needs Assessment ("NA") process for GTA West. The Needs Assessment ("NA") is the first step in the regional planning process and was carried out by the Study Team for the GTA West region. This report was issued on May 9, 2019 and identified a number of needs. The information from the Needs Assessment has been input into the scoping process to determine the nature of the planning process to address these identified needs.

During the Scoping Assessment, the participants reviewed the nature and timing of all known needs in the region to determine the most appropriate planning approach going forward. This process also determined the best geographic grouping of the needs in order to create efficient study areas. The planning approaches considered include:

1. An Integrated Regional Resource Plan ("IRRP") – where a greater range of options, including non-wires, are to be considered as options and/or closer coordination with communities and stakeholders is required
2. A Regional Infrastructure Plan ("RIP") – which considers more straight-forward wires- only options with limited engagement; or
3. A local plan undertaken by the transmitter and affected Local Distribution Company ("LDC") – where no further regional coordination is needed.

Additional information on selecting a planning approach can be found in Appendix B. This Scoping Assessment report:

- Lists the needs identified in the Needs Assessment report
- Define the geographic grouping of the needs into sub-regions, as applicable
- Determines the appropriate regional planning approach and scope for each sub-region where a need for regional coordination or more comprehensive planning is identified
- Establishes a term of reference for an IRRP if an IRRP is required; and
- Establishes the composition of the Working Group for the IRRP.

## 2 Team

The Scoping Assessment was carried out with the following participants or the study team:

- Independent Electricity System Operator
- Hydro One Networks Inc. (Transmission)
- Hydro One Networks Inc. (Distribution)
- Alectra Utilities
- Burlington Hydro Inc.
- Milton Hydro Distribution Inc.
- Oakville Hydro Electricity Distribution Inc.
- Halton Hills Hydro

## 3 Categories of Needs, Analysis

### 3.1 Overview of Region

The Greater Toronto Area (GTA) West Region roughly covers the Regional Municipalities of Halton and Peel. The Region includes the area roughly bordered geographically by Highway 27 to the north east, Highway 427 to the south east, Regional Road 25 to the west, King Street to the north and Lake Ontario to the south. The GTA West Region area comprises the municipalities of Brampton, South Caledon, Halton Hills, Mississauga, Milton, Oakville and portions of Burlington.

Electrical supply to the GTA West Region is provided through 500/230 kV autotransformers at Trafalgar TS and at Claireville TS and 230 kV transmission lines and step-down transformation facilities as shown in Figure. 1. The GTA West Region is defined electrically by the 230 kV transmission circuits bounded by Claireville TS, Richview TS and Manby TS to the east and Burlington TS to the west. Many of the 230 kV transmission circuits in this area provide both a bulk system and regional system functions. That is, in addition to delivering reliable supply to local customers, they also form part of an integrated network that enables large transfers of power between regions of the province. The 500 kV transmission facilities present in this geographic area are also considered bulk assets. Although the bulk transmission system is not the focus of regional planning, it impacts how the system is modelled and contingencies evaluated. The distribution system in this Region is at two voltage levels, 44 kV and 27.6 kV. Local generation in the area includes two gas fired plants: the 1250 MW Goreway GS in Brampton and the 600 MW TCE generation plant in Halton Hills. The Local Distribution Customers (LDC) in the GTA West Region is Burlington Hydro Inc., Alectra Utilities Co., Halton Hills Hydro Inc., Hydro One Networks Inc., Milton Hydro Distribution Inc. and Oakville Hydro Electricity Distribution Inc.

Kleinburg TS is located near Bolton, Ontario and has been part of the ongoing GTA North regional planning process. However, the majority of the Kleinburg TS transformational capacity is being used to supply communities located in the GTA West region. Due to this reason, the Study Team has decided to include the Kleinburg TS as part of the GTA West Regional Planning process as well.

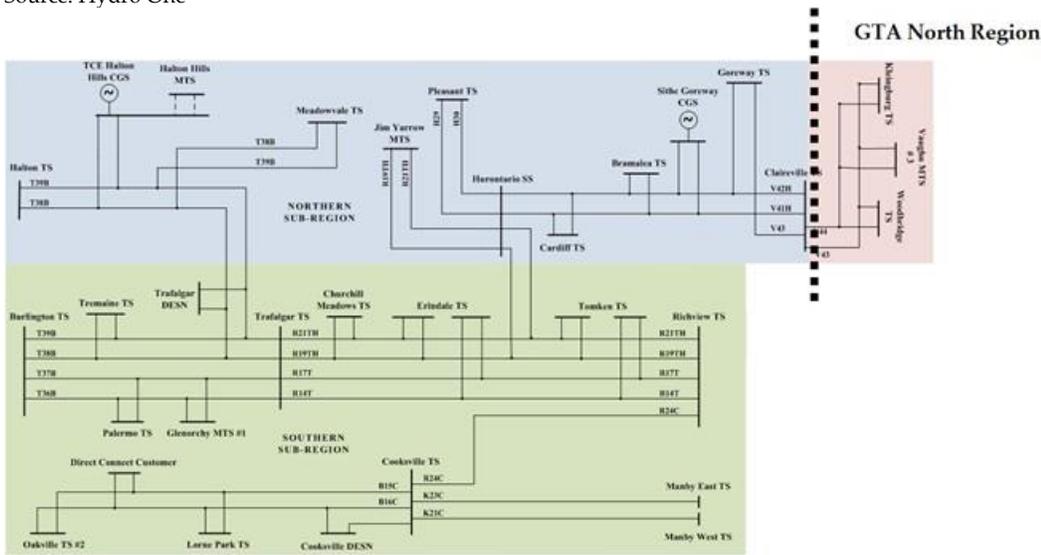
A geographic layout of the electricity infrastructure supplying GTA West, in addition to the section of GTA North providing supply to Kleinburg TS, is shown in Figure 1, below. An electrical single line diagram for the same area is shown in Figure 2.

**Figure 1 Geographical Area of the GTA West Region with Electrical Layout**  
 Source: IESO



**Figure 2 GTA West Region (Single Line Diagram)**

Source: Hydro One



### 3.2 Background of the Previous Planning Process

Regional planning in GTA West has been underway for a number of years. A regional planning Working Group for GTA West North sub region (Northwest GTA), consisting of the Independent Electricity System Operator (IESO), Alectra Utilities, Milton Hydro, Halton Hills Hydro, and Hydro One Transmission and Distribution, had been active since 2013. Later that year, the planning process was restructured to conform to the timelines and requirements of the Ontario Energy Board’s (OEB) formalized Regional Planning Process. The first cycle of the regional planning process for GTA West was completed in 2016, with the focus on ensuring adequate supply to support near-term growth in the northern sections of this area and identifying potential long-term risks and opportunities linked to continued strong growth.

Through this formalized regional planning process, a number of projects were recommended to support the near- and medium-term growth and to maximizing the use of the existing system, including:

- Near-term need for two new step-down transmission facilities to ensure new customer connections can be accommodated in Halton Hills and Milton. The first (Halton Hills Hydro MTS) is under construction and expected to come into service shortly, while the second has a tentative need date of 2022 (based on Needs Assessment forecast).
- Medium-term need for a transmission line upgrade to address emerging capacity needs in the central Brampton area (H29/30 supply to Pleasant TS). This need has not yet been triggered, but actual demand is being monitored to determine when work will be initiated.

Additionally, a long term needs for new transmission capacity to serve growth in the northern sections of this region (primarily northern Brampton and southern Caledon) has been identified. Due to the distance between the existing transmission system and areas of anticipated growth, alternatives to new wires infrastructure may not be viable. It was recommended that work continue to identify and preserve land capable of supporting a new transmission corridor to serve growth in the area, if

and when it manifests and should transmission be the optimal way to serve the growth.

This second regional planning cycle started with the Needs Assessment (NA) report published in May 2019. The needs identified in this report form the basis of the analysis for this scoping assessment and are discussed in further detail in Section 3.3, below.

### **3.3 Needs Identified**

The Needs Assessment identified a number of needs in the GTA West Region based on the most up to date sustainment plans and a 10-year demand forecast. This section describes emerging needs identified in the GTA West Region, and also reaffirms the near, mid, and long-term needs identified in the previous regional planning cycle.

For the purpose of the Scoping Assessment, the study team has grouped the identified needs into the following categories: (1) Supply Capacity (2) Load Security and Restoration (3) End of Life Facilities, and (4) Bulk System.

#### **3.3.1 Supply Capacity Needs**

Supply capacity needs can refer to the ability of either the Transformer station, or the local transmission network to deliver reliable supply to customers.

Transformer station supply capacity refers to the electricity system's ability to deliver power to the local distribution network through the regional transformer stations. This is generally limited by the ratings of the step-down transformer stations in the local area, and also considers the proximity of stations with remaining capacity and the end use customers they are required to supply.

Transmission supply capacity refers to the ability of generation and transmission facilities to supply power within a local area, or to transfer it in from other areas, respectively. It is generally defined by the generation capacity and transfer limits of specific generation and transmission facilities under applicable outage scenarios as specified in the Ontario Resource and Transmission Assessment Criteria (ORTAC) and various bulk system conditions.

Supply capacity needs are summarized below:

**Table 1: Capacity Needs**

Need	Facilities	Need Date
Transformer Station	Halton, TS	2022
Transmission Circuit	Radial Supply to Halton, TS (T38B/T39B)	-
Transmission Circuit	H29 / H30 Transmission Circuit Supply	2024

As mentioned in the Needs Assessment, construction of a second step down station at the site of the existing Halton TS had previously been recommended to address capacity needs, now anticipated to be in service for 2022. Although capacity exists to supply this station, building and loading it will accelerate supply security needs on the Halton radial pocket (T38/38B), as described in section 3.3.2, below. As a result, timing and configuration issues related to Halton TS #2 should be evaluated in conjunction with supply security and restoration needs. This will allow for better evaluation of feasibility and timing associated with this station and identify if any further upgrades are required.

Note that the primary concern when evaluating this circuit has been supply security needs, not circuit capacity. Due to the presence Halton Hills GS, a 600 MW gas generation facility, T38/39B is able to meet anticipated capacity needs under all applicable criteria. However, load rejection may be required in the event that generation is unavailable at the time of loss of transmission. The extent of loss required will be studied within the scope of the IRRP.

Transmission capacity needs have been anticipated for the H29/H30 circuits, which supply Pleasant TS, ever since the third set of step-down transformers was installed in 2008. The existing conductors which supply the station were installed before the third set of transformers were approved and are not large enough to accommodate full loading of this station. This issue was studied during the last regional planning cycle, where Hydro One has indicated that they are able to upgrade the conductors to allow the station to be further loaded. Given the straightforward nature of this upgrade, it is not recommended for further coordinated study. Instead, actual loading should continue to be monitored such that this work can be undertaken with sufficient lead time to prevent capacity overloads. For reference, the coincident peak for this station in 2018 was 376 MW, and estimated circuit capacity based on the 2015 IRRP was 417 MW. However, actual circuit capacity is dependent on the power factor of end use customers, and so is also subject to change over time.

Although the Needs Assessment identified transformer capacity needs for one station (Halton TS), it is worth noting that the load forecast only went out 10 years, while an IRRP considers a 20-year planning horizon. As a result, we may see additional capacity needs once a longer-term forecast is prepared. In particular, stations in the northern section of the GTA West region (serving northern Brampton, southern Caledon, and Halton Hills), face unique geographic challenges in supplying new customer growth which is increasingly far removed from existing transmission supply circuits. This means that once existing capacity has been fully utilized, there are few feasible options for serving new customer demand. As documented in the previous cycle of regional planning, it is recommended that land suitable for a future transmission corridor in northwest GTA be identified and set aside to

preserve this as a long-term option. If land is not set aside, there is a risk that continued development may preclude the ability to secure a linear corridor without greater land use impact and cost. In accordance with

the Provincial Policy Statement (PPS)<sup>1</sup>, opportunities for colocation of linear infrastructure are to be made wherever practical. As a result, the IESO has been working with various Ministries, in addition to Regional and Municipal contacts since 2009 to identify opportunities to secure land for a future transmission corridor adjacent to a proposed transportation corridor also under development in Northwest GTA. This process is ongoing. It is recommended that any regional planning process continue to be carried out in a manner that allows for coordination of information with this initiative, particularly related to needs, timing, and potential solutions.

### **3.3.2 Load Restoration and Supply Security Needs**

Load restoration describes the electricity system's ability to restore power to those affected by a major transmission outage within reasonable timeframes. A restoration need emerges when load is interrupted following a major transmission outage and cannot be supplied within the timelines specified by the applicable planning criteria. Under applicable criteria load restoration times are dependent on the amount of load being interrupted and proximity to maintenance crew and centres. Supply security needs emerge if the total amount of electricity supply at risk of interruption following a major transmission outage exceeds the amounts permissible by the applicable planning criteria and is used to identify areas where a supply outage could affect a vast number of customers, regardless of restoration time. Details on planning contingencies which must be considered, and associated restoration and security guidelines, are defined in ORTAC.

Areas with potential restoration or security needs are summarized below:

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<sup>1</sup> The Provincial Policy Statement (PPS) is a consolidated statement of the government's policies on land use planning. It applies province-wide and provides provincial policy direction on key land use planning issues that affect communities.

**Table 2: Restoration and Supply Security Needs**

<b>Need</b>	<b>Facilities</b>	<b>Need Date</b>
Restoration	<ul style="list-style-type: none"><li>• Kleinburg Radial Pocket (V43/V44)</li><li>• Halton Radial Pocket (T38B/T39B)</li><li>• Pleasant Radial Pocket (H29/H30)</li><li>• West of Cooksville (B15C/B16C)</li></ul>	Present day
Supply Security	Halton Radial Pocket (T38B/T39B)	Mid-2020s

There are multiple areas in GTA West where a major transmission outage has the potential to interrupt load to many customers, and where full restoration may be delayed until the transmission outage has been cleared. When considering restoration needs, care is always taken to ensure that the cost of any solution does not exceed the expected benefit to customers. In the case of GTA West, most major outages have historically been of short duration due to close proximity to staffed maintenance centres. Major infrastructure solutions, such as new transmission facilities, are therefore not generally appropriate. Instead, options such as enhanced distribution transfer capability are often worth examining, especially given their range of benefits for local customers, and lower overall costs. There are also often ways to design or modify planned infrastructure solutions intended to address other needs in ways that maximizes restoration capability. For both these reasons, it is recommended that all restoration needs be kept in scope for further coordinated study.

The Halton radial pocket (T38/39B) supplies the largest potential load at risk of interruption. Additionally, the need for new transformer capacity means that this circuit's load is expected to continue to grow over the planning period, and potentially exceed the 600 MW security threshold in the mid-2020s. Compared to load restoration needs, supply security often represents a much greater risk to customer reliability given the large area of impact. This need is therefore recommended to be studied in greater detail, and in coordination with transformer capacity needs.

### **3.3.3 End of Life Facility Needs**

The need to replace aging transmission assets may present opportunities to better align investments with evolving power system priorities. This may involve up-sizing equipment in areas with capacity needs, downsizing or even removing equipment that is no longer required to supply needs.

Facilities anticipated to be approaching end of life are summarized below:

**Table 3: End of Life Facilities**

<b>Facilities</b>	<b>Tagged Date</b>
Trafalgar TS - Component Replacement	2022
Halton TS - PCT and Component Replacements	2024
Erindale TS - PCT and Component Replacements	2025
Pleasant TS - Breakers, PCT and Component Replacements	2026
Bramalea TS - PCT and Component Replacements	2026
Palermo TS - T3 / T4 Supply Transformer	2025

The majority of these anticipated facility replacements are minor, and do not have the potential to impact other system needs. However, in the case of Palermo TS, it is worthwhile to investigate the relative cost and benefits of upgrading the T3/T4 supply transformers to a higher rating upon end of life. The rationale is that Palermo TS currently has relatively low rated 50/83 transformers capable of supplying around 110 MW of load. A more common higher rated transformer, 75/125 could be sized to increase capacity by around 50%, or more. Palermo TS is a well utilized station, peaking at near maximum load for the past several years. Demand for additional transformer capacity in the area had triggered the development of nearby Tremaine TS in 2013.

Additionally, LDCs have recently requested additional feeder capacity at Tremaine TS. For one LDC, Milton Hydro, the ability to place load at an upsized Palermo TS may be preferable as it is geographically closer to much of the new customer demand, meaning shorter distribution feeders would be required to connect new loads, representing lower costs and higher reliability (shorter distribution lines lowers exposure to many outage risks). Additionally, Tremaine TS is supplied by the heavily loaded T38/39B circuits, which have been identified as being at risk for supply security needs in the mid-2020s. Palermo TS, on the other hand, is supplied by the more lightly loaded T36/37B circuits. This means that any opportunity to load Palermo TS rather than Tremaine TS could defer these security needs and any recommended solution designed to address it. For these reasons, it is recommended that end of life opportunities associated with Palermo TS be considered for further regional coordinated planning.

### **3.3.4 Bulk System Needs and Considerations**

Bulk system studies typically focus on the adequacy and reliability of the 500kV and 230kV bulk transmission networks. Needs are generally driven by broader provincial electricity and policy direction, such as the refurbishment of nuclear facilities or a large influx of new renewable energy, which can trigger changes in flow patterns across the province. Bulk needs are not generally driven by changes in local customer demand.

Bulk system needs identified through the Needs Assessment are summarized below:

**Table 4: Bulk System Needs**

<b>Need</b>	<b>Facilities</b>	<b>Need Date</b>
Transmission Circuit	Richview x Trafalgar (R14T/R17T & R19TH/R21ST)	-

The potential for Trafalgar x Richview circuits to exceed their thermal ratings, with a transmission element out of service, has been documented and studied in the past regional planning cycle. This need is linked to the amount of power being transferred from the west side of Ontario to the east, through an interface known as Flow East Towards Toronto (“FETT”).

This situation is expected to be more critical as Pickering Nuclear Generation Station units retire and Darlington NGS units are under refurbishment outages, as these generating stations are located east of the FETT interface. These needs are being addressed through an IESO bulk system study. In order to ensure that both the regional and bulk studies share consistent assumptions and look for opportunities to integrate needs and potential least cost solutions, the regional and bulk planning teams will continue to coordinate throughout the process.

### **3.4 Analysis of Needs and Planning Approach**

#### **Needs to be Addressed in Local Planning**

A local planning process is recommended to address the end-of-life needs at all stations listed in Table 3 with the exception of Palermo TS, as there is limited opportunity to reconfigure or resize the facilities to align with other regional needs. Additionally, the reconductoring of H29/30 represents a straightforward transmission solution which has already been evaluated through regional planning and does not have the potential to influence or be affected by other planning decisions.

#### **Needs to be Addressed in Bulk System Planning**

Bulk system planning is currently being undertaken to address needs which may emerge as a result of higher FETT flows, as is expected over the coming decade. Since the Richview x Trafalgar needs are directly related to this bulk system issue, and not to local demand growth, it is recommended that this need continue to be studied outside of the regional planning process to ensure better coordination with other bulk system needs and options.

#### **Needs to be Addressed in Integrated Regional Resource Plan (IRRP)**

With the exception of end-of-life replacements and bulk system needs described above, the remaining needs discussed in Section 3.3:

- Have the potential to be addressed by non-wires solutions
- Could be impacted by varying bulk systems flows
- Could potentially be addressed in a coordinated manner (e.g., one solution may be able to address multiple needs)
- Impacts multiple LDCs in GTA West
- Would require on-going engagement and coordination with community-level energy planning activities

As such, these needs should be addressed in a coordinated manner and an IRRP is recommended for the GTA West Region.

## 4 Conclusion

The Scoping Assessment concludes that:

1. A coordinated approach is required and an IRRP is recommended for the GTA West region to address the following needs:
  - Supply security needs on T38/39B, with coordinated consideration of Halton TS #2 timing and loading
  - End of Life decisions regarding the Palermo TS transformers
  - Restoration needs, as defined in Section [3.3.2](#), above
  - Potential long term capacity needs, both transformer and circuit, affecting northern sections of GTA West

Note that this list of needs is not exhaustive, as further detailed evaluation undertaken through the IRRP may identify new needs, particularly those requiring consideration for the longer term. Additionally, the IRRP process is expected to be carried out in a manner that allows for continuous coordination of information, particularly related to needs, timing, and potential solutions with the following two ongoing processes:

- Flow East Towards Toronto (“FETT”) Bulk Study
- Northwest GTA transmission corridor study

The draft Terms of Reference for the GTA West IRRP, outlining the scope, objectives and timeline of the IRRP can be found in Appendix A.

2. A Local Planning process is recommended for end-of-life needs described above, with the exception of Palermo TS T3/T4 transformers. The Working Group will actively monitor the replacement plan for these facilities to ensure that any changes to replacement plan (e.g., changes to the replacement timeline, additional components to be replaced) will be considered in a coordinated manner as part of regional planning activities in this region, as needed. Additionally, the reconductoring of H29/30 represents a straightforward transmission solution which has already been evaluated through regional planning and does not have the potential to be influenced or affected by other planning decisions. As a result, it is recommended that actual loading of Pleasant TS continue to be monitored, and development work for this project be initiated when required.

# List of Acronyms

CDM: Conservation and Demand Management

DG: Distributed Generation

IESO: Independent Electricity System Operator

IRRP Integrated Regional Resource Plan

kV: kilovolt

LDC: Local Distribution Company

MW: Megawatt

NA: Needs Assessment

OEB: Ontario Energy Board

ORTAC: Ontario Resource and Transmission Assessment Criteria

RIP: Regional Infrastructure Plan

TS: Transformation Station

# Appendix A: The GTA West IRRP Terms of Reference

## 1 Introduction and Background

These Terms of Reference establish the objectives, scope, key assumptions, roles and responsibilities, activities, deliverables and timelines for an Integrated Regional Resource Plan (“IRRP”) for the GTA West region.

Based on the needs identified within the region through the Needs Assessment, and further investigated through the Scoping Assessment, an integrated regional resource planning approach for the GTA West region has been recommended.

### The GTA West Region

The Greater Toronto Area (GTA) West Region roughly covers the Regional Municipalities of Halton and Peel. The Region includes the area roughly bordered geographically by Highway 27 to the north east, Highway 427 to the south east, Regional Road 25 to the west, King Street to the north and Lake Ontario to the south. The GTA West Region area comprises the municipalities of Brampton, South Caledon, Halton Hills, Mississauga, Milton, Oakville and portions of Burlington.

Electrical supply to the GTA West Region is provided through 500/230 kV autotransformers at Trafalgar TS and at Claireville TS and 230 kV transmission lines and step-down transformation facilities as shown in Fig. 1. The GTA West Region is defined electrically by the 230 kV transmission circuits bounded by Claireville TS, Richview TS and Manby TS to the east and Burlington TS to the west. Many of the 230 kV transmission circuits in this area provide both a bulk system and regional system functions. That is, in addition to delivering reliable supply to local customers, they also form part of an integrated network that enables large transfers of power between regions of the province. The 500 kV transmission facilities present in this geographic area are also considered bulk assets. Although the bulk transmission system is not the focus of regional planning, it impacts how the system is modelled and contingencies evaluated. The distribution system in this Region is at two voltage levels, 44 kV and 27.6 kV. Local generation in the area include the two gas fired plants, the 1250 MW Goreway GS in Brampton and the 600 MW TCE generation plant in Halton Hills. The Local Distribution Customers (LDC) in the GTA West Region is Burlington Hydro Inc., Alectra Utilities Co., Halton Hills Hydro Inc., Hydro One Networks Inc., Milton Hydro Distribution Inc. and Oakville Hydro Electricity Distribution Inc.

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A geographic layout of the electricity infrastructure supplying GTA West, in addition to the section of GTA North providing supply to Kleinburg TS, is shown in Figure 1, below. An electrical single line diagram for the same area is shown in Figure 2.

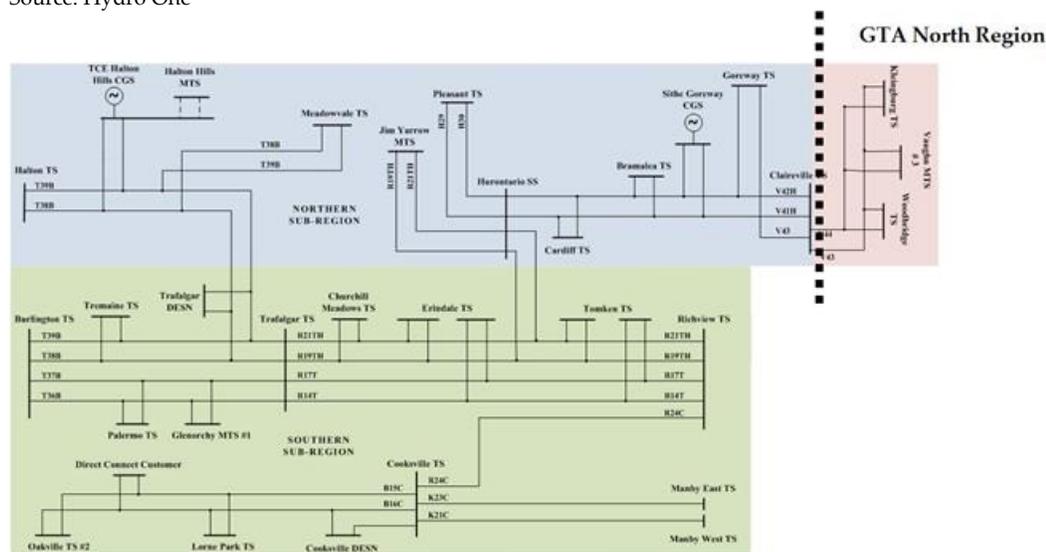
**Figure 1 Geographical Area of the GTA WEST Region with Electrical Layout**

Source: IESO



**Figure 2 GTA WEST Region (Single Line Diagram)**

Source: Hydro One



**Background**

Regional planning in GTA West has been underway for a number of years. A regional planning Working Group for GTA West North sub region (Northwest GTA), consisting of the Independent Electricity System Operator (IESO), Alectra Utilities, Milton Hydro, Halton Hills Hydro, and Hydro One Transmission and Distribution, had been active since 2013. Later that year, the planning process was restructured to conform to the timelines and requirements of the Ontario Energy Board’s (OEB) formalized Regional Planning Process. The first cycle of the regional planning process for GTA West was completed in 2016, with the focus on ensuring adequate supply to support near-term growth in the northern sections of this area and identifying potential long-term risks and opportunities linked to continued strong growth.

Through this formalized regional planning process, a number of projects were recommended to support the near- and medium-term growth and to maximizing the use of the existing system, including:

- Near-term need for two new step-down transmission facilities to ensure new customer connections can be accommodated in Halton Hills and Milton. The first (Halton Hills Hydro MTS) is under construction and expected to come into service shortly, while the second has a tentative need date of 2022 (based on Needs Assessment forecast).
- Medium-term need for a transmission line upgrade to address emerging capacity needs in the central Brampton area (H29/30 supply to Pleasant TS). This need has not yet been triggered, but actual demand is being monitored to determine when work will be initiated.

Additionally, a long term needs for new transmission capacity to serve growth in the northern sections of this region (primarily northern Brampton and southern Caledon) has been identified. Due to the distance between the existing transmission system and areas of anticipated growth, alternatives to new wires infrastructure are not considered viable. As such, it was recommended that work

continue to identify and preserve land capable of supporting a new transmission corridor to serve growth in the area, if and when it manifests.

This second regional planning cycle started with the Needs Assessment (NA) report published by Hydro One in May 2019. The Needs Assessment (“NA”) is the first step in the regional planning process and was carried out by the Study Team lead by Hydro One Networks Inc. (“Hydro One”) for the GTA West region. This report was issued on May 9, 2019 and identified a number of needs. The need information from the Needs Assessment has been input into the scoping process to determine the nature of the planning process to address the identified needs.

During the Scoping Assessment, the participants reviewed the nature and timing of all known needs in the region to determine the most appropriate planning approach going forward. This process also determined the best geographic grouping of the needs in order to create efficient study areas. The planning approaches considered include:

1. An Integrated Regional Resource Plan (“IRRP”) – where a greater range of options, including non-wires alternatives, are to be considered and/or closer coordination with communities and stakeholders is required
2. A Regional Infrastructure Plan (“RIP”) – which considers more straight-forward wires-only options with limited engagement; or
3. A local plan undertaken by the transmitter and affected Local Distribution Company (“LDC”)– where no further regional coordination is needed.

## **2 Objectives**

The GTA West IRRP will assess the adequacy of electricity supply to customers in the region and will develop a set of recommended actions to maintain reliability of supply to the region over the next 20 years. Specifically, the IRRP will:

- Assess the adequacy of electricity supply to customers in the GTA West area over the next 20 years
- Determine whether there is a need to initiate development work or to fully commit infrastructure investments in this planning cycle
- Identify and coordinate major asset renewal needs with regional needs, and develop a flexible, comprehensive, integrated electricity plan for GTA West; and,
- Develop an implementation plan that is flexible in order to accommodate changes in key assumptions over time, while keeping options viable.

### **2.1 Scope**

This IRRP will develop and recommend an integrated plan to meet the needs of the GTA West region. The plan is a joint initiative involving, Hydro One Networks Inc. (Transmission), Hydro One Networks Inc. (Distribution), Alectra Utilities, Burlington Hydro Inc., Milton Hydro Distribution Inc., Oakville Hydro Electricity Distribution Inc., Halton Hills Hydro and the IESO. These organizations

are defined as the Working Group for the GTA West IRRP.

The plan will focus on these specific items:

- Supply security needs on T38/39B, with coordinated consideration of Halton TS #2 timing and loading
- End of Life decisions regarding the Palermo TS transformers
- Restoration needs, as defined in Section [3.3.2](#) of the Scoping Assessment
- Potential long term capacity needs, both transformer and circuit, affecting northern sections of the GTA West region; and,
- Any additional needs that emerge in carrying out the IRRP.

Like all IRRPs, the GTA West IRRP will integrate forecast electricity demand growth, conservation and demand management (“CDM”) in the area, distributed energy resources (“DER”) uptake, transmission and distribution system capability, relevant community plans, and bulk system developments as applicable. In particular, the GTA West IRRP will be carried out in a manner that allows for continuous coordination of information, particularly related to needs, timing, and potential solutions with the following two ongoing processes:

- Flow East Towards Toronto (“FETT”) Bulk Study
- Northwest GTA transmission corridor study

Based on the identified needs, the GTA West IRRP process will consist of the following activities:

- 1) Development of a Stakeholder Engagement Plan
- 2) Development of an updated 20-year demand / load forecast for the region.
- 3) Assessment of the adequacy of transformer station ratings and the area’s load meeting capability and reliability:
  - a. Identify or confirm the transformer station capacity needs and sufficiency of the area’s load meeting capability for the study period using the updated load forecast.
  - b. Confirm identified restoration and security needs using the updated load forecast.
  - c. Collect information on any know reliability issues and load transfer capabilities from the Local Distribution Companies (“LDCs”)
- 4) Assessment of options for confirmed needs. Options are evaluated using decision making criteria included, but not limited to, technical feasibility, economics, reliability performance, and environmental and social factors.
- 5) Development of the long-term recommendations and the implementation plan.
- 6) Completion of the IRRP report documenting the near-, mid-, and long-term needs and recommendations.

Depending on the nature and the urgency of the electricity needs and risks identified, the IRRP could recommend a combination of the following actions:

- Active monitoring
- Project development work to shorten lead time for the project, without firm commitment for constructing the project.
- Commitment of Project and Proceed with Project Implementation (e.g., resources acquisition, transmission procurement, regulatory approval)
- Interim measures to manage the near-term requirements, until longer-term solutions could come into service
- Additional pilots, studies and/or engagement to gather more information
- Coordination with other planning or related processes (e.g., community or bulk system planning)

Should the IRRP identify the need for infrastructure investment, the IRRP will provide a rationale and define high-level project requirements to support project development and implementation to be carried out by other proponents. The outcomes from the GTA West IRRP will help inform transmitter and LDC rate filings and any related transmission/resources acquisitions processes that may result.

It is important to note that detailed discussion of acquisition mechanisms, cost allocation, cost recovery, siting, operations and implementation of recommended projects are beyond the scope of IRRP.

In order to carry out this scope of work, the working group will consider the data and assumptions outlined in section 4 below.

## **2.2 Data and Assumptions**

The plan will consider the following data and assumptions:

- Demand Data
  - Historical coincident & non-coincident peak demand information for the region
  - Historical weather correction, for median and extreme conditions
  - Gross peak demand forecast scenarios by region, TS, etc.
  - Coincident peak demand data including transmission-connected customers
  - Identified potential future load customers
- Conservation and Demand Management
  - Incorporation of verified results for CDM programs/opportunities in the area
  - Long-term conservation forecast for LDC customers based on planned Provincial CDM activities
  - LDC Local Programs, if applicable
  - Conservation potential studies, if available
  - Potential for CDM at transmission-connected customers' facilities
  - Load segmentation data for each TS based on customer type (e.g., residential, commercial, industrial, agricultural) and proportion of LDC service territory within the study area

- Local resources
  - Existing local generation, including distributed generation (“DG”), district energy, customer-based generation, non-utility generators and hydroelectric facilities as applicable
  - Existing or committed renewable generation from Feed-in-Tariff (“FIT”) and non-FIT procurements
  - Future resource proposals as relevant
  
- Relevant local plans, as applicable
  - LDC Distribution System Plans
  - Community Energy Plans and Municipal Energy Plans (e.g., Community Energy Investment Strategy for Waterloo Region)
  - Municipal Growth Plans
  - Any transit plans impacting electricity use or tied to community developments
  
- Existing system capability
  - Transmission line ratings as per transmitter records
  - Transformer station ratings (10-day LTR) as per asset owner
  - Load transfer capability
  - Technical and operating characteristics of local generation
  
- End-of-life asset considerations and sustainment plans
  - Transmission assets
  - Distribution assets
  - Impact of on-going plans and projects on applicable facility ratings
  
- Other considerations, as applicable

## 2.3 Working Group

The core Working Group will consist of planning representatives from the following organizations including embedded LDCs that have identified needs in this region:

- Independent Electricity System Operator (*Team Lead for IRRP*)
- Hydro One Networks Inc. (Transmission)
- Hydro One Networks Inc. (Distribution)
- Alectra Utilities
- Burlington Hydro Inc.
- Milton Hydro Distribution Inc.
- Oakville Hydro Electricity Distribution Inc.
- Halton Hills Hydro

## Authority and Funding

Each entity involved in the study will be responsible for complying with regulatory requirements as applicable to the actions/tasks assigned to that entity under the implementation plan resulting from this IRRP. For the duration of the study process, each participant is responsible for their own funding.

## 2.4 Engagement

Integrating, early and sustained engagement with communities and stakeholders is a key component in the IRRP planning process.

The first step in engagement will consist of the development of a stakeholder engagement plan, which will be made available for comment before it is finalized. Below is the scope of community and stakeholder engagement to be considered for this IRRP:

- Local electricity needs and considerations
- Status and key assumptions from Community Energy Planning (e.g., energy intensity, Electric Vehicles and fuel switching scenarios)
- Status and key assumptions in Growth Plans and local economic developments (housing, population growth, commercial and industrial development)
- Impact of climate change in GTA West
- Long-term Land Use and Infrastructure Corridor Plans
- Local interests in developing and implementing community-based energy solutions and factors that could facilitate or hinder the implementation of community-based energy solutions. For example:
  - Existing or planned pilot projects
  - Available local funding to support these pilots
  - Local policy/programs that enable/hinder the development of these projects
  - Support from local utilities, community groups and government
  - Land use impact and considerations

### 3. Activities, Timelines and Primary Accountability

**Table A-1 Summary of IRRP Timelines and Activities**

Activity	Load Responsibility	Deliverables	Timeframe
Prepare Terms of Reference considering stakeholder input	IESO	Finalized Terms of Reference	Aug – Oct 2019
Develop the Planning Forecast for the sub-region: <ul style="list-style-type: none"> <li>• Establish historical coincident and non- coincident peak demand information</li> <li>• Establish historical weather correction, median and extreme conditions</li> <li>• Establish gross peak demand forecast and high/low growth scenarios</li> <li>• Establish existing, committed and potential DG</li> <li>• Establish near- and long-term conservation forecasts based on planned Conservation activities and codes and standards</li> <li>• Develop planning forecast scenarios - including the impacts of CDM, DG and extreme weather conditions</li> </ul>	IESO  IESO  LCDs  IESO  IESO	Long-term planning forecast scenarios	Sept – Dec 2019
Provide information on load transfer capabilities under normal and emergency conditions	LDCs	Load transfer capabilities under normal and emergency conditions	Sept – Dec 2019
Provide and review relevant community plans, if applicable	LDCs and IESO	Relevant community plans	Sept – Dec 2019

Activity	Load Responsibility	Deliverables	Timeframe
<p>Develop Options and Alternatives:</p> <ul style="list-style-type: none"> <li>• Develop conservation options</li> <li>• Develop local generation options</li> <li>• Develop transmission (see Action 7 below) and distribution options</li> <li>• Develop options involving other electricity initiatives (e.g., smart grid, storage)</li> <li>• Integrate with bulk needs</li> <li>• Develop portfolios of integrated alternatives</li> <li>• Technical comparison and evaluation</li> </ul>	<p>IESO and LDCs IESO and LDCs</p> <p>All</p> <p>IESO and LDCs with support as needed</p> <p>IESO All</p> <p>All</p>	<p>Develop flexible planning options for forecast</p>	<p>Q1 – Q3 2020</p>
<p>Plan and Undertake Community &amp; Stakeholder Engagement</p> <ul style="list-style-type: none"> <li>• Early engagement with local municipalities and Indigenous communities within study area, First Nation communities who may have an interest in the study area, and the Métis Nation of Ontario</li> <li>• Develop communications materials</li> <li>• Undertake community &amp; stakeholder engagement</li> <li>• Summarize input &amp; and incorporate feedback</li> </ul>	<p>All</p>	<ul style="list-style-type: none"> <li>• Community and Stakeholder Engagement Plan</li> <li>• Input from local communities</li> </ul>	<p>Q3 2019 – ongoing as required</p>

Activity	Load Responsibility	Deliverables	Timeframe
Develop long-term recommendations and implementation plan based on community and stakeholder input	IESO	<ul style="list-style-type: none"> <li>• Implementation plan</li> <li>• Monitoring activities and identification of decision triggers</li> <li>• Hand-off letters</li> <li>• Procedures for annual review</li> </ul>	Q3-Q4 2020
Prepare the IRRP report detailing the recommended near, medium and long-term plan for approval by all parties	IESO	IRRP report	February 9, 2021

## Appendix B: Selecting a Regional Planning Approach

Needs identified through the Needs Assessment (NA) will be reviewed during the Scoping Assessment to determine whether a Local Plan (LP), Regional Infrastructure Plan (RIP), or Integrated Regional Resource Plan (IRRP) regional planning approach is more appropriate. Where multiple sub-regions are identified, each will be considered individually. It is possible that a combination of LP, RIP and IRRP planning approaches could be selected in different sub-regions, although if the need for wires-type solution is urgent, it will typically trigger a hand-off letter instead.

The three potential planning outcomes are designed to carry out different functions, and selection should be made based on the unique needs and circumstances in each area. The criteria used to select the regional planning approach within each sub-region are consistent with the principles laid out in the PPWG Report to the Board and are discussed in this document to ensure consistency and efficiency throughout the Scoping Assessment.

IRRPs are comprehensive undertakings that consider a wide range of potential solutions to determine the optimal mix of resources to meet the needs of an area for the next 20 years, including consideration of conservation, generation, new technologies, and wires infrastructure. RIPs focus instead on identifying and assessing the specific wires alternatives and recommend the preferred wires solution for an area and are thus, narrower in scope. LPs have the narrowest scope; only considering simple wires solutions that do not require further coordinated planning. A LP process is recommended when needs are:

- (a) Local in nature (only affecting one LDC or customer)
- (b) Limited investments of wires (transmission or distribution) solutions
- (c) Does not require upstream transmission investments
- (d) Does not require plan level community and/or stakeholder engagement and,
- (e) Does not require other approvals such as Leave to Construct (S92) application or Environmental Approval.

If it is determined that coordinated planning is required to address identified needs, either a RIP or IRRP may be initiated. A series of criteria have been developed to assist in determining which planning approach is the most appropriate based on the identified needs. These are discussed below. In general, an IRRP is initiated:

- Wherever a non-wires measure has the potential to meet or significantly defer the needs identified by the transmitter during the Needs Assessment
- Community or stakeholder engagement is required, or
- The planning process or outcome has the potential to impact bulk system facilities

If it is determined that the only feasible measures involve new/upgraded transmission and/or

distribution infrastructure, with no requirement for engagement or anticipated impact on bulk systems, a RIP will be selected instead.

Wires type transmission/distribution infrastructure solutions refer, but are not limited, to:

- Transmission lines
- Transformer/ switching stations
- Sectionalizing devices including breakers and switches
- Reactors or compensators
- Distribution system assets

Additional solutions, including conservation and demand management, generation, and other electricity initiatives can also play a significant role in addressing needs. Because these solutions are non-wires alternatives, they must be studied through an IRRP process.

Determining the feasibility of non-wires alternatives to meet identified needs should also consider issues such as timelines for implementing solutions. For instance, if a need has been identified as immediate or near term, non-wires solutions that rely on lengthy development and roll-out periods may not be feasible.