Hydro One Networks Inc.
483 Bay Street
7th Floor South Tower
Toronto, Ontario M5G 2P5
HydroOne.com

Pasquale Catalano
Director
Infrastructure, Partnerships and Compliance
C 647.616.8310
Pasquale.Catalano@HydroOne.com

BY EMAIL AND RESS

October 23, 2026

Mr. Ritchie Murray
Registrar
Ontario Energy Board
Suite 2700, 2300 Yonge Street
P.O. Box 2319
Toronto, ON M4P 1E4

Dear Mr. Murray,

EB-2026-0254 – Hydro One Networks Inc. Leave to Construct – H29/H30 Transmission Line Project – Application and Evidence

Pursuant to Section 92 of the Ontario Energy Board Act, 1998, (the "Act"), Hydro One Networks Inc. ("Hydro One") seeks the Ontario Energy Board's ("OEB") approval for an Order or Orders granting leave to construct transmission line facilities in the Brampton area of Southwest Ontario.

Additionally, pursuant to Section 97 of the Act, Hydro One seeks OEB approval for an Order granting approval of the forms of land use agreements offered or to be offered to affected landowners.

Hydro One is confirming that the documents filed in support of the referenced application do not include any personal information under the Freedom of Information and Protection of Privacy Act (Ontario) ("FIPPA") with respect to this Application.

An electronic copy of this Application and Evidence has been filed using the OEB's Regulatory Electronic Submission System.

Sincerely,

Pasquale Catalano

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EXHIBIT LIST

Exhibit	Tab	Schedule	Attachment	Contents
A				
	1	1		Exhibit List
	1	2		Mapping Filing Requirements to Exhibit List
	1	3		List of Acronyms and Abbreviations
B				
	1	1		Application
	2	1		Project Overview
	2	1	1	General Area Map
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	3	1		Evidence In Support of Need
	3	1	1	IESO Support of Need – Letter to Hydro One
	4	1		Project Categorization
	5	1		Cost Benefit Analysis and Options
	6	1		Quantitative Benefits of the Project
	7	1		Apportioning Project Costs and Risks
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Exhibit	Tab	Schedule	Attachment	Contents
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C				
	1	1		Descriptions of the Physical Design
D				
	1	1		Operational Details
E				
	1	1		Land Matters
	1	1	1	Detailed Route Map with PINs
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	1	1	3	Transfer and Grant of Easement Agreement
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F				
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Exhibit	Tab	Schedule	Attachment	Contents
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	1	1	2	Report - GTA West – Regional Infrastructure Plan – Feb 2022

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MAPPING OEB CHAPTER 4 FILING REQUIREMENTS TO S92 EXHIBIT LIST

OEB Chapter 4 Filing Requirement	Hydro One S.92 Application Exhibit
4.3.1 – The Index	A-01-01 – Exhibit List A-01-02 – Mapping OEB Chapter 4 Filing Requirements to s.92 Application Exhibit List
4.3.2 – The Application	
4.3.2.1 – Administrative Matters	B-01-01 – Application
4.3.2.2 – Project Overview	B-02-01 – Project Overview Documents C-01-01 – Descriptions of the Physical Design
4.3.2.3 – Evidence in Support of Need for the Project	B-03-01 – Evidence in Support of Need
4.3.2.4 – Project Categorization	B-04-01 – Project Categorization and Classification
4.3.2.5 – Analysis of Alternatives	B-05-01 – Cost Benefit Analysis and Options B-06-01 – Quantitative and Qualitative Benefits
4.3.2.6 – Project Costs	B-07-01 – Apportioning Project Costs and Risks B-09-01 – Transmission Rate Impact Assessment
4.3.2.7 – Risks	B-07-01 – Apportioning Project Costs and Risks
4.3.2.8 – Comparable Projects	B-07-01 – Apportioning Project Costs and Risks
4.3.2.9 – Connection Projects that Also Address a Network Need	B-08-01 – Connection Projects Requiring Network Reinforcement
4.3.2.10 – Connection Projects Requiring Network Reinforcement	B-08-01 – Connection Projects Requiring Network Reinforcement

OEB Chapter 4 Filing Requirement	Hydro One S.92 Application Exhibit
4.3.2.11 – Transmission Rate Impact Assessment	B-09-01 – Transmission Rate Impact Assessment
4.3.2.12 – Establishment of Deferral Accounts	B-10-01 – Revenue Requirement Information and Deferral Account Requests
4.3.2.13 – Capital Contribution Period	B-09-01 – Transmission Rate Impact Assessment
4.3.2.14 – Project Schedule	B-11-01 – Project Schedule
4.3.3 – Project Details	
4.3.3.1 – The Route	B-02-01 - Project Overview Documents
4.3.3.2 – Description of the Physical Design	C-01-01 – Descriptions of the Physical Design
4.3.3.3 – Maps	B-02-01 - Project Overview Documents E-01-01 – Land Matters
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4.3.6 – System Impact Assessment	F-01-01 – System Impact Assessment
4.3.7 – Customer Impact Assessment	G-01-01 – Customer Impact Assessment

OEB Chapter 4 Filing Requirement	Hydro One S.92 Application Exhibit
4.3.8 – Regional and Bulk Planning	H-01-01- Regional and Bulk Planning
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4.3.8.3 – Bulk System Plan	H-01-01- Regional and Bulk Planning

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Acronym or Abbreviation Expansion
A	Amperes
AACE	Association for the Advancement of Cost Engineering *(estimate classification system)*
ACSR	Aluminum Conductor Steel Reinforced
ACSS	Aluminum Conductor Steel Supported
Alectra	Alectra Utilities Corporation
CCRA	Connection Cost Recovery Agreement
CIA	Customer Impact Assessment
CSA	Canadian Standards Association
CTS	Customer Transformer Station
Class EA	Class Environmental Assessment
DCF	Discounted Cash Flow
EA	Environmental Assessment
EMF	Electromagnetic Field
ESR	Environmental Study Report
FETT	Flow East Towards Toronto
Hydro One	Hydro One Networks Inc.
IEP	Integrated Energy Plan
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Plan
ISD	Investment Summary Document
ISOC	Integrated System Operating Centre
JCT	Junction
kcmil	Kilo-circular mils *(unit of measure of the area of a wire with a circular cross section)*
km	Kilometer
kV	Kilovolt
kW	Kilowatt
LDC	Local Distribution Company
LTC	Leave to Construct
LTE	Long Term Emergency

Acronym or Abbreviation	Acronym or Abbreviation Expansion
LTR	Limited Time Rating
MTO	Ministry of Transportation
MW	Megawatt
MWH *(or MWHR)*	Megawatt-hour
NERC	North American Electric Reliability Council
NPV	Net Present Value
NPCC	Northeast Power Coordinating Council
OEB	Ontario Energy Board
OEMP	Ontario Electricity Market Price
OM&A	Operations, Maintenance and Administrative costs
OPGW	Optical Fibre Ground Wire
PC&T	Protection, Control and Telecom
PIN	Property Identification Number
PV	Present Value
RIP	Regional Infrastructure Plan
ROW	Right-of-Way
RPP	Regulated Price Plan
SIA	System Impact Assessment
SS	Switching Station
TS	Transformer Station
TSC	Transmission System Code
TW	Trapezoidal Wire
UTR	Uniform Transmission Rates

ONTARIO ENERGY BOARD

IN THE MATTER OF the Ontario Energy Board Act, 1998, S.O. 1998, c. 15, Schedule B (the "Act");

AND IN THE MATTER OF an Application by Hydro One Networks Inc. pursuant to s. 92 of the Act, for an Order or Orders granting leave to construct in order to reconductor the existing transmission line H29/H30 ("H29/H30 Transmission Line Project" or the "Project") between Hurontario Switching Station ("Hurontario SS") and Pleasant Transformer Station ("Pleasant TS").

AND IN THE MATTER OF an Application by Hydro One Networks Inc. pursuant to s. 97 of the Act for an Order granting approval of the forms of agreement offered or to be offered to affected landowners.

APPLICATION FOR LEAVE TO CONSTRUCT

OCTOBER 23, 2026

A. INTRODUCTION

1. The Applicant is Hydro One Networks Inc. ("Hydro One"), a subsidiary of Hydro One Inc. The Applicant is an Ontario corporation with its head office in the City of Toronto. Hydro One carries on the business of, among other things, owning and operating transmission facilities within Ontario.

2. Hydro One hereby applies to the Ontario Energy Board ("OEB" or "Board") pursuant to s. 92 of the Act for an Order or Orders granting leave to construct to reconductor an existing 230 kV transmission double-circuit (nomenclature "H29/H30") in the Brampton area in Ontario (the "Project" or "H29/H30 Transmission Line Project").

3. Hydro One is seeking approval from the OEB of the form of the voluntary property rights agreements offered or to be offered to affected landowners, pursuant to s. 97 of the Act.

4. The Application is supported by written evidence which includes details of the Applicant's proposal for the H29/30 Transmission Line Project. The written evidence is prefiled and may be amended from time to time prior to the OEB's final decision.

5. Acronyms are used throughout the evidence and are defined at **Exhibit A, Tab 1, Schedule 3**.

B. NATURE OF THE PROJECT

6. The H29/H30 circuit is a 230 kV radial double-circuit transmission line that emanates from Hurontario SS and solely supplies Pleasant TS, servicing customers in the Brampton, Caledon, and Halton Hills area, along the existing right-of-way ("ROW").

7. As identified by the Independent Electricity System Operator ("IESO"), the Long-Term Emergency ("LTE") rating of the transmission line is lower than the Limited Time Rating ("LTR") of the transformers at Pleasant TS, meaning the power flows into Pleasant TS are constrained by the rating (i.e., supply capacity) of the H29/H30 transmission circuit.

8. Reconductoring of the H29/H30 circuits is driven by the need originally identified in the IESO's 'Northwest Greater Toronto area Integrated Regional Resource Plan[1] ("IRRP"), dated April 28, 2015, and is to upgrade the H29/H30 circuits to provide higher thermal capacity thus enabling step-down transformer facilities located at Pleasant TS to achieve their maximum rated capacity. The Project will improve operational effectiveness and provide sufficient transmission capacity to accommodate forecast load growth in the area. The need for the Project has been reaffirmed and recommended in subsequent regional planning processes. Copies of the IRRP and RIP can be found at Attachments to **Exhibit H, Tab 1, Schedule 1.** The IESO has also provided correspondence to address whether the Project has linkages and/or interdependencies to other planned or recommended transmission or non-wires projects in regional plans and/or IESO bulk plans. A copy of the correspondence is included at **Exhibit B, Tab 3, Schedule 1, Attachment 1**.

9. The Project has been identified as a non-discretionary development project, as further described in **Exhibit B, Tab 4, Schedule 1**.

10. The 230 kV 1033.5 kcmil Aluminum-Conductor-Steel-Supported ("ACSS") / Trapezoidal Wire ("TW") conductor selected by Hydro One to construct the new transmission line is predicated on Hydro One's commitment to minimize transmission line losses, where feasible. The H29/H30 Transmission Line Project will ensure safe and reliable supply of electricity. Further information regarding the

[1] https://www.ieso.ca/-/media/Files/IESO/Document-Library/regional-planning/Northwest-Greater-Toronto/2015-Northwest-GTA-IRRP-Report.pdf, Pg.73.

transmission line loss analysis for the Project is provided in **Exhibit B, Tab 5, Schedule 1.**

11. A copy of an overview map of the Project area is provided in **Exhibit B, Tab 2, Schedule 1, Attachment 1,** and a copy of a schematic diagram of the Project can be found at **Exhibit B, Tab 2, Schedule 1, Attachment 2.**

12. The proposed in-service date for the H29/H30 Transmission Line Project is the end of April 2029. It is predicated on a construction commencement date of April 2027 and an OEB leave to construct approval by March 2027. The Project Schedule is provided in **Exhibit B, Tab 11, Schedule 1**.

13. Hydro One submits that the leave to construct application can be assessed in a manner that is consistent with the short-form leave to construct performance standards. Hydro One consents to this proceeding being reviewed in accordance with the procedural steps defined therein if the OEB determines that a hearing is necessary to assess the public interest.

14. The IESO has completed a System Impact Assessment ("SIA"). The SIA concludes that the Project is expected to have no material adverse impact on the reliability of the integrated power system and recommends that a *Notification of Conditional Approval for Connection* be issued. The IESO's final SIA is provided in **Exhibit F, Tab 1, Schedule 1, Attachment 1.**

15. Hydro One has completed a Customer Impact Assessment ("CIA") in accordance with Hydro One's connection procedures. A copy of the final CIA is provided at **Exhibit G, Tab 1, Schedule 1, Attachment 1**. Hydro One will fulfill all requirements of the SIA and the CIA, and will obtain all necessary approvals, permits, licences, certificates, agreements, and rights required to construct the Project.

16. The forecast total cost of the transmission line facilities Project for which Hydro One is seeking approval is approximately $20.3 million[2]. The details pertaining to these costs are provided in **Exhibit B, Tab 7, Schedule 1, Table 1**. To support affordability, and consistent with the aims of the Integrated Energy Plan to reduce upfront capital costs associated with connecting to distribution and transmission infrastructure[3], Hydro One has proposed to extend the revenue horizon for the two directly-connected transmission affected Local Distribution Companies ("LDCs") to 40 years to align the transmission connection revenue horizon for the LDCs with recent amendments to the Distribution System Code[4]. The Project economics, as outlined in **Exhibit B, Tab 9, Schedule 1**, show that the Project will result in no impact on the line connection pool rate and no impact on the overall average Ontario consumer's electricity bill.

C. PROJECT LAND REQUIREMENTS

17. The total length of the Project's double-circuit transmission line is approximately 8.5 kilometers, which traverses various land-owners (municipal, provincial, railway, etc.). The Project will utilize the existing corridor width, the vast majority of which is 36 m.

18. Hydro One currently holds 99.6% of the land rights required along the route. Consequently, Hydro One is also seeking approval in this Application of the forms of agreement offered or to be offered to facilitate the establishment of additional permanent rights for the H29/H30 circuit, where necessary. As of the date of filing the Application, Hydro One requires a single permanent land right agreement from a municipally owned property, but all other necessary land rights to deliver the Project are held by Hydro One. Hydro One intends to work towards a voluntary agreement

[2] An additional $1.3M of OM&A removal costs are associated with completing this Project
[3] mem-energy-for-generations-en-2025-07-18.pdf, p.85
[4] https://www.rds.oeb.ca/CMWebDrawer/Record/908732/File/document?_gl=1*dxqtp2*_gcl_au*MTM0NzgxNjU2OC4xNzkwMTgxNTI5

that would enable Hydro One to acquire a permanent easement over this property. Hydro One anticipates reaching a voluntary agreement pending the municipal approval process required to grant the easement. Should the need arise, temporary construction rights for access or staging areas may be required for the duration of the construction period of the Project. Further information on Land Related matters is found in Exhibit E, Tab 1, Schedule 1.

D. PUBLIC INTEREST

19. The Project is being undertaken to address the needs of the transmission system and connected customers in the local area. The Project is expected to increase downstream transmission capacity and maintain or improve the quality of service and reliability of the H29/H30 circuit.

20. The Project has considered transmission line losses in a cost-effective manner. There are no practical alternatives to the Project scope of work. Further information regarding the cost benefit analysis of the Project is provided in **Exhibit B, Tab 5, Schedule 1**.

21. The quantitative and qualitative benefits of the Project provided at **Exhibit B, Tab 6, Schedule 1**, describes how the Project aligns with supporting economic growth consistent with the policies of the provincial government, including affordability, and identifies specific sections of Ontario's Integrated Energy Plan ("IEP") that are relevant to the Project as required by OEB CEO Policy 2026-01[5].

22. As documented in the final CIA[6], no directly connected customers are adversely affected by the Project. The IESO's Final SIA[7] confirms that the Project will have no material adverse impact on the reliability of the integrated power system.

[5] https://www.rds.oeb.ca/CMWebDrawer/Record/931660/File/document?_gl=1*ogwr5*_gcl_au*NTUxMzEzNTkxLjE3ODY1MDQyODg.
[6] Exhibit G, Tab 1, Schedule 1, Attachment 1.

23. Overall, the Project is not expected to have a material impact on Uniform Transmission Rates or the overall average Ontario consumer's electricity bill. Hydro One consents to the conditions outlined in the OEB's Standard Conditions of Approval for Electricity Transmission Leave to Construct Applications[8] for the Project.

E. REQUESTED RELIEF

24. Hydro One requests:
    a) An Order or Orders made pursuant to section 92 of the Act granting leave to construct the Project;
    b) An Order approving the form of the voluntary property rights agreements offered or to be offered to affected landowners, pursuant to s. 97 of the Act, and
    c) Such other relief as Hydro One may request or as the Board may direct.

25. Hydro One further requests that the proceeding be disposed of without a hearing pursuant to section 21 (4)(b) of the OEB Act as no person will be adversely affected in a material way by the outcome of the proceeding. Hydro One has provided justifications for this request in Appendix A of the Application. However, should the OEB consider that a hearing is necessary, Hydro One requests that the OEB establish defined procedural steps through to a decision at the outset of the proceeding at the time of issuance of Procedural Order No. 1.

[7] Exhibit F, Tab 1, Schedule 1, Attachment 1.
[8] https://www.oeb.ca/sites/default/files/issues-list-LTC-electricity.pdf

F. ADMINISTRATIVE MATTERS

26. Hydro One requests that a copy of all documents filed with the Board be served on the Applicant and the Applicant's counsel, as follows:

a) The Applicant:

Ms. Eryn Mackinnon
Regulatory Advisor
Hydro One Networks Inc.

Mailing Address:	7th Floor, South Tower
	483 Bay Street
	Toronto, Ontario M5G 2P5
Telephone:	(437) 318-3700
Email:	Regulatory@HydroOne.com

b) The Applicant's Counsel:

Mr. Evan J. Barz / Mr. Alex Farrant
Osler, Hoskin & Harcourt LLP

Mailing Address:	Suite 6200, First Canadian Place
	100 King Street West
	Toronto, Ontario M5H 1H1
Telephone:	(416) 862-4209 / (416) 862-4216
Fax:	(416) 862-6666
Electronic access:	ebarz@osler.com / afarrant@osler.com

APPENDIX A

HYDRO ONE'S BASIS FOR REQUESTING NO HEARING FOR THIS S.92 APPLICATION

Hydro One provides the following summary of evidence in support of its request that the Application be adjudicated without a hearing as follows:

1. The SIA concludes that the Project is expected to have no material adverse impact on the reliability of the integrated power system, provided that all requirements in the SIA report are implemented Please refer to **Exhibit F, Tab 1, Schedule 1 Attachment 1**.

2. The CIA results confirm that the Project will not have any adverse effect on the voltage in the area and will improve the supply reliability to the area as detailed in **Exhibit G, Tab 1, Schedule 1, Attachment 1**.

3. There will be no impact on uniform transmission rates as detailed in **Exhibit B, Tab 9, Schedule 1**.

4. Although there is one municipally held property that Hydro One requires land rights for to accommodate the proposed transmission facilities, Hydro One believes it is appropriate to move forward in the manner requested as the registered owner of the property is a municipality that has not opposed the acquisition of the requested land rights. Hydro One has been engaging with the municipality since August 2024 and is following the municipality's land disposition process in order to secure the required permanent rights. Hydro One expects the remaining administrative steps in the municipal land disposition process to conclude, and for Hydro One to have the outstanding land right secured and register the easement on title, by the end of 2026. Hydro One is committed to working with the municipality to ensure future municipal

plans for the property are respected and accommodated, as further discussed at **Exhibit E, Tab 1, Schedule 1**.

5. Cumulatively, this evidence illustrates that no person will be adversely affected in a material way by the outcome of the proceeding.

PROJECT OVERVIEW

Hydro One is seeking approval to reinforce an existing 230 kV radial double-circuit transmission circuit (nomenclature "H29/H30") in the Brampton area of Southwest Ontario. The original circuits were placed in-service in 1964 and provide electrical supply primarily to two transmission-connected customers[1] (referred to herein collectively as the "Customers", the "Local Distribution Companies" or "LDCs")

The proposed Project consists of the reconductoring of an approximately 8.5 km transmission circuit (or approximately 17 circuit-km) that spans between Hurontario SS and Pleasant TS. These circuits provide the sole supply to Pleasant TS, from Hurontario SS, from which the Customers are connected and receive their electrical supply.

This Project is driven by the need for additional supply capacity on this circuit. In recent years the H29/30 circuit's peak load demand has exceeded the line's thermal limit, also known as the long-time emergency ("LTE") rating of the circuits. Currently, the LTE rating of the transmission line is approximately 100 Megawatts ("MW") lower than the 10-day Limited Time Rating ("LTR") of the transformers at Pleasant TS, meaning that the transformer capacity at Pleasant TS is not being fully utilized due to a restricted flow on the H29/H30 circuits. Additional increases in electricity demand are forecast by the LDC's connected to the Pleasant TS facility. In the circuits' current configuration Pleasant TS will <u>not</u> be able to accommodate the forecast LDC increases if the existing conductors on the H29/H30 circuit are not upsized. In addition to reconductoring the transmission circuits, the Project also requires minor reinforcement of the steel towers along the route to accommodate the upsized conductor's additional weight and meet new security standards.

[1] Alectra Utilities Corporation (or "Alectra"), and Hydro One Distribution. Halton Hills Hydro is also served indirectly from Pleasant TS; however they are categorized as an embedded distributor of Hydro One Distribution.

The Project supports the continued safe and reliable operation of the existing transmission system by addressing the thermal capacity needs on the H29/H30 circuits.

A map showing the geographic location of the Project, and the existing facilities, including the transmission line route is provided in **Exhibit B, Tab 2, Schedule 1, Attachment 1.** This Project will maintain the existing ROW and does not contemplate the acquisition of new land rights, other than reaffirming land rights for one municipally held property.

Schematic diagrams of the transmission line facilities are provided at **Exhibit B, Tab 2, Schedule 1, Attachment 2.**

The Project will deliver the following benefits:

- fully accommodate the current transformer capacity at Pleasant TS by relieving the thermal bottleneck that currently exists on the H29/H30 circuits, thereby unlocking and enabling further downstream load growth to be supported by Pleasant TS;
- support Hydro One's commitment to customers by improving system reliability;
- reduce lines loses; and
- ensure compliance with current engineering, safety, and operating standards.

Filed: 2026-10-23
EB-2026-0254
Exhibit B-2-1
Attachment 1
Page 1 of 1

PLEASANT TS

JIM YARROW MTS

HURONTARIO SS

CITY OF BRAMPTON

CITY OF MISSISSAUGA

MCLAUGHLIN RD N

MAIN ST S

KENNEDY RD S

STEELES AVE E

HIGHWAY 401

CREDITVIEW RD

BOVAIRD DR W

WILLIAMS PKY

QUEEN ST W

MCLAUGHLIN RD S

Etobicoke Creek

KENNEDY RD

HURONTARIO ST

CHINGUACOUSY RD

STEELES AVE W

MAVIS RD

Credit River

MISSISSAUGA RD

HIGHWAY 407

DERRY RD W

MCLAUGHLIN RD

H29/H30 Transmission Line Project - Section 92 Overview Map

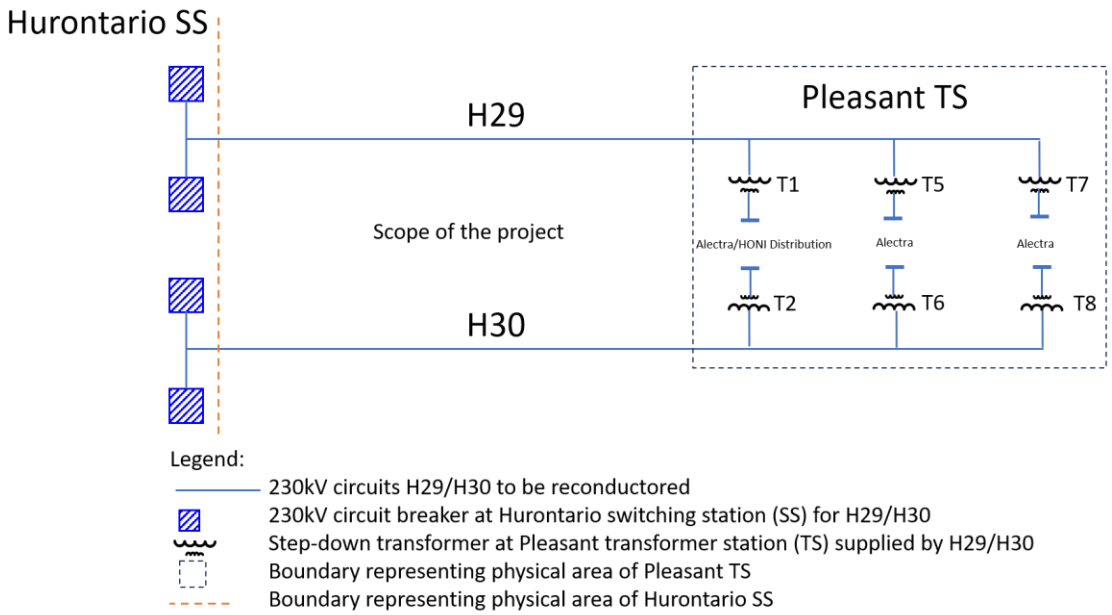
- Transformer Station (TS)
- H29/H30 Transmission Line
- Other Existing Transmission Line
- Highway
- Major road
- Railway
- Waterbody
- Municipal Boundary

1:25,000 0 0.5 1 km

RECONDUCTORING OF EXISTING FACILITIES:

H29/H30: Hurontario SS x Pleasant TS

SIMPLIFIED SCHEMATIC DIAGRAM



EVIDENCE IN SUPPORT OF NEED

The H29/H30 circuits radially supply Hydro One's Pleasant TS. Pleasant TS directly supplies two LDCs, Alectra and Hydro One Distribution. This Project is driven by the need identified by the IESO for additional supply capacity due to recent instances of high system loading. The Project is also driven by the forecast increased electricity demand to be supplied by Pleasant TS to the LDCs. The existing conductors of the H29/H30 circuit consist of ACSR 795 kcmil 26/7, with a summer LTE rating of 1,100 A. The proposed new conductors will consist of ACSS 1033.5 kcmil with a summer LTE of 1,700 A and will satisfy the capacity increase needed through increased thermal capability.

The need for reconductoring the H29/H30 230 kV circuits was initially identified in the IESO's *Northwest Greater Toronto area Integrated Regional Resource Plan*[1] ("the 2015 IRRP"), dated April 28, 2015. The Northwest Greater Toronto Area Working Group describes concerns regarding future overloading at Pleasant TS. To address this need, the 2015 IRRP recommended Hydro One undertake the preliminary work required to validate the technical, feasibility and cost for the replacement of conductors on the H29/30 circuits to a summer LTE planning rating of 1400 A and that this measure be implemented before peak loads at Pleasant TS exceed approximately 417 MW.

The IESO subsequently published its 'Greater Toronto Area West (Peel/Halton) Integrated Regional Resource Plan', dated July 2021 ("the 2021 IRRP")[2]. Recommendations that flowed out of the 2021 IRRP considered that the GTA West electricity demand forecast projects sustained growth driven by urbanization and development particularly in the northern areas of the region. Municipalities have also published community energy plans and/or climate change action plans that call for greater electrification which could drive additional upward pressure on the demand

[1] https://www.ieso.ca/-/media/Files/IESO/Document-Library/regional-planning/Northwest-Greater-Toronto/2015-Northwest-GTA-IRRP-Report.pdf, Pg. 63
[2] Exhibit H, Tab 1, Schedule 1, Attachment 1.

forecast[3]. Therefore, to accommodate load growth and maintain reliability, the 2021 IRRP recommended upgrading the H29/H30 circuit to provide higher capacity on the circuits[4]. The Project need was subsequently reaffirmed in the GTA West Regional Infrastructure Plan ("RIP") issued February 23, 2022[5]. Since that 2022 GTA West RIP, and in accordance with Section 3C.3.3 of the TSC, Hydro One has continued to apprise the OEB via an annual report identifying the status of regional planning for all regions including GTA West. Therein, the Project is explicitly identified with the latest current forecasts for the Project as of at the time of the TSC submission[6].

Hydro One considered transmission line losses in the conductor selection process. For further details and analysis of the conductor loss evaluation, refer to **Exhibit B, Tab 5, Schedule 1**.

Additionally, the IESO has provided a letter[7] to Hydro One, dated September 9, 2026, which addresses the OEB filing requirement that the IESO provide correspondence to address whether the Project has linkages and/or interdependencies to other planned or recommended transmission or non-wires projects in regional plans and/or IESO bulk plans. The letter supports the Project's scope of work and confirms that it addresses an identified regional transmission capacity need and is consistent with the applicable regional planning findings and recommendations"[8].

The letter aligns with the findings of the IESO's *Greater Toronto Area West (Peel/ Halton) Integrated Regional Resource Plan*[9], issued July 2021, that states the Project is required to ensure continued safe and reliable supply for this region.

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[3] Ibid, Pg. 12
[4] ibid Pg. 13.
[5] Exhibit H, Tab 1, Schedule 1, Attachment 2. Pg.31.
[6] https://www.rds.oeb.ca/CMWebDrawer/Record/919426/File/document
[7] Attachment 1 to this Exhibit.
[8] Attachment 1 to this Exhibit, Pg 2.
[9] Exhibit H, Tab 1, Schedule 1, Attachment 1.

Independent Electricity System Operator
1600-120 Adelaide Street West
Toronto, ON M5H 1T1
t 416.967.7474
www.ieso.ca

September 9, 2026
Pasquale Catalano
Director, Major Projects and Partnerships
Hydro One Networks Inc.
483 Bay Street,
Toronto, ON, M5G 2P5

Dear Mr. Catalano:

Re: Supplemental Support of Need – H29/H30 Reconductoring Project

The Independent Electricity System Operator ("IESO") is providing this letter in response to Hydro One Networks Inc.'s ("Hydro One") request for supplemental support regarding the H29/H30 Reconductoring Project between Hurontario Switching Station (“SS’) and Pleasant Transformer Station (“TS”), which Hydro One intends to include as supporting information in its application under section 92 of the *Ontario Energy Board Act, 1998*.

Background

- The proposed project consists of reconductoring the existing H29 and H30 230 kV transmission circuits (“circuits”) between Hurontario SS and Pleasant TS with higher-ampacity conductors to increase the capacity of the circuits and reinforce the supply to Pleasant TS.

The need for increased capacity on the H29/H30 circuits was originally identified in the 2015 Northwest GTA Integrated Regional Resource Plan (“IRRP”), which recommended upgrading the circuits with high-rated conductors. The 2021 GTA West IRRP subsequently confirmed this need and recommended that Hydro One proceed with the reconductoring work.

The H29/H30 circuits supply Pleasant TS. When demand at Pleasant TS exceeds approximately 417 MW and one of the H29/H30 circuits is out of service, there is potential for the companion circuit to become overload. The regional planning process therefore identified reconductoring these circuits as the appropriate transmission reinforcement to address this capacity need.

IESO Assessment

The IESO considers the proposed H29/H30 reconductoring to be consistent with the need identified through the regional planning process and with the regional plan recommendation to increase the thermal capability of these circuits.

The IESO further notes that the project:

- supports the continued reliable operation of the existing transmission system;
- addresses the identified thermal capacity need on H29/H30 circuits;

- Increases the transfer capability of the circuits and reinforces supply to Pleasant TS; and
- is consistent with the transmission reinforcement identified through the GTA West regional planning process.

Conclusion

The IESO supports Hydro One proceeding with the proposed H29/H30 Transmission Circuit Reconductoring Project as described above, as it addresses an identified regional transmission capacity need and is consistent with the applicable regional planning findings and recommendations.

Please let me know if Hydro One requires any additional information regarding the IESO's assessment.

Sincerely,



Gabriel Adam, P.Eng

Director, Transmission Assurance and Standards

IESO

cc: Micheal Xavier, Hydro One
Beverly Nollert, IESO
Carrie Aloussis, IESO
Ismael El-Samahy, IESO
Steve Norrie, IESO
Julian Lobo, IESO
Gerardo Sanchez, IESO

PROJECT CATEGORIZATION AND CLASSIFICATION

1.0 PROJECT CATEGORIZATION

Subsection 4.3.2.4 of the Board's Filing Requirements for Electricity Transmission Applications requires applicants to categorize projects as being either discretionary or non-discretionary. Non-discretionary project characteristics include:

a) mandatory requirements to satisfy reliability standards set by standards authorities including Northeast Power Coordinating Council ("NPCC")/North American Electric Reliability Council ("NERC") or the IESO;
b) a need to connect new load (of a distributor or large user) or new generation connection;
c) a need to address equipment loading or voltage/short circuit stresses when their rated capacities are exceeded;
d) a transmission project that the transmitter is required by its licence to develop and seek approvals for;
e) projects identified in a provincial government approved plan;
f) projects that are required to achieve provincial government objectives that are prescribed in governmental directives or regulations; and
g) priority transmission projects declared by Lieutenant Governor in Council order that the construction, expansion, or reinforcement of an electricity transmission line is needed as a priority project.

Based upon the above criteria, Hydro One submits that the Project is properly categorized as a non-discretionary project. It is being undertaken in accordance with direction from the IESO in the regional planning process described in **Exhibit B, Tab 3, Schedule 1** to address a supply capacity need on the H29/H30 conductors that has been defined to connect new distributor forecast load.

2.0 PROJECT CLASSIFICATION

Projects are classified into three groups based on their purpose.

- Development Projects, which most closely align with the System Service category as defined in Chapter 5 of the OEB Filing Requirements for Utility System Plans, are those which:
  i. provide an adequate supply capacity and/or maintain an acceptable or prescribed level of customer or system reliability for load growth or for meeting increased stresses on the system; or
  ii. enhance system efficiency such as minimizing congestion on the transmission system and reducing system losses.

- Connection Projects, which most closely align with the System Access category as defined in Chapter 5 of the OEB Filing Requirements for Utility System Plans, are those which provide connection of a load or generation customer or group of customers to the transmission system.

- Sustainment Projects, which most closely align with the System Renewal category as defined in Chapter 5 of the OEB Filing Requirements for Utility System Plans, are those which maintain the performance of the transmission network at its current standard or replace end-of-life facilities on a “like for like” basis.

Based on the above criteria, the Project is a Development Project as the proposed transmission facilities provide for additional system capacity and maintain reliability and quality of electricity supply.

Categorization and Classification

		Project Need	
		Non-Discretionary	Discretionary
Project Class	Development	**X**	
	Connection		
	Sustainment		

COST BENEFIT ANALYSIS AND OPTIONS

The Project is driven by the recommendations in the GTA West RIP[1] and Customer-requests for additional electrical supply. The H29/H30 circuit is the single source of supply to Pleasant TS and the upgrade of the conductor is the most cost-effective and efficient means of providing the incremental increase in supply, compared to more impractical and costly alternatives, such as the construction of a new transmission circuit. Further, this Project is being contemplated at the request of the transmission-connected Customers. Any deferral or delay of the Project would delay the provision of additional supply capacity and threaten the safety and reliability of the transmission circuit, which is already experiencing overloading.

For the reasons set out above, there are no practical alternatives to the H29/H30 Transmission Line Project scope of work for which Hydro One is seeking the OEB's approval, as described in **Exhibit B, Tab 3, Schedule 1.** A Class EA is not required for the Project because the number of structures requiring modification is below the applicable Class EA requirement threshold.

1.0 TRANSMISSION LINE ALTERNATIVES

Conductor Size Alternative Analysis

Hydro One undertook an analysis of conductor size alternatives that would: (a) meet the supply needs for Pleasant TS as identified in the IESO's GTA West IRRP published in 2021[2], and (b) be the optimal conductor size and rating, based on the expected load scenario in terms of line losses. In completing this assessment, Hydro One assessed only conductors that would minimize tower structure investments. The conductor alternatives evaluated were:

1. Alternative 1 – 966.2 kcmil ACSS/TW conductor
2. Alternative 2 – 1033.5 kcmil ACSS/TW conductor

[1] Exhibit H, Tab 1, Schedule 1, Attachment 2.
[2] Exhibit H, Tab 1, Schedule 1, Attachment 1.

Analysis and Recommendations

All alternatives listed above address the supply load need of the Project and provide a safe and reliable supply to customers in the area.

Notably, only ACSS-type conductors were considered appropriate alternatives because of their lighter weight and low sag performance. Both ACSS conductor alternatives address the supply load requirement of the Project and require comparably minor tower reinforcement requirements and no tower foundational reinforcements or modification. ACSS conductor sizes beyond the two listed above were not considered for this Project, as any further increase in ACSS conductor size would increase the weight of that conductor, thereby triggering the need for additional structure reinforcement on each tower structure and ultimately introducing more complexity and Project cost. Similarly, ACSR-type conductors were not considered practical conductor alternatives for this Project because the minimum ACSR conductor that is capable of meeting the forecast load growth of the circuit would require major transmission tower reinforcement, including tower foundations.

The following screening analysis considers the impact of line losses. The screening analysis summarized in Table 1 below was conducted in accordance with Hydro One's Transmission Line Loss Guideline.[3]

[3] As recently filed in proceeding EB-2023-0197, Exhibit I, Tab 2, Schedule 1, Attachment 1.

Table 1 - Project Line Loss Screening Analysis

	Alt. #1 (966.2 kcmil ACSS/TW)	**Alt. #2** (1033.5 kcmil ACSS/TW)
Net Capital Cost [4] **($M)**	19.97	20.27
Losses at Peak Flow [5] (MW)	1.812	1.697
Losses at System Peak (MW)	1.812	1.697
Annual Revenue Costs ($M)	1.51	1.53
Annual Cost of Capital to Cover Losses ($M)	0.30	0.28
Annual Cost of Energy Losses ($M)	0.84	0.79
Annual Cost of Losses [6] **($M)**	1.15	1.07
Total Annual Cost [7] **($M)**	2.66	2.61

As shown in Table 1, although Alternative #1 is favourable from a capital costs perspective, once consideration is given to Total Annual Cost, Alternative #2 is the preferred alternative to deliver the Project. Consequently, in accordance with Hydro One's Transmission Line Loss Guideline, a detailed 50-year net present value ("NPV") analysis was conducted. The NPV used a 5.65% discount rate to evaluate which conductor alternative would provide the best NPV. The NPV sensitivity analysis used varying values for the prices of energy and a capacity price of $167,169/MW consistent with Hydro One's Transmission Line Loss Guideline and the IESO's most recent Capacity Auction Reference Price.

The results of the NPV sensitivity analysis are provided in Table 2.

[4] Net Capital Cost is the total Project cost net of removals; and was based on a project definition equivalent to a Class 3 (for Alternative 2) and underpins Alternatives 1 under the AACE estimate classification system .
[5] Losses based on anticipated future forecast flows.
[6] Annual Cost of Losses is the summation of Annual Cost of Energy Losses (i.e. Megawatt-hour ("MWHR")) losses multiplied by the energy price) and the Annual Cost of Capital to Cover Losses (i.e. MW losses multiplied by Capacity Price).
[7] Total Annual Cost is the summation of Annual Revenue Costs and Annual Cost of Losses.

Table 2 - NPV Sensitivity Analysis of Conductor Alternatives

	Alt. #1 (966.2 kcmil ACSS/TW)	**Alt. #2** (1033.5 kcmil ACSS/TW)
Net Capital Cost	19.97	20.27
Annual Losses (MWHR)	3,844	3,601
Losses at System Peak (MW)	1.808	1.694
Net Present Value ($M)		
Price	**Alt. #1** (966.2 kcmil ACSS/TW)	**Alt. #2** (1033.5 kcmil ACSS/TW)
Energy Price of $53.16/MWHR and Capacity Price of $167,169/MW[8]	-30.45	**-29.95**
Energy Price of $120/MWHR and Capacity Price of $167,169/MW	-36.54	**-35.66**

The NPV analysis in Table 2 affirms that the Alternative #2 conductor is the most cost-effective alternative. Both alternatives meet the capacity needs for the area, however based on the analysis above, Alternative #2 is selected as the preferred and recommended alternative.

[8] Based on the IESO's Capacity Auction Reference Price effective May 1, 2026, the capacity price is $167,169/MW.

QUANTITATIVE AND QUALITATIVE BENEFITS

The Project is being undertaken to enable increased supply availability at Pleasant TS that will accommodate future load growth as forecast by the transmission-connected Customers, Alectra and Hydro One Distribution. The Project's conductor has been selected with consideration to lowering line losses via the selection of the most appropriately sized conductor. Furthermore, by increasing the conductor sizing and reinforcing the H29/H30 transmission circuit, the Project will maintain reliable electrical service to Alectra and Hydro One Distribution customers and ensure compliance with current engineering, safety, and operating standards. Further specific details of Project benefits are described below:

Increase supply capacity on the H29/H30 circuits

The existing conductors of the H29/H30 circuits consist of 795 kcmil 26/7 ACSR with an LTE rating of approximately 420MW. This LTE rating is insufficient to support the existing Pleasant TS transformer capacity of approximately 525MW and supply the forecast future load of the connected customers. As a result, the load supply capability of Pleasant TS is restricted by the upstream circuits. The Project will increase the 230 kV circuit LTE rating to 650 MW by using a 1033.5 kcmil ACSS conductor. This will not only 'unlock' the full capacity of Pleasant TS and eliminate overload scenarios; but also accommodate additional new load forecast by Alectra and Hydro One distribution on the H29/H30 circuits.

Line Loss Benefits

The proposed conductor for the Project is expected to reduce transmission line losses. The 1033.5 kcmil ACSS conductor has a resistance of 0.0658 ohm/km, while the resistance of the existing 795 kcmil ACSR is 0.08 ohm/km. As a result, when comparing the same amount of load current flowing through the circuits, the line losses (i.e., MW) reduction can be expected to be in the vicinity of 18% less for the Project's proposed conductor compared to the existing conductor. Please refer to **Exhibit B, Tab 5, Schedule 1** for further discussion**.**

Alignment with Ontario's Integrated Energy Plan

Though the Project is not explicitly identified in the IEP, there are multiple sections of the IEP that are relevant to the need, scope and delivery of the Project, and the Project aligns with the policies and aims of the IEP.

As noted in **Exhibit B, Tab 4, Schedule 1**, the Project is a non-discretionary development project and therefore aligns with the Minister's message in the IEP that we must modernize the grid to meet the needs of tomorrow: "[A]s demand grows across the province, driven by population growth, electrification and new industrial projects, Ontario must act now to support the building and upgrading of the lines that will power our future and unleash our economy."[1]

Consistent with the above, and with a view to supporting affordability, Hydro One is proposing to expand the economic horizon of the Project to align with recent amendments to the Distribution System Code ("DSC")[2] that expands connection economic horizons to 40 years. This was explicitly identified in the IEP[3]. Hydro One believes this is a customer-centric proposal and should be equally positioned for transmission connections as it will streamline connections to the transmission system, minimize affordability concerns regarding upfront contributions associated with connections to the transmission system, and have no material impact on uniform transmission rates.

Furthermore, the proposal aligns with the 'Beneficiary Pays' principle, meaning the Project will not unduly burden customers, as described in the IEP. The proposed revenue horizon for the economic evaluation in this Application is one that aligns both system codes (transmission and distribution) and matches the risk profile and the

[1] Energy for Generations, Ontario's Integrated Plan to Power the Strongest Economy in the G7 (June 2025) – Pg. 68.
[2] https://www.rds.oeb.ca/CMWebDrawer/Record/908732/File/document?_gl=1*dxqtp2*_gcl_au*MTM0NzgxNjU2OC4xNzkwMTgxNTI5
[3] Energy for Generations, Ontario's Integrated Plan to Power the Strongest Economy in the G7 (June 2025) – Pg. 85.

revenue horizon for the Project's customers to that of the distribution customers who will share in the benefits of the increase in distribution supply load available.

Reducing upfront costs to connect to the transmission system is expressly contemplated in the IEP relation to how Ontario is aiming to enable growth through faster, streamlined connections. Specifically, the IEP states:

> "A modern electricity grid must not only be reliable and efficient – it must also be responsive to growth. As Ontario continues to build homes, expand industrial capacity, and attract investment, customers need timely and affordable connections to the electricity system. The existing connection frameworks have not kept pace with the changes in the sector. Cost structures, limited planning coordination, and slow approval processes have created barriers for housing developments and job-creating projects… Ontario is taking action to modernize how customers connect to the distribution and transmission grid. Enabled by the Affordable Energy Act, 2024, the government is developing new regulations to reduce the upfront capital costs associated with connecting to distribution and transmission infrastructure, including for residential developments and industrial customers. These changes will help unlock new developments by reducing investment risk for 'first mover' customers, while ensuring fairness is maintained for ratepayers."[4]

The information provided in the Application, including the above discussion regarding the Project's alignment with the IEP, is provided to support OEB Staff in comporting with the OEB's CEO Policy–2026-01[5] to identify portions of the IEP that are relevant to matters in issue in this proceeding.

[4] ibid. Pg. 85.
[5] https://www.rds.oeb.ca/CMWebDrawer/Record/931660/File/document?_gl=1*1mt8v20*_gcl_au*MTM0NzgxNjU2OC4xNzkwMTgxNTI5

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APPORTIONING PROJECT COSTS & RISKS

The estimated capital cost of the Project is $20.3M[1]. A breakdown of the capital cost estimate is shown below in Table 1.

Table 1 - Project Cost

	Estimated Cost ($000's)
Materials	4,166
Labour	6,795
Equipment Rental & Contractor Costs	4,364
Sundry	1,370
Contingencies	1,728
Overhead [2]	1,108
Allowance for Funds Used During Construction[3]	599
Real Estate	135
Total Line Capital Work[4]	**$20,265**

The costs outlined above in Table 1 allow for the schedule of approval, design and construction activities to proceed as set out in the Project Schedule at **Exhibit B, Tab 11, Schedule 1**.

The cost estimates provided in Table 1, and similarly the Project Schedule provided at **Exhibit B, Tab 11, Schedule 1**, are based on a project definition equivalent to Class 3[5]

[1] There will be an additional OM&A expenditure of $1.3M removals associated with constructing this Project.
[2] Overhead Costs allocated to the Project are for corporate services costs. These costs are charged to capital projects through a standard overhead capitalization rate. As such they are considered "Indirect Overhead".
[3] Capitalized Interest is calculated using the Board's approved interest rate methodology (EB-2016-0160) to the Project's forecast monthly cash flow and carrying forward closing balances from the preceding month.
[4] Total Project capital cost includes nominal station-related costs related to protection setting changes of approximately $242 k.

under the AACE International (formerly the Association for the Advancement of Cost Engineering) estimate classification system.

1.0 AVOIDED SUSTAINMENT WORK

No avoided sustainment work has been identified for this Project.

2.0 RISKS AND CONTINGENCIES

As with most projects, there are project delivery risks in meeting the forecast that must be reflected in project cost estimates. Hydro One's cost estimate for the Project includes an allowance for contingencies in recognition of these risks. Hydro One follows industry-established best practices in developing contingency forecasts utilizing a risk management model that incorporates both qualitative and quantitative risk analysis of identified project risks.

The Project-specific risks that predominantly contribute to the total contingency suggested for the Project are outlined below:

- **Outage Constraints** – H29 and H30 circuits are critical radial feeds into the Brampton area, resulting in constrained outage opportunities. Planned outages may be subject to cancellation or rescheduling with minimal notice which could impact work sequencing, and the overall Project Schedule.
- **Procurement and Equipment Costs** – Procurement and equipment costs remain subject to commodity price fluctuations, fuel cost volatility, and changing market conditions. There is also a risk of limited supplier and material availability which could result in increased pricing, extended lead times, and delays in the delivery of critical materials and equipment. Any disruption in the supply chain or delays in material delivery could impact construction sequencing and project execution, potentially resulting in schedule and cost impacts.

[5] An estimate range of -20%/+30%.

- **Approvals and Permit Delays** – Risk of delays in obtaining required approvals including leave to construct.

To address the above-mentioned risks Hydro One has implemented the following mitigation measures:

1. Outage windows required for the Project have been strategically staged outside of summer peak demand periods. Provisions have been put in place for additional resources to address adverse shoulder-season weather, should they be required. Regular customer engagement and mitigation measures at Pleasant TS also support minimized recall times. For example, as detailed in the CIA provided at **Exhibit G, Tab 1, Schedule 1, Attachment 1,** a temporary 230 kV bypass disconnect switch will be installed to reduce restoration time if a transformer contingency occurs during Project construction.
2. Funding for long lead time materials was approved during the Project's development phase aimed at reducing Project procurement and schedule risks. After making commitments to the suppliers for long lead time materials, suppliers are contractually required to secure those materials with the intended aim of improving material availability and reducing exposure to supply chain disruptions. Fuel and commodity price risks are managed through contractual pricing and adjustment provisions. These measures collectively help minimize potential cost and schedule impacts to the Project and support the proposed contingency level.
3. Proactively submitting all regulatory applications, in accordance with those applications' filing requirements, in advance of the construction start date of the Project, including this leave to construct application.

Cost contingency has not been included for the following, given the unlikelihood or uncertainty that any of these events would occur over the course of the Project:

- Environmental or safety incidents;
- Labour disputes;
- Major fluctuations in material costs or availability that are outside Hydro One's control, and

- Any other unexpected events or situations that could significantly affect the Project.

3.0 COSTS OF COMPARABLE PROJECTS

Chapter 4 of the OEB Filing Requirements for Electricity Transmission Applications requires an Applicant to provide the cost of comparable projects constructed by the Applicant. Table 2 below compares the H29/H30 Transmission Line Project with three recent steel structure reconductoring/refurbishment projects: the M30A/M31A Conductor Upgrade Project, the Richview x Trafalgar 230 kV Conductor Upgrade Project, and the D1A/D3A Refurbishment Project. While these projects have some differences in overall scope, they represent the most reasonable and informative cost comparators available, based on similarities in construction methods, structure types, geographic setting, and recent in-service dates.

- **The M30A/M31A Conductor Upgrade Project:** This project involved replacing single phase conductors with dual-bundled 1443 kcmil ACSR conductor on existing circuits M30A and M31A (both 230 kV circuits) thereby increasing the circuits' capacity. The larger heavier conductor upgrade drove a requirement for additional steel reinforcement on the steel lattice towers. Each set of structures carries three circuits in total, one circuit of which is subject to reconductoring. This project also included the installation of a temporary bypass, installation of new OPGW skywire on M31A, and station work at Merivale TS and Hawthorne TS to accommodate the new larger dual-bundled conductor. The M30A/M31A circuit length is approximately 24 km (a route length of approximately 12 km) and is located in the eastern part of the province in an urban geographic location. This conductor upgrade project was completed in July 2023.
- **The Richview x Trafalgar 230 kV Conductor Upgrade Project**: This project involved replacing existing conductor with 1433 kcmil ACSS conductor on existing circuits R14/17T and R19/21TH (both 230 kV circuits) thereby increasing the circuits' capacity, as well as, several new steel lattice towers and structural reinforcement to existing double-circuit steel lattice towers to accommodate the larger heavier conductor. This project also included the installation of new OPGW

skywire to address IESO's transmission security needs east of the 'Flow East Towards Toronto' transmission system interface and a number of bypass sections to facilitate the conductor upgrade installation work. The Richview x Trafalgar Conductor Upgrade project circuit length is approximately 70.8 km[6] (route length of approximately 21.7 km) and is located in the southern part of the province in an urban geographic location. This conductor upgrade project was completed in April 2026.

- **The B10/B20H Reconductoring Project (Beach TS x Burlington TS):** The B10/B20H project involved replacing like-for-like sections of 1192 kcmil ACSR conductor between Burlington TS and Beach TS with no required station modifications. The project replaced approximately 11.6 circuit kilometres (route length of approximately 5.8 km) of conductor, primarily within urban residential neighbourhoods in southern Ontario, and included spans crossing several major highways, akin to the other comparator projects.

The above projects were selected as reasonable comparators as they share key characteristics with the Project. Specifically, these comparator projects involved reconductoring of existing transmission facility infrastructure and similar-sized conductor and circuit configurations being carried on predominantly steel lattice tower structures in comparable locations (i.e., urbanized settings), making them appropriate benchmarks for comparing until circuit cost.

For the purposes of cost comparison in Table 2, Hydro One has adjusted the total project costs attributable to each selected project to exclude cost elements that are project-specific, noncomparable, or driven by material scope differences. These adjustments are necessary to facilitate a reasonable comparison for the underlying unit costs (in this case being shown comparatively in circuit kilometers) across projects.

[6] The R17T/R14T circuits were reconductored over full project route length, between Richview TS to Trafalgar TS (approximately 21.7 km), whereas the R21TH/R19TH circuits were reconductored between Tomken TS and Trafalgar TS (a route length of approximately 13.7 km). The total circuit km length is a calculation of; 21.7 km x 2 circuits, and 13.7 km of 2 circuits, equaling a total circuit km length of approximately 70.8 km.

For the purposes of the comparison, Hydro One has made adjustments to exclude costs associated with real estate, station-specific work, and impacts from newly enacted tariff implications applicable to the proposed Project.

Hydro One has excluded the real estate costs from all comparable projects because these are project-specific requirements and are not comparable between the projects. Although real estate costs are excluded from the comparison provided in Table 2, the costs are reasonable as the real estate estimate for the Project is supported by independent third-party appraisals and a contingency amount that is reserved for acquisition.

Additionally, Hydro One has excluded the station-specific work attributable to each project to isolate the line-specific work. The station-specific work for these projects was comparably minor in terms of scope and materiality, consisting primarily of work required to change the station's line protections and control settings to accommodate the new conductors. In the case of the B10/B20H Refurbishment Project, which consisted of a like-for-like conductor replacement, no new station-specific protection and control setting changes were required.

An adjustment was also made to the H29/H30 Transmission Line Project costs to account for incremental costs associated with new tariffs effective September 8, 2026, whereby the Government of Canada imposed a 50% tariff on imported steel derivative products, including steel tower structures, conductors and tower foundation steel materials.[7]

The cost of each comparable project shown in Table 2 has also been adjusted to show the comparable projects in 2029 dollars utilizing the OEB's inflation escalation factors. On this adjustment specifically, despite sharing similar key characteristics, there is an

[7] List of steel derivative products subject to 50 per cent tariffs effective September 8, 2026 - Canada.ca

identified distinction in the timing of the comparator projects, specifically with respect to the B10/B20H Reconductoring Project because of limited 230 kV reconductoring projects that share a similar scope of the Project. The B10/B20H Reconductoring Project was completed at a time when significant inflationary pressures had not impacted the utility and construction sectors as they have in recent years. The current market environment continues to impact project costs through higher labour rates, increased material and equipment costs, ongoing supply chain constraints, commodity price volatility, tariffs, and geopolitical uncertainty affecting the cost and availability of materials and equipment, including tariffs.

While escalation adjustments have been applied to the comparator projects utilizing a conservative escalation of the OEB inflation factor, these adjustments may not fully capture project-specific cost drivers associated with the procurement of transmission line materials, especially for projects that were executed and completed prior to COVID-19. As a result, differences in adjusted unit costs, particularly between the B10/B20H Reconductoring Project and the H29/H30 Transmission Line Project, may not capture the 17-year difference in the completion date cost escalation gap experienced by the industry within that timeframe. Consequently, the Project should be considered within the context of current market conditions.

Notwithstanding the above project-specific considerations, the adjusted costs of the comparable projects in Table 2 demonstrate that the Project's cost estimate is within the range of the comparable transmission line project benchmarks and is reasonable.

Table 2 - Costs of Comparable Line Projects

Project	Circuit M30A/M31A Conductor Upgrade (Merivale TS x Hawthorne TS)	Circuit R14/17T and R19/21TH Conductor Upgrade (Richview TS x Trafalgar TS)	Circuit B10/B20H Reconductoring Project (Beach TS x Burlington TS	Circuit H29/H30 (Hurontario SS x Pleasant TS)
Circuit Operating Designation(s)	M30A/M31A	R14/17T R19/21TH	B10/B20H	H29/H30
Voltage	230 kV	230 kV	230 kV	230 kV
Structure Type	Steel Latice	Steel Lattice	Steel Lattice	Steel Lattice
Circuit Type	Multi	Double	Multi	Double
Conductor	1443 kcmil ACSR	1433 kcmil ACSS	1192 kcmil ACSR	1033.5 kcmil ACSS
Route Length (km)	12.0 km	21.7 km	5.8 km	8.5 km
Location	Eastern Ontario	Southern Ontario	Southern Ontario	Southern Ontario
Project Surroundings	Urban	Urban	Urban	Urban
In-Service Year	July 2023	April 2026	April 2012	April 2029
Estimate or Actual	Actual	Actual	Actual	Estimate
OEB-Approved Cost Estimate	$19.7M[8]	$56.3M[9]	N/A	-
Total Cost	**$38,899K**	**$87,678K**	**$5,515K**	**$20,265K**
Less Adjustments:				
Less: Station Work Scope	*$385K*	*$464K*	*NA*	*$243K*
Less Real Estate	*$677K*	*$51K*	*N/A*	*$135K*
Less: Newly Enacted Tariff	*N/A*	*N/A*	*N/A*	*$1,234K*
Comparable Cost, before Escalation	**$37,837 K**	**$87,163 K**	**$5,515K**	**$18,653K**
Escalation Adjustment[10]	$8,792 K	$8,467K	$3,079K	-
Total Adjusted Comparable Cost	**$46,629 K**	**$95,630 K**	**$8,594 K**	**$18,653 K**
Circuit km Length (km)	24.0 km	70.8 km	11.6 km	17.0 km
Unit Cost ($/ Circuit-km)	**$1,943 K/km**	**$1,351 K/km**	**$741 K/km**	**$1,097 K/km**

[8] This project was approved in Hydro One's Joint Rate Application EB-2021-0110 (investment summary document T-SS-03). The project was also approved at the same project value in the Section 92 leave to construct proceeding EB-2020-0265.
[9] Per the Section 92 leave to construct proceeding evidence in EB-2021-0136
[10] Inflation adjustment factors used for comparator projects are consistent with the OEB inflation parameters described in EB-2021-0212 and the OEB letter titled '2023 Inflation Parameters' distributed October 2022.

CONNECTION PROJECTS REQUIRING NETWORK REINFORCEMENT

This is not a connection project requiring network reinforcement therefore this evidence is not required.

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TRANSMISSION RATE IMPACT ASSESSMENT

1.0 ECONOMIC FEASIBILITY

The Project will refurbish approximately 8.5 km of an existing 230 kV double-circuit transmission line from Hurontario SS to Pleasant TS[1]. The costs for the line reconductoring are classified as Line Connection pool for cost classification purposes. However the full Project cost is allocated between the two benefiting transmission-connected customers and will not have any impact on transmission ratepayers via the Uniform Transmission Rates ("UTRs").

To support affordability and consistent with the aims of the Integrated Energy Plan to reduce upfront capital costs associated with connecting to distribution and transmission infrastructure[2], as part of this Application, Hydro One proposes to extend the revenue horizon for the affected LDCs to 40 years to align the transmission connection revenue horizon for the LDCs with recent amendments to the Distribution System Code ("DSC")[3]. The 40-year DCF analysis shown in Tables 1 and 2 demonstrate that based on the estimated total Project cost of $21.6[4] million, plus the assumed impact on the future capital cost allowance and Hydro One corporate income tax, the Project will have a negative NPV of $5.8M.

2.0 COST RESPONSIBILITY

Line Connection Pool

The Hydro One double-circuit transmission line H29/H30 is a 230 kV connection transmission line in the Greater Toronto Area. Based on the cost allocation methodology approved by the Board and as detailed in Hydro One's most recently OEB-approved

[1] See **Exhibit B, Tab 2, Schedule 1**, for information on the proposed Project scope of work
[2] mem-energy-for-generations-en-2025-07-18.pdf, p.85
[3] https://www.rds.oeb.ca/CMWebDrawer/Record/908732/File/document?_gl=1*dxqtp2*_gcl_au*MTM0NzgxNjU2OC4xNzkwMTgxNTI5
[4] Initial costs of $21.6 million include $20.3 million of up front capital costs plus $1.3 million cost of removals (not capitalized).

transmission rate filing[5], these lines are allocated 100% to the Line Connection Pool. However, as outlined above, the cost allocation for this Project will be 100% allocated to the two transmission-connected Customers, Alectra and Hydro One Distribution, resulting in no impact to transmission ratepayers.

3.0 RATE IMPACT ASSESSMENT

A rate impact analysis has been carried out based on Hydro One's transmission revenue requirement for the year 2026, and the 2026 approved Ontario Transmission Rate Schedules. The Line Connection Pool revenue requirements are unaffected by the Project.

More specifically, based on the total Project's initial cost of $21.6 million and no forecast future incremental operating or maintenance costs, there will be no change in the line pool revenue requirement once the Project's impacts are reflected in the transmission rate base at the projected April 2029 in-service date. Notably, the 2026 OEB approved rate of $1.03 kW/month remains unchanged through the 33rd year and slightly reduces in the 34th year, as the Project costs are recovered via a combination of capital contrition and future incremental revenues. The detailed analysis illustrating the calculation of the incremental line revenue and rate impact is provided in Tables 4, 5 and 6, below.

Impact on Typical Residential Customer

Based on the load forecast, initial capital costs and any ongoing maintenance costs, adding the costs of the required facilities to the Line Connection Pool will not impact a typical residential customer's rates under the Regulated Price Plan ("RPP"). This is reflective of the full recovery concept via the Project-triggering Customers.

[5] EB-2019-0082, Exhibit I, Tab 10, Schedule 50, Page 2 of 2, Filed August 2, 2019

A. Typical monthly bill	$168.81 per month
B. Transmission component of monthly bill	$18.08 per month
C. Line Connection Pool share of Transmission component	$1.74 per month
D. Transformation Connection Pool share of Transmission component	$5.85 per month
E. Network Connection Pool share of Transmission component	$10.49 per month
F. Impact on Line Connection Pool Provincial Uniform Rates	0.00%
G. Impact on Transformation Connection Pool Provincial Uniform Rates	0.00%
H. Impact on Network Connection Pool Provincial Uniform Rates	0.00%
I. % Impact of Network, Line & Transformation Connection Pool UTR	0.0%
J. Increase in Transmission costs for typical monthly bill (B x I)	$0 per month or $0 per year
K. Net increase on typical residential customer bill (J / A)	0.00%

Table 1 - Net Present Value, Page 1

Date:	28-Sep-26
Project #	23617

SUMMARY OF CONTRIBUTION CALCULATIONS
Line Pool - Estimated cost

Facility Name:	H29 H30 Reconductor 230kV circuits
Description:	Reconductor 8.5km 230kV circuits from ACSR 795 to ACSS 1033
Customer:	HONI and Alectra

			In-Service Date	<------- Project year ended - annualized from In-Service Date ------->												
		Month	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30
		Year	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	
			0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	
Revenue & Expense Forecast																
Load Forecast (MW)				66.0	77.4	84.5	90.9	94.4	94.9	95.2	95.9	96.3	96.3	96.3	96.3	
Load adjustments (MW)				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
				66.0	77.4	84.5	90.9	94.4	94.9	95.2	95.9	96.3	96.3	96.3	96.3	
Tariff Applied ($/kW/Month)				1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	
Incremental Revenue - $M				0.8	1.0	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
Removal Costs - $M			(1.3)													
On-going OM&A Costs - $M			0.0	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Municipal Tax - $M				(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Net Revenue/(Costs) before taxes - $M			(1.3)	0.7	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
Income Taxes			0.4	0.0	0.2	0.1	0.1	0.0	0.0	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.1)	
Operating Cash Flow (after taxes) - $M			(1.0)	0.7	1.0	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	
		Cumulative PV @ 5.65%														
PV Operating Cash Flow (after taxes) - $M	**(A)**	**14.5**	**(1.0)**	**0.7**	**1.0**	**0.9**	**0.9**	**0.9**	**0.8**	**0.7**	**0.7**	**0.6**	**0.6**	**0.6**	**0.5**	
Capital Expenditures - $M																
Upfront - capital cost before overheads & AFUDC			(18.6)													
- Overheads			(1.1)													
- AFUDC			(0.6)													
Total upfront capital expenditures			**(20.3)**													
On-going capital expenditures				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
PV On-going capital expenditures			0.0													
Total capital expenditures - $M			**(20.3)**													
Capital Expenditures - $M																
PV CCA Residual Tax Shield - $M			**0.0**													
PV Working Capital - $M			**(0.0)**													
PV Capital (after taxes) - $M	**(B)**	**(20.3)**	**(20.3)**													
Cumulative PV Cash Flow (after taxes) - $M	**(A) + (B)**	**(5.8)**	**(21.2)**	**(20.5)**	**(19.6)**	**(18.6)**	**(17.7)**	**(16.9)**	**(16.1)**	**(15.3)**	**(14.6)**	**(14.0)**	**(13.4)**	**(12.8)**	**(12.3)**	

Discounted Cash Flow Summary

Economic Study Horizon - Years:		**40**
Discount Rate - %		**5.65%**
		$M
PV Incremental Revenue		18.4
PV OM&A Costs		(1.9)
PV Municipal Tax		(1.1)
PV Income Taxes		(4.1)
PV CCA Tax Shield		3.1
PV Capital - Upfront	(20.3)	
Add: PV Capital Contribution	**0.0**	(20.3)
PV Capital - On-going		0.0
PV Working Capital		(0.0)
PV Surplus / (Shortfall)		**(5.8)**
Profitability Index*		**0.7**

Notes:
*PV of total cash flow, excluding net capital expenditure & on-going capital & proceeds on disposal / PV of net capital expenditure & on-going capital & proceeds on disposal

Other Assumptions

In-Service Date:	30-Apr-29
Payback Year:	2069
No. of years required for payback:	40

Table 2 - Net Present Value, Page 2

Date:	28-Sep-26
Project #	23617

SUMMARY OF CONTRIBUTION CALCULATIONS
Line Pool - Estimated cost

Facility Name:	H29 H30 Reconductor 230kV circuits
Description:	Reconductor 8.5km 230kV circuits from ACSR 795 to ACSS 1033
Customer:	HONI and Alectra

<-------- Project year ended - annualized from In-Service Date -------->

Month	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30
Year	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**
	13	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*
Revenue & Expense Forecast													
Load Forecast (MW)	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3
Load adjustments (MW)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3
Tariff Applied ($/kW/Month)	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
Incremental Revenue - $M	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Removal Costs - $M													
On-going OM&A Costs - $M	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Municipal Tax - $M	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Net Revenue/(Costs) before taxes - $M	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Income Taxes	(0.1)	(0.1)	(0.1)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
Operating Cash Flow (after taxes) - $M	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
PV Operating Cash Flow (after taxes) - $M (A)	**0.5**	**0.5**	**0.4**	**0.4**	**0.4**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.2**	**0.2**
Capital Expenditures - $M													
Upfront - capital cost before overheads & AFUDC													
- Overheads													
- AFUDC													
Total upfront capital expenditures													
On-going capital expenditures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PV On-going capital expenditures													
Total capital expenditures - $M													
Capital Expenditures - $M													
PV CCA Residual Tax Shield - $M													
PV Working Capital - $M													
PV Capital (after taxes) - $M (B)													
Cumulative PV Cash Flow (after taxes) - $M (A) + (B)	**(11.8)**	**(11.4)**	**(10.9)**	**(10.5)**	**(10.2)**	**(9.8)**	**(9.5)**	**(9.2)**	**(8.9)**	**(8.6)**	**(8.4)**	**(8.2)**	**(7.9)**

Table 3 - Net Present Value, Page 3

Date:	28-Sep-26
Project #	23617

SUMMARY OF CONTRIBUTION CALCULATIONS
Line Pool - Estimated cost

Facility Name:	H29 H30 Reconductor 230kV circuits
Description:	Reconductor 8.5km 230kV circuits from ACSR 795 to ACSS 1033
Customer:	HONI and Alectra

		<------- Project year ended - annualized from In-Service Date -------->														
Month		Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30	Apr-30
Year		2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
		26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Revenue & Expense Forecast																
Load Forecast (MW)		96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3
Load adjustments (MW)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3	96.3
Tariff Applied ($/kW/Month)		1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
Incremental Revenue - $M		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Removal Costs - $M																
On-going OM&A Costs - $M		(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Municipal Tax - $M		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Net Revenue/(Costs) before taxes - $M		1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Income Taxes		(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Operating Cash Flow (after taxes) - $M		0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
PV Operating Cash Flow (after taxes) - $M	**(A)**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
Capital Expenditures - $M																
Upfront - capital cost before overheads & AFUDC																
- Overheads																
- AFUDC																
Total upfront capital expenditures																
On-going capital expenditures		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PV On-going capital expenditures																
Total capital expenditures - $M																
Capital Expenditures - $M																
PV CCA Residual Tax Shield - $M																
PV Working Capital - $M																
PV Capital (after taxes) - $M	**(B)**															
Cumulative PV Cash Flow (after taxes) - $M	**(A) + (B)**	**(7.7)**	**(7.5)**	**(7.3)**	**(7.2)**	**(7.0)**	**(6.8)**	**(6.7)**	**(6.5)**	**(6.4)**	**(6.3)**	**(6.2)**	**(6.1)**	**(6.0)**	**(5.9)**	**(5.8)**

Table 4 - Revenue Requirement and Line Pool Rate Impact, Page 1

Revenue Requirement and Line Pool Rate Impact **(After Capital Contribution)**

H29 H30 Reconductor 230kV circuits		Project YE 30-Apr 2030	30-Apr 2031	30-Apr 2032	30-Apr 2033	30-Apr 2034	30-Apr 2035	30-Apr 2036	30-Apr 2037	30-Apr 2038	30-Apr 2039	30-Apr 2040	30-Apr 2041
Calculation of Incremental Revenue Requirement ($ millions)		1	2	3	4	5	6	7	8	9	10	11	12
In-service date	30-Apr-29												
Capital Cost	20.3												
Less: Capital Contribution Required	(6.8)												
Net Project Capital Cost	13.4												
Average Rate Base		6.6	13.0	12.8	12.5	12.2	12.0	11.7	11.4	11.2	10.9	10.6	10.3
Incremental OM&A Costs		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grants in Lieu of Municipal tax		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Depreciation		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Interest and Return on Rate Base		0.4	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
Income Tax Provision		(0.0)	(0.1)	(0.1)	(0.0)	(0.0)	(0.0)	0.0	0.0	0.0	0.1	0.1	0.1
REVENUE REQUIREMENT PRE-TAX		**0.8**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**
Incremental Revenue		0.8	1.0	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
SUFFICIENCY/(DEFICIENCY)		**0.0**	**(0.1)**	**(0.1)**	**0.0**	**0.0**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
	Base Year												
Line Pool Revenue Requirement including sufficiency/(deficiency)	232	233	233	233	233	233	233	233	233	233	233	233	233
Line MW	226	227	227	227	227	227	227	227	227	227	227	227	227
Line Pool Rate ($/kw/month)	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
Increase/(Decrease) in Line Pool Rate ($/kw/month), relative to base year		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RATE IMPACT relative to base year		**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

Assumptions

Incremental OM&A		$3.68037852575368 k per new km of line each year.
Grants in Lieu of Municipal tax	0.33%	Transmission system average
Depreciation	2.00%	Reflects 50 year average service life for towers, conductors and station equipment, excluding land
Interest and Return on Rate Base	6.34%	Includes OEB-approved ROE of 9.36%, 4.79% on ST debt, and 4.3% on LT debt. 40/4/56 equity/ST debt/ LT debt split
Income Tax Provision	26.50%	2026 federal and provincial corporate income tax rate
Capital Cost Allowance	8.00%	99.3% Class 47 assets

Table 5 - Revenue Requirement and Line Pool Rate Impact, Page 2

Revenue Requirement and Line Pool Rate Impact **(After Capital Contribution)**

H29 H30 Reconductor 230kV circuits		30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr	30-Apr
		2042	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**
Calculation of Incremental Revenue Requirement ($ millions)		13	14	15	16	17	18	19	20	21	22	23	24	25
In-service date	30-Apr-29													
Capital Cost	20.3													
Less: Capital Contribution Required	(6.8)													
Net Project Capital Cost	13.4													
Average Rate Base		10.1	9.8	9.5	9.3	9.0	8.7	8.5	8.2	7.9	7.7	7.4	7.1	6.9
Incremental OM&A Costs		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grants in Lieu of Municipal tax		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Depreciation		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Interest and Return on Rate Base		0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.4
Income Tax Provision		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
REVENUE REQUIREMENT PRE-TAX		**1.1**	**1.1**	**1.1**	**1.1**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**0.9**
Incremental Revenue		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
SUFFICIENCY/(DEFICIENCY)		**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.3**
	Base Year													
Line Pool Revenue Requirement including sufficiency/(deficiency)	232	233	233	233	233	233	233	233	233	233	233	233	233	233
Line MW	226	227	227	227	227	227	227	227	227	227	227	227	227	227
Line Pool Rate ($/kw/month)	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
Increase/(Decrease) in Line Pool Rate ($/kw/month), relative to base year		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RATE IMPACT relative to base year		**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

Table 6 - Revenue Requirement and Line Pool Rate Impact, Page 3

Revenue Requirement and Line Pool Rate Impact **(After Capital Contribution)**

H29 H30 Reconductor 230kV circuits		30-Apr 2055	30-Apr 2056	30-Apr 2057	30-Apr 2058	30-Apr 2059	30-Apr 2060	30-Apr 2061	30-Apr 2062	30-Apr 2063	30-Apr 2064	30-Apr 2065	30-Apr 2066	30-Apr 2067	30-Apr 2068	30-Apr 2069
Calculation of Incremental Revenue Requirement ($ millions)		26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
In-service date	30-Apr-29															
Capital Cost	20.3															
Less: Capital Contribution Required	(6.8)															
Net Project Capital Cost	13.4															
Average Rate Base		6.6	6.3	6.0	5.8	5.5	5.2	5.0	4.7	4.4	4.2	3.9	3.6	3.4	3.1	2.8
Incremental OM&A Costs		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grants in Lieu of Municipal tax		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Depreciation		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Interest and Return on Rate Base		0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Income Tax Provision		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
REVENUE REQUIREMENT PRE-TAX		**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**
Incremental Revenue		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
SUFFICIENCY/(DEFICIENCY)		**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.5**	**0.5**	**0.5**	**0.5**
	Base Year															
Line Pool Revenue Requirement including sufficiency/(deficiency)	232	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
Line MW	226	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
Line Pool Rate ($/kw/month)	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Increase/(Decrease) in Line Pool Rate ($/kw/month), relative to base year		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
RATE IMPACT relative to base year		**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**-0.97%**	**-0.97%**	**-0.97%**	**-0.97%**	**-0.97%**	**-0.97%**	**-0.97%**

Table 7 - DCF Assumptions

Transmission rates are based on current OEB-approved uniform provincial transmission rates.

	Monthly Rate ($ per kW)
Network	**6.39**
Transformation	**3.47**
Line	**1.03**

Grants in lieu of Municipal tax (% of up-front capital expenditure, a proxy for property value): **0.33%**

Income taxes:

Basic Federal Tax Rate - % of taxable income:	2026	**15.00%**
Ontario corporation income tax - % of taxable income:	2026	**11.50%**

Capital Cost Allowance Rate:

Class 47 costs	2026	**8%**
Easement rights	2026	**5%**
Decision Support defined costs (2)	2026	**0%**
Decision Support defined costs (3)	2026	**0%**

After-tax Discount rate: **5.65%**

REVENUE REQUIREMENT INFORMATION AND DEFERRAL ACCOUNT REQUESTS

Revenue Requirement and Transmission System Plan Information

Hydro One's 2028-2032 revenue requirement application (docket EB-2026-0164) prefiled evidence, filed with the OEB on October 7, 2026, identified the H29/H30 Transmission Line Project within Investment Summary Document ("ISD") T-SA-08[1].

Deferral Account Request

There are no new deferral account requests being made as part of this Application.

[1] EB-2026-0164 – Hydro One's approved 2028-2032 rate application, Exhibit B-2-1, ISD T-SA-08

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PROJECT SCHEDULE

TASK	START	FINISH
Submit Section 92	October 2026	March 2027
Receipt of Key Permits and Approvals (non-S.92)	September 2026	July 2027
Detailed Engineering	March 2026	September 2026
Major Material Ordered	January 2026	January 2027
Construction	April 2027	April 2029
Commissioning	April 2028	April 2029
In Service	-	April 2029
Site Remediation	June 2029	August 2029

The Project Schedule above outlines the forecast schedule for the Project and has been predicated on Hydro One successfully securing leave to construct approval by March 2027. Construction is set to commence in April 2027 and the cost evidence provided in **Exhibit B, Tab 7, Schedule 1** is underpinned by this schedule**.** Project timelines have been based on recent OEB processing timelines and take into consideration the OEB's Performance Standards for Processing non-complex Leave to Construct Applications.

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DESCRIPTIONS OF THE PHYSICAL DESIGN

1.0 ROUTE DESCRIPTION

The Project is located in the western part of the GTA. The circuit spans between Hurontario SS and Pleasant TS. The total line length of the Project is approximately 8.5 km and will utilize an existing ROW approximately 36 m wide.

1.1 ROUTE DETAILS

Generally, the existing 230 kV transmission line emanates from Hurontario SS, located south of HWY 407 and Hurontario Street in the City of Brampton and proceeds north-west and connects to Pleasant TS, spanning a total distance of approximately 8.5 km.

More specifically, the route follows the existing in-situ transmission line corridor. From the connection to the existing Hurontario SS, the route proceeds west for approximately 3.0 km before crossing Steeles Ave W. The route continues west beyond the Jim Yarrow MTS for another 0.5 km. The route then turns north west for 4.5 km until it approaches James Potter Rd and Roundstone Dr where it then turns north for 0.5km to meet existing tower# 62. New tapping structures outside and adjacent to Pleasant TS will facilitate the connection of both circuits from the existing tower structure #62 to Pleasant TS. The length of tapping route for both these circuits is expected to be less than 100 m.

A map showing the general route of the Project is provided as **Attachment 1** of **Exhibit B, Tab 2, Schedule 1**.

2.0 LINE DESCRIPTION

The 230 kV transmission line will be comprised of two circuits (nomenclature ‘H29’ and ‘H30’). Each of the 230 kV circuits will utilize one 1033.5 kcmil ACSS/TW “Curlew” conductor per phase, for a total of three phases per circuit, supported on the existing self-supporting steel lattice towers. Three towers will require moderate reinforcement to accommodate the weight of the larger conductor. No changes to the existing shieldwire and/or OPGW on the line will be made.

After Project completion the H29/H30 230 kV double circuit transmission line will have the following attributes:

i. The line will have a continuous ampacity of 1450A at 150C conductor temperature (summer 35C);
ii. Glass insulators will be used for both suspension and tension applications in accordance with Hydro One standards;
iii. Stockbridge-type vibration dampers to dampen the conductor in accordance with Hydro One standard, based on the final line configuration and per the manufacturer's design; and
iv. The existing double circuit line makes use of 19 existing self-supported lattice suspension towers with typical spans of approximately 320 m (refer to Figure 1). There are also 8 heavy angle and other special structures used for infrastructure crossings and points of inflection (refer to Figure 2).

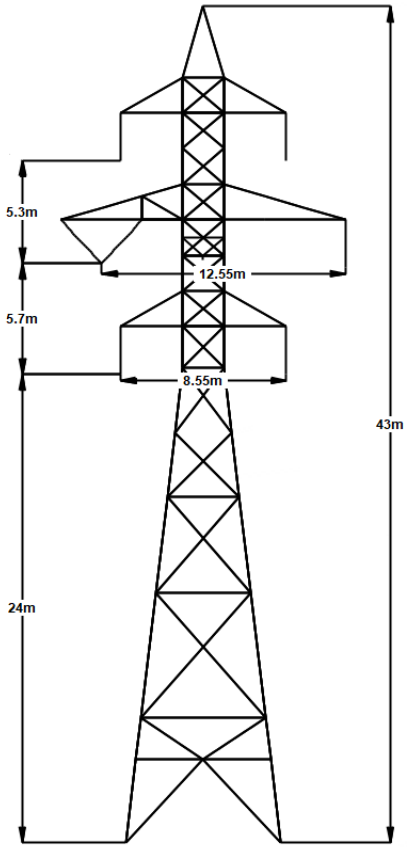

Figure 1: Suspension Tower

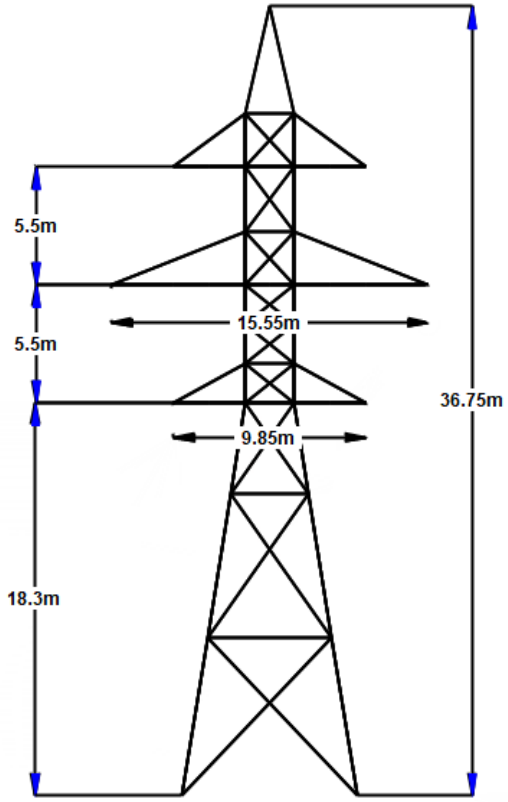

Figure 2: Heavy Angle

Additionally, the new 230 kV tapping into Pleasant TS will have the following attributes:

i. The 1033.5 kcmil ACSS/TW “Curlew” conductor will have a continuous ampacity of 1450A at 150C conductor temperature (summer 35C);

ii. Glass insulators will be used for tension applications in accordance with Hydro One Standards;

iii. Stockbridge-type vibration dampers to dampen the conductor in accordance with Hydro One standard if required, based on the final line configuration and per the manufacturer’s design;

iv. Typical structure foundations will be augered caisson type; and

v. The tapping into Pleasant TS segments of the line will make use of three self-supported lattice towers with various heights with typical spans of approximately 50 m (refer to Figure 3 for generic geometry).

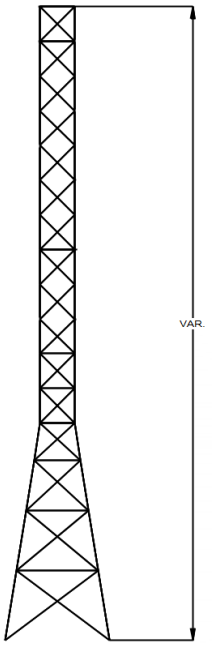

Figure 3: Suspension Tower

3.0 LINE REMOVAL

The Project will upgrade the existing conductors on approximately 8.5 km of the 230 kV transmission line, requiring removal of the existing conductors on the H29/H30 circuit between Hurontario SS and Pleasant TS.

4.0 STATION WORK

The following protection settings will be reviewed and revised to consider the Project:

- Hurontario H29, H30 line protections
- Pleasant T1, T2, T5, T6, T7, T8 line backup protections

OPERATIONAL DETAILS

Hydro One PC&T facilities at Hurontario SS and Pleasant TS will continue to protect the H29/H30 circuit by detecting faults and isolating faulted elements. Line protection for the H29/H30 circuit will be updated to accommodate operation of the reconductor circuit post in-service. The proposed facility will be operated by Hydro One's ISOC as directed by the IESO.

There are two existing customers connected to the H29/H30 transmission circuits via Pleasant TS and they will remain connected after the Project is completed. These customers are:

1. Alectra Utilities.
2. Hydro One Distribution.

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LAND MATTERS

1.0 THE ROUTE

The Project involves the reconductoring of the existing H29/H30 circuits, in-situ, on a section of line approximately 8.5km in length. The circuits span between Hurontario SS and Pleasant TS in the west of the GTA. The existing transmission corridor is largely comprised of Provincially owned "Bill 58" lands or within public road allowances pursuant to *Section 41* of the *Electricity Act*[1]. The existing ROW width, the vast majority of which is 36 m, remains sufficient for the proposed Project's requirements.

2.0 DESCRIPTION OF LAND RIGHTS

The Project corridor crosses 56 properties. One of these properties is owned in fee simple by Hydro One. Of the remaining 55 properties, 22 are provincially held, 31 are municipally held, and one is held by a rail company.

The Project requires Hydro One to reaffirm land rights on only one municipally-held property. For the balance of the properties, Hydro One holds existing property rights, in the form of permanent easements, sufficient to accommodate execution of the Project. Those easements are on crown lands and enabled via "Bill 58", permits and rights or on road allowances that are established through the *Electricity Act*.

A summary of the property types and their relative proportionate share of the route is detailed in Table 1:

[1] The Reliable Energy and Consumer Protection Act (Bill 58) amended the Electricity Act, resulting in the transfer of corridor lands owned by Hydro One to the Government of Ontario, but which lands are identified under section 41 of the Electricity Act as being utilized for transmission and distribution purposes, including poles and lines.

Table 1 - Summary of Property Types and Proportion of Route

Land Ownership Type	Area (Hectares)	Proportion of Route (%)
Municipal Lands	0.14	0.4%
Provincial Lands ("Bill 58")	27.34	87.2%
Provincial Lands (Non- "Bill 58")	0.71	2.3%
Railway Lands	0.10	0.3%
Hydro One Owned Lands	0.19	0.6%
Road Allowances	2.86	9.1%

3.0 MAPS OF THE PROJECT AREA

At **Exhibit B, Tab 2, Schedule 1, Attachment 1**, Hydro One has provided a map with the intention it be used as the Application's *Notice Map* should the OEB determine that a hearing for this Application is required. **Attachment 1 to this Schedule** provides a more detailed route map that illustrates, as appropriate, properties along line route sections with lot and concession numbers of the land over, under, on or adjacent to which the line runs.

4.0 DESCRIPTION OF NEW LAND RIGHTS REQUIRED

As outlined above, the Project requires Hydro One to acquire permanent land rights over one municipally held property. Hydro One intends to obtain a registered permanent easement for the property to reaffirm its land right on which the current transmission facilities are located. The directly impacted property can be described as an abandoned rail corridor that the owner intends to be used in the future as a muti-use recreational trail.

The Project corridor will include a combination of the following land rights requirements:

- Easement rights on one municipal property (new land rights required); and
- Potentially temporary access and/or construction rights on municipally owned and private properties for access roads, temporary work headquarters, laydown areas, and material storage facilities.

Hydro One will document all required new land rights to construct, operate and maintain the line in several agreements. On affected properties, the following land rights agreements are or may be required:

- Transfer and Grant of Easement in Gross;
- Agreement for Temporary Rights;
- Off Corridor Access; and
- Damage Claim Agreement/Waiver.

Where crossings of public roads and highways are contemplated and indicated in **Attachment 1** of this Schedule, Hydro One will rely on the land rights afforded by section 41 of the *Electricity Act* (where applicable). Hydro One will notify and work with impacted road authorities, including municipalities and ministries, and obtain all required permits and/or agreements, including where agreements are required for the placement of infrastructure per section 41(9) of the *Electricity Act*. All road crossings will be designed to meet or exceed Canadian Standards Association ("CSA") vertical clearance standards.

5.0 EARLY ACCESS TO LAND

Hydro One requires early access to the corridor to perform various activities/studies associated with the Project which include specific environmental studies, and engineering and design studies. As the existing corridor is largely comprised of Bill 58 lands or public roads, no early access agreements are required.

6.0 LAND ACQUISITION PROCESS

Hydro One is seeking approval of voluntary property rights agreements with one affected property owner. Hydro One requires permanent rights, in the form of an easement, over one land parcel along the Project route and Hydro One has been engaging with the owner (a municipality) since August 2024. Hydro One continues to follow the municipality's land disposition process in order to secure the required permanent rights and is committed to working with the municipality to ensure their future plans for the property (i.e., a recreational trail) are respected and accommodated. Hydro One expects

the remaining administrative steps in the municipal land disposition process to conclude, and for Hydro One to have the outstanding land right secured and register the easement on title, by the end of 2026. Valuation of the easement will be established through a property-specific appraisal that is predicated on the municipality's land disposition process.

A summary of all land negotiations to date, including their status, is summarized in Table 2 below. Further details on the properties and permits associated with the Project route are provided in **Attachment 2** of this Schedule.

Table 2 - Land Acquisition Status (As of October 23, 2026)

Property Type	Number of Properties	Early Access Agreement Offered	Early Access Agreement Achieved	Voluntary Settlement Agreements Offered	Voluntary Settlement Agreements Achieved	Issues	Resolution Approach
Municipal Lands	1	N/A	N/A	1	0	Awaiting Municipal Approval	Continue to Negotiate

7.0 LAND - RELATED FORMS

The land rights form agreements Hydro One intends to utilize for the Project and related activities are provided in **Attachment 3 through Attachment 6** to this Exhibit.

All other applicable agreements (e.g. rail crossing agreements, temporary rights agreements, etc.) will be utilized as part of the land acquisition process as required.

Table 3, below, lists other Hydro One OEB-approved s.92 proceedings where these forms of agreements, which remain substantially unchanged, have been included.

Table 3 - Forms of Agreement Remaining Unchanged

Form of Agreement	Attachment	Previous OEB Docket
Agreement for Temporary Rights	4	EB-2024-0155, Exhibit E, Tab 1, Schedule 1, Attachment 9
Damage Claim Agreement/Waiver	6	EB-2024-0155, Exhibit E, Tab 1, Schedule 1, Attachment 12
Off Corridor Access	5	EB-2024-0155, Exhibit E, Tab 1, Schedule 1, Attachment 10

Table 4 below indicates the proceeding where the form of agreements are similar to forms previously approved by the OEB, except for any changes noted below.

The difference between the proposed form, provided at **Attachment 3 of this Schedule**, and previous versions approved by the OEB is the removal of the “Option” elements in the form agreement. The easement rights remain materially unchanged between both forms but the agreement, as proposed, permits the acquisition of the necessary easement outright at the time the parties execute the agreement.

Due to the certainty of the need for the land right required, limited construction window, and duration between land right acquisition and construction commencement, should this requested relief be approved, the proposed revision in the form of agreement is considered reasonable and eliminates any potential delay or unnecessary administrative costs with exercising options thereafter.

Table 4 - Forms of Agreement Remaining Materially Unchanged

Form of Agreement	Attachment	Previous OEB Docket
Transfer and Grant of Easement	3	EB-2024-0155 – Exhibit E, Tab 1, Schedule 1, Attachment 4

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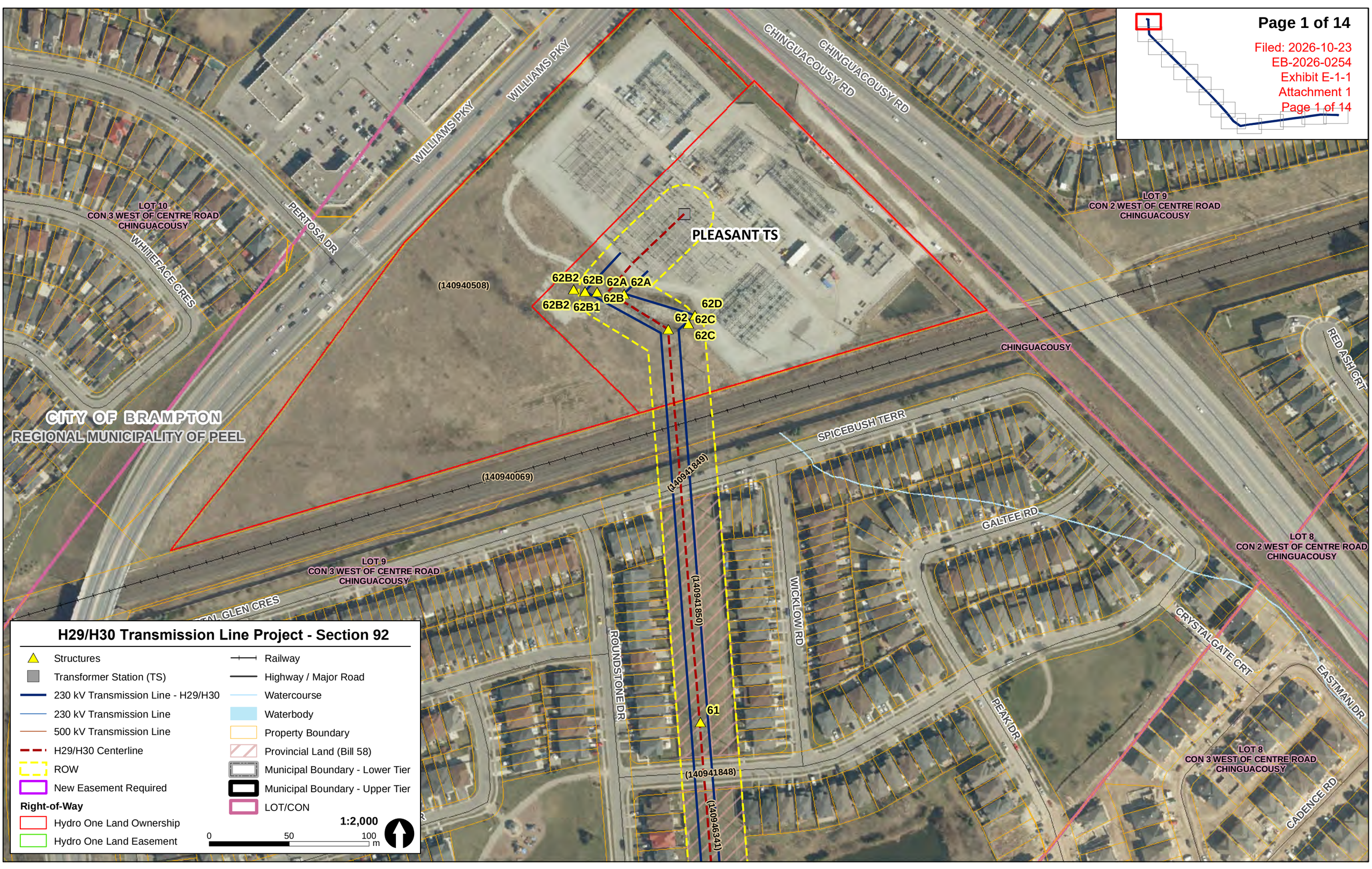
Filed: 2026-10-23
EB-2026-0254
Exhibit E-1-1
Attachment 1
Page 1 of 14



H29/H30 Transmission Line Project - Section 92

- Structures
- Transformer Station (TS)
- 230 kV Transmission Line - H29/H30
- 230 kV Transmission Line
- 500 kV Transmission Line
- H29/H30 Centerline
- ROW
- New Easement Required

Right-of-Way

- Hydro One Land Ownership
- Hydro One Land Easement

- Railway
- Highway / Major Road
- Watercourse
- Waterbody
- Property Boundary
- Provincial Land (Bill 58)
- Municipal Boundary - Lower Tier
- Municipal Boundary - Upper Tier
- LOT/CON

1:2,000

0 50 100 m



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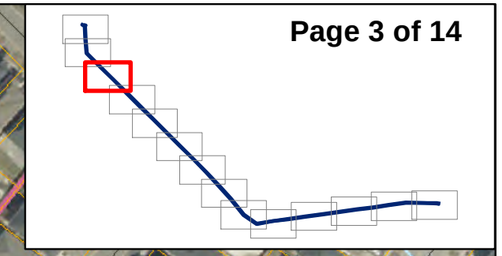
- Municipal Boundary - Upper Tier
- LOT/CON

1:2,000

0 50 100 m



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59
VALLEYWAY DR
GRENDON CRES
ARGELIA CRES
PARITY RD
EXTON RD
AMARETTO CRT
EBURY DR
DEGRASSI COVE CIR
VALLEYWAY DR
LOT 8
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY
CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL
JAMES POTTER RD
STILLMAN DR
LOT 7
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY
58
RICHMEAD RD
ADRIAN CRES
(140944784)
(140946339)
DAWES RD
DAWES RD
DURANGO DR

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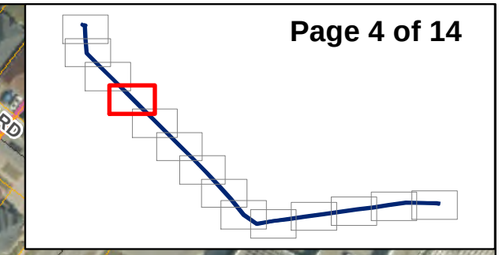

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RICHMEAD RD
LOT 7
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CHINGUACOUSY
CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL
JAMES POTTER RD
LISSON CRES
SPEEDWELL ST
SEMLEY ST
DURANGO DR
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CHINGUACOUSY
56
DAVISELM DR
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JAMES POTTER RD
VICTORIAVILLE RD

H29/H30 Transmission Line Project - Section 92

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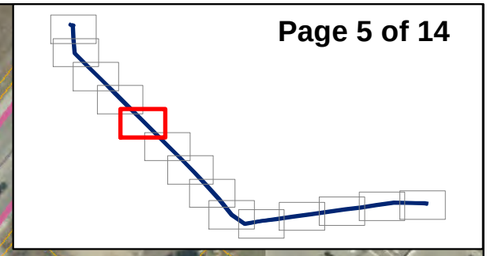

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LOT 6
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY
TEAL CREST CIR
QUEEN ST W
JAMES POTTER RD
ALLEGRO DR
CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL
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(140861434)
DOUGLAS RD
MONKTON CIR
MONKTON CIR
BORRELLI DR
OWL CREEK PL
LIBBY RD

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LOT/CON
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CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL
LOT 5
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY
LOT 4
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY
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52
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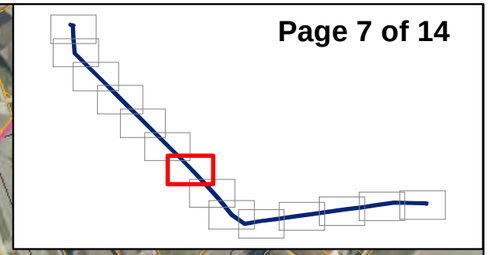
MONKTON CIR
BORRELLI DR
HEATHERGLEN DR
ASHFIELD
ALLEGRO DR
BONNIE BRAES DR
SLIPROCK CRES
ADELINE CRT
JAMES POTTER RD
BEECHMONT DR
SAGE MEADOW CRES
ANGELGATE
TEABERRY TERR
ADAIR CRT
TIMBERCOVE RD
WASHINGTON CRT
KIMBOROUGH HOLLOW
MIDCREST CIR
MAYWOOD ST



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TIMBERCOVE RD
MIDCREST CIR
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MIDNIGHT LANE
KIMBOROUGH HOLLOW
CHESTERWOOD CRES
BONNIE BRAES DR
ELMCREST DR
YOUNG GARDEN CRES
LOT 4
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY
CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL
51
INGLESIDE RD
BITTERSWEET RD
JAMES POTTER RD
NIGHTLAND CRT
SANDINO CRES
LOT 3
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY
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(140861242)
(140861247)
ARROWPOINT DR
MISTLETOE PL
LEADERSHIP DR

H29/H30 Transmission Line Project - Section 92

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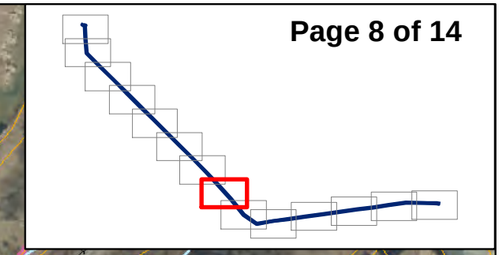


JAMES POTTER RD

(140861242)

ASPENHILLS RD

MISTLETOE PL

50

(140864940)

JAMES POTTER RD

YOUNG DR

LOT 3
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY

CITY OF BRAMPTON

REGIONAL MUNICIPALITY OF PEEL

FAHEY DR

SEASTAR RD

(140861247)

LOT 2
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY

49

LEADERSHIP DR

(140860707)

H29/H30 Transmission Line Project - Section 92

- Structures
- Transformer Station (TS)
- 230 kV Transmission Line - H29/H30
- 230 kV Transmission Line
- 500 kV Transmission Line
- H29/H30 Centerline
- ROW
- New Easement Required

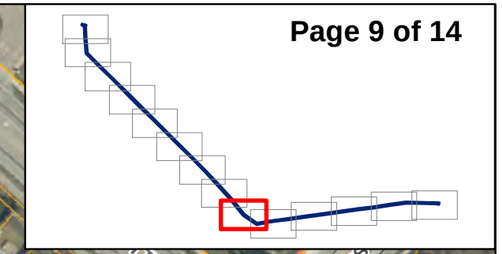
Right-of-Way

- Hydro One Land Ownership
- Hydro One Land Easement

- Railway
- Highway / Major Road
- Watercourse
- Waterbody
- Property Boundary
- Provincial Land (Bill 58)
- Municipal Boundary - Lower Tier
- Municipal Boundary - Upper Tier
- LOT/CON

1:2,000

0 50 100 m



(140861247)

LOT 3
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY

LEADERSHIP DR

FAHEY DR

HEPBURN GATE

TER RD

CHAROLAIS

SOLIDARITY CRT

LOT 2
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY

CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL

(140864940)

FAIRMONT CLOSE

OAK CRES

48

(140860707)

LOT 1
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY

47

TATRA CRES

H29/H30 Transmission Line Project - Section 92

- Structures
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- Waterbody
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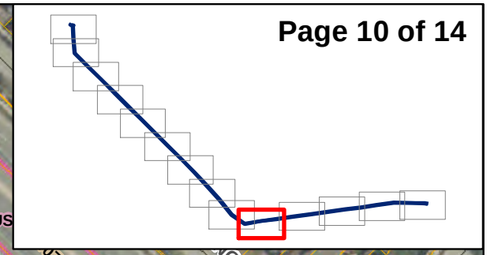
- Provincial Land (Bill 58)
- Municipal Boundary - Lower Tier
- Municipal Boundary - Upper Tier
- LOT/CON

1:2,000

0 50 100 m



OBLATE CRES
SOLIDARITY CRT
JAMES POTTER RD
OBLATE CRES
PEFFERLAW CIR
CHINGUACOUS
(140780291) CHINGUACOUSY RD
CHINGUACOUSY RD
GDALE CRES
LOT 2
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY
(140861435)
(140780292)
45C 45B
45
45A
(140860277)
MAVIS RD
MAVIS RD
(140861436)
46
(140860706)
(140860707)
47
CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL
LOT 1
CON 3 WEST OF CENTRE ROAD
CHINGUACOUSY
REGINA CRT
FREELAND HOLLOW
ARIZONA DR
URBANA RD
JIM YARROW MTS
STEELES AVE W
TATRA CRES
BERRINGER GROVE
GATLIN ST
TORONTO
JAMES POTTER RD
OCTOBER PL
(140860100)
KRAKOW ST
POLONIA AVE
ROYAL VISTA RD
STEELES AVE W
LOT 15
CON 3 WEST OF CENTRE ROAD OR HURONTARIO STREET
TORONTO
CLEMENTINE DR
SAINT EUGENE ST
MADDYBETH CRES

H29/H30 Transmission Line Project - Section 92

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- LOT/CON

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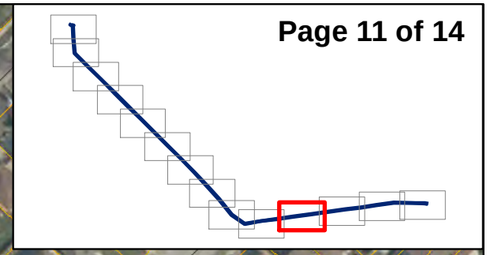
0 50 100 m



BUTLERMERE DR
STEELES AVE W
CRANBERRY CRES
CREDITSTONE RD
MILLSTONE DR
PREAKNESS CRT
LOT 1
CON 2 WEST OF CENTRE ROAD
CHINGUACOUSY
BEACONSFIELD AVE
(140780292)
ST TROPEZ CRT
SANTA ANITA CRT
LANGDALE CRES
CHINGUACOUSY
LOT 15
CON 2 WEST OF CENTRE ROAD OR HURONTARIO STREET
TORONTO
CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL
CHINGUACOUSY RD
(140780291)
(140845479)
(140845480)
(140841414)
(140841413)
(140841412)
(140841411)
43
44
(140861436)
(140860277)
(140860100)
MAVIS RD
PENNSYLVANIA AVE
MICHIGAN AVE
MICHIGAN AVE
BLUE BONNET DR
DERBY RD
CANARVAN CRT
LOT 14
CON 2 WEST OF CENTRE ROAD OR HURONTARIO STREET
TORONTO

H29/H30 Transmission Line Project - Section 92

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- Hydro One Land Easement

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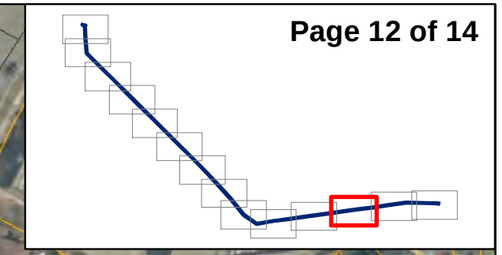
1:2,000

0 50 100 m



MILLSTONE DR
ORTONA DR
DUTCH CRES
WINDMILL BLVD
BUTLERS CRT
SCARLETT DR
TULIP DR
KINGKNOLL DR
PREAKNESS CRT
O'HARA PL
FALLEN OAK CRT
LOT 15
CON 2 WEST OF CENTRE ROAD OR HURONTARIO STREET
TORONTO
CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL
40
41
42
(140845474)
(140841409)
(140841411)
ACADIAN HTS
LOT 14
CON 2 WEST OF CENTRE ROAD OR HURONTARIO STREET
TORONTO
BENT TREE CRT
STALBRIDGE AVE
RAY LAWSON BLVD
WOODSEND RUN
RODWELL CRT
OAKLEA BLVD
LOT 13
CON 2 WEST OF CENTRE ROAD OR HURONTARIO STREET
TORONTO

H29/H30 Transmission Line Project - Section 92

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1:2,000

0 50 100 m


H29/H30 Transmission Line Project - Section 92
Structures
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Highway / Major Road
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Municipal Boundary - Lower Tier
Municipal Boundary - Upper Tier
LOT/CON
1:2,000
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CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL
TORONTO
LOT 14
CON 1 WEST OF CENTRE ROAD OR HURONTARIO STREET
TORONTO
LOT 14
CON 2 WEST OF CENTRE ROAD OR HURONTARIO STREET
TORONTO
LOT 13
CON 1 WEST OF CENTRE ROAD OR HURONTARIO STREET
TORONTO
LOT 13
WEST OF CENTRE ROAD OR HURONTARIO STREET
TORONTO
ELMSTEAD CRT
GARDEN GATE CIR
REDPOLL CRT
MEADOWLARK DR
SONGSPARROW DR
FALLEN OAK CRT
TIMBERLANE DR
MCLAUGHLIN RD
CURLEW ST
SKRANDA HILL
LAURAGLEN CRES
WALLINGFORD CRT
SADDLECREEK CRT
RAVENSWOOD DR
HIGHWAY 407
HIGHWAY 407
(140810165)
(140845473)
(140810175)
(140810174)
(140800909)
(140800323)
(140801091)
(140801130)
(140845474)
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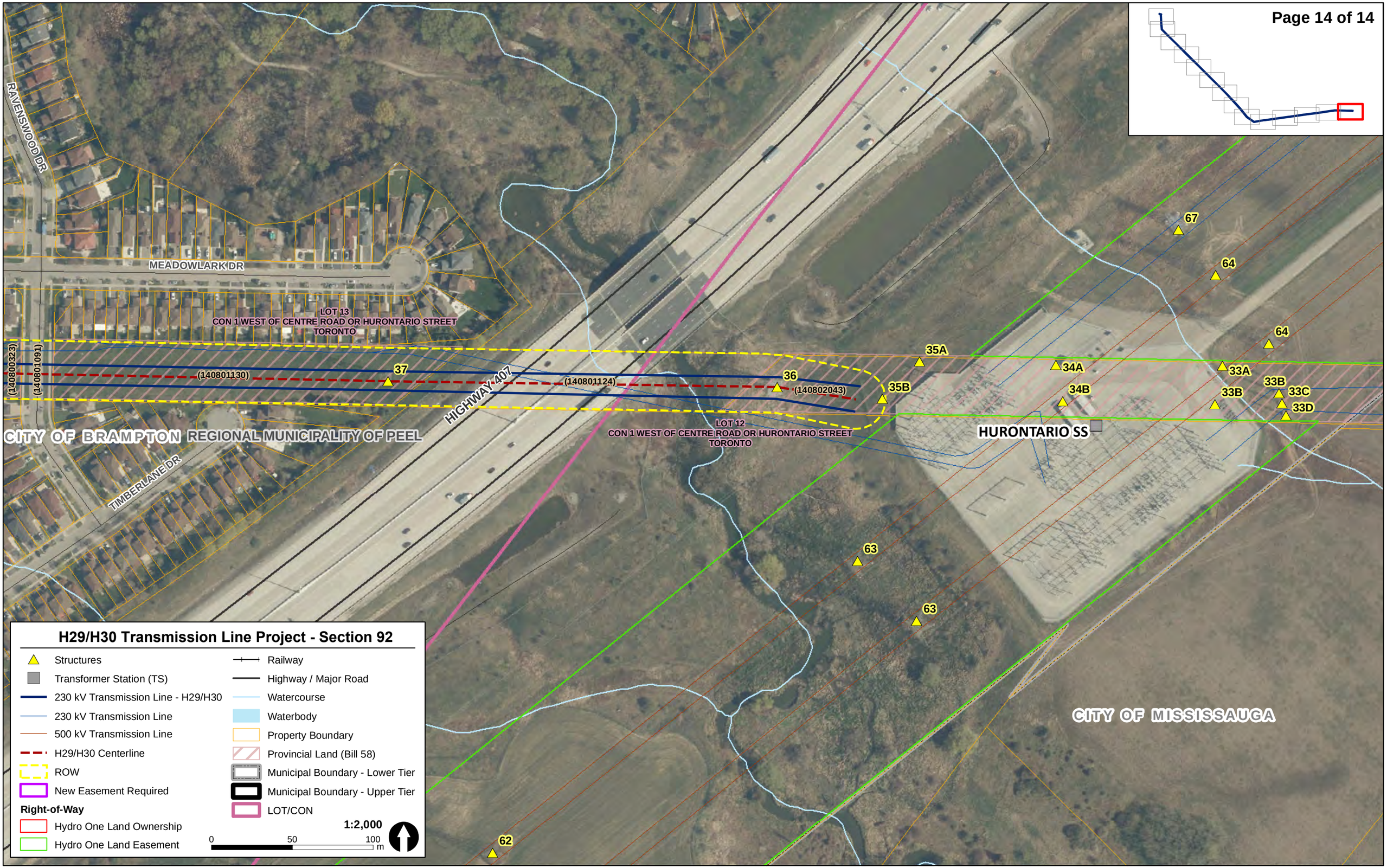

H29/H30 Transmission Line Project - Section 92

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- LOT/CON

1:2,000

0 50 100 m

PIN (Property Identification Number)	LEGAL DESCRIPTION	TYPE OF PROPERTY	Does Hydro One Require New or Updated Property Rights	RIGHTS REQUIRED	Where Agreement is Outstanding - Summary of Negotiations to Date	OWNER(S)
14086-4940 LT	PART LOT 1, CONCESSION 3, WEST HURONTARIO STREET, FORMERLY TOWNSHIP OF CHINGUACOUSY AS IN CH1915, CH11562, CH11563, CH4303; PART OF LOT 2, CONCESSION 3, WEST HURONTARO STREET, FORMERLY TOWNSHIP OF CHINGUACOUSY AS IN CH1825, CH5622; CITY OF BRAMPTON; SAVE	Municipal	Yes	Permanent Easement	In Negotiations	THE CORPORATION OF THE CITY OF BRAMPTON
14078-0181 LT	PT LT 1, CON 2 WEST OF HURONTARIO ST , PART 1-3 , 43R17238 ; BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14078-0291 LT	PT CHINGUACOUSY RD LYING N OF STEELES AV & S OF CHAROLAIS BLVD BEING ; PT ORIG RDAL BTN CONS 2 & 3 WEST OF HURONTARIO ST CHINGUACOUSY ; BRAMPTON	Road Allowance	No	N/A	N/A	PUBLIC AUTHORITY HAVING JURISDICTION
14078-0292 LT	PT OF STEELES AV LYING W OF TAIT BLVD AND E OF CHINGUACOUSY RD BEING PT ORIG RDAL BTN LTS 1 & 15 CON 2 WHS, PT ORIG RDAL BTN CON 2 & 3 WEST OF HURONTARIO ST ; PT LT 15, CON 2 WEST OF HURONTARIO ST , PART 16 & 17 , 43R322 , PT 9, RD119 ; PT LT 1, CON 2 WEST OF HURONTARIO ST , PT8 RD119, PTS 1,2,3,4,5,6,7,8,9,10,11,12,13,14,&15, 43R322, ; S/T CH32003,CH32004,CH32014,CH32139,"BR46870,BR46871,BR47148" BRAMPTON "AMENDED 2003/02/19 BY C. COOPER"	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE TOWN OF BRAMPTON THE CORPORATION OF THE COUNTY OF PEEL
14080-0323 LT	PT LT 13, CON 1 WEST OF HURONTARIO ST , AS IN TT81033, LYING BTN TIMBERLANE DR & RAVENSWOOD DR; S/T RO835018 ; S/T RO820219 BRAMPTON	Bill 58	No	N/A	N/A	THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO
14080-0909 LT	PT LT 13, CON 1 WEST OF HURONTARIO ST , PART 2 , 43R14257 ; BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14080-1091 LT	PT LT 13, CON 1 WEST OF HURONTARIO ST , PART 1 & 2 , 43R15875 ; S/T RO928733 ; BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14080-1124 LT	PT LTS 12 & 13, CONC 1 WHS(TOR.TWP.) DES PARTS 1, 2 & 3, PL D-38; S/T RO642471; S/T EASEMENT IN FAVOUR OF HYDRO ONE BRAMPTON NETWORKS INC. OVER PT LT 12, CON 1 WHS DES PTS 5,8,10,11 & 23, PL 43R27175, IN PR481082.; SUBJECT TO AN EASEMENT OVER PTS 1,2,3,4,5,6,&7, PL 43R33031 IN FAVOUR OF PT LT 13 CON 4 EHS DES PTS 6 & 10 PL 43R4206, PT LT 14 CON 4 EHS DES PT 8 PL 43R4206, PT LT 13 CON 4 EHS DES PTS 1-4 PL 43R5310 , EXCEPT RO108473, PT LTS 13 & 14 CON 5EHS DES PT 5 PL 43R5310 AS IN PR1791802; CITY OF BRAMPTON	Provincial	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF ENERGY AND INFRASTRUCTURE
14080-1130 LT	PT LOT 13, CON 1 WEST OF HURONTARIO ST , AS IN TT80641 , LYING E OF RAVENSWOOD DR , EXCEPT 820218 , 928733 & PT OF PT 1 , PL D-38 LYING WITHIN THE LIMITS OF PT LOT 13 ; S/T TT80719 , TT80720 , TT82416 , TT80641 , 642471 , 785722 , 820219 & 835018 ; S/T EASE OVER PARTS 1 , 2 , & 3 , PL 43R17751 "ADDED 96/12/10 BY C. COOPER" ; T/W 820218 , 608806 , 928733 ; BRAMPTON	Bill 58	No	N/A	N/A	THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO
14080-2043 LT	PT LOT 12, CON 1 WEST OF HURONTARIO ST , AS IN TT80719, TT80720, TT82416, EXCEPT 32381VS , 747164 & PT OF PT 1 & PARTS 2 & 3, PL D-38, SAVE & EXCEPT PTS 1,2 & 3, PL 43R33517, LYING NORTH EAST OF PART 1, PL 43R33517; SUBJECT TO AN EASEMENT AS IN TT82416; SUBJECT TO AN EASEMENT AS IN RO655854; SUBJECT TO AN EASEMENT IN GROSS OVER PT 4, PL 43R31088 AS IN PR1271071; SUBJECT TO AN EASEMENT OVER PART 9, 43R37210 AS IN PR3104353; CITY OF MISSISSAUGA	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF INFRASTRUCTURE
140810165	PT MCLAUGHLIN RD (FORMERLY FIRST LINE W) BEING ; PT ORIG RDAL BTN CONS 1 AND 2 WEST OF HURONTARIO ST , LYING BTN RAY LAWSON BLVD & CURLEW ST ; BRAMPTON	Road Allowance	No	N/A	N/A	PUBLIC AUTHORITY HAVING JURISDICTION
140810174	PT LT 14, CON 1 WHS (TOR TWP) DES AS PT 4, PL 43R32434 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON

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14081-0175 LT	PT LT 13, CON 1 WHS (TOR TWP) AS IN TT81033, LYING W OF TIMBERLANE DRIVE; PT LT 14, CON 1 WHS (TOR TWP) AS IN TT80389, SAVE AND EXCEPT PT 4, PL 43R32434 SUBJECT TO AN EASEMENT AS IN TT81033 SUBJECT TO AN EASEMENT AS IN RO820219 CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF ENERGY AND INFRASTRUCTURE
14084-1409 LT	PT LT 14, CON 2 WEST OF HURONTARIO ST , PART 1, 2 & 3 , 43R13618 ; BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14084-1411 LT	PT LT 14, CON 2 WEST OF HURONTARIO ST , AS IN TT81033, LYING W OF RAY LAWSON BLVD ; PT LT 15, CON 2 WEST OF HURONTARIO ST , AS IN TT110490, EXCEPT PTS 1, 2 & 3, PL 43R19838 ; PT LT 15, CON 2 WEST OF HURONTARIO ST , AS IN TT99083 LYING E OF KINGKNOLL DR; S/T TT81033 ; S/T RO921984, RO984168 BRAMPTON	Bill 58	No	N/A	N/A	THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO
14084-1412 LT	PT LT 15, CON 2 WEST OF HURONTARIO ST , PART 4 , 43R15112 ; BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14084-1413 LT	PT LT 15, CON 2 WEST OF HURONTARIO ST , AS IN TT99083, LYING BTN MILLSTONE DR & KINGKNOLL DR; S/T TT99083 ; S/T RO984168,RO984169 BRAMPTON	Bill 58	No	N/A	N/A	THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO
14084-1414 LT	PT LT 15, CON 2 WEST OF HURONTARIO ST , PART 6 & 7 , 43R17430 ; BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14084-2104 LT	PT LT 15, CON 2 WEST OF HURONTARIO ST.(TORONTO TWP) DES PARTS 8 AND 9, PL 43R21993, & PT 2, PL 43R21430; BRAMPTON; S/T EASEMENT IN FAVOUR OF PT 4, 43R17430, S & E PTS 8 & 9, 43R21993, OVER PTS 8 & 9, 43R21993 & PT 2, 43R21430 AS IN LT1731941.	Road Allowance	No	N/A	N/A	THE REGIONAL MUNICIPALITY OF PEEL
14084-5473 LT	PT LT 14 CON 2 WHS (TOR TWP)DES AS PT 8, PL 43R32434 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14084-5474 LT	PT LT 14 CON 2 WHS (TOR TWP)AS IN TT81033, LYING E OF RAY LAWSON BLVD. EXCEPT PTS 1, 2, 3, PL 43R23721, PT 8, PL 43R32434 SUBJECT TO AN EASEMENT AS IN TT81033 CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF ENERGY AND INFRASTRUCTURE
14084-5479 LT	PT LT 15 CON 2 WHS (TOR.TWP.) DES PTS 1, 2, 5, 6 PL 43R-33257 SUBJECT TO AN EASEMENT AS IN RO984169 TOGETHER WITH AN EASEMENT AS IN LT1731941 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14084-5480 LT	PT LT 15, CON 2 WEST OF HURONTARIO ST.(TORONTO TWP), DES PART 4, PL 43R17430, SAVE AND EXCEPT PARTS 8 AND 9, PL 43R21993 AND PTS 1, 2, 5, 6 PL 43R-33257 SUBJECT TO AN EASEMENT AS IN RO984169 TOGETHER WITH AN EASEMENT AS IN LT1731941 CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF INFRASTRUCTURE
14086-0100 LT	RDAL BTN TWP OF TORONTO & TWP OF CHINGUACOUSY AKA STEELES AV W FROM THE NE LIMIT OF THE RDAL BTN CONS 3 & 4 WHS TO THE SW LIMIT OF CHINGUACOSY RD; FIRSTLY: PT LT 1, CON 3, WHS CHINGUACOUSY AS IN CH28849; PT LT 15, CON 3, WHS TORONTO AS IN TT136352 & PT 1, 43R20379; SECONDLY: PT LT 1 CON 3 WHS CHINGUACOUSY PTS 18 TO 24, 26, 27, 29 & 30, 43R322 & PTS 6 & 7, 43R21993, PTS 1 TO 3, 43R22169; S/T RO1144550; PT LT 15 CON 3 WHS TORONTO PTS 25, 32 & 34, 43R322 ; S/T CH32005, CH32013, CH32120 BRAMPTON	Road Allowance	No	N/A	N/A	THE REGIONAL MUNICIPALITY OF PEEL
14086-0277 LT	PT LT 1 CON 3 WHS CHINGUACOUSY DES PTS 21, 22 PL 43R25388 BRAMPTON	Road Allowance	No	N/A	N/A	THE REGIONAL MUNICIPALITY OF PEEL
14086-0706 LT	PT LT 1 CON 3 WHS CHING DES PT 1 PL 43R-30105; BRAMPTON;	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14086-0707 LT	PT LT 1 CON 3 WHS CHING; PT LT 2 CON 3 WHS CHING, LYING WEST OF PT 1 PL 43R-30105; BRAMPTON; S/TCH23063, (PARTIALLY RELEASED BY PR1401697); ,CH22873, CH33650, DESCRIPTION MAY NOT BE ACCEPTABLE IN THE FUTURE.	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT ONTARIO AS REPRESENTED BY THE MINISTER OF ONE PUBLIC INFRASTRUCTURE RENEWAL
14086-1242 LT	PT LT 3 CON 3 WHS CHING DES PT 1 PL 43R-32447; BRAMPTON.	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14086-1243 LT	PT LT 4 CON 3 WHS CHING DES PTS 1, 2, 3 PL 43R-32448; BRAMPTON; S/T CH23320.	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14086-1245 LT	PT LT 4 CON 3 WHS CHING AS IN CH23320, LYING EAST OF PT 3 PL 43R-32448; BRAMPTON.	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF PUBLIC INFRASTRUCTURE RENEWAL

PIN (Property Identification Number)	LEGAL DESCRIPTION	TYPE OF PROPERTY	Does Hydro One Require New or Updated Property Rights	RIGHTS REQUIRED	Where Agreement is Outstanding - Summary of Negotiations to Date	OWNER(S)
14086-1246 LT	PT LT 3 CON 3 WHS CHING AS IN CH22874, LYING WEST OF PT 1 PL 43R-32447; BRAMPTON; S/T CH22874 PARTIALLY RELEASED BY PR2572323.	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF PUBLIC INFRASTRUCTURE RENEWAL
14086-1247 LT	PT LT 3 CON 3 WHS CHING AS IN CH22874, LYING EAST OF PT 1 PL 43R-32447; PT LT 2 CON 3 WHS CHING AS IN CH23385, CH33626; S/T CH23385, CH33626. S/T CH22874 PARTIALLY RELEASED BY PR1752976, PR2333133, PR2337156, PR2360609, PR2442809, PR2572323; SUBJECT TO AN EASEMENT IN GROSS OVER PT 1, 43R33738 AS IN PR2092722; SUBJECT TO AN EASEMENT OVER PT 1, PL 43R33738 IN FAVOUR OF BLK 19, PL 43M1906 AS IN PR2344326; SUBJECT TO AN EASEMENT OVER PT 1 PL 43R37339 AS IN PR3031874; CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF INFRASTRUCTURE
14086-1432 LT	PT EAST HALF LT 5, CONC 3, WHS CHING, DES PTS 1, 2 & 3, 43R-32449 SUBJECT TO AN EASEMENT AS IN CH23173 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14086-1434 LT	PT LT 4 CON 3 WHS CHING AS IN CH23320, LYING WEST OF PT 1 PL 43R-32448; PT LT 5 CON 3 WHS CHING AS IN CH23173, EXCEPT VS117242 LYING SOUTH OF PT 1, 43R32449 SUBJECT TO AN EASEMENT AS IN CH23320 CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF INFRASTRUCTURE
14086-1435 LT	PT LT 1, CON 3 WHS, CHING, DES PT 29, PL 43R-32197 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14086-1436 LT	PT LT 1, CON 3 WHS CHING; PT LT 2 CON 3 WHS CHING LYING EAST OF PT 1 PL 43R30105 SAVE AND EXCEPT PT 29 PL 43R32197; S/T CH22837, CH33625, CH33650; DESCRIPTION MAY NOT BE ACCEPTABLE IN THE FUTURE CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF INFRASTRUCTURE
14086-3438 LT	PT LT 5, CON 3 WHS (CHING) DES PT 2, 43R34489 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14086-3582 LT	PT LT 5, CON 3 WHS (CHING) DES AS PTS 1 & 3, 43R34489 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE REGIONAL MUNICIPALITY OF PEEL
14086-3583 LT	PT LT 5 CON, 3 WHS (CHING) AS IN CH23173, EXCEPT VS117242 & PT 2, 43R34489 LYING NORTH OF PTS 1, 2 & 3, 43R32449; SAVE & EXCEPT PTS 1 & 3, PL 43R34489 SUBJECT TO AN EASEMENT AS IN CH23173 CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF INFRASTRUCTURE
14094-0065 LT	RDAL BTN CONS 5 & 6 WHS CHINGUACOUSY AKA QUEEN ST W, LYING BTN CREDITVIEW RD & CHINGUACOUSY RD; FIRSTLY: PT LT 5 CON 3 WHS CHINGUACOUSY PTS 3 & 4, 43R7896, PTS 1 & 2, 43R4703 & AS IN VS24688 & VS117242; PT LT 6 CON 3 WHS CHINGUACOUSY PT 1, 43R8020 & AS IN VS117242, VS24688; PT LT 1 PL 428 CHINGUACOUSY; PT LT 2 PL 428 CHINGUACOUSY; PT LT 3 PL 428 CHINGUACOUSY; PT LT 4 PL 428 CHINGUACOUSY; PT LT 5 PL 428 CHINGUACOUSY; PT LT 6 PL 428 CHINGUACOUSY; PT LT 7 PL 428 CHINGUACOUSY AS IN VS24688; 10 FT WID PL 428 CHINGUACOUSY ; SECONDLY: PT LT 5 CON 3 WHS CHINGUACOUSY AS IN VS34085 & VS67313; S/T RO422946 ; S/T CH31004,CH31005,CH31006,CH31010, CH31011,CH31012; CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE REGIONAL MUNICIPALITY OF PEEL
14094-0069 R	LT 9 CON 3 WHS CHINGUACOUSY; BRAMPTON	Rail	No	N/A	N/A	CANADIAN NATIONAL RAILWAY COMPANY OZNER CORPORATION
14094-0508 LT	PT LT 9, CON 3 W.H.S., CHING AS IN VS216118 & CH22384, EXCEPT VS 241822, PTS 1 TO 3, 43R-23669 & PTS 1 & 2, 43R-23746 ; S/T EASE IN FAVOUR OF THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO, OVER PT OF LT 9, CON 3 W.H.S. AS IN CH23352 (SKETCH ATTACHED) ; T/W EASE IN FAVOUR OF PT LT 9, CON 3. W.H.S., CHING AS IN VS216118 & CH22384, EXCEPT VS241822, PTS 1 TO 3, 43R-23669 & PTS 1 & 2, 43R-23746, OVER PTLT 9, CON 3 W.H.S., PT 2, 43R-23669 & PT 2, 43R-23746, AS IN LT2029497;	HONI	No	N/A	N/A	HYDRO ONE NETWORKS INC.

PIN (Property Identification Number)	LEGAL DESCRIPTION	TYPE OF PROPERTY	Does Hydro One Require New or Updated Property Rights	RIGHTS REQUIRED	Where Agreement is Outstanding - Summary of Negotiations to Date	OWNER(S)
14094-1848 LT	PT LT 9, CON 3 WHS CHINGUACOUSY, PT 1, 43R30450; BRAMPTON; TO BE ESTABLISHED AS PART OF THE PUBLIC HIGHWAY SYSTE, TO BE PART OF SPICEBUSH TERRACE BY BY-LAW 361-2006 AS IN PR1154283.	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14094-1849 LT	PT LT 9, CON 3 WHS CHINGUACOUSY, PTS 2 & 3, 43R30450; BRAMPTON; PT 2 PL 43R-30450 TO BE ESTABLISHED AS PART OF THE HIGHWAY SYSTEM TO BE PART OF SPICEBUSH TERRACE BY BY-LAW 361-2006 AS IN PR1154283.	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14094-1850 LT	PT LT 9, CON 3 WHS CHINGUACOUSY, BEING PT OF PT 8, 43R1980 LYING BETWEEN PTS 1 & 2, 43R30450; BRAMPTON. S/T EASEMENT IN GROSS OVER PT 1, 43R30699, AS IN PR1202284. S/T EASEMENT IN GROSS OVER PT 2, 43R30699, AS IN PR1202284.	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF PUBLIC INFRASTRUCTURE RENEWAL
14094-4477 LT	PT LT 6, CON 3 WHS (CHING) DES AS PTS 19, 20, PL 43R33489 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14094-4478 LT	PT LT 6, CON 3 WHS (CHING) DES AS PTS 12, 13, 15, 16, 17, 18, PL 43R33489; SUBJECT TO AN EASEMENT IN GROSS OVER PTS 12, 15, 17, 43R33489 AS IN PR2010363	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF INFRASTRUCTURE
14094-4479 LT	PT LT 6, CON 3 WHS (CHING) DES AS PTS 11, 14, PL 43R33489; S/T EASEMENT AS IN CH23211, SAVE AND EXCEPT PTS 15, 16, PL 43R33489 (PARTIALLY RELEASED BY PR1952105) CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14094-4480 LT	PT LT 6, CON 3 WHS (CHING) DES AS PT 6, PL 43R33489 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14094-4488 LT	PT LT 6, CON 3 WHS (CHING), DES PTS 3, 4, 5, 43R33489; PT 3 43R33489 IS DEDICATED AS PART OF THE PUBLIC HIGHWAY SYSTEM KNOWN AS PT OF QUEEN STREET WEST BY BY-LAW NO. 96-2011 AS IN PR2079938 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE REGIONAL MUNICIPALITY OF PEEL
14094-4489 LT	PT LT 6, CON 3 WHS (CHING), DES PTS 7-10, 43R33489 SUBJECT TO AN EASEMENT IN GROSS OVER PTS 7, 9, 10, 43R33489 AS IN PR2010363 CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF INFRASTRUCTURE
14094-4784 LT	PART OF LOT 7 CONCESSION 3 WHS CHINGUACOUSY, DESIGNATED AS PART 1, 43R-34560 CITY OF BRAMPTON	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14094-6337 LT	PT LT 8 CON 3 WHS CHINGUACOUSY; PT 4, 43R34560; CITY OF BRAMPTON; REGIONAL MUNICIPALITY OF PEEL	Road Allowance	No	N/A	N/A	THE CORPORATION OF THE CITY OF BRAMPTON
14094-6339 LT	PT OF LOTS 6 & 7, CON 3 WHS CHINGUACOUSY; S/T CH23212 (PARTIALLY RELEASED BY PR2678161)SUBJECT TO AN EASEMENT IN GROSS OVER PT 21, 43R33489 AS IN PR2010363 CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF GOVERNMENT AND CONSUMER SERVICES
14094-6340 LT	PT OF LOTS 7 & 8 CON 3 WHS CHINGUACOUSY; S/T CH23382(PARTIALLY RELEASED BY PR2691678); S/T CH23209 (PARTIALLY RELEASED BY PR2867264; SUBJECT TO AN EASEMENT IN GROSS OVER PTS 2 & 3, PL 43R34560 AS IN PR2310091 CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF GOVERNMENT AND CONSUMER SERVICES
14094-6341 LT	PT OF LOTS 8 AND 9 CON 3 WHS CHINGUACOUSY; S/T VS26468 & CH23210; S/T EASEMENT OVER PT 4, 43R30450 IN FAVOUR OF BLKS 260 & 261 43M1718, AS IN PR1202283; S/T EASEMENT OVER PTS 7 & 8 PL 43R31438 IN FAVOUR OF LT 201 PL 43M1718, AS IN PR1642568 CITY OF BRAMPTON	Bill 58	No	N/A	N/A	HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF GOVERNMENT AND CONSUMER SERVICES

TRANSFER AND GRANT OF EASEMENT

WHEREAS [FULL LEGAL NAME OF TRANSFEROR] (the "**Transferor**") is the owner in fee simple and in possession of the Lands described in Schedule "A" attached hereto (the "**Lands**").

AND WHEREAS Hydro One Networks Inc. (the "**Transferee**") has erected, or is about to erect, certain Works (as more particularly described in paragraph 1(a) hereof) over, across, along and upon the Lands.

IN CONSIDERATION of the payment of ● DOLLARS ($●.00) paid by the "Transferee" to the Transferor, mutual covenants hereinafter set forth and other good and valuable consideration, the Transferor and Transferee hereto agree as follows:

1. The Transferor hereby grants and conveys to the Transferee, its successors and assigns the rights and easement, free from all encumbrances and restrictions, the following unobstructed and exclusive rights, easements, covenants, agreements and privileges in perpetuity (the "**Rights**") in, through, under, over, across, along and upon that portion of the Lands of the Transferor described herein on Schedule A-1 (the "**Strip**"), for the following purposes:

   (a) To enter and install, construct, erect, maintain, open, inspect, add to, enlarge, alter, repair and keep in good condition, move, remove, replace, reinstall, reconstruct, relocate, supplement and operate and maintain at all times over, across, along and upon the Strip an electrical transmission system and telecommunications system consisting in both instances all such aboveground lines, wires, cables, telecommunications cables, conductors, apparatus, works, accessories, associated material and equipment, and appurtenances pertaining to or required by either such system (all or any of which are herein individually or collectively called the ("Works") as in the opinion of the Transferee are necessary or convenient thereto for use as required by Transferee in its undertaking from time to time, or a related business venture.

   (b) To enter on and selectively cut or prune, and to clear and keep clear, and remove all trees (subject to compensation for merchantable wood values), branches, bush and shrubs and other obstructions and materials in, over or upon the Strip, and without limitation, to cut and remove all leaning or decayed trees located on the Lands whose proximity to the Works renders them liable to fall and come in contact with the Works or which may in any way interfere with the safe, efficient or serviceable operation of the Works or this easement by the Transferee.

   (c) To conduct all engineering, legal surveys, and make soil tests, soil compaction and environmental studies and audits in, under, on and over the Strip as the Transferee in its discretion considers requisite.

   (d) To erect, install, construct, maintain, repair and keep in good condition, move, remove, replace and use bridges and such gates in all fences which are now or may hereafter be on the Strip as the Transferee may from time to time consider necessary.

   (e) Except for fences and permitted paragraph 2(a) installations, to clear the Strip and keep it clear of all buildings, structures, erections, installations, or other obstructions of any nature (hereinafter collectively called the "**obstruction**") whether above or below ground, including removal of any materials and equipment or plants and natural growth, which in the opinion of the Transferee, endanger its Works or any person or property or which may be likely to become a hazard to any Works of the Transferee or to any persons or property or which do or may in any way interfere with

the safe, efficient or serviceable operation of the Works or this easement by the Transferee.

(f) To enter on and exit by the Transferor's access routes and to pass and repass at all times in, over, along, upon and across the Strip and so much of the Lands as is reasonably required, for the Transferee, its employees, agents, contractors, subcontractors, workmen and permittees with or without all plant machinery, material, supplies, vehicles and equipment for all purposes necessary or convenient to the exercise and enjoyment of this easement, subject to compensation afterwards for any crop or other physical damage only to the Lands or permitted structures sustained by the Transferor caused by the exercise of this right of entry and passageway.

2. The Transferor agrees that:

(a) It will not interfere with any Works established on or in the Strip and shall not, without the Transferee's consent in writing, erect or cause to be erected or permit in, under or upon the Strip any obstruction or plant or permit any trees, bush, shrubs, plants or natural growth which does or may interfere with the Rights granted herein. The Transferor agrees it shall not, without the Transferee's consent in writing, change or permit the existing configuration, grade or elevation of the Strip to be changed and the Transferor further agrees that no excavation or opening or work which may disturb or interfere with the existing surface of the Strip shall be done or made unless consent therefore in writing has been obtained from the Transferee, provided however, that the Transferor shall not be required to obtain such permission in case of emergency. Notwithstanding the foregoing, in cases where in the reasonable discretion of the Transferee, there is no danger or likelihood of danger to Works of the Transferee or to any persons or property and the safe or serviceable operation of this easement by the Transferee is not interfered with, the Transferor may at its expense and with the prior written approval of the Transferee, construct and maintain roads, lanes, walks, drains, sewers, water pipes, oil and gas pipelines, fences (not to exceed 2 metres in height) and service cables on or under the Strip (the "**Installation**") or any portion thereof; provided that prior to commencing such Installation, the Transferor shall give to the Transferee a minimum of ten days notice in writing thereof to enable the Transferee to have a representative present to inspect the proposed Installation during the performance of such work, and provided further that the Transferor comply with all instructions given by such representative and that all such work shall be done to the reasonable satisfaction of such representative. In the event of any unauthorised interference aforesaid or contravention of this paragraph, or if any authorised interference, obstruction or Installation is not maintained in accordance with the Transferee's instructions or in the Transferee's reasonable opinion, may subsequently interfere with the Rights granted herein, the Transferee may at the Transferor's expense, forthwith remove, relocate, clear or correct the offending interference, obstruction, Installation or contravention complained of from the Strip, without being liable for any damages caused thereby.

(b) Notwithstanding any rule of law or equity, the Works installed by the Transferee shall at all times remain the property of the Transferee, notwithstanding that such Works are or may become annexed or affixed to the Strip and shall at anytime and from time to time be removable in whole or in part by the Transferee.

(c) No other easement or permission will be transferred or granted and no encumbrances will be created over or in respect to the Strip, prior to the registration of a Transfer of this grant of Rights.

(d) The Transferor will execute such further assurances of the Rights in respect of this grant of easement as may be requisite.

(e) The Rights hereby granted:

(i) shall be of the same force and effect to all intents and purposes as a covenant running with the Strip.

(ii) is declared hereby to be appurtenant to and for the benefit of the Works and undertaking of the Transferee described in paragraph 1(a).

3. The Transferor agrees that the Transferee may, in the Transferee's sole discretion, obtain at the Transferee's sole cost and expense all necessary postponements and subordinations (in registrable form) from all current and future prior encumbrancers, postponing their respective rights, title and interests to the Transfer of Easement herein so as to place such Rights and easement in first priority on title to the Lands.

4. There are no representations, covenants, agreements, warranties and conditions in any way relating to the subject matter of this grant of Rights whether expressed or implied collateral or otherwise except those set forth herein.

5. No waiver of a breach or any of the covenants of this grant of Rights shall be construed to be a waiver of any succeeding breach of the same or any other covenant.

6. The burden and benefit of this transfer of Rights shall run with the Strip and the Works and undertaking of the Transferee and shall extend to, be binding upon and enure to the benefit of the parties hereto and their respective heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF the parties hereto have executed this Grant of Easement.

Signed by the Transferee this day of , 2025.

HYDRO ONE NETWORKS INC.

Per:_____
Name:
Position:

I have authority to bind the Corporation.

Signed by the Transferor this day of , 2025.

[FULL LEGAL NAME OF TRANSFEROR]

Per:_____
Name:
Position:

Per:_____
Name:
Position:

We/I have authority to bind the Corporation

SCHEDULE "A"

LEGAL DESCRIPTION OF LANDS

[INSERT LEGAL DESCRIPTION OF LANDS]

SCHEDULE "A-1"

EASEMENT LANDS

[Part of Lot •, Concession •, Shown as Parts •, on Reference Plan •R-•••]

Filed: 2026-10-23
EB-2026-0254
Exhibit E-1-1
Attachment 4
Page 1 of 4

THIS AGREEMENT made in duplicate the _____ day of_____ 202X.

Between:

[INSERT SUBJECT PROPERTY LEGAL OWNER]

(hereinafter referred to as the "Grantor")

OF THE FIRST PART

--- and ---

HYDRO ONE NETWORKS INC.

(hereinafter referred to "HONI")

OF THE SECOND PART

WHEREAS the Grantor is the owner in fee simple and in possession of certain lands legally described as [INSERT SUBJECT PROPERTY LEGAL DESCRIPTION] being PIN: [INSERT SUBJCT PROPERTY PIN], collectively referred to as the "Lands".

WHEREAS HONI desires the right to enter onto and use a portion of the Lands in connection with the [INSERT PROJECT REQUIRING THE TEMPORARY SITE] (the "Project").

NOW THEREFORE THIS AGREEMENT WITNESSETH that in consideration of the fee of XXXXX Dollars ($XXXX) plus harmonized sales tax ("HST") per month (the "Monthly Rent") to be paid by HONI to the Grantor, and the mutual covenants herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. The Grantor hereby grants, conveys and transfers to HONI in, over, along and upon that part of the Lands highlighted in red as shown in Schedule "A" attached hereto (the "Material Laydown Area"), the rights and privileges as follows:

(a) for the servants, agents, contractors and workmen of HONI at all times with all necessary vehicles and equipment to pass and repass over the Lands for the purpose of access to the Material Laydown Area;
(b) to store, use and maintain upon the Material Laydown Area, construction equipment and machinery as may be necessary for HONI's purposes;
(c) to place upon the Material Laydown Area, temporary trailers as may be necessary for HONI's purposes of a construction field office for the purposes of the Project; and
(d) to cut and remove all trees, brush and other obstructions made necessary by the exercise of the rights granted hereunder

2. The term of this Agreement and the permission granted herein shall be a term of XX (XX) months commencing on [INSERT DATE OF COMMENCEMENT] and ending [INSERT DATE OF EXPIRY] (the "Term"). HONI may, in its sole option, and upon 30 days' notice to the Grantor, extend the Term on a month to month basis for up to an additional XX (XX) months, under the same provisions and conditions contained in this Agreement, including the Monthly Rent.

3. Upon the expiry of the Term or any extension thereof, HONI shall remove and repair any physical damage to the Material Laydown Area and/or Lands resulting from HONI's use of the Material Laydown Area and the permission granted herein; and, shall restore the Material Laydown Area to its original condition so far as reasonably practicable.

4. The total amount of the Monthly Rent shall be paid in full by HONI at the commencement of the Term. For clarity, HONI shall pay the total amount of XXXX Dollars ($XXX) plus HST at the commencement of the Term.

5. All agents, representatives, officers, directors, employees and contractors and property of HONI located at any time on the Material Laydown Area shall be at the sole risk of HONI and the Grantor shall not be liable for any loss or damage or injury (including loss of life) to them or it however occurring except and to the extent to which such loss, damage or injury is caused by the negligence or willful misconduct of the Grantor.

6. HONI agrees that it shall indemnify and save harmless the Grantor from and against all claims, demands, costs, damages, expenses and liabilities (collectively the "Costs") whatsoever arising out of HONI's presence on the Material Storage Yard Area or of its activities on or in connection with the Material Storage Yard Area arising out of the permission granted herein except to the extent any of such Costs arise out of or are contributed to by the negligence or willful misconduct by the Grantor.

7. Notices to be given to either party shall be in writing, personally delivered or sent by registered mail (except during a postal disruption or threatened postal disruption), telegram, electronic facsimile or other similar means of prepaid recorded communication to the applicable address set forth below (or to such other address as such party may from time to time designate in such manner):

TO HONI:

Hydro One Networks Inc.
Real Estate Services
1800 Main Street East
Milton, Ontario L9T 753

Attention:
Tel:

TO GRANTOR:

XXXXXXX
XXXXXXX
XXXXXXX

Attention:
Tel:

8. Notices personally delivered shall be deemed to have been validly and effectively given on the day of such delivery. Any notice sent by registered mail shall be deemed to have been validly and effectively given on the fifth (5th) business day following the date on which it was sent. Any notice sent by telegram, electronic facsimile or other similar means of prepaid recorded communication shall be deemed to have been validly and effectively given on the Business Day next following the day on which it was sent. "Business Day" shall mean any day which is not a Saturday or Sunday or a statutory holiday in the Province of Ontario. This Agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable herein. The parties hereto submit themselves to the exclusive jurisdiction of the Courts of the Province of Ontario.

9. Any amendments, modifications or supplements to this Agreement or any part thereof shall not be valid or binding unless set out in writing and executed by the parties with the same degree of formality as the execution of this Agreement.

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed by their duly authorized representatives as of the day and year first above written.

[INSERT SUBJECT PROPERTY LEGAL OWNER]

_____
Grantor's HST Registration Number

_____
Name:
Title:

I have authority to bind the Corporation

HYDRO ONE NETWORKS INC.

_____
Name:
Title:

I have authority to bind the Corporation

Page 3 of 4

Material Laydown Area

SCHEDULE “A”

*Sketch for reference only, not to scale.

Page 4 of 4

Off-Corridor Access Road

THIS AGREEMENT made in duplicate the _____day of _____2021

Between:

XXXXXXXXX

(hereinafter referred to as the "Grantor")
OF THE FIRST PART

--- and ---

HYDRO ONE NETWORKS INC.

(hereinafter referred to as "HONI")
OF THE SECOND PART

WHEREAS the Grantor is the owner in fee simple and in possession of certain lands legally described as ***(INSERT LEGAL DESCRIPTION)*** **(the "Lands").**

WHEREAS The Grantor has entered into a Temporary Access Agreement with HONI on a portion of the Lands highlighted in green in Schedule "A" (the "Access Lands"). HONI will be utilizing a portion of the Lands as a means of off-corridor access highlighted in red in Schedule "A" ("Off-Corridor Access Lands").

WHEREAS the Owner is agreeable in allowing HONI to enter onto the Lands to use the Off-Corridor Access Lands in order to commence activities which shall include necessary real estate, environmental and engineering studies and testing including but not limited to borehole testing, archaeological studies, soil assessments, property appraisals and surveys in, on or below the Lands subject to the terms and conditions contained herein (the "Activities").

NOW THEREFORE THIS AGREEMENT WITNESSES THAT in consideration of the lump sum of **$XXXXX.00** now paid by HONI to the Owner, and the respective covenants and agreements of the parties hereinafter contained and other valuable consideration, the receipt and sufficiency of which are hereby acknowledged by the parties hereto, the parties hereto agree as follows:

1. The Grantor hereby grants to HONI the right to enter upon the Lands for the purpose of Off-Corridor Access Lands.

2. The Grantor hereby grants to HONI, as of the date this Agreement, (i) the right to enter upon and exit from, and to pass and repass at any and all times in, over, along, upon, across, through and under the Off-Corridor Access Lands as may be reasonably necessary, at all reasonable times, for HONI and its respective officers, employees, workers, permittees, servants, agents, contractors and subcontractors, with or without vehicles, supplies, machinery, plant, material and equipment for the purpose of the Activities, subject to payment of compensation for damages including payment for crops caused thereby. HONI agrees that it shall take all reasonable care while undertaking the Activities.

3. The term of this Agreement and the permission granted herein shall be two (2) years from the date written above (the "Term"). HONI may, in its sole discretion, and upon 10 days notice to the Grantor, extend the Term for an additional length of time, which shall be negotiated between the parties.

4. Upon the expiry of the Term or any extension thereof, HONI shall repair any physical damage to the Off-Corridor Access Lands and/or Lands resulting from HONI's use of the Access Lands and the permission granted herein; and, shall restore the Access Lands to its original condition so far as possible and practicable.

5. All agents, representatives, officers, directors, employees and contractors and property of HONI located at any time on the Off-Corridor Access Lands shall be at the sole risk of HONI and the Grantor shall not be liable for any loss or damage or injury (including loss of life) to them or it however occurring except and to the extent

to which such loss, damage or injury is caused by the negligence or willful misconduct of the Grantor.

6. HONI agrees that it shall indemnify and save harmless the Grantor from and against all claims, demands, costs, damages, expenses and liabilities (collectively the "Costs") whatsoever arising out of HONI's presence on the Off-Corridor Access Lands or of its activities on or in connection with the Off-Corridor Access Lands arising out of the permission granted herein except to the extent any of such Costs arise out of or are contributed to by the negligence or willful misconduct by the Grantor.

7. Notices to be given to either party shall be in writing, personally delivered or sent by registered mail (except during a postal disruption or threatened postal disruption), telegram, electronic facsimile to the applicable address set forth below (or to such other address as such party may from time to time designate in such manner):

TO HONI:

Hydro One Networks Inc.
Real Estate Services
1800 Main Street East
Milton, Ontario L9T 7S3

Attention: Real Estate Acquisitions
Tel: 905-875-2508
Fax: 905-878-8356

TO GRANTOR:

XXXXXXXX
XXXXXXXX

8. Notices personally delivered shall be deemed to have been validly and effectively given on the day of such delivery. Any notice sent by registered mail shall be deemed to have been validly and effectively given on the fifth (5th) business day following the date on which it was sent. Any notice sent by telegram, electronic facsimile or shall be deemed to have been validly and effectively given on the Business Day next following the day on which it was sent. "Business Day" shall mean any day which is not a Saturday or Sunday or a statutory holiday in the Province of Ontario. This Agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable herein. The parties hereto submit themselves to the exclusive jurisdiction of the Courts of the Province of Ontario.

9. Any amendments, modifications or supplements to this Agreement or any part thereof shall not be valid or binding unless set out in writing and executed by the parties with the same degree of formality as the execution of this Agreement.

Page 2 of 4

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed by their duly authorized representatives as of the day and year first above written.

SIGNED, SEALED & DELIVERED
In the presence of:

_____
Witness

OWNER(S):

_____
Name:

SIGNED, SEALED & DELIVERED
In the presence of:

_____
Witness

_____
Name:

HYDRO ONE
HST # 870 865 821 RT001

HYDRO ONE NETWORKS INC.

By: _____
Name:
Title:

I have authority to bind the Corporation

Page 3 of 4

SCHEDULE "A"

PROPERTY SKETCH

Page 4 of 4

Damage Claim

THIS MEMORANDUM OF AGREEMENT dated the ____ day of _____, 20____

Between:

[INSERT NAME OF OWNER]

herein called the "**Claimant**"

- and-

Hydro One Networks Inc.

herein called the "**Hydro One**"

Witnesseth:

The Claimant agrees to accept: XXXXXXX ($XXX.XX) in full payment and satisfaction of all claims or demands for damages of whatsoever kind, nature or extent which may have been done to date by Hydro One during the construction, completion, operation or maintenance of the works of Hydro One constructed on [INSERT LEGAL DESCRIPTION] which property the Claimant is the legal owner and which damages may be approximately summarized and itemized as:

[INSERT DESCRIPTION OF DAMAGE]

Area

TOTAL $

.

Subject to Approval by Hydro One Networks Inc.

Witness

_____

Signature

_____

Signature

SYSTEM IMPACT ASSESSMENT

Please refer to **Attachment 1 to this Schedule** for the Final SIA prepared by the IESO (SIA reference # CAA ID: 2025-EX1301).

The Final SIA concludes that the Project is expected to have no material adverse impact on the reliability of the integrated power system, and recommends that a Notification of Conditional Approval for Connection be issued.

Hydro One confirms that it will implement the requirements noted by the IESO in the SIA.

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Expedited System Impact Assessment Report

Final Report - Public

CAA ID: 2025-EX1301
Project: H29/H30 Conductor Upgrade
Connection Applicant: Hydro One Networks Inc.

October 22, 2025

ieso
Connecting Today.
Powering Tomorrow.

Acknowledgement

The IESO wishes to acknowledge the assistance of Hydro One in completing this assessment.

Disclaimer

This report has been prepared solely for the purpose of assessing whether the connection applicant's proposed connection with the IESO-controlled grid would have an adverse impact on the reliability of the integrated power system and whether the IESO should issue a notice of conditional approval or disapproval of the proposed connection under Chapter 4, section 6 of the Market Rules.

Conditional approval of the project is based on information provided to the IESO by the connection applicant and Hydro One at the time the assessment was carried out. The IESO assumes no responsibility for the accuracy or completeness of such information, including the results of studies carried out by Hydro One at the request of the IESO. Furthermore, the conditional approval is subject to further consideration due to changes to this information, or to additional information that may become available after the conditional approval has been granted.

If the connection applicant has engaged a consultant to perform connection assessment studies, the connection applicant acknowledges that the IESO will be relying on such studies in conducting its assessment and that the IESO assumes no responsibility for the accuracy or completeness of such studies including, without limitation, any changes to IESO base case models made by the consultant. The IESO reserves the right to repeat any or all connection studies performed by the consultant if necessary to meet IESO requirements.

Conditional approval of the proposed connection means that there are no significant reliability issues or concerns that would prevent connection of the proposed project to the IESO-controlled grid. However, the conditional approval does not ensure that a project will meet all connection requirements. In addition, further issues or concerns may be identified by the transmitter(s) during the detailed design phase that may require changes to equipment characteristics and/or configuration to ensure compliance with physical or equipment limitations, or with the Transmission System Code, before connection can be made.

This report has not been prepared for any other purpose and should not be used or relied upon by any person for another purpose. This report has been prepared solely for use by the connection applicant and the IESO in accordance with Chapter 4, section 6 of the Market Rules. This report does not in any way constitute an endorsement of the proposed connection for the purposes of obtaining a contract with the IESO for the procurement of supply, generation, demand response, demand management or ancillary services.

The IESO assumes no responsibility to any third party for any use, which it makes of this report. Any liability which the IESO may have to the connection applicant in respect of this report is governed by Chapter 1, section 13 of the Market Rules. In the event that the IESO provides a draft of this report to the connection applicant, the connection applicant must be aware that the IESO may revise drafts of this report at any time in its sole discretion without notice to the connection applicant. Although the IESO will use its best efforts to advise you of any such changes, it is the responsibility of the connection applicant to ensure that the most recent version of this report is being used. The IESO provides no comment, representation or opinion, express or implied, with respect to who should bear the cost of IESO requirements for connection in this report and disclaims any liability in connection therewith.

Project Description

Hydro One Networks Inc. (the "connection applicant" and the "transmitter") is proposing to reconductor two 8.5 km 230kV radial circuits H29/H30 between Hurontario SS and Pleasant TS (the "project") to accommodate future load growth within the area, as identified in the 2021 GTA West Integrated Regional Resource Plan (IRRP).

The proposed in-service date is Q2 2029.

Notification of Conditional Approval

This assessment concludes that the proposed connection of the project is expected to have no material adverse impact on the reliability of the integrated power system, provided that all requirements in this report are implemented. Therefore, the assessment supports the release of the Notification of Conditional Approval for connection of the project.

IESO Requirements for Connection

General Requirements:

The connection applicant shall satisfy all applicable requirements specified in the Market Rules, the Transmission System Code (TSC) and reliability standards. Some of the general requirements that are applicable to this project are presented in detail in Appendix A: General Requirements of this report.

Appendix A: General Requirements

The connection applicant shall satisfy all applicable requirements specified in the Market Rules, the Transmission System Code and reliability standards. This section highlights some of the general requirements that are applicable to the project.

1. The connection applicant must notify the IESO at connection.assessments@ieso.ca as soon as they become aware of any changes to the project scope or data used in this assessment. The IESO will determine whether these changes require a re-assessment.
2. The connection applicant shall ensure that the project's equipment meet the voltage requirements specified in section 4.2 and section 4.3 of the Ontario Resource and Transmission Assessment Criteria (ORTAC).
3. According to Section 6.1.2 of the TSC, the connection applicant must ensure the project's transmission connection equipment is designed to withstand the fault levels in the area. According to Section 6.4.4 of the TSC, if any future system changes result in an increased fault level higher than the project's equipment capability, the connection applicant is required to replace that equipment with higher rated equipment capable of withstanding the increased fault level, up to the maximum fault level specified in Appendix 2 of the TSC.

   It is the connection applicant's responsibility to verify that all equipment and circuit breakers within the project are appropriately sized for the local fault levels.

   The connection applicant shall ensure that the circuit breakers/switchers installed at the project have rated interrupting time that satisfies Appendix 2 of the TSC. Fault interrupting devices installed at the project must be able to interrupt fault currents at the applicable maximum continuous voltage as specified in Section 4.2 and Section 4.3 of ORTAC.
4. The connection applicant shall ensure that the connection equipment is designed to be fully operational in all reasonably foreseeable ambient conditions. Failures of the connection equipment must be contained within the project and have no adverse impact on the IESO-controlled grid.
5. In accordance with Section 7.4 of Chapter 4 of the Market Rules, the connection applicant shall provide to the IESO the applicable telemetry data listed in Appendix 4.16 of the Market Rules on a continual basis. The data shall be provided in accordance with the performance standards set forth in Appendix 4.20 and Appendix 4.21, subject to Section 7.6A of Chapter 4 of the Market Rules. Additional telemetry quantities may be applicable. The whole telemetry list will be finalized during the IESO's Market Registration process.

   The connection applicant must install monitoring equipment that meets the requirements set forth in Appendix 2.2 of Chapter 2 of the Market rules. As part of the IESO's Market Registration process, the connection applicant must also complete end to end testing of all necessary telemetry points with the IESO to ensure that standards are met and that sign conventions are understood. All found anomalies must be corrected before IESO's final approval to connect any phase of the project is granted.

6. The connection applicant must initiate the IESO's Market Registration process at least four months prior to the commencement of any project related outages. Once the IESO's Market Registration process has been successfully completed, the IESO will provide the connection applicant with a Registration Approval Notification (RAN) document, confirming that the project is fully authorized to connect to the IESO-controlled grid. For more details about this process, the connection applicant is encouraged to contact IESO's Market Registration at market.registration@ieso.ca

   The connection applicant is required to provide "as-built" equipment data for the project during the IESO Market Registration process. If the "as-built" equipment data differ materially from the ones used in this assessment, then the IESO may decide that further analysis of the project is required.

7. As per Market Manual 1.4: Connection Assessment and Approval, the connection applicant will be required to provide a status report of its proposed project with respect to its progress upon request of the IESO using the project status report form on the IESO website. Failure to comply with project status requirements listed in Market Manual 1.4: Connection Assessment and Approval will result in the project being withdrawn.

Appendix B: Project Data (Confidential)

Appendix C: Technical Assessments (Confidential)

Independent Electricity System Operator
1600-120 Adelaide Street West
Toronto, Ontario M5H 1T1

Phone: 905.403.6900
Toll-free: 1.888.448.7777
E-mail: customer.relations@ieso.ca

ieso.ca

@IESO_Tweets
facebook.com/OntarioIESO
linkedin.com/company/IESO

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CUSTOMER IMPACT ASSESSMENT

Please refer to **Attachment 1 of this Schedule** for the Final CIA prepared by Hydro One.

The CIA concludes that the Project is expected to have no material adverse impact on the reliability of the transmission connected customers in the area.

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Hydro One Networks Inc.
483 Bay Street
Toronto, Ontario
M5G 2P5

CUSTOMER IMPACT ASSESSMENT

230KV CIRCUITS H29/H30 RECONDUCTORING

FINAL REPORT

Issued by:
Transmission System Planning and Large Customer Division
Hydro One Networks Inc.

Prepared by:

Chester Li P.Eng

Sr. Network Management Engineer

Hydro One Networks Inc.

Approved by:

Michael Xavier P.Eng

Manager, Transmission Planning

Hydro One Networks Inc.

Date: March 4, 2026

Disclaimer

This Customer Impact Assessment was prepared based on preliminary information available about the connection of the proposed project. It is intended to highlight significant impacts, if any, to affected transmission customers early in the project development process and thus allow an opportunity for these parties to bring forward any concerns that they may have, including those needed for the review of the connection and for any possible application for Leave-to-Construct. Subsequent changes to the required modifications or the implementation plan may affect the impacts of the proposed connection identified in this Customer Impact Assessment. The results of this Customer Impact Assessment are subject to change to accommodate the requirements of the IESO and other regulatory or municipal authority requirements. The fault levels assessed as part of this Customer Impact Assessment are meant to assess current conditions in the study horizon and are not intended to be for the purpose of sizing equipment or making other project design decisions. Many other factors beyond the existing fault levels go into project design decisions.

Hydro One Networks Inc. shall not be liable, whether in contract, tort or any other theory of liability, to any person who uses the results of the Customer Impact Assessment under any circumstances whatsoever for any damages arising out of such use unless such liability is created under some other contractual obligation between Hydro One Networks Inc. and such person.

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1. Background

This Customer Impact Assessment (CIA) is performed in accordance with Hydro One Networks Inc.'s (Hydro One) Customer Impact Assessment Procedure (Section 2.4 in Hydro One's Ontario Energy Board (OEB) approved Transmission Connection Procedures) and Section 6.4.1 of the OEB's Transmission System Code (the Code). The CIA is supplement to the system impact assessment (SIA) "H29/H30 Conductor Upgrade" issued by the IESO (CAA ID 2025-EX1301). Hydro One performs a CIA where a proposed new or modified connection (Proposed Project) requires a system impact assessment (SIA) by the Independent Electricity System Operator (IESO), or Hydro One has determined that one or more existing Hydro One transmission customers may be impacted by the Proposed Project. The CIA intends to highlight impacts of the Proposed Project, if any, on existing Hydro One transmission customers early in the project development process and provides an opportunity for existing Hydro One transmission customers that may be impacted by the Proposed Project to bring forward any concerns that they may have.

Hydro One may revise the result of this CIA and issue CIA revision:

(i) where there are subsequent changes to the Proposed Project, the required transmission system modifications or the implementation plan that changes the impact of the Proposed Project on one or more existing connected transmission customers; and

(ii) to accommodate the IESO's requirements in respect of the Proposed Project identified in either the SIA or any revision of the SIA for the Proposed Project.

.

2. Description of the Proposed Project

The GTA West Integrated Regional Resource Plan (IRRP) published in July 2021 and later GTA West Regional Infrastructure Plan (RIP) published in February 2022 recommended reconducting H29/H30 by 2027 to meet the forecasted load growth at Pleasant TS.

H29/H30 are 8.5km 230kV radial circuits emanated from Hurontario SS, exclusively supplying Pleasant TS (Fig.1). Pleasant TS has three pairs of transformers in DESN configuration providing 44kV and 27.6kV power supply (Fig.2). Customers supplied by Pleasant TS include Alectra (all buses) and Hydro One Distribution (JQ Bus). The existing conductors of H29/H30 are 795 kcmil 26/7 ACSR with long time emergency rating (LTE) rating approximately 420MW. This LTE is not enough to support the existing Pleasant TS transformer capacity of approximately 525MW. Recorded load at Pleasant TS in 2025 has exceeded the LTE of the circuits. This project will reconductor the H29/H30 circuits with 1033.5 kcmil ACSS conductor in response to IRRP/RIP recommendations as well as customers' load growth needs. The new circuits will be able to accommodate up to 650MW.

The IESO has published SIA 2025-EX1301 for the Proposed Project dated October 22, 2025 and concluded that the Proposed Project has no adverse impact on the reliability of the integrated power system.

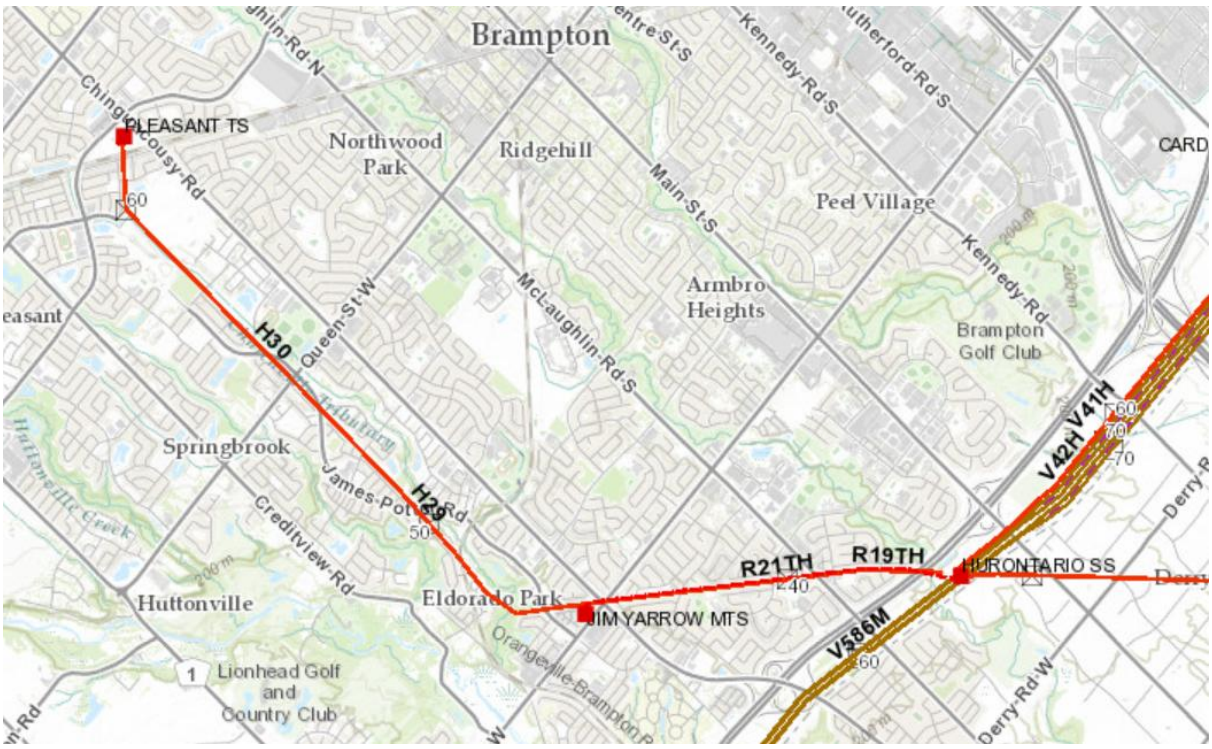

Fig.1 Circuit H29/H30 Supplying Pleasant TS from Hurontario SS

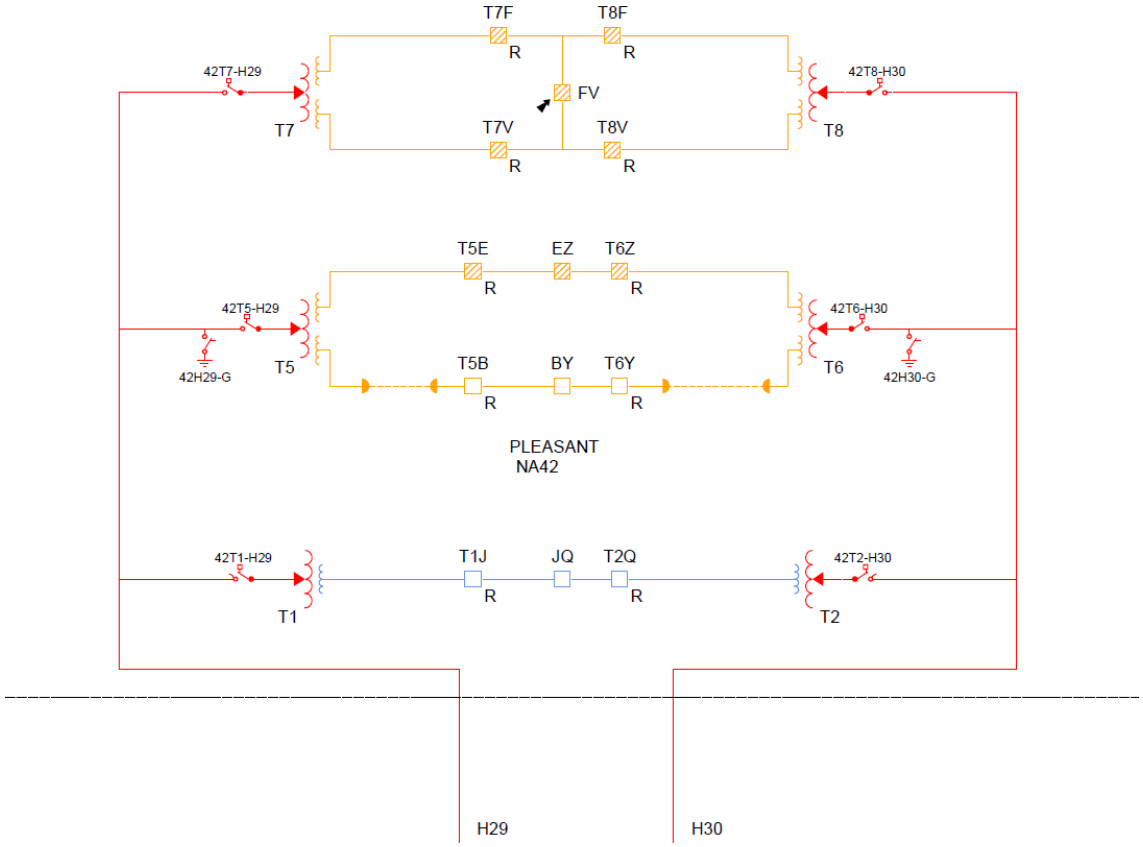

Fig.2 Pleasant TS configuration (T5, T6, T7, T8 provide 27.6kV supply, T1, T2 provide 44kV supply)

3. Existing Connected Transmission Customers

Hydro One determines that the following existing transmission connected customers may be impacted by the Proposed Project:

Table 1 Customers impacted by the project

Station	Customer Name
Pleasant TS	Alectra Hydro One Networks Inc

4. Project Impact

The Proposed Project has the following scope:

- Replace ACSR 795 kcmil with ACSS/TW 1033.5 kcmil without modifying tower geometry.
- Swap phasing of one circuit from Blue-White-Red to Red-White-Blue from top to bottom, i.e., change the phasing configuration from Super Bundle to Low Reactance mode.

As a result, the following changes are expected after the Proposed Project is completed:

- Slightly lower circuit resistance due to increased conductor diameter, thus less line loss compared with the existing circuits for same amount of power flow.
- Lower circuit reactance due to Low Reactance phasing reconfiguration, thus less reactive power loss compared with the existing circuits for same amount of power flow.
- Significantly lower electromagnetic field (EMF) at edges of the right-of-way due to re-phasing. Calculation shows the magnetic field can reduce by 65% at edge of ROW.

For existing customers' loads at 27.6kV and 44kV buses, no change in voltage regulation or power quality is expected since system strength at low voltage buses is dominated by step-down transformer impedance and the minor changes in high voltage line impedance are negligible. For similar reasons, short circuit levels at load supply buses will remain unchanged as listed in Table 2.

Table 2 Fault levels at load supply buses

Bus	Fault level (kA, 3-phase/single-phase fault)
Pleasant JQ Bus[1]	14.6 / 13.5
Pleasant EZ Bus[2]	13.2 / 10.3
Pleasant BY Bus[2]	13.1 / 10.2
Pleasant F Bus[2]	14.0 / 10.5
Pleasant V Bus[2]	14.0 / 10.5
Note	1. Operating voltage 46kV, symmetrical component, all elements in service 2. Operating voltage 29kV, symmetrical component, all elements in service

The Proposed Project will not change reliability of the supplies to Pleasant TS. Outage management is identified as major challenge in project execution since Pleasant TS loads will be supplied by single transformers during construction. Based on input from the Existing Customers, a temporary 230kV bypass

disconnect switch will be installed to reduce restoration time once a transformer contingency occurs during the construction.

5. Conclusion

There is no adverse impact on the existing customers due to connection of the Proposed Project. The new transmission supply to Pleasant TS will provide benefits of reduced active and reactive losses, lower EMF compared with the existing configuration. Hydro One will manage outages with coordination with the existing customers to minimize impact from contingencies during construction.

REGIONAL AND BULK PLANNING

The Project is driven by regional planning needs, as aforementioned in the Application. The most recent regional planning reports in support of the Project are provided in Attachments 1 and 2, as noted below:

Attachment 1: GTA West IRRP Report (July 2021)
Attachment 2: GTA West RIP Report (February 2022)

These reports conclude that the construction of the Project is the preferred option to address the long-term needs in the area and maintain system reliability.

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Greater Toronto Area West (Peel/Halton)

Integrated Regional Resource Plan

July 2021

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List of Acronyms

Acronym	Definition
CCAP	Climate Change Action Plan
CCGT	Combined Cycle Gas Turbine
CDM	Conservation and Demand Management
CEP	Community Energy Plan
DER	Distributed Energy Resource
DG	Distributed Generation
ERP	Enabling Resource Program
FETT	Flow East Towards Toronto
GS	Generating Station
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Plan
LDC	Local Distribution Company
LTE	Long-term Emergency (Equipment Rating)
MTO	Ministry of Transportation
NCM	Lithium Nickel Manganese Cobalt Oxide
NERC	North American Electric Reliability Corporation
OEB	Ontario Energy Board
ORTAC	Ontario Resource and Transmission Assessment Criteria
RIP	Regional Infrastructure Plan
SCGT	Simple Cycle Gas Turbine
STE	Short-term Emergency (Equipment Rating)
TS	Transformer Station

This Integrated Regional Resource Plan (IRRP) was prepared by the Independent Electricity System Operator (IESO) pursuant to the terms of its Ontario Energy Board licence, EI-2013-0066.

This IRRP was prepared on behalf of the Technical Working Group (Working Group) of the Greater Toronto Area West (GTA West) region which included the following members:

Independent Electricity System Operator

Hydro One Networks Inc. (Distribution)

Hydro One Networks Inc. (Transmission)

Alectra Utilities

Burlington Hydro Inc.

Milton Hydro Distribution Inc.

Oakville Hydro Electricity Distribution Inc.

Halton Hills Hydro

The Working Group assessed the reliability of electricity supply to customers in the GTA West Region over a 20-year period beginning in 2019; developed a plan that considers opportunities for regional coordination in anticipation of potential demand growth and varying supply conditions in the region; and developed an implementation plan for the recommended options, while maintaining flexibility in order to accommodate changes in key conditions over time.

The GTA West Working Group members agree with the Integrated Regional Resource Plan (IRRP)'s recommendations and support implementation of the plan, subject to obtaining necessary regulatory approvals and appropriate community consultations. The GTA West Working Group members do not commit to any capital expenditures and must still obtain all necessary regulatory and other approvals to implement recommended actions.

1. Introduction

This Integrated Regional Resource Plan (IRRP) addresses the electricity needs of the Greater Toronto Area West region (GTA West) over the next 20 years from 2019 to 2038. The GTA West region is located in central Ontario and includes 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 comprises the municipalities of Brampton, Caledon, Halton Hills, Mississauga, Milton, Oakville and portions of Burlington.

During discussions with communities, the IESO received feedback that the name "GTA West Regional Planning" was challenging to differentiate from other initiatives underway in the area with a similar naming convention, thus, the region was changed to "Peel/Halton (GTA West) Region" for engagement purposes. Official planning documents continue to adhere to the regulatory name of "GTA West Region".

The GTA West region is summer peaking and, over the last five years, electrical demand has grown on average by 1.3% per year. 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 1.1. 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. Local generation in the area includes two gas fired plants: the 1250 MW Goreway Generating Station (GS) in Brampton and the 600 MW Halton Hills GS in Halton Hills.

The region's electricity is delivered by six local distribution companies (LDCs): Hydro One Networks, Alectra Utilities, Burlington Hydro, Milton Hydro Distribution, Oakville Hydro Electricity Distribution, and Halton Hills Hydro. Hydro One Networks is also the primary transmission asset owner. This IRRP report was prepared by the Independent Electricity System Operator (IESO) on behalf of a Working Group composed of the aforementioned LDCs and transmitter.

Development of the GTA West IRRP was initiated in August 2019 following the publication of the Needs Assessment report in May 2019 by Hydro One and the Scoping Assessment Outcome Report in August 2019 by the IESO. The Scoping Assessment identified needs that should be further assessed through an IRRP. The Working Group was then formed to gather data, identify near- to long-term needs in the region and develop the recommended actions included in this IRRP.

This report is organized as follows:

- A summary of the recommended plan for the region is provided in Section 2;
- The process and methodology used to develop the plan are discussed in Section 3;
- The context for electricity planning in the region and the study scope are discussed in Section 4;

- Demand forecast scenarios, and conservation and demand management and distributed generation assumptions, are described in Section 5;
- Electricity needs in the region are presented in Section 6
- Alternatives and recommendations for meeting needs are addressed in Section 7
- A summary of engagement to date and moving forward is provided in Section 8; and
- The conclusion is provided in Section 9

Figure 1.1 | Geographical area of the GTA West region with electrical layout



2. The Integrated Regional Resource Plan

This Integrated Regional Resource Plan (IRRP) provides recommendations to address the electricity needs of the GTA West region over the next 20 years. The needs identified are based on the demand growth anticipated in the region and the capability of the existing transmission system as evaluated through application of the IESO's Ontario Resource and Transmission Assessment Criteria (ORTAC) and reliability standards governed by the North American Electric Reliability Corporation (NERC). The IRRP's recommendations are informed by an evaluation of options, representing alternative ways to meet the needs, that consider: reliability, cost, technical feasibility, maximizing the use of the existing electricity system (where economic), and feedback from stakeholders.

The GTA West electricity demand forecast projects sustained growth driven by urbanisation and development particularly in the northern areas of the region. Municipalities have also published community energy plans and/or climate change action plans that call for greater electrification which could drive additional upward pressure on the demand forecast.

The IRRP recommendations below are organized under a near-/medium-term plan and a long-term plan. This distinction reflects the different levels of forecast certainty, lead time for development, and planning commitment required over these time horizons. This approach ensures that the IRRP provides clear direction on investments needed in the near future while remaining flexible to new information as electrification, energy efficiency, and development plans evolve.

2.1 Near-/Medium-Term Plan

The near- and medium-term plan is comprised of several recommendations to accommodate load growth, maintain reliability, and optimize end-of-life asset replacement. The recommendations are summarized in Table 2.1 and further discussed below.

Table 2.1 | Summary of Near-/Medium-term Plan for the GTA West Region

Need Description	Recommendation	Lead Responsibility	Required By
After a loss of either H29 or H30, the remaining circuit will exceed its LTE rating	H29/H30 reconductoring	Hydro One	2025
After a loss of V42H and H29, R19TH will exceed its LTE rating. After a loss of V41H and H30, R21TH will exceed its LTE rating	Control actions and/or load rejection scheme	Hydro One	Today

Need Description	Recommendation	Lead Responsibility	Required By
Transformers T3 and T4 at Palermo TS will reach end-of-life	Upsize transformers at end-of-life to the larger 75/125 MVA transformers	Hydro One	2025
Simultaneous loss of both T38B and T39B would result in over 600MW of load being lost by configuration	Further analysis of wires options including circuit sectionalisation and/or reterminating supply stations	Hydro One	2025
30-minute load restoration following V41H/V42H, R19TH/R21TH, and R14T/R17T6 contingencies	Investigate opportunities to enhance distribution load transfer capabilities	LDCs with loads on impacted circuits	Ongoing

2.1.1 H29/H30 Reconductoring

When load at Pleasant TS exceeds approximately 417 MW and one of the H29/30 circuits that supplies Pleasant TS is out of service, there is a potential for overloads on the companion circuit. This need was originally identified in the 2015 Northwest GTA IRRP and upgrading the H29/H30 circuits with conductors of a higher rating was recommended. At the time, the demand forecast was only expected to reach 417 MW in 2033 but the IRRP recognized that this timing could change significantly if higher growth or lower conservation adoption materialized and consequently recommended that the load at Pleasant TS should be monitored and the reconductoring work should be pursued when demand reaches approximately 400 MW.

As discussed in the 2019 GTA West Scoping Assessment report, the role of the current IRRP is to update the implementation timing of this upgrade, not further investigate alternatives to it, given the relatively straightforward scope. The current forecast for Pleasant TS projects demand to reach 417 MW by 2027. However, the observed 2020 summer peak demand was much higher than anticipated and reached 410 MW during a July heat wave. At this time, it is still unclear whether this is an isolated event related to the ongoing COVID-19 pandemic and associated electricity consumption patterns or if this will be an enduring trend. Given that the lead time required to implement the reconductoring work will be at least three years, the IRRP recommends that Hydro One should begin implementation as soon as possible for a targeted in-service date around 2025.

2.1.2 Pleasant TS Control Actions

Post-contingency thermal violations during outage conditions are expected to occur on the R19TH/R21TH circuits leading into Hurontario SS by 2021. This type of contingency is expected to be very infrequent since it only occurs under the confluence of peak load conditions, hot weather, pre--existing forced outage on one element and a subsequent contingency on another. As a result, this need is most economically managed by control actions or load rejection schemes. Alternative options considered are further discussed in Section 7.2.

In the near- to medium-term, the overloads on R19TH/R21TH are expected to exceed their long-term emergency (LTE) but not their short-term emergency (STE) rating. During this period, manual post--contingency control actions such as unloading one of the two transformers at Jim Yarrow TS can provide relief by reducing circuit loading below the LTE rating provided that such actions can be completed within 15 minutes. As load continues to grow, the overloads are expected to exceed STE by 2038 at which point an automatic load rejection scheme at Pleasant TS will be required. The IRRP recommends that the Regional Infrastructure Plan (RIP) led by Hydro One should develop and implement control actions as soon as possible.

2.1.3 Upsizing Palermo TS at End-of-Life

The existing T3 and T4 transformers at Palermo TS will reach end-of-life in 2025. Palermo TS is fully utilized today and there is no remaining capacity for growth. Tremaine TS, a nearby station, is also expected to exceed capacity in 2033.

Refurbishing Palermo TS with larger 75/125 MVA transformers would require significant station reconfiguration. However, Hydro One indicated that the yard itself is in relatively poor condition, had recently been downgraded, and will likely need to be replaced in less than 10 years regardless of the transformer size chosen. Based on planning-level cost estimates, the cost of upsizing Palermo TS when its transformers reach end-of-life in 2025 is substantially more cost-effective than the alternative of refurbishing Palermo TS like-for-like in 2025 followed by subsequent upsizing or building a new station when capacity needs arise in 2033. This financial analysis is further discussed in Section 7.3. The IRRP recommends that the RIP should perform additional analysis to reaffirm the cost estimate and develop an implementation plan for upsizing Palermo TS in 2025.

2.1.4 Further Wires Analysis for T38B/T39B Load Security

The load security need on T38B/T39B was initially documented in the 2015 Northwest GTA IRRP and was expected to materialized between 2024 and 2026. No firm recommendation was made at the time because the need was still approximately 10 years off and future bulk system reinforcements along the Flow East Towards Toronto (FETT) interface may also address the load security need.

The current IRRP forecast reaffirms that the load security need is expected to materialize in 2025. Furthermore, in December 2020, the IESO determined that the most suitable and cost-effective bulk system FETT interface reinforcement are conductor upgrades to the Richview TS x Trafalgar TS 230 kV transmission lines which does not resolve the load security need on T38B/T39B. The FETT interface bulk study is further discussed in Section 4.2.

The IRRP considered the merits of generation, non-wires options and an integrated transmission option, the Hurontario SS x Meadowvale TS transmission reinforcement, that could simultaneously improve bulk system transfer capabilities and help alleviate the load security need on T38B/T39B. Ultimately, wires options such as reterminating Tremaine TS on the companion T36B/T37B circuits or installing breakers at Lantz Junction to sectionalize T38B/T39B are the most suitable and -cost-effective solution at this time. The options analysis is further discussed in Section 7.4.

The IRRP recommends that the RIP should perform detailed analysis to further refine the technical feasibility and costs of these wires options. As part of this work, the RIP should update the near-term load forecast for the stations served on T38B/T39B. The IRRP also recognizes that there may be merit in applying to the IESO for an ORTAC exemption to accept a lower performance level for a few years until future FETT transfer capability needs in the late 2020's are known given the potential integrated nature of the solutions that could address these needs. The IESO will continue to participate in the RIP technical working group to provide advice and input on this matter.

2.1.5 Explore Opportunities to Enhance Distribution Transfer Capabilities

All stations in the GTA West region have dual supply meaning that no load would be lost by configuration for any single contingency. However, there are multiple areas in the GTA West region where major transmission contingencies (such as the simultaneous loss of two elements) would interrupt supply to many customers and where full restoration would be delayed until the transmission contingency has been cleared. The GTA West region is a densely populated and well serviced area so it is assumed that all contingencies can be restored within eight hours consistent with ORTAC load restoration criteria. Most major contingencies have historically been of short duration due to close proximity to staffed maintenance centres. Of the remaining restoration criteria, the 30-minute restoration of all load lost above 250 MW is the most limiting since it relies on remote control actions such as emergency distribution load transfers.

As discussed in the Scoping Assessment, major infrastructure solutions such as new transmission facilities are not generally appropriate since the cost of the solution would exceed the expected benefit to customers. However, restoration needs were kept in scope for this IRRP to evaluate if planned infrastructure solutions for other needs can be modified in ways that maximize restoration capability.

Of the double circuit contingencies where the 30-minute restoration criteria cannot be met, infrastructure solutions for H29/H30 was deemed uneconomic in the previous IRRP due to the high cost and low probability of the contingency occurring while T38B/T39B restoration needs can be significantly improved through the wires options discussed in the previous section for addressing load security.

There remain three double contingencies that are at risk of not meeting 30-minute restoration criteria: V41H/V42H, R19TH/R21TH, and R14T/R17T. At this time, there are no planned infrastructure reinforcements for other needs that can also help improve load restoration on these circuits. However, the IRRP recommends that local distributors, in conjunction with Hydro One where appropriate, investigate opportunities to improve distribution load transfer capability from the stations supplied on these circuits to other nearby stations to maximize restoration capability.

In the long term, future transmission reinforcement projects such as the NW GTA Transmission Corridor can help improve load restoration by providing additional supply points from which northern loads can be restored.

2.2 Long-Term Plan

In addition to the near- and medium-term plan above, there are four items to monitor and develop in the long term.

2.2.1 Monitor Halton Pocket Growth and T38B/T39B Reconductoring

During an outage to Halton Hills GS, post-contingency thermal violations on T38B/T39B are expected to occur by 2031. The thermal violation is on a short 400-meter section of T38B/T39B immediately north of Lantz Junction. This radial portion of T38B/T39B serves the Halton Pocket including Trafalgar DESN, Halton TS, Halton TS #2, Halton MTS, and Meadowvale TS.

Reconductoring the limiting section is the most cost-effective option. The options analysis is further discussed in Section 7.5. Given the timing of the need, no firm recommendation is required at this time. The Working Group will continue to monitor load growth in the Halton Pocket and revisit this need, and its potential alternatives, in the next cycle of regional planning.

2.2.2 Monitor Growth at Cardiff TS and Jim Yarrow TS

Cardiff TS and Jim Yarrow TS are expected to reach capacity in 2029 and 2032, respectively. Given the timing of the need, no firm recommendation is required at this time. The Working Group will continue to monitor load growth and revisit this need in the next cycle of regional planning.

2.2.3 Supporting Community Energy Plans and Monitoring Energy Efficiency and Electrification Trends

Most lower- and upper-tier municipalities in the GTA West region have published community energy plans (CEP) or climate change action plans (CCAP) including the:

- Region of Peel's Climate Change Master Plan,
- Town of Oakville's Community Energy Strategy,
- Town of Caledon Community Climate Change Action Plan,
- Town of Halton Hills' Community Energy Plan,
- City of Brampton Community Energy and Emissions Reduction Plan,
- City of Burlington's Climate Action Plan, and
- City of Mississauga Climate Change Action Plan to name a few.

The scope varies by municipality and plan but the general aim is to promote energy efficiency, improve resiliency, lower greenhouse gas emissions, and invest in the local economy.

While the IRRP seeks to align with these plans where possible, not all of the objectives fall within the scope of the regional planning nor the IESO's mandate. For example, absent of provincial government policy, the IESO is technology agnostic and will generally choose the most economic option that adequately resolves the need and meets applicable reliability standards. Greenhouse gas emissions are considered in the IRRP's options analysis by accounting for the carbon price associated with emitting resources, but the IESO does not have emission reduction targets unless directed by government policy. Furthermore, while regional planning is responsible for ensuring electricity ratepayer value and minimizing electricity costs, the IESO relies on government policy for broader socioeconomic considerations.

There are three CEP and CCAP objectives that the IESO and regional planning can play a role in supporting. First, the IESO recognizes that distributed energy resources (DER) are becoming increasingly prevalent and features prominently in many CEPs and CCAPs. DERs can provide benefits to both customers as well as the distribution and transmission systems. By enabling DERs to provide wholesale services, system costs can be reduced and opportunities for customers and investors can be increased. The IESO's Enabling Resources Program (ERP) will produce a 5-10 year plan to enable resources to provide services they cannot or cannot fully currently provide. The ERP has identified storage, hybrids, and DERs as high-priority opportunities. The IESO is developing a DER roadmap which is expected to be shared with stakeholders in the fall of 2021 to provide clarity on IESO objectives, initiatives, and timing for DER integration. More information can be found on the Distributed Energy Resource Roadmap engagement page.

Second, the Working Group will continue to support and monitor energy efficiency uptake. Conservation expected to be achieved through codes, standards, and program delivery has already been included in the planning forecast as described in Section 5.4. On September 30, 2020 the IESO received a Ministerial directive to implement a new 2021-2024 Conservation and Demand Management (CDM) Framework. The new CDM Framework will contribute to lowering the net demand as seen on the transmission system and ensures energy efficiency can continue to play a role in meeting the region's needs. The Working Group will monitor uptake of the CDM framework as well as energy efficiency initiatives in CEPs and assess the impact of these additional savings on the timing of local reliability needs.

Finally, the Working Group will monitor electrification trends and their impact on the demand forecast. The Working Group recognizes that many CEPs and CCAPs are calling for ambitious electrification targets as a means to achieve carbon emission reductions. It is not yet clear how impactful electrification will be to the load forecast in the near-term but it could drive significantly higher demand in the long term that will necessitate new electricity supply into the area. While it is still difficult to establish when firm investments or infrastructure reinforcements will be needed, it is prudent to prepare for a future where electricity demand could potentially be significantly higher than forecast.

The IESO and local distribution companies will continue to participate in local community energy planning initiatives such as the Heritage Heights Community Energy Plan Working Group at the request of municipal staff.

2.2.4 NW GTA Transmission Corridor

While the IRRP has not identified a firm need date for new transmission infrastructure in the northern areas of the region, Halton Hills, Brampton and Caledon are experiencing rapid growth in areas that are increasingly further away from existing transmission infrastructure. As discussed in the previous section, high electrification uptake could also significantly impact electricity demand.

The Ministry of Transportation (MTO) is currently planning for a new 400-series highway in the same approximate area as the anticipated long-term need for new transmission in the region. Provincial policy encourages colocation of linear infrastructure to reduce land use impacts and the IESO and Ministry of Energy are conducting a joint study to ultimately identify a suitable corridor of land that can be preserved for future transmission infrastructure should the need arise. The expectation is that the preferred route for this future transmission corridor will largely align with MTO's highway study area. Although co-location of linear infrastructure provides benefits from a land use perspective, it is important to note that the need associated with future transmission is linked to the size and location of anticipated growth, and not any specific transportation or other infrastructure plan. Protecting land for a future transmission corridor maintains flexibility to accommodate future demand growth in the northern areas beyond what is already captured in the IRRP forecast and mitigates the challenges of needing to build transmission infrastructure through developed land.

3. Development of the Plan

3.1 Regional Planning Process

In Ontario, preparing to meet the electricity needs of customers at a regional level is achieved through regional planning. Regional planning assesses the interrelated needs of a region—defined by common electricity supply infrastructure—over the near, medium, and long term and results in a plan to ensure cost-effective and reliable electricity supply. A regional plan considers the existing electricity infrastructure in an area, forecast growth and customer reliability, evaluates options for addressing needs, and recommends actions.

The current regional planning process was formalized by the OEB in 2013 and is performed on a five-year planning cycle for each of the 21 planning regions in the province. The process is carried out by the IESO, in collaboration with the transmitters and LDCs in each planning region. The process consists of four main components:

1. A Needs Assessment, led by the transmitter, which completes an initial screening of a region's electricity needs and determines if there are electricity needs requiring regional coordination;

2. A Scoping Assessment, led by the IESO, which identifies the appropriate planning approach for the identified needs and the scope of any recommended planning activities;

3. An IRRP, led by the IESO, which proposes recommendations to meet the identified needs requiring coordinated planning; and/or

4. A RIP, led by the transmitter, which provides further details on recommended wires solutions.

Further details on the regional planning process and the IESO's approach to regional planning can be found in Appendix A.

Regional planning is not the only type of electricity planning in Ontario. Other types include bulk system planning and distribution system planning. There are inherent overlaps in all three levels of electricity infrastructure planning.

The IESO has recently completed a review of the regional planning process following the completion of the first cycle of regional planning for all 21 regions. Additional information on the Regional Planning Process Review along with the final report is posted on the IESO's website.

3.2 GTA West and IRRP Development

The process to develop the GTA West IRRP was initiated in August 2019 following the publication of the Needs Assessment report in May 2019 by Hydro One and Scoping Assessment Outcome Report in August 2019 by the IESO.

In October 2020, the IESO wrote to the Ontario Energy Board (OEB) to provide notice of expected delays in completing three ongoing IRRPs including the GTA West IRRP. The additional time to complete the GTA West IRRP provided the IESO the opportunity to align the timing with that of the bulk system plan for the Flow East Toward Toronto (FETT) and further investigate higher than expected actual demand observed at some of the transformers stations within the region in 2020. The IESO estimated that 3-6 months of additional time was required beyond the original completion date of February 8th, 2021.

4. Background and Study Scope

This is the second cycle of regional planning for the GTA West region. In the first cycle of regional planning, the region was divided into two sub-regions: Northwest GTA and Southwest GTA. The Northwest GTA sub-region roughly encompassed the municipalities of Milton, Halton Hills, Caledon and Brampton while the Southwest GTA sub-region encompassed Mississauga, Oakville, and parts of Burlington. Following a Needs Assessment and Scoping Assessment in 2014, an IRRP was initiated for the Northwest GTA sub-region and subsequently published in 2015. The first cycle concluded in 2016 with the publication of a Regional Infrastructure Plan.

The current cycle of regional planning began in 2019 with the publication of the GTA West Needs Assessment Report where a number of needs requiring further regional coordination was identified. The 2019 GTA West Scoping Assessment recommended an IRRP for the entire region to address needs in a coordinated manner. This report presents an integrated regional electricity plan for the next 20-year period starting from 2019.

4.1 Study Scope

This IRRP develops and recommends options to meet the electricity needs of the GTA West Region in the near, medium, and long term. The plan was prepared by the IESO on behalf of the Working Group. The plan includes consideration of forecast electricity demand growth, conservation and demand management (CDM), distributed generation (DG), transmission and distribution system capability, relevant community plans, condition of transmission assets and developments on the bulk transmission system.

The following transmission facilities were included in the scope of this study:

- Step-down transformer stations: Halton TS, Halton Hills MTS, Meadowvale TS, Jim Yarrow MTS, Pleasant TS, Cardiff TS, Bramalea TS, Goreway TS, Tremaine TS, Trafalgar TS, Palermo TS, Glenorchy MTS #1, Churchill Meadows TS, Erindale TS, Tomken TS, Oakville TS #2, Lorne Park TS, Cooksville TS
- Transmission lines: H29/H30, R14T/R17T, R19TH/R21TH, T36B/T37B, T38B/ T39B, V41H/V42H, V43/V44, B15C/B16C, K21C/K23C, R24C

The single line diagram of the GTA West region is shown in Figure 4.1 below. Note that the 500 kV circuits and bulk system transfer capabilities through the region is not within the scope of the IRRP and separately studied in the FETT interface bulk transmission study which is discussed further below in Section 4.2.

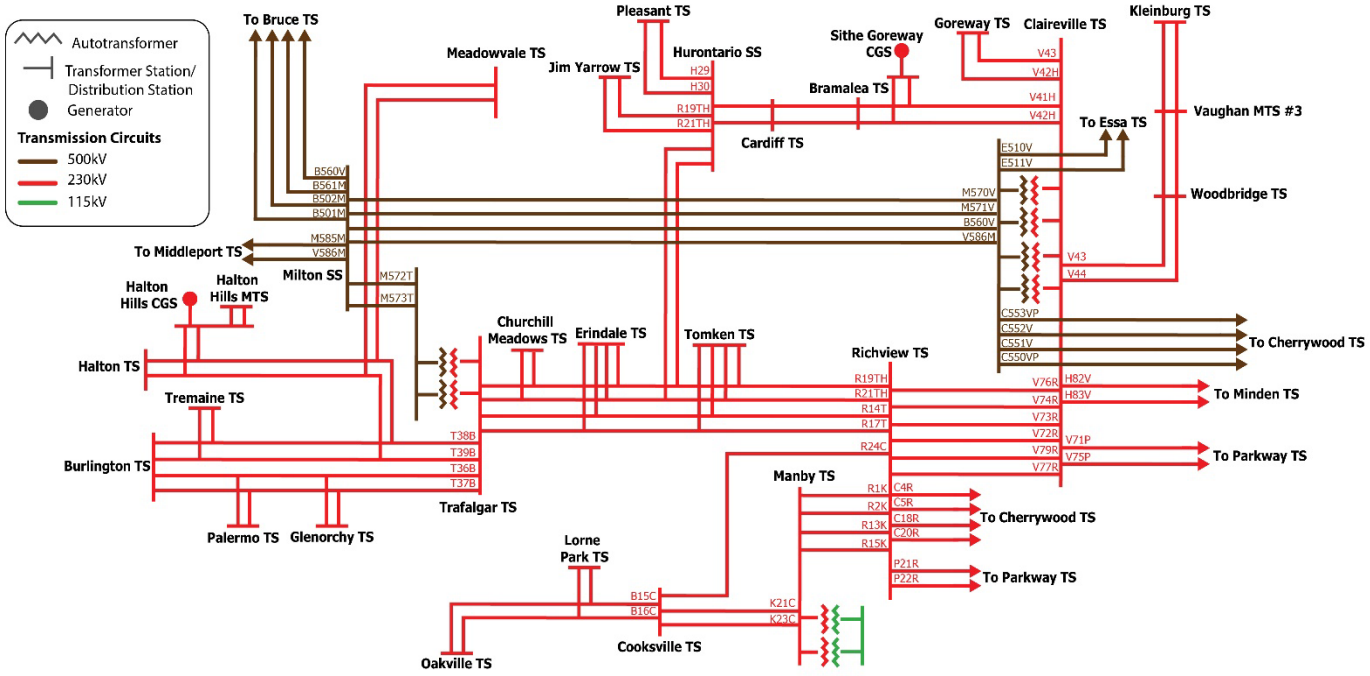

Figure 4.1 | Single Line Diagram of the GTA West Region

The GTA West IRRP was developed by completing the following steps:

- Preparing a 20-year electricity demand forecast and establishing needs over this timeframe (as described in the following steps);
- Examining the load meeting capability (LMC) and reliability of the existing transmission system, taking into account facility ratings and performance of transmission elements, transformers, local generation, and other facilities such as reactive power devices. Needs were established by applying ORTAC and NERC criteria;
- Assessing system needs by applying a contingency-based assessment and reliability performance standards for transmission supply in the IESO-controlled grid;
- Confirming identified end-of-life asset replacement needs and timing with LDCs;
- Establishing alternatives to address system needs including, where feasible and applicable, generation, transmission and/or distribution, and other approaches such as non-wires alternatives including conservation and demand management;
- Engaging with the community on needs and possible alternatives;

- Evaluating alternatives to address near- and long-term needs; and
- Communicating findings, conclusions, and recommendations within a detailed plan.

4.2 FETT Interface Bulk Transmission Study

Flow East Towards Toronto (FETT) is a transmission interface that delivers electricity from western to eastern Ontario and consists of three paths: (a) four 500 kV circuits into Claireville TS from the west, (b) four 230 kV circuits between Trafalgar TS and Richview TS, and (c) two 230 kV circuits between Orangeville TS and Essa TS.

Supply capacity in eastern Ontario is expected to decline over the next decade, which contributes to a provincial need for capacity and, because of limits on the transfer capability of the FETT interface, ~2000 MW of that capacity will have to be sited east of the FETT interface by 2026. To reduce the amount of capacity that must be sited in eastern Ontario, the IESO issued a letter in December 2020 recommending that Hydro One proceed with conductor upgrades to the R14T/R17T and R19TH/R21TH circuits between Trafalgar TS and Richview TS as a first stage to increase the FETT transfer capability.

Future FETT interface needs beyond these conductor upgrades are not known at this time and will depend on the future resources acquisition framework and availability of potential resources east of FETT. The IESO will continue participate in the Working Group during the RIP to help ensure recommendations are aligned with the latest bulk system information.

5. Electricity Demand Forecast

Regional planning in Ontario is driven by the need to meet peak electricity demand requirements in the region. This section describes the development of the demand forecast for the GTA West Region. It highlights the assumptions made for peak demand forecasts including weather correction and the contribution of CDM and DG. The resulting net extreme weather demand forecast is used in assessing the electricity needs of the area over the planning horizon.

5.1 Historical Demand

Growth within the GTA West region has been steady over the last five years, largely driven by expanding urban boundaries and intensifying urban areas. Figure 5.1 below shows the net actual (as observed at metering point), net median weather corrected (adjusted to reflect median on peak weather conditions), and gross median weather corrected (impact of DG removed) historical demand. The gross median weather corrected electrical demand has grown at an average rate of 1.3% over the past five years, representing an increase of approximately 150 MW for the study area. The peak demand hour for each year occurs in the summer from approximately 3 PM to 7 PM.

Generally speaking, the 2018 gross median weather corrected peak at each station was used as the starting point for the forecast unless adjustments were necessary to remove outliers.

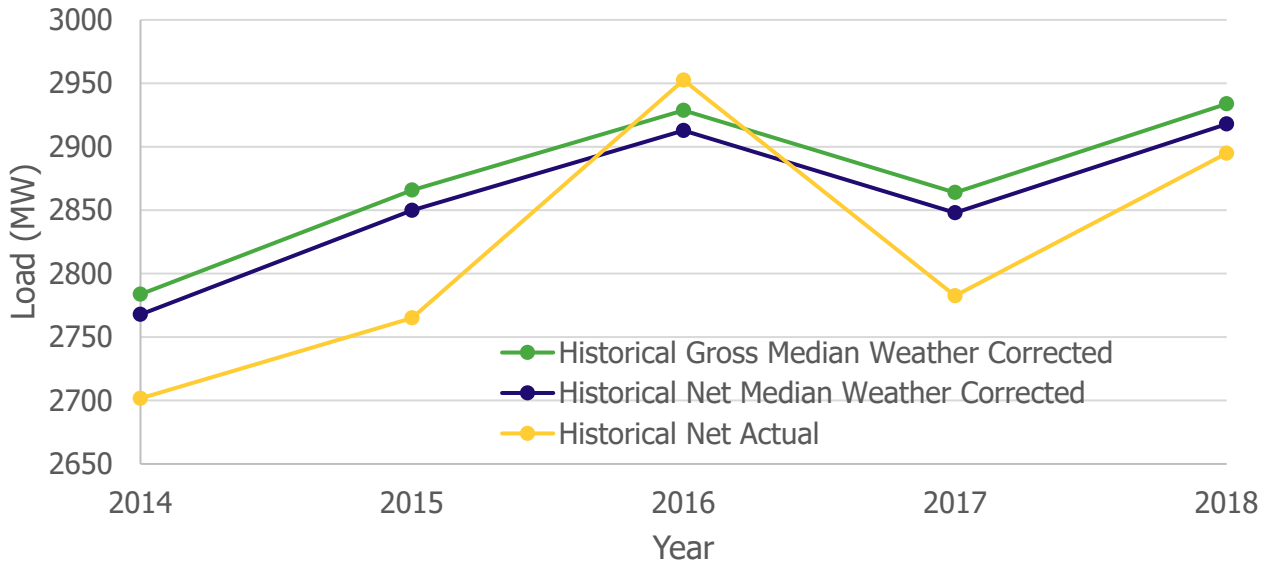

Figure 5.1 | Historical Demand in the GTA West Region

5.2 Demand Forecast Methodology

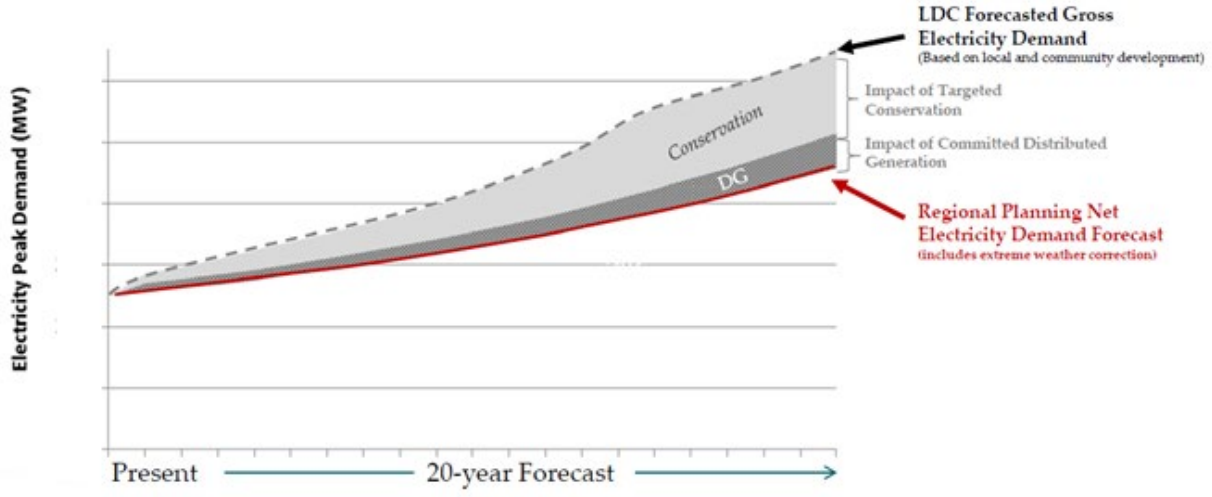

Figure 5.2 | Illustrative Development of Demand Forecast

For the purpose of this IRRP, a 20-year regional peak demand forecast was developed to assess reliability needs for GTA West. The steps taken to perform this are depicted in Figure 5.2. Gross demand forecasts, which assume the weather conditions of an average year based on historical weather conditions and referred to as normal weather, were developed by the LDCs. These forecasts were then modified to reflect the peak demand impacts of provincial conservation targets and DG contracted through previous provincial programs such as FIT and microFIT, and adjusted to reflect extreme weather conditions in order to produce a reference forecast for planning assessments. This net forecast was then used to assess the electricity needs in the region. Additional details related to the development of the demand forecast are provided in Appendix B.

5.3 Gross LDC Forecast

Each participating LDC in the GTA West Region prepared gross demand forecasts at the station level, or at the station bus level for multi-bus stations. These gross demand forecasts account for increases in demand from new or intensified development and known connection applications. Most LDCs cited alignment with municipal and regional official plans and credited them as a primary source for input data. LDCs are also expected to account for changes in consumer demand resulting from typical efficiency improvements and response to increasing electricity prices, i.e., "natural conservation", but not for the impact of future DG or new conservation measures, such as codes and standards and CDM programs, which are accounted for by the IESO as discussed in Section 5.4 below. The gross LDC forecast assumes median on-peak weather conditions.

LDCs have a better understanding of future local demand growth and drivers than the IESO, since they have the most direct involvement with their customers, connection applicants and municipalities and communities which they serve. The IESO typically carries out demand forecasting at the provincial level. More details on the LDCs' load forecast assumptions can be found in Appendix B.2 to B.7. Figure 5.3 below shows the total gross LDC forecast for the GTA West region.

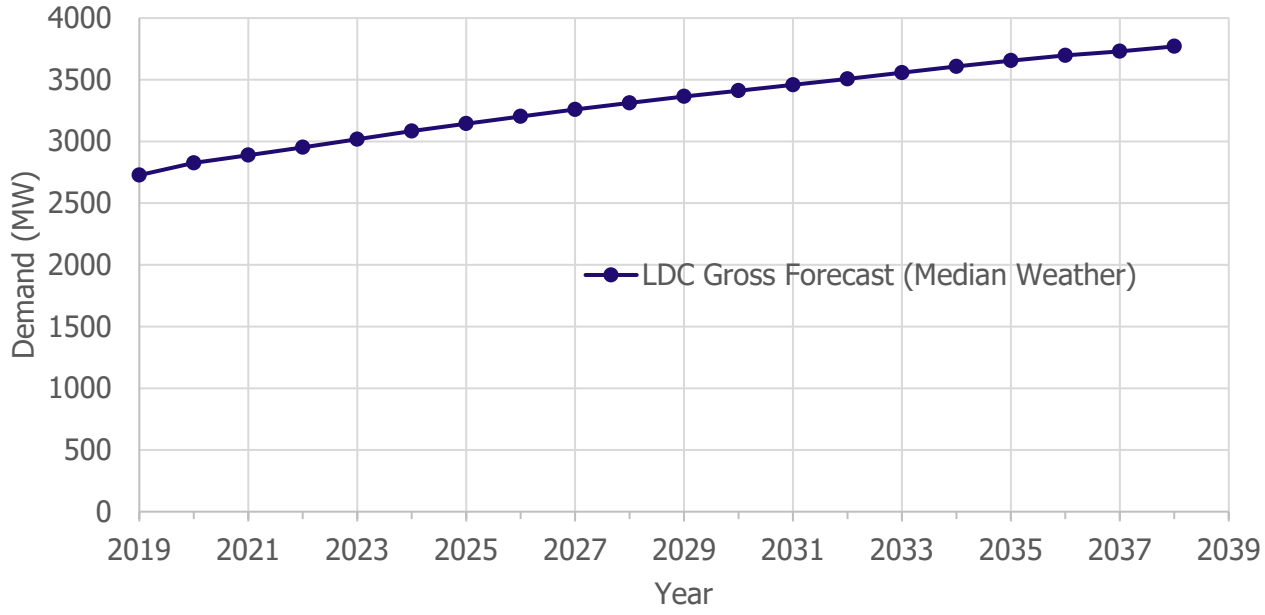

Figure 5.3 | Total Gross LDC Forecast (Median Weather)

5.4 Contribution of Conservation to the Forecast

Conservation and demand management, is a clean and cost-effective resource that helps meet Ontario's electricity needs and has been an integral component of provincial and regional planning. Conservation is achieved through a mix of codes and standards amendments as well as CDM program-related activities These approaches complement each other to maximize conservation results.

The estimate of demand reduction due to codes and standards are based on expected improvement in the codes for new and renovated buildings and through regulation of minimum efficiency standards for equipment used by specified categories of consumers, i.e. residential, commercial and industrial consumers.

The estimates of demand reduction due to program-related activities account for Save on Energy[1] programs, as well as those that will be implemented as part of the 2021-2024 CDM Framework, which started in January 2021. The IESO centrally delivers programs on a province-wide basis to serve business and low-income customers, as well as Indigenous communities.

[1] https://www.saveonenergy.ca/

Figure 5.4 shows the estimated total yearly reduction to the demand forecast due to conservation (from codes, standards and CDM programs) for each of the residential, commercial and industrial consumers. Additional details are provided in Appendix B.8.

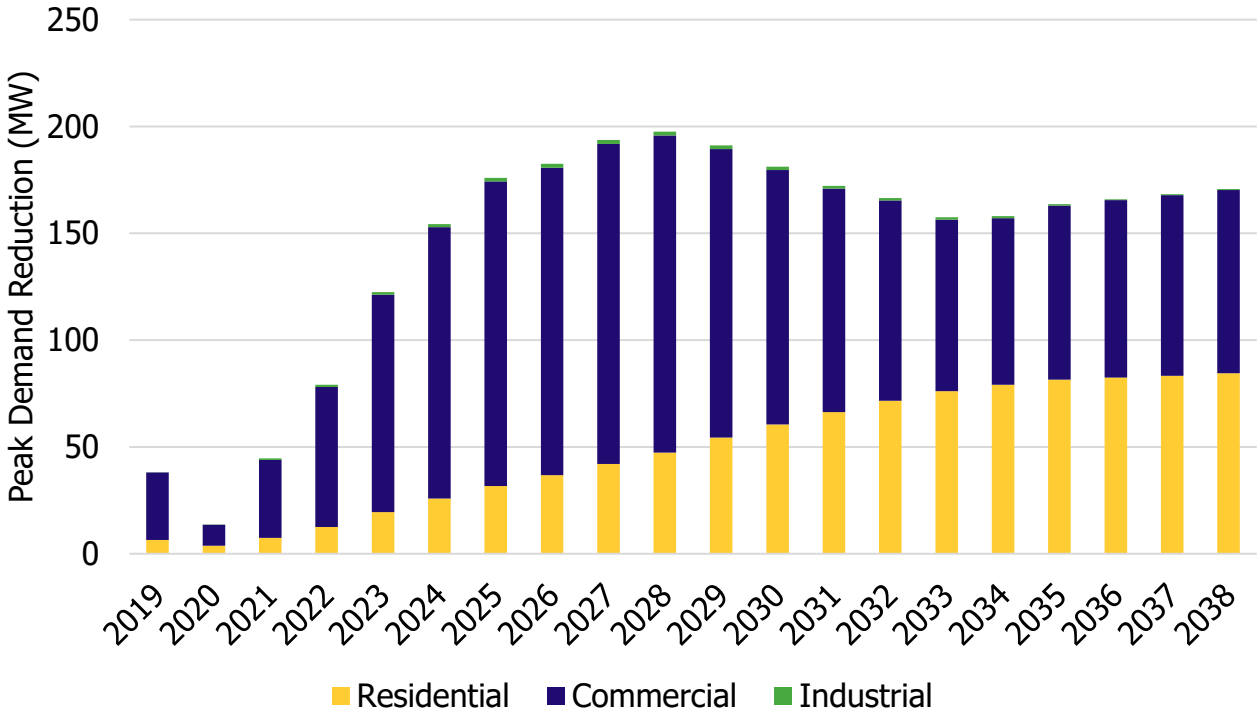

Figure 5.4 | Total Forecast Peak Demand Reduction (Codes, Standards, and CDM Programs)

5.5 Contribution of Distributed Generation to the Forecast

In addition to conservation resources, DG in the GTA West Region is also forecast to offset peak-demand requirements. The introduction of the Green Energy and Green Economy Act, 2009, and the associated development of Ontario's FIT Program, has increased the significance of distributed renewable generation which, while intermittent, contributes to meeting the province's electricity demands. The installed DG capacity by fuel type and contribution factor assumptions can be found in Appendix B.9.

After reducing the demand forecast due to conservation as described above, the forecast is further reduced by the expected contribution from contracted DG in the region. Figure 5.5 shows the impact of DG on reducing the demand forecast. In the long term, the contribution of DG is expected to diminish as these contracts expire. Additionally, any facilities without a contract with the IESO are not currently included in the DG peak demand reduction forecast.

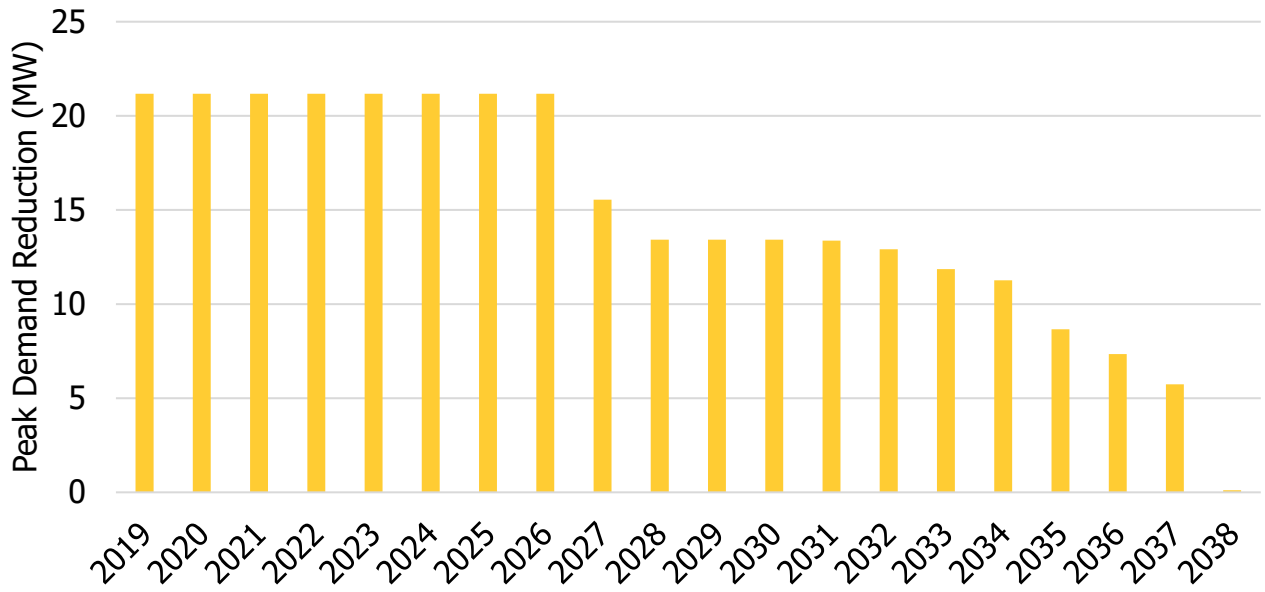

Figure 5.5 | Peak Demand Reduction to Demand Forecast due to DG

5.6 Net Extreme Weather ("Planning") Forecast

The net extreme weather forecast, as known as the "planning" forecast, is created in two steps. First the gross LDC median weather forecast is adjusted for extreme weather conditions according to the methodology described in Appendix B.1. This results in the gross extreme weather forecast. The net extreme weather forecast is then obtained by adding in the forecast DG and conservation impacts described in Section 5.4 and 5.5 above. Note that this planning forecast is non-coincident meaning that each station in the region is forecast separately at their own peak demand.

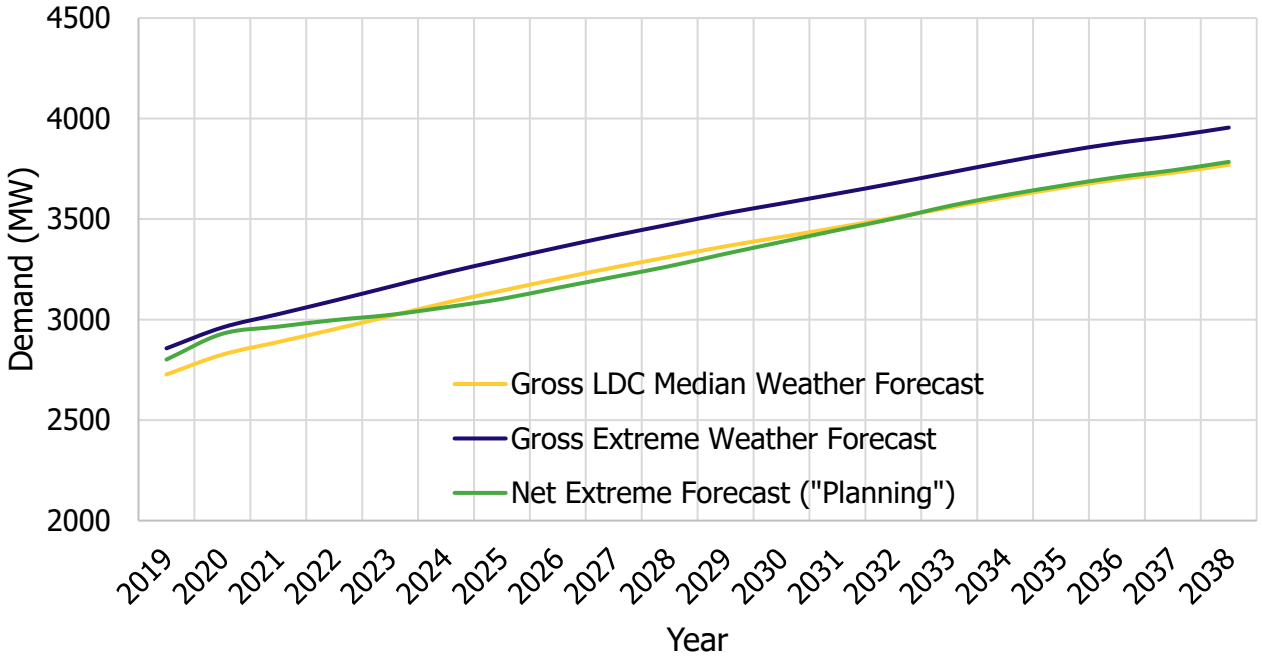

Figure 5.6 | Net Extreme Weather ("Planning") Forecast for the GTA West Region

To determine the need date for needs that are driven by more than one station, the coincident planning forecast for the relevant group of stations are found by applying a coincidence factor. The coincidence factor is based on the contribution of each station to the group's coincident peak over the past five years. The net extreme weather forecast for the GTA West region is shown in Figure 5.6 below.

5.7 Load Profiling

In addition to the annual peak forecast, hourly load profiles (8,760 hours per year over the 20 year forecast horizon) for certain stations or group of stations with identified needs were developed to characterize their needs with finer granularity. The profiles are based on historical data adjusted for variables that impact demand such as calendar day (e.g. holidays and weekends) and weather (e.g. extreme weather events like ice storms or heat waves) impacts. The profiles are then scaled to match the annual peak forecast for each year. As described in Section 7.1, these profiles are used to quantify the magnitude, frequency, and duration of needs to better evaluate the suitability of generation and distributed energy resource options.

Additional load profile details including summary tables and hourly heat maps for each need can be found in Appendix D. Note that this data is used to roughly inform the overall energy requirements that a non-wire alternative would need to meet for the purposes of evaluating alternatives; it cannot be used to deterministically specify the precise hourly energy requirements. Further, this data is only used to select suitable technology types and roughly estimate operating costs. Demand patterns can change significantly as consumer behaviour evolves, new industries emerge, and trends like electrification achieve greater adoption. The Working Group will continue to monitor these changes as part of implementation of the plan.

6. Needs

6.1 Needs Assessment Methodology

Based on the planning demand forecast (extreme weather, net demand), system capability, the transmitter's identified end-of-life asset replacement plans, and the application of ORTAC and North American Electric Reliability Corporation (NERC) TPL-001-4 Standard, the Working Group identified electricity needs in the near-, medium- and long-term timeframe for the following categories:

- **Station Capacity Needs** describe the electricity system's inability to deliver power to the local distribution network through the regional step-down transformer stations at peak demand. The capacity rating of a transformer station is the maximum demand that can be supplied by the station and is limited by station equipment. Station ratings are often determined based on the 10-day Limited Time Rating (LTR) of a station's smallest transformer under the assumption that the largest transformer is out of service. A transformer station can also be limited when downstream or upstream equipment, e.g., breakers, disconnect switches, low-voltage bus or high voltage circuits, is undersized relative to the transformer rating.

- **Supply Capacity Needs** describe the electricity system's inability to provide continuous supply to a local area at peak demand. This is limited by the LMC of the transmission supply to an area. The LMC is determined by evaluating the maximum demand that can be supplied to an area accounting for limitations of the transmission elements, e.g., a transmission line, group of lines, or autotransformer, when subjected to contingencies and criteria prescribed by ORTAC and TPL-001-4. LMC studies are conducted using power system simulations analysis.

- **End-of-life Asset Refurbishment Needs** are identified by the transmitter with consideration to a variety of factors such as asset age, the asset's expected service life, risk associated with the failure of the asset, and its condition. Replacement needs identified in the near- and early mid-term timeframe would typically reflect more condition-based information, while replacement needs identified in the medium to long term are often based on the equipment's expected service life. As such, any recommendations for medium- to long-term needs should reflect the potential for the need date to change as condition information is routinely updated.

- **Load Security and Restoration Needs** describe the electricity system's inability to minimize the impact of potential supply interruptions to customers in the event of a major transmission outage, such as an outage on a double-circuit tower line resulting in the loss of both circuits. Load security describes the total amount of electricity supply that would be interrupted in the event of a major transmission outage. Load restoration describes the electricity system's ability to restore power to those affected by a major transmission outage within reasonable timeframes. The specific load security and restoration requirements are prescribed by Section 7 of ORTAC.

Technical study results can be found in Appendix C. The needs identified are discussed in Sections 6.2 and 6.3 below.

6.2 Near-/Medium-Term Needs Identified

Table 6.1 below summarizes the near- and medium-term needs identified by this IRRP.

Table 6.1 | Summary of Near and Medium-Term Needs

Need	Need Description	Need Date
H29/H30 Supply Capacity	After a loss of either H29 or H30, the remaining circuit (i.e. H30 or H29) will exceed its LTE rating.	2027[2]
R19TH/R21TH Supply Capacity	After a loss of V42H and H29, R19TH will exceed its LTE rating. After a loss of V41H and H30, R21TH will exceed its LTE rating.	Today
Palermo TS End-of-Life Refurbishment	Transformers T3 and T4 at Palermo TS will reach end-of-life.	2025
T38B/T39B Load Security	Simultaneous loss of both T38B and T39B would result in over 600 MW of load being lost by configuration.	2025
Load Restoration Needs	30-minute restoration of all load lost above 250 MW not achievable with current load transfer capabilities after select N-2 contingencies	Ongoing

[2] Note that the "Required By" date for this need in Section 2.1 is 2025. This reflects the recommendation to advance the H29/H30 work to help mitigate the risk of high than anticipated growth.

6.2.1 Station Capacity Needs

There are no station capacity needs in the near term.

6.2.2 Supply Capacity Needs

6.2.2.1 H29/H30 Supply Capacity Need

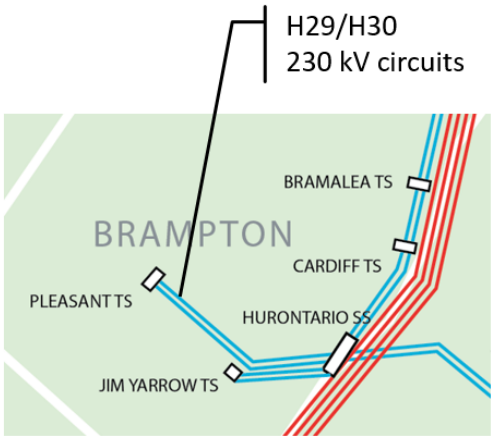

Figure 6.1 | H29/H30 230 kV Circuits

The circuits identified as H29 and H30 form an 8.5 km, 230 kV double-circuit supplying Pleasant TS, as shown in Figure 6.1 above.

According to the demand forecast, this need is expected to exceed the identified LMC of 417 MW by 2027. It is important to note that the 2020 actual peak demand at Pleasant TS reached 410 MW during the July 2020 summer peak. This is shown in Figure 6.2 below. However, it may be too early to conclude if this was an isolated event related to the COVID-19 pandemic or an enduring trend. This need was also identified in the 2015 GTA West IRRP.

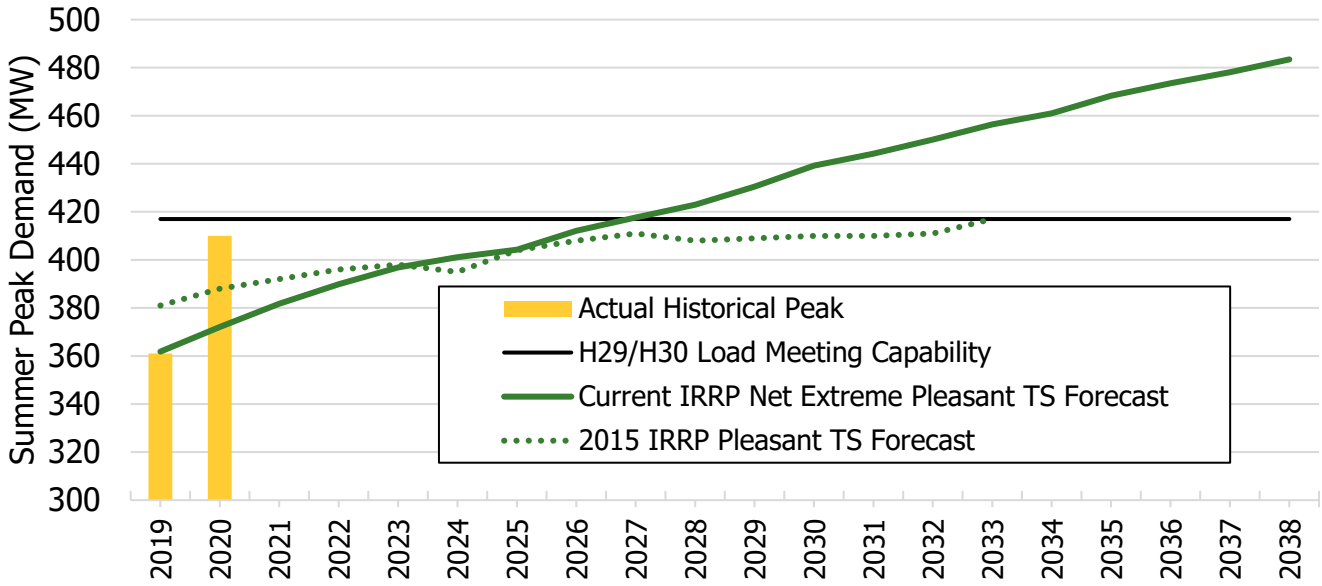

Figure 6.2 | Pleasant TS Historical and Forecast Demand

6.2.2.2 R19TH/R21TH[3] Supply Capacity Need

The circuits R19TH and R21TH form a 230 kV double-circuit from Richview TS to Trafalgar TS. These circuits also extend from Hanlan JCT northward towards Hurontario SS. These circuits provide a supply path to Jim Yarrow MTS, Pleasant TS, Cardiff TS, and Bramalea TS. Figure 6.3 below shows an overview of the area.

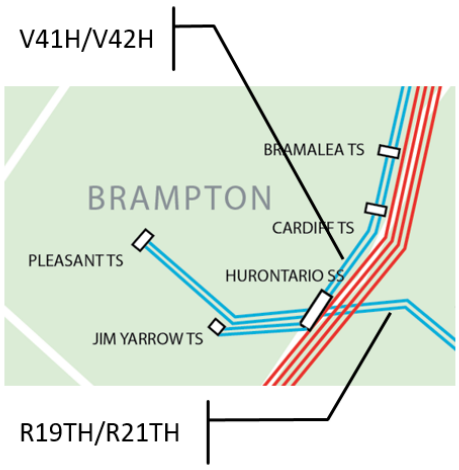

Figure 6.3 | R19TH and R21TH 230 kV Circuits

[3] The limiting sections of R19TH/R21TH referred to here are different from the ones that will be upgraded as the result of the FETT Interface Bulk Transmission Study (Section 4.2).

This need occurs only for specific contingencies during a pre-existing outages (N-1-1 contingency). When V42H is experiencing an outage followed by an H29 contingency, the circuit section of R19TH from Hanlan JCT to Hurontario SS will start to exceed its LTE rating by 2021 and will exceed its STE rating by 2038. The need is primarily driven by growth at Pleasant TS. This is also true for the circuit section of R21TH from Hanlan JCT to Hurontario SS when V41H is experiencing an outage followed by an H30 contingency. The need is illustrated in Figure 6.4 below.

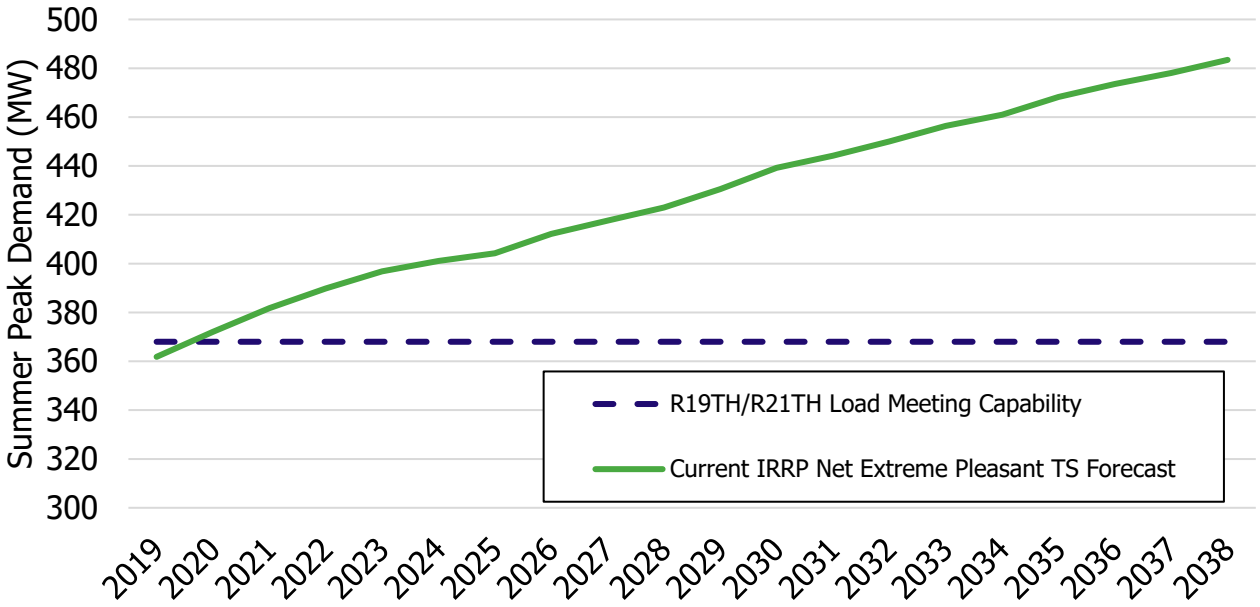

Figure 6.4 |R19TH/R21TH Supply Capacity Need

6.2.3 End-of-Life Refurbishment Needs

6.2.3.1 Palermo TS

Palermo TS is a transformer station that serves load of Burlington Hydro Inc., Milton Hydro Inc. and Oakville Hydro in the municipalities of Burlington, Milton, and Oakville. The transformers at Palermo TS (T3 and T4) are sized up to 83 MVA and will reach end-of-life in 2025.

It is important to note that the nearby Tremaine TS is expected to exceed its station supply capacity limits by 2033 (details of which are found in Section 6.3.2 below). Therefore, it is prudent to consider the needs of Tremaine TS when addressing the end-of-life issues at Palermo TS. Figure 6.5 below shows a geographical overview of Palermo TS and Tremaine TS within the GTA West system.

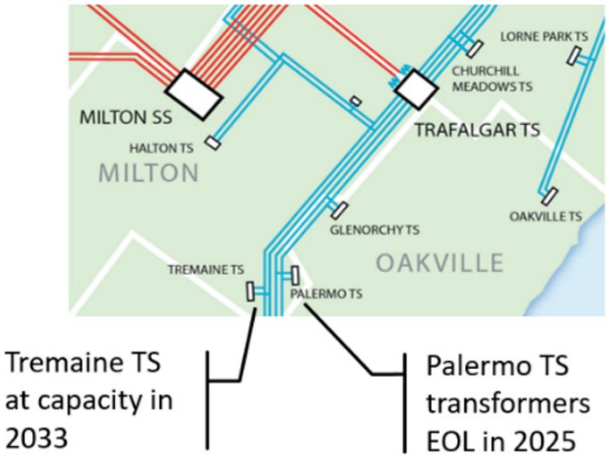

Figure 6.5 | Overview of Palermo TS and Tremaine TS

6.2.4 Load Security

6.2.4.1 T38B/T39B Load Security Need

The circuits designated as T38B/T39B form a 230 kV double-circuit from Burlington TS to Trafalgar TS. These circuits serve numerous transformer stations including Tremaine TS, Trafalgar DESN, Meadowvale TS, Halton TS, Halton #2 TS (future), and Halton Hills MTS. The local 683 MW gas-powered Halton Hills Generating Station also provides power to the province via these two circuits. The area served by this double-circuit is often referred to as the "Halton Pocket". Figure 6.6 provides an overview of the Halton Pocket.

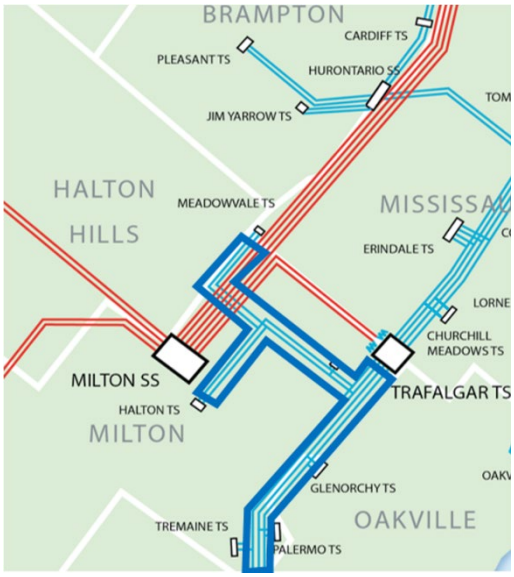

Figure 6.6 | Overview of the Halton Pocket

Starting in 2025, the loss of both T38B and T39B circuits will result in over 600 MW of load being disconnected from the system, and is a violation of Section 7.1 of the ORTAC. This is due to all the aforementioned stations being served solely by these two circuits. The load of at the Halton pocket is expected to grow throughout the study period (i.e. 2020 to 2038). By 2038, it is expected that up to 775 MW of coincident load will be lost following the loss of both these circuits. This is shown in Figure 6.7.

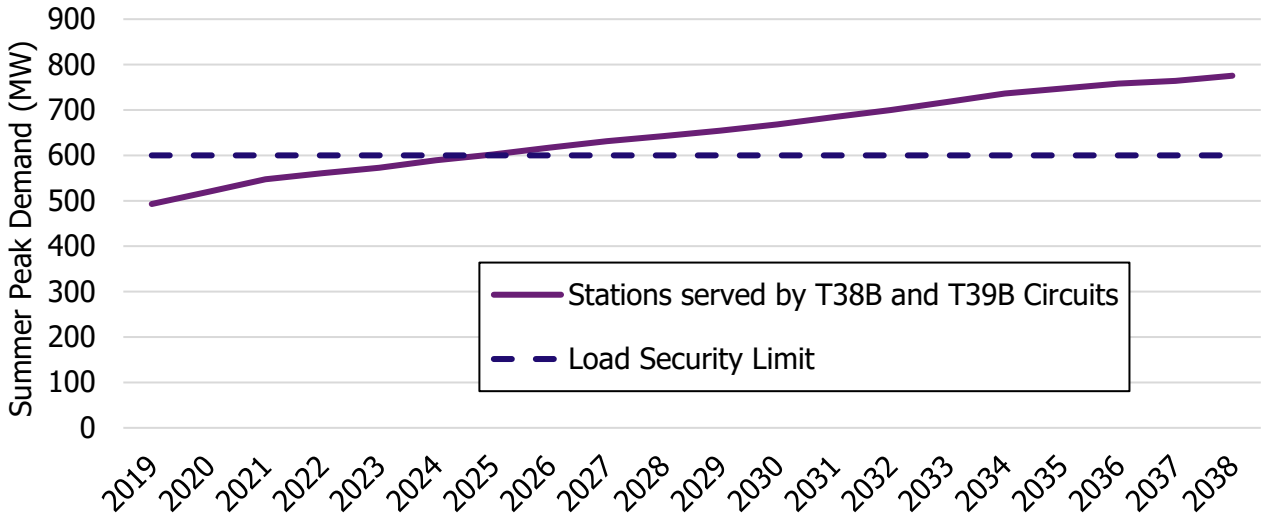

Figure 6.7 | T38B and T39B Load Security Need

6.2.5 Load Restoration

The Needs Assessment and Scoping Assessment reports both identified several load restoration needs in the GTA West Region, as outlined below:

1. Kleinburg Radial Pocket (V43/V44)
2. Halton Radial Pocket (T38B/T39B)
3. Pleasant Radial Pocket (H29/H30)
4. Cardiff/Bramalea Supply (V41H/V42H)
5. West of Cooksville (B15C/B16C)
6. Richview X Trafalgar (R19TH/R21TH)
7. Richview X Trafalgar (R14T/R17T)

For the load restoration needs #1 and #5, it is found that the 4-hour and 8-hour load restoration can be substantially met throughout the forecast. The load serving West of Cooksville and Kleinburg Radial Pocket circuits do not exceed 250 MW throughout the forecast and so the 30-minute requirement does not apply. In addition, need #2 will also be investigated in the RIP in conjunction with the load security need identified above.

In the 2015 GTA West IRRP, addressing the load restoration need #3 (Pleasant Radial Pocket) was ruled out as a cost justification assessment revealed that mitigating solutions were estimated to be significantly costlier to customers in the area than the status quo. This is primarily due to the low probability of the event (loss of H29/H30) occurring and the high cost of building a third supply circuit to Pleasant TS. The 2020 GTA West IRRP takes the same position; it is still not economically prudent to pursue a transmission- or distribution-based solution at this time.

Therefore, for the purposes of this IRRP, the outstanding restoration needs in this IRRP are the Cardiff/Bramalea Supply, and the two Richview x Trafalgar supplies (needs #4, #6, and #7). The 30-minute restoration of all load lost above 250 MW is the most limiting restoration criteria since it relies on remote control actions such as emergency distribution load transfers. 30-minute restoration needs in these pockets existing today and will persist throughout the forecast horizon as demand grows.

6.3 Long-Term Needs Identified

Table 6.2 below summarizes the long-term needs identified by this IRRP:

Table 6.2 | Summary of Long-Term Needs

Need	Need Description	Need Date
Halton Pocket Supply Capacity	Under outage conditions of the local generator, loss of T38B or T39B will lead to the remaining T39B or T38B to exceed its LTE rating	2031
Station Capacity Needs	Cardiff TS, Jim Yarrow MTS, and Tremaine TS are expected to exceed their station capacity limits	2029, 2032, and 2033, respectively
NW GTA Transmission Corridor	There is an anticipated need for future transmission in the GTA West area. This is linked to expected population and employment growth projections.	N/A

6.3.1 Halton Pocket Supply Capacity Need

The load growth at the Halton Pocket is expected to introduce supply capacity needs in the area. Under an outage condition at the Halton Hills Generating Station, the loss of T38B or T39B is expected to cause its remaining companion circuit (i.e. either T39B or T38B, respectively) to exceed its LTE rating. Specifically, this limiting portion of T38B and T39B is a 400-meter section from Lantz JCT to the Trafalgar DESN JCT. This is expected to occur starting in 2031. Figure 6.8 below shows an overview of the limiting section on T38B and T39B. Figure 6.9 shows the limit vs. the forecasted demand in the area.

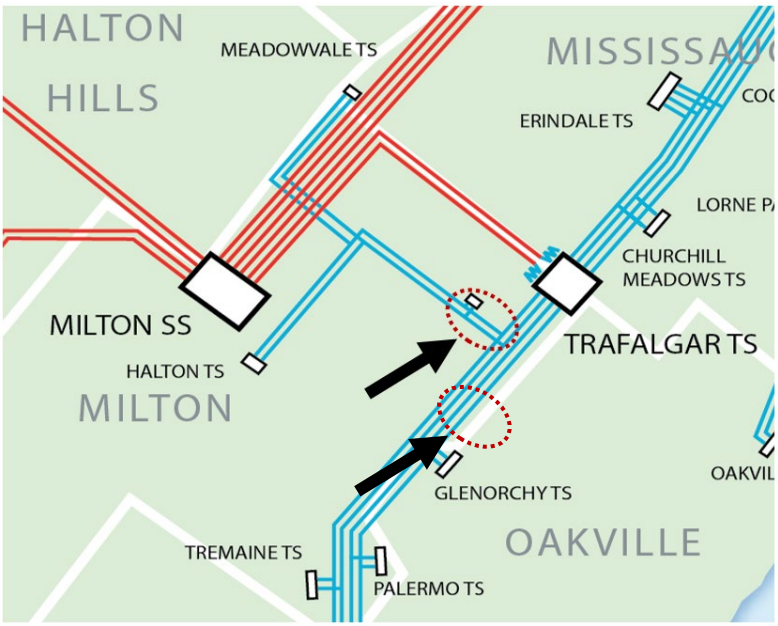

Figure 6.8 | Overview of limiting section on T38B and T39B

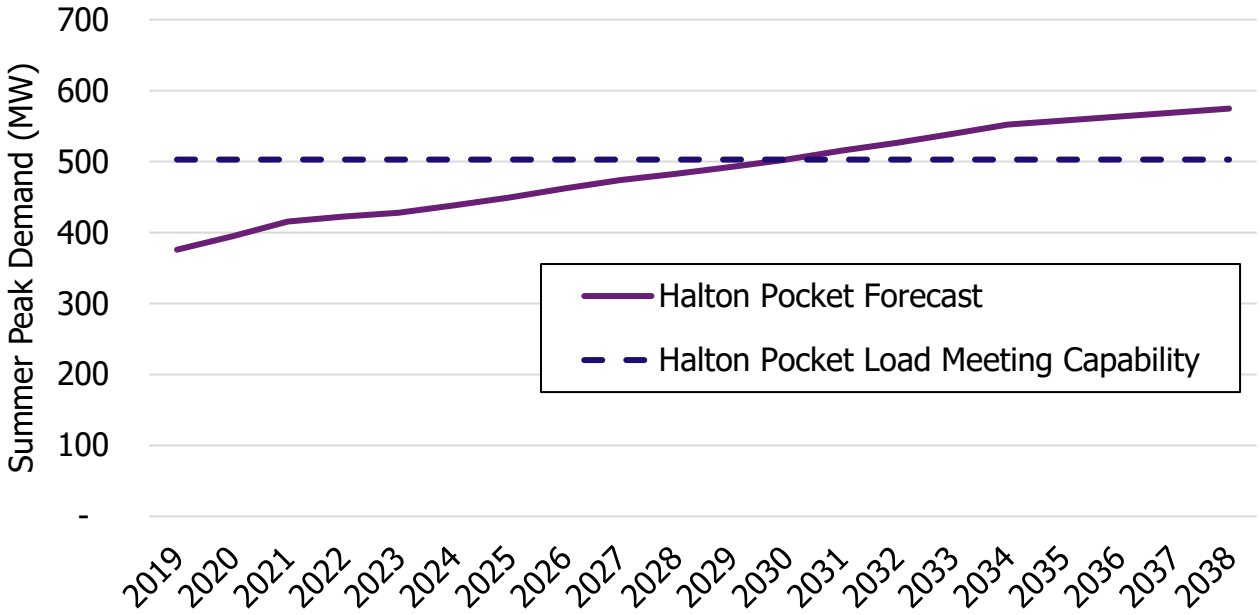

Figure 6.9 | Halton Pocket Supply Capacity Need

6.3.2 Station Capacity Needs

The growth at Cardiff TS is driven mainly by the expansion of a large customer. This expansion was initially slated for mid-2020s but has been put on hold until 2029 due to the effects of the COVID-19 pandemic. Similarly, the growth at Jim Yarrow MTS is primarily driven by load transfers from other stations in Mississauga to Jim Yarrow MTS. However, these load transfers have been delayed to 2032 due to the effects of the COVID-19 pandemic.

The growth at Tremaine TS is expected to exceed station capacity by 2033. A nearby station, Palermo TS, is expected to reach end-of-life by 2025. It is prudent planning practice to consider the needs of both stations when addressing the station capacity needs at Tremaine TS.

7. Plan Options and Recommendations

This section describes the options considered to address system needs in the GTA West region. Section 7.1 to 7.5 documents alternatives to the recommendations described in Section 2 and the rationale for choosing these recommendations. Note that H29/H30 reconductoring is not further discussed here because this recommendation was made in the previous regional planning cycle and this IRRP is only updating the need date. Section 7.6 discusses the Hurontario x Meadowvale transmission option which had the potential to address multiple needs and provide bulk system benefits but was ultimately not selected.

7.1 Options Development and Cost Estimates

Generally speaking, there are two approaches for addressing regional needs that arise as electricity demand increases:

- Build new infrastructure to increase the LMC of the area. These are commonly referred to as "wires" options and can include things like new transmission lines, autotransformers, step-down transformer stations, voltage control devices or upgrades to existing infrastructure. Wires options may also include control actions or protection schemes that influence how the system is operated to avoid or mitigate certain reliability concerns.

- Install or implement measures to reduce the net peak demand to maintain loading within the system's existing LMC. These are commonly referred to as "non-wires" options and can include things like local utility scale generation, distributed energy resources, or conservation and demand management.

Wires options are developed by designing transmission reinforcements or control actions that are appropriate for the specific limiting phenomenon (voltage, thermal, stability, etc.) of each need. These options are developed through discussions with the Working Group.

To select and size suitable generation and other non-wires options, an hourly load profile is first created as described in Section 5.6. The most suitable technology type and capacity is chosen by examining the "unserved energy" profile which is the hourly demand above the existing LMC. The profile indicates the duration, frequency, magnitude, and total energy associated with each need. These characteristics are shown visually in Appendix D.

The high-level cost estimates for wires options are provided by the transmitter, Hydro One. There is a significant error margin around these estimates as they are only intended to enable comparison between options during the IRRP. As a standard practice, the IRRP performs sensitivity analysis (-25% to +50% costs) to ensure that the recommendations are robust. The Regional Infrastructure Plan (RIP) following the IRRP will perform additional detailed analysis and refine these cost estimates before implementation work begins. The IESO will continue to participate in the Working Group during the RIP and revisit these recommendations if costs estimates differ significantly.

Cost estimates for generation and other non-wires alternatives are based on benchmark capital and operating cost characteristics for each resource type and size. Generally speaking, the most cost-effective transmission-connected options for meeting local needs in GTA West are resources with performance and costs on par with simple cycle gas turbines (SCGT) or combined cycle gas turbines (CCGT) generators depending on the relative size of the capacity versus energy requirements. New natural gas-fired generation was considered in the economic analysis for illustrative purposes to represent the cost of new generation. In some cases, energy storage such as lithium nickel manganese cobalt oxide (NMC) batteries are also becoming competitive due to declining technology costs and the expectation of carbon prices increasing in line with federal policy. Other distributed energy resources which are typically distribution-connected are also considered. The most cost-effective distributed options are typically a combination of smaller-scale storage and demand response. For each of the above options, the system capacity value is "credited" back to arrive at the net cost to meet local reliability needs. This is done to ensure a level playing field comparison between resources that provide capacity and wires options that address the local need but do not provide system capacity benefits.

CDM measures can also help decrease the net electricity demand. Centrally delivered energy efficiency measures under the 2021-2024 Conservation and Demand Management framework are already included in the load forecast as discussed in the Section 5.4. Incremental CDM measures are suitable for needs where growth is slow and the magnitude of the overload relative to the total demand is very small (e.g. on the order of few percent per year). Given the timing, high rate of growth, and MW magnitude of the needs observed, incremental CDM measures are not suitable for the needs identified in this IRRP.

Both the upfront and operating cost of the wires options, generation, and distributed energy resources are compiled to generate levelized annual capacity costs ($/kW-yr) over the lifespan of the asset in question (typically 70 years for transmission infrastructure) for each option. The net present value of these levelized costs are the primarily basis through which options are compared below. Unless stated otherwise, the net present values discussed in the following sections are in 2020 CAD dollars. The list of assumptions made in the economic analysis can be found in Appendix E.

7.2 Alternatives to Pleasant TS Control Actions

Post-contingency thermal violations during outage conditions are expected to occur on the R19TH/R21TH circuits leading into Hurontario SS by 2021. The magnitude of the need is expected to reach 115 MW by 2038. Since this is a post-contingency limitation during pre-existing outage conditions (referred to as an N-1-1 contingency), a load rejection scheme or manual control actions are permitted by ORTAC load security criteria. While a number of stations contribute to this overload, a load rejection scheme at Pleasant TS is most effective to manage this need and is expected to be relatively simple since it is limited to monitoring the immediate circuits (H29/H30) supplying Pleasant TS. As noted in Section 2.1.2, manual control actions are also feasible in the near- to medium-term when overloads exceed long-term emergency (LTE) but not short-term emergency (STE) ratings. For the purpose of comparing the costs of alternative options, this section will assume that a load rejection scheme is installed today at the cost of $5MM.

In most cases where control actions are sufficient to meet the need, other options will typically be orders of magnitude more expensive. Other transmission, generation, and distributed energy resource options do exist and they are included here for completeness. Table 7.1 summarizes the options considered and the net present value of the their levelized costs. A load rejection scheme is the most cost-effective option and the IRRP recommends that the Regional Infrastructure Plan (RIP) led by Hydro One should develop and implement control actions by 2023.

Table 7.1 | Alternatives to Pleasant TS Control Actions and Costs

Option	Cost NPV
Pleasant TS load rejection scheme	$5MM
Install bus at Hurontario SS to maintain dual supply to Pleasant TS during V42 outage/H29 contingency and V41H outage/H30 contingency N-1-1 combinations	$52MM
Local generation portfolio made up of SCGT generation and demand response installed in three phases between today and 2030 as demand increases[4]	$200MM
Distributed energy resource portfolio made up of NMC batteries installed in three phases between today and 2030 as demand increases	$368MM

[4] As discussed in Section 7.1, the cost of new natural gas-fired generation was considered in the economic analysis for illustrative purposes to represent the cost of new generation.

7.3 Alternative to Upsizing Palermo TS at End-of-Life

The 83 MVA transformers at Palermo TS (T3 and T4) will reach end-of-life in 2025 and will need to either be replaced either like-for-like or upsized to 75/125 MVA transformers. Today, Palermo TS is able to supply a maximum of 110 MW and is fully loaded with no room for additional growth. Upsizing the transformers and reconfiguring the station will allow Palermo TS to serve approximately 40-50 MW of additional load. Note that the station yard is in relatively poor condition, had recently been de-rated in 2019, and will likely need to be replaced in less than 10 years regardless of the transformer size chosen. The approximately cost of a like-for-like replacement is $30MM. Upsizing will cost approximately $5MM more for a total cost of $35MM. These costs can vary significantly depending on the extent to yard work needed so the IRRP uses $25MM and $35MM for the like-for-like and upsized costs, respectively. This is a more conservative assumption with a higher incremental cost of upsizing.

Tremaine TS, a nearby station 3 km from Palermo TS, can serve a maximum of 190 MW and is forecast to reach capacity in 2033. This is a good opportunity to look at the Palermo TS end-of-life need and Tremaine TS capacity need together and select an optimal refurbishment option to serve regional needs at the lowest cost to ratepayers.

The first option is to refurbish Palermo TS like-for-like in 2025 followed by a subsequent upsizing or new station in 2033 when the capacity need arises. The second option is to upsize Palermo TS at a higher cost when it reaches end-of-life in 2025 and simultaneously resolve the capacity need albeit earlier than necessary. Table 7.2 below summarizes these two options and the associate net present value of the costs. Option 2 is significantly more cost-effective than Option 1 and the IRRP recommends that the RIP should perform additional analysis to reaffirm the cost estimates and develop an implementation plan for upsizing Palermo TS in 2025.

Table 7.2 | Alternatives to Upsizing Palermo TS at End-of-Life and Costs

Option	2025 Action	2033 Action	NPV
Option 1	Refurbish Palermo TS like-for-like - $25MM	Upsize Palermo TS - $35MM	$47MM
Option 2	Upsize Palermo TS - $35MM	None	$32MM

7.4 Alternatives to Local Wires Solutions for T38B/T39B Load Security

Starting in 2025, the loss of both T38B and T39B circuits will result in over 600 MW of load being disconnected from the system, and is a violation of Section 7.1 of the ORTAC. By 2038, it is expected that up to 775 MW of coincident load will be lost following the loss of both these circuits.

The purpose of ORTAC load security criteria is to specify the maximum permitted amount of load lost following recognized contingencies which limits the magnitude of customer interruptions. Installing incremental generation and distributed energy resources are not considered suitable options for addressing the load security need because, while they can reduce the net demand (loading observed on the transmission system), they do not reduce the gross demand (actual electricity consumption) that is interrupted post-contingency. For example, the existing Halton Hills GS has a capacity of 640 MW which is more than the combined coincident peak load of all the stations served on T38B/T39B today. However, in the event of a common tower contingency, all load stations and Halton Hills GS would be interrupted by configuration regardless of the generator's output. The same logic applies to distributed energy resources connected on the distribution system. While it is possible to configure some distributed resources like batteries to provide backup power when grid supply is lost, that is a matter of load restoration rather than load security.

The IRRP considered options to either resupply the Trafalgar DESN at Trafalgar TS or to reconfigure the radial portion of T38B/T39B so that it is supplied directly from Trafalgar TS rather than branching northward at Lantz Junction. This would sectionalize T38B/T39B and reduce the total load lost during double circuit contingencies. These options were ruled out because Trafalgar TS is a gas insulated station with large SF_6 insulated ducts which makes additional connections to the bus impractical. Supplying the Trafalgar DESN or additional circuits would require adding new diameters which would cost on the order of $40MM to $50MM based on previous study estimates.

The IRRP also considered opportunities to align with the FETT bulk study and select a common solution to meeting both regional and bulk system needs simultaneously. This is further discussed in Section 7.6 but ultimately, the most capable and cost-effective solution for addressing bulk system needs at this time, the R14T/R17T/R19TH/R21TH conductor upgrades, will not resolve the T38B/T39B load security need.

The remaining options are local transmission solutions like reterminating supply stations on lighter loaded circuits or installing breakers to sectionalize T38B/T39B. The cost of installing breakers to sectionalize T38B/T39B at Tremaine TS or Lantz Junction is approximately $5MM. For the same cost, Tremaine TS can also be reterminated from T38B/T39B to the companion T36B/T37B circuits since the station sits immediately under the transmission corridor. More detailed wires analysis is needed to refine these cost estimates and further study the technical feasibility of installing breakers or reterminating stations at various points along the circuits. The IRRP recommends that the RIP should carry out detailed wires analysis including updating the near-term demand forecast for the stations served on T38B/T39B. As additional bulk system needs on the FETT interface in the late 2020's become more clear, the IESO will continue to provide input on the Working Group to help ensure that the RIP recommendations are aligned with the latest bulk system information.

7.5 Alternatives to T38B/T39B Reconductoring for Halton Pocket Supply

During an outage to Halton Hills GS, post-contingency thermal violations on T38B/T39B are expected to occur by 2031. The thermal violation is on a short 400-meter section of T38B/T39B immediately north of Lantz Junction. This radial portion of T38B/T39B serves the Halton Pocket including Trafalgar DESN, Halton TS, Halton TS #2, Halton MTS, and Meadowvale TS. By 2038, the coincident demand at these stations will exceed the LMC by approximately 70 MW.

The transmission, utility generation, and distributed energy resource options considered are shown in Table 7.3. Upgrading the conductors on the limiting section of T38B/T39B is the most cost-effective option to meet the supply capacity need in the Halton Pocket. Although load rejection is permitted to account for local generation outages, upgrading T38B/T39B is still cheaper due to the short length of the limiting section. A load rejection scheme would also be more complex to operate and reduce reliability for local customers. Note that if Halton Hills GS were to not continue operation after its contract expiry, load rejection would also no longer be an option. Given the timing of the need, no firm recommendation is required at this time. The Working Group will continue to monitor load growth in the Halton Pocket and revisit this need in the next cycle of regional planning.

Table 7.3 | Alternatives to T38B/T39B Reconductoring and Costs

Option	NPV of Levelized Cost Net of System Capacity Value (if applicable)
Upgrade limiting section of T38B/T39B	<$1MM
Local generation portfolio made up of SCGT generation and demand response installed in two phases between 2030 and 2036 as demand increases[5]	$97MM
Distributed energy resource portfolio made up of NMC batteries installed in two phases between 2030 and 2034 as demand increases	$50MM

7.6 Hurontario SS x Meadowvale TS Transmission Option

The Meadowvale SS x Hurontario TS (MxH) transmission option is a new double 230 kV circuit line from Meadowvale TS to Hurontario SS along the existing transmission corridor. This is an integrated option that has potential benefits for both bulk and regional needs. The MxH option is estimated to cost $47MM. This includes the cost of the 8 km line between Meadowvale TS and Hurontario SS as well as an additional 5 km of transmission between Meadowvale TS and Halton TS to allow for a connection to Milton SS if 500-230 kV autotransformers are installed in the future.

From a regional perspective, the MxH option can address the R19TH/R21TH supply capacity, T38B/T39B load security, and T38B/T39B supply capacity needs. The cost of addressing these needs separately through the recommendations above is $5MM in 2023 (Pleasant TS load rejection scheme), $5MM in 2025 (retermination/sectionalisation for T38B/T39B load security), and $1MM in 2033 (T38B/T39B reconductoring) for a total net present value of $10MM. On regional needs alone, it is more cost-effective to address each need separately rather than together through the MxH option.

[5] As discussed in Section 7.1, the cost of new natural gas-fired generation was considered in the economic analysis for illustrative purposes to represent the cost of new generation.

From a bulk perspective, the MxH option introduces a new path along the FETT interface which would improve transfer capability. However, the MxH option alone would not provide sufficient additional transfer capability. The FETT interface is currently thermally limited by the Richview TS x Trafalgar TS circuits. Upgrading the conductors on these circuits (R14T/R17T/R19TH/R21TH) yields an approximately three-fold higher incremental transfer capability increase than the MxH option would provide.

Furthermore, even after discounting the cost of the MxH option by the avoided regional reliability costs, the per MW capability cost of the MxH option is still roughly double that of the Richview TS x Trafalgar TS conductor upgrades. The IESO issued a letter in December 2020 recommending that Hydro One should proceed with conductor upgrades to the R14T/R17T/R19TH/R21TH circuits between Trafalgar TS and Richview TS as a first stage to increase the FETT transfer capability.

Future FETT interface needs beyond these conductor upgrades are not known at this time and will depend on the future resources acquisition framework and availability of potential resources east of FETT. The IESO will continue to participate in the Working Group during the RIP to help ensure recommendations are aligned with the latest bulk system information.

8. Engagement

Engagement is critical in the development of an IRRP. Providing opportunities for input in the regional planning process enables the views and preferences of communities to be considered in the development of the plan, and helps lay the foundation for successful implementation. This section outlines the engagement principles as well as the activities undertaken to date for the GTA West IRRP.

8.1 Engagement Principles

The IESO's engagement principles[6] help ensure that all interested parties are aware of and can contribute to the development of this IRRP. The IESO uses these principles to ensure inclusiveness, sincerity, respect and fairness in its engagements, striving to build trusting relationships as a result.

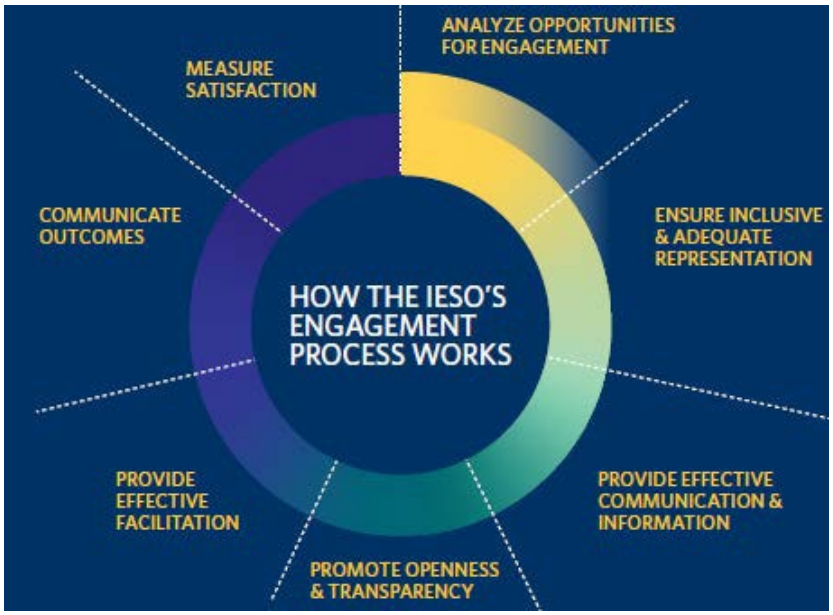

Figure 8.8.1 | The IESO's Engagement Principles

8.2 Creating an Engagement Approach for GTA West (Peel/Halton)

The first step in ensuring that any IRRP reflects the needs of community members and interested stakeholders is to create an engagement plan to ensure that all interested parties understand the scope of the IRRP and are adequately informed about the background and issues in order to provide meaningful input on the development of the IRRP for the region.

[6] https://www.ieso.ca/en/sector-participants/engagement-initiatives/overview/engagement-principles

Creating the engagement plan for this IRRP involved:

- Targeted discussions to help inform the engagement approach for this planning cycle;
- Communications and other engagement tactics to enable a broad participation, using multiple channels to reach audiences; and
- Identifying specific stakeholders and communities who may have a direct impact in this initiative and that should be targeted for further one-on-one consultation, based on identified and specific needs in the region.

As a result, the engagement plan for this IRRP included:

- A dedicated webpage[7] on the IESO website to post all meeting materials, feedback received and IESO responses to the feedback throughout the engagement process;
- Regular communication with interested communities and stakeholders by email or through the IESO weekly Bulletin;
- Public webinars;
- Face-to-face meetings; and
- One-on-one outreach with specific stakeholders to ensure that their identified needs are addressed (see Section 8.4 Bringing Communities to the Table).

8.3 Engage Early and Often

The IESO held preliminary discussions to help inform the engagement approach for this second round of planning, leveraging existing relationships built through the previous planning cycle. This started with the Scoping Assessment Outcome Report for the GTA West region. An invitation to targeted municipalities, Indigenous communities and those with an identified interest in regional issues to announce the commencement of a new regional planning cycle and invite interested parties to provide input on the GTA West Scoping Assessment Report before it was finalized.

Feedback was received and focused on the need to align community energy plans and other planning initiatives in the development of the IRRP, and for the final plan to consider designated land use in the region including a recreational aircraft flying space in the event of any potential infrastructure siting recommendations. Along with a response to the feedback received, the final Scoping Assessment was posted in August 2019 which identified the need for a coordinated regional planning approach done through an IRRP for the GTA West Region.

[7] Regional Electricity Planning - Peel/Halton (GTA West) Region (ieso.ca)

Following the finalization of the Scoping Assessment, outreach then began with targeted municipalities to inform early discussions for the development of the IRRP including the IESO's approach to engagement. The launch of a broader engagement initiative followed with an invitation to IESO subscribers of the GTA West planning region to ensure that all interested parties were made aware of this opportunity for input. Three public webinars were held at major stages during the IRRP development to give interested parties an opportunity to hear about progress and provide comments on key components of the plan. These webinars received strong participation with a cross-representation of stakeholders and community representatives. Written feedback was received as a result during a 21-day comment period following each webinar.

The three stages of engagement invited input on:

1. The draft engagement plan, the electricity demand forecast and the early identified needs to set the foundation of this planning work.
2. The defined electricity needs for the region and potential options to meet the identified needs.
3. The analysis of options and draft IRRP recommendations.

Comments received during this engagement focused on the following major themes:

- Consideration should be given to local developments and growth plans
- Alignment and coordination is needed with other community planning and projects in the region. Future infrastructure and/or electricity supply should consider the priorities of energy and climate action plans and, in particular, alternative energy systems, renewable generation and electrification
- Incorporate shifting economies into planning assumptions and cost benefit analysis
- Integrated options that provide both local and broader provincial system benefit should be considered
- Consideration should be given to non-wires alternatives as part of the recommended solutions in the IRRP

Feedback received during the written comment periods for these webinars helped to guide further discussion throughout the development of this IRRP as well as add due consideration to the final recommendations.

All interested parties were kept informed throughout this engagement initiative via email to GTA West region subscribers, municipalities and communities as well as the members of the GTA/Central Regional Electricity Network.

Based on the discussions both through the GTA West IRRP engagement initiative and broader network dialogue, there is a clear interest to further discuss the potential for alternative energy solutions as a way to meet local needs particularly as communities shift towards electrification. This insight has been valuable to the IESO and will help to inform future discussions to examine and consider these types of initiatives and the opportunities that they may present in future planning efforts. To that end, ongoing discussions will continue through the IESO's GTA/Central Regional Electricity Network to keep interested parties engaged in a two-way dialogue on local developments, priorities and planning initiatives to prepare for the next planning cycle.

All background information, including engagement presentations, recorded webinars, detailed feedback submissions, and responses to comments received, are available on the IESO's Peel/Halton (GTA West) IRRP engagement webpage.

8.4 Bringing Municipalities to the Table

The IESO held meetings with municipalities to seek input on their planning and to ensure that these plans were taken into consideration in the development of this IRRP. At major milestones in the IRRP process, meetings were held with the upper- and lower-tier municipalities in the region to discuss: key issues of concern, including forecast regional electricity needs; options for meeting the region's future needs; and, broader community engagement. Meetings were also held to discuss the joint NW GTA Corridor Study underway by the IESO, Ministry of Energy, Northern Development and Mines; coinciding with the Ministry of Transportation's Transportation Corridor Study that is also underway. These meetings helped to inform the municipal/community electricity needs and priorities and provided opportunities to strengthen this relationship for ongoing dialogue beyond this IRRP process.

During discussions with communities, the IESO received feedback that the name "GTA West Regional Planning" was challenging to differentiate from other initiatives underway in the area with a similar naming convention, thus, the region was changed to "Peel/Halton (GTA West) Region" for engagement purposes. Official planning documents continue to adhere to the regulatory name of "GTA West Region".

8.5 Engaging with Indigenous Communities

To raise awareness about the regional planning activities underway and invite participation in the engagement process, regular outreach was made to Indigenous communities within the GTA West electricity planning region throughout the development of the plan. This includes the communities of Alderville First Nation, Curve Lake First Nation, Haudenosaunee Confederacy Chiefs Council, Hiawatha First Nation, Huron-Wendat, Kawartha Nishnawbe First Nation, Mississaugas of Scugog Island First Nation, Mississauagas of the Credit First Nation, and Six Nations of the Grand River.

The IESO remains committed to an ongoing, effective dialogue with communities to help shape long-term planning in regions all across Ontario.

9. Conclusion

The GTA West IRRP identifies electricity needs in the region over the 20-year period from 2019 to 2038, recommends a plan to address immediate and near-term needs, and lays out actions to monitor long-term needs. The IESO will continue to participate in the Working Group during the next phase of regional planning, the Regional Infrastructure Plan, to provide input and ensure a coordinated approach with bulk system planning where such linkages are identified in the IRRP.

In the near term, the IRRP recommends the implementation of control actions at Pleasant TS to manage overloads during outage conditions, upsizing Palermo TS at end-of-life, and further wires analysis for T38B/T39B load security needs during the Regional Infrastructure Plan. Responsibility for these actions has been assigned to the appropriate members of the Technical Working Group.

In the long term, the IRRP recommends that the Working Group monitor growth in the Halton Pocket and at Cardiff TS and Jim Yarrow TS to determine when further reinforcements will be needed. The IESO and the Working Group will also continue to monitor community energy planning and monitor electrification trends. The IESO and the Ministry of Energy will continue the NW GTA Transmission Corridor study to identify a suitable corridor of land that can be preserved for future transmission infrastructure should the need arise.

The Technical Working Group will meet at regular intervals to monitor developments and track progress toward plan deliverables. In the event that underlying assumptions change significantly, local plans may be revisited through an amendment, or by initiating a new regional planning cycle sooner than the five-year schedule mandated by the OEB.

Independent Electricity System Operator
1600-120 Adelaide Street West
Toronto, Ontario M5H 1T1

Phone: 905.403.6900
Toll-free: 1.888.448.7777
E-mail: customer.relations@ieso.ca

ieso.ca

@IESO_Tweets
linkedin.com/company/IESO

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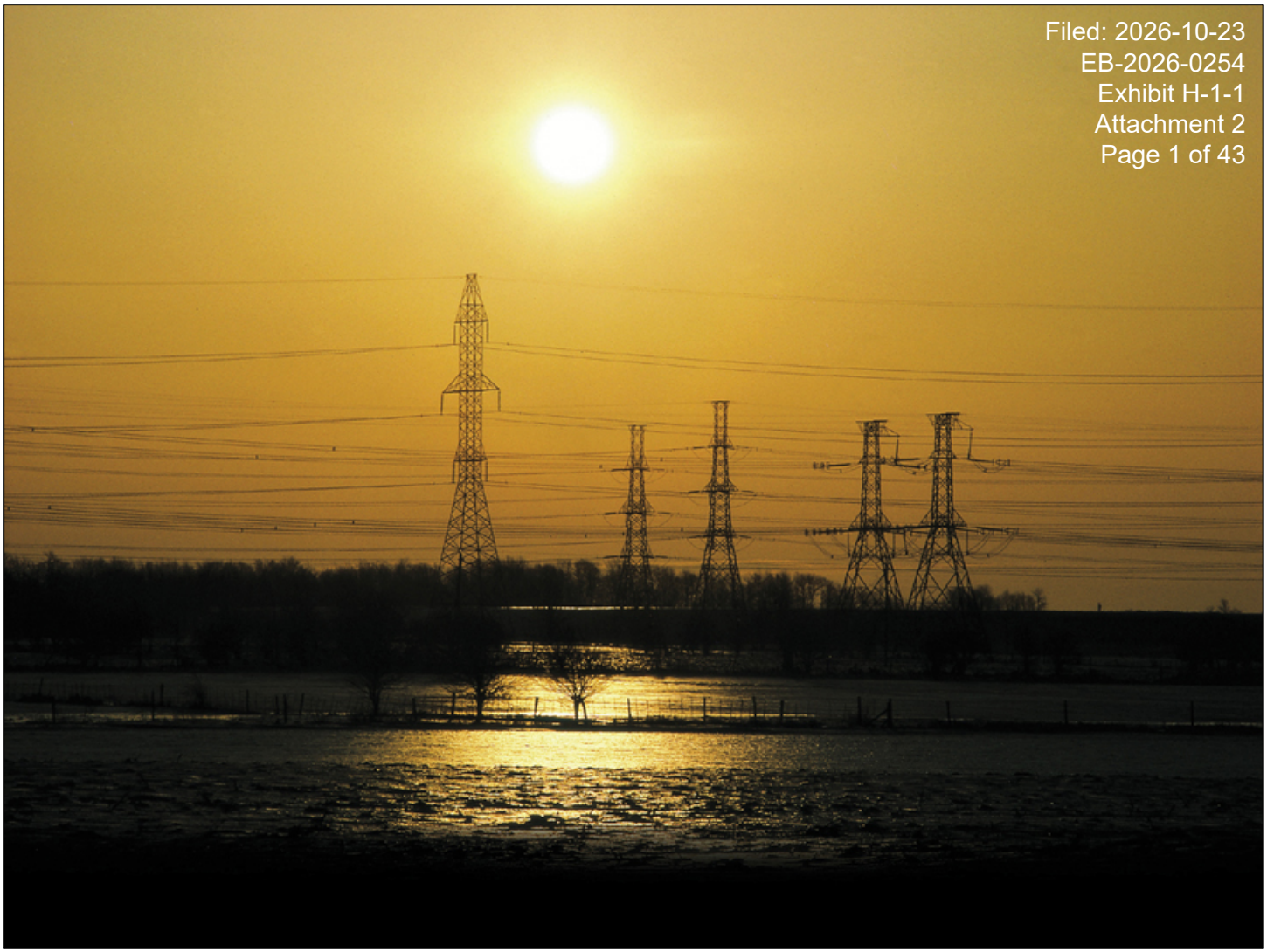

GTA West

REGIONAL INFRASTRUCTURE PLAN

February 23, 2022

hydro one

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Prepared by:
Hydro One Networks Inc. (Lead Transmitter)

With support from:

Company
Alectra Utilities Corporation (Alectra)
Burlington Hydro Electric Inc.
Halton Hills Hydro Inc.
Hydro One Networks Inc. (Distribution)
Independent Electricity System Operator
Milton Hydro Distribution Inc.
Oakville Hydro Electricity Distribution Inc.

Disclaimer

This Regional Infrastructure Plan ("RIP") report was prepared for the purpose of developing an electricity infrastructure plan to address electrical supply needs identified in previous planning phases and also any additional needs identified based on new and/or updated information provided by the RIP Working Group.

The preferred solution(s) that have been identified in this report may be reevaluated based on the findings of further analysis. The load forecast and results reported in this RIP report are based on the information provided and assumptions made by the participants of the RIP Working Group.

Working Group participants, their respective affiliated organizations, and Hydro One Networks Inc. (collectively, "the Authors") make no representations or warranties (express, implied, statutory or otherwise) as to the RIP report or its contents, including, without limitation, the accuracy or completeness of the information therein and shall not, under any circumstances whatsoever, be liable to each other, or to any third party for whom the RIP report was prepared ("the Intended Third Parties"), or to any other third party reading or receiving the RIP report ("the Other Third Parties"), for any direct, indirect or consequential loss or damages or for any punitive, incidental or special damages or any loss of profit, loss of contract, loss of opportunity or loss of goodwill resulting from or in any way related to the reliance on, acceptance or use of the RIP report or its contents by any person or entity, including, but not limited to, the aforementioned persons and entities.

EXECUTIVE SUMMARY

THIS REGIONAL INFRASTRUCTURE PLAN ("RIP") WAS PREPARED BY HYDRO ONE WITH SUPPORT FROM THE TECHNICAL WORKING GROUP IN ACCORDANCE WITH THE ONTARIO TRANSMISSION SYSTEM CODE REQUIREMENTS. IT IDENTIFIES INVESTMENTS IN TRANSMISSION FACILITIES, DISTRIBUTION FACILITIES, OR BOTH, THAT SHOULD BE DEVELOPED AND IMPLEMENTED TO MEET THE ELECTRICITY INFRASTRUCTURE NEEDS WITHIN THE GTA WEST REGION.

The participants of the GTA West Regional Infrastructure Plan ("RIP") Technical Working Group ("TWG") included members from the following organizations:

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

This RIP is the final phase of the second cycle of the GTA West regional planning (RP) process and it follows the completion of the GTA West Integrated Regional Resource Plan ("IRRP") [1] in August 2021; and the GTA West Needs Assessment ("NA") [2] and Scoping Assessment ("SA") in May 2019 and August 2019, respectively. This RIP provides a consolidated summary of needs and recommended plans for the GTA West Region over a 10-year planning horizon (2021-2031) based on available information. The load forecast for the 2032-2041 period is provided to show the longer term needs and trend. All needs for this long term horizon will be reviewed and confirmed in future regional planning cycles.

The first cycle of Regional Planning process was completed in January 2016 with the publication of the GTA West RIP [3], which provided a description of needs and recommendations of preferred wires plans to address near-term needs. Since the previous planning cycle the following projects have been completed:

- Halton Hills Hydro MTS (completed in 2018)
- Tremaine TS: Add 4 x 27.6 kV feeders (completed in 2020)

The recommended major infrastructure investments including assets replacements in the GTA West Region over the near and medium-term (2021-2031) period are given in Table 1 below, along with their planned in-service date and budgetary estimate for planning purposes.

Table 1. GTA West Region - Recommended Plans over the 2021-2031 Study Period

No.	Investments	I/S Date	Cost[1] ($M)
A	**Increase Capacity**		
1	Palermo TS: Refurbish and Upgrade Transformers T3 and T4 and add new 27.6 kV yard	2026	30
2	Hurontario TS x Pleasant TS: Reconductor circuits H29/H30 with higher ampacity conductor	2027	8
B	**Asset Replacement**		
1	Bramalea TS: Replace Transformers T3 and T4	2028	20
2	Tomken TS: Replace Transformers T1 and T2	2029	49
3	Lorne Park TS: Replace Transformer T2	2030	14

[1] These costs are budgetary estimates for planning purposes unless otherwise specified

A number of potential capacity needs were also identified with the following facilities expected to exceed capacity limits over the medium to long term as listed below. The stations loading will continue to be monitored with medium term needs being managed at the distribution level utilizing capacity at adjacent area stations. All needs will be reviewed in the next regional planning cycle.

Medium Term Capacity Needs 2027 - 2031

- Pleasant TS: T1/T2 DESN – 2027
- Erindale TS: T1/T2 DESN – 2028
- Cardiff TS: T1/T2 DESN – 2029
- Erindale TS: T5/T6 DESN – 2031

Longer Term Capacity Needs 2032 – 2041

- Kleinburg TS: T1/T2 DESN – 2032
- Jim Yarrow MTS: T3/T4 DESN - 2032
- T38B/T39B: Lantz Jct x Trafalgar DESN – 2033
- Goreway TS: T5/T6 DESN - 2034
- Bramalea TS:T3/T4 DESN - 2036
- Tremaine TS: T1T2 DESN - 2039

The GTA West TWG recommends that:

- Hydro One and LDCs continue with the implementation of infrastructure investments listed in Table 1 while keeping the TWG apprised of project status;
- All the other identified needs/options are to be further reviewed by the TWG in the next regional planning cycle.

The next regional planning cycle for the GTA West Region must be triggered within five years, beginning with the Needs Assessment ("NA") phase. It is expected that the next NA will start in Q1 2024. However, the next regional planning cycle can be started earlier if required to address any new emerging needs.

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1. INTRODUCTION

THIS REPORT PRESENTS THE REGIONAL INFRASTRUCTURE PLAN ("RIP") TO ADDRESS THE ELECTRICITY NEEDS OF THE GTA WEST REGION.

The report was prepared by Hydro One Networks Inc. (Transmission) ("Hydro One") on behalf of the Technical Working Group ("TWG") in accordance with the regional planning process established by the Ontario Energy Board ("OEB") in 2013. The Working Group included members from the following organizations:

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

The GTA West Region encompasses the municipalities of Brampton, southern Caledon, Halton Hills, Mississauga, Milton, and Oakville[1]. The region includes the area roughly bordered geographically by Highway 27 to the northeast, Highway 427 to the southeast, Regional Road 25 to the west, King Street to the north and Lake Ontario to the south, as shown in Figure 1-1.

Bulk electricity in the region is supplied by Burlington TS from the west, Claireville TS from the north, Richview TS and Manby TS from the east, and from the 500/230 kV autotransformers at Trafalgar TS, and distributed by a network of 230 kV transmission lines and twenty (20) step-down transformer stations. The summer 2021 non-coincident peak load of the region was approximately 3184 MW.

[1] Some parts of the City of Burlington are also supplied from Palermo and Tremaine transformer stations, located in the GTA West region.

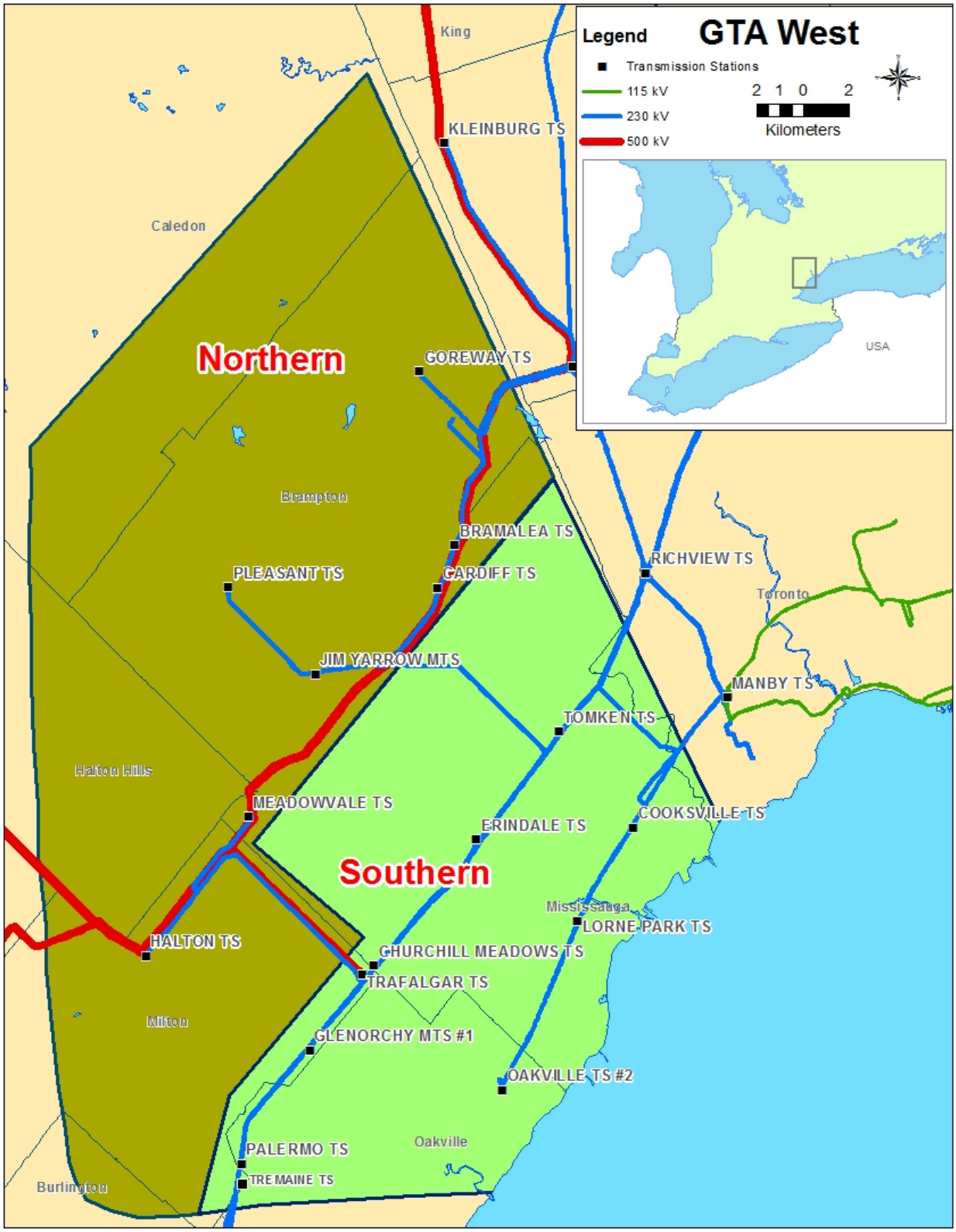

Figure 1-1 GTA West Region Map

1.1 Scope and Objectives

This RIP report examines the needs in the GTA West Region. Its objectives are to:

- Identify new supply needs that may have emerged since previous planning phases (e.g., Needs Assessment, Scoping Assessment, Local Plan, and/or Integrated Regional Resource Plan);
- Assess and develop wires plans to address these needs;
- Provide the status of wires planning currently underway or completed for specific needs;
- Identify investments in transmission and distribution facilities or both that should be developed and implemented on a coordinated basis to meet the electricity infrastructure needs within the region.

The RIP reviews factors such as the load forecast, transmission and distribution system capability along with any updates with respect to local plans, conservation and demand management ("CDM"), renewable and non-renewable generation development, and other electricity system and local drivers that may impact the need and alternatives under consideration.

The scope of this RIP is as follows:

- A consolidated report of the needs and relevant wires plans to address near and medium-term needs (2021-2031) identified in previous planning phases (Needs Assessment, Scoping Assessment, Local Plan, or Integrated Regional Resource Plan);
- Identification of any new needs over the 2021-2031 period and wires plans to address these needs based on new and/or updated information;
- Consideration of long-term needs identified by the TWG.

1.2 Structure

The rest of the report is organized as follows:

- Section 2 provides an overview of the regional planning process;
- Section 3 describes the region;
- Section 4 describes the transmission work completed over the last ten years;
- Section 5 describes the load forecast and study assumptions used in this assessment;
- Section 6 describes the results of the adequacy assessment of the transmission facilities and identifies the needs;
- Section 7 discusses the needs and provides the alternatives and preferred solutions; and,
- Section 8 provides the conclusion and next steps.

2. REGIONAL PLANNING PROCESS

2.1 Overview

Planning for the electricity system in Ontario is done at essentially three levels: bulk system planning, regional system planning, and distribution system planning. These levels differ in the facilities that are considered and the scope of impact on the electricity system. Planning at the bulk system level typically looks at issues that impact the system on a provincial level, while planning at the regional and distribution levels looks at issues on a more regional or localized level.

Regional planning looks at supply and reliability issues at a regional or local area level. Therefore, it largely considers the 115 kV and 230 kV portions of the power system that supply various parts of the province.

2.2 Regional Planning Process

A structured regional planning process was established by the Ontario Energy Board in 2013 through amendments to the Transmission System Code ("TSC") and Distribution System Code ("DSC"). The process consists of four phases: the Needs Assessment [2] ("NA"), the Scoping Assessment ("SA"), the Integrated Regional Resource Plan ("IRRP"), and the Regional Infrastructure Plan ("RIP").

The regional planning process begins with the NA phase which is led by the transmitter to determine if there are regional needs. The NA phase identifies the needs and the Technical Working Group (TWG) determines whether further regional coordination is necessary to address them. If no further regional coordination is required, further planning is undertaken by the transmitter and the impacted local distribution company ("LDC") or customer and a Local Plan ("LP") is developed to address them. These needs are local in nature and can be best addressed by a straight forward wires solution.

In situations where identified needs require further coordination at the regional or sub-regional levels, the IESO initiates the SA phase. During this phase, the IESO, in collaboration with the TWG, reviews the information collected as part of the NA phase, along with additional information on potential non-wires alternatives, and makes a decision on the most appropriate regional planning approach. The approach is either a RIP, which is led by the transmitter, or an IRRP, which is led by the IESO. If more than one sub-region was identified in the NA phase, it is possible that a different approach could be taken for different sub-regions.

The IRRP phase will generally assess infrastructure (wires) versus resource (CDM and Distributed Generation) options at a higher or more macro level, but sufficient to permit a comparison of options. If the IRRP phase identifies that infrastructure options may be most appropriate to meet a need, the RIP phase will conduct detailed planning to identify and assess the specific wires alternatives and recommend a preferred wires solution. Similarly, resource options which the IRRP identifies as best suited to meet a need are then further planned in greater detail by the IESO. The IRRP phase also includes IESO led

[2] also referred to as Needs Screening

stakeholder engagement with municipalities and establishes a Local Advisory Committee (LAC) in the region or sub-region.

The RIP phase is the final stage of the regional planning process and involves confirmation of previously identified needs; identification of any new needs that may have emerged since the start of the planning cycle; and development of a wires plan to address these needs. This phase is led and coordinated by the transmitter and the deliverable of this stage is a comprehensive and consolidated report of a wires plan for the region. Once completed, this report can be referenced in rate filing submissions and as part of LDC rate applications with a planning status letter provided by the transmitter to the LDC(s). Respecting the OEB timeline provision of the RIP, plan level stakeholder engagement is not undertaken during this phase. However, stakeholder engagement at a project specific level will be conducted as part of the project approval requirement.

To efficiently manage the regional planning process, Hydro One has been undertaking wires planning activities in collaboration with the IESO and LDCs for the region as part of and/or in parallel with:

- Planning activities that were already underway in the region prior to the regional planning process taking effect;
- The NA, SA, IRRP and LP phases of regional planning;
- Conducting wires planning as part of the RIP for the region or sub-region;
- Planning for connection capacity requirements with the LDCs and transmission connected customers.

Figure 2 -1 illustrates the various phases of the regional planning process (NA, SA, IRRP, and RIP) and their respective phase trigger, lead, and outcome.

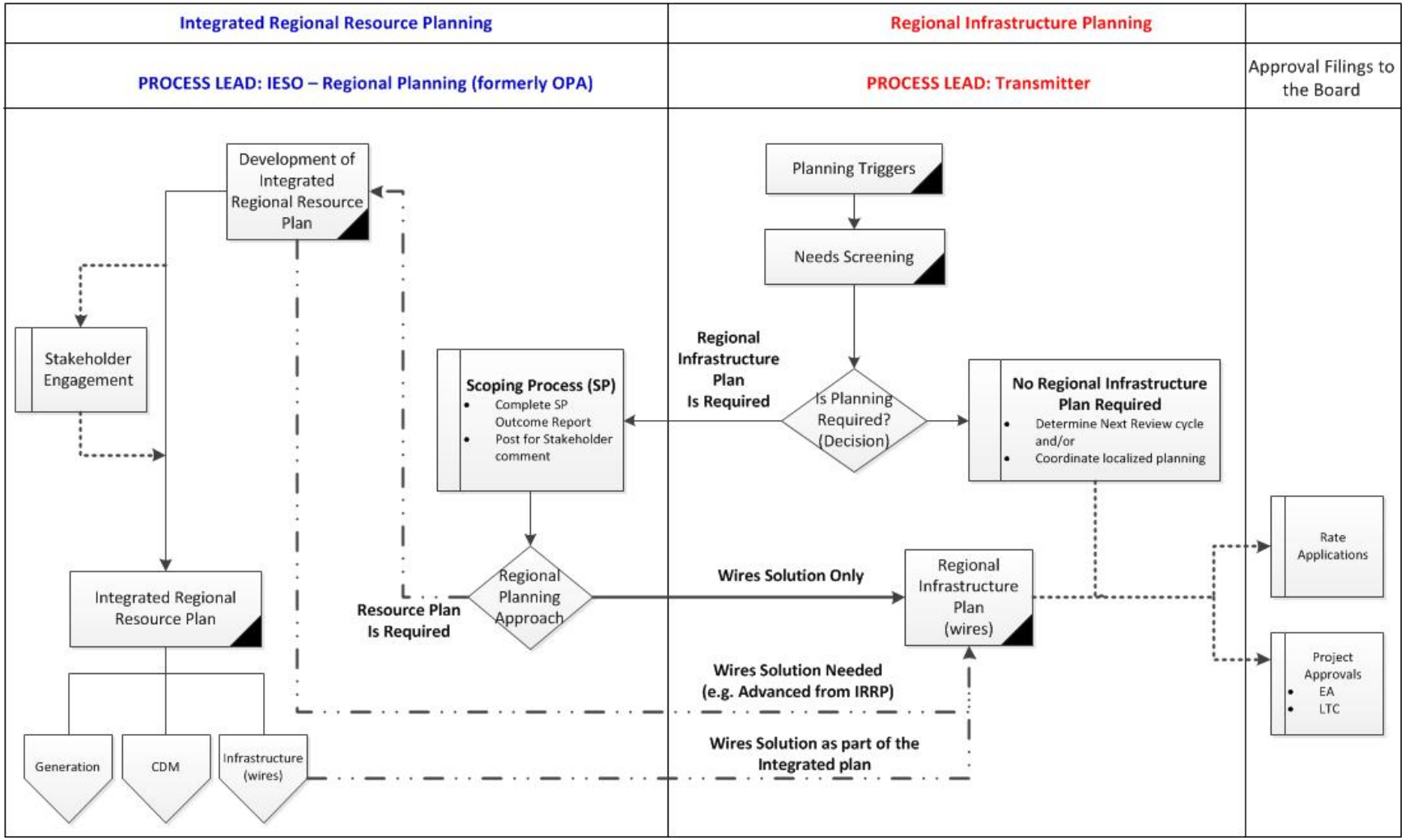

Figure 2-1 Regional Planning Process Flowchart

2.3 RIP Methodology

The RIP phase consists of four steps (see Figure 2-2) as follows:

1. Data Gathering: The first step of the RIP process is the review of planning assessment data collected in the previous stages of the regional planning process. Hydro One collects this information and reviews it with the Working Group to reconfirm or update the information as required. The data collected includes:
   - Net peak demand forecast at the transformer station level. This includes the effect of any distributed generation or conservation and demand management programs.
   - Existing area network and capabilities including any bulk system power flow assumptions.
   - Other data and assumptions as applicable such as asset conditions, load transfer capabilities, and previously committed transmission and distribution system plans.
2. Technical Assessment: The second step is a technical assessment to review the adequacy of the regional system including any previously identified needs. Additional near and medium-term needs may be identified at this stage.
3. Alternative Development: The third step is the development of wires options to address the needs and to come up with a preferred alternative based on an assessment of technical considerations, feasibility, environmental impact and costs.
4. Implementation Plan: The fourth and last step is the development of the implementation plan for the preferred alternative.

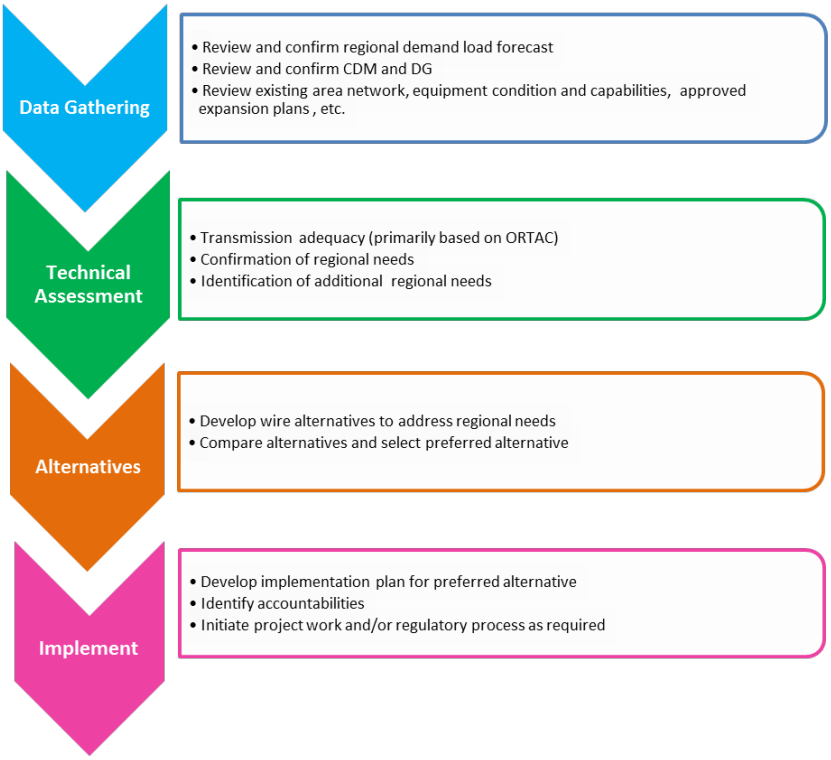

Figure 2-2 RIP Methodology

3. REGIONAL CHARACTERISTICS

THE GTA WEST REGION COVERS THE REGIONAL MUNICIPALITIES OF HALTON AND PEEL AND INCLUDES THE MUNICIPALITIES OF BRAMPTON, SOUTHERN CALEDON, HALTON HILLS, MISSISSAUGA, MILTON, AND OAKVILLE. 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.

Bulk electricity in the region is supplied by Burlington TS from the west, Claireville TS from the north, Richview TS and Manby TS from the east, and from the 500/230 kV autotransformers at Trafalgar TS, and distributed by a network of 230 kV transmission lines and twenty (20) step-down transformer stations (see Appendix A and B for a complete list). 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 Sithe Goreway GS in Brampton and the 683 MW Halton Hills GS in Halton Hills.

The Local Distribution Customers (LDC) in the GTA West Region are Alectra Utilities Co., Burlington Hydro Inc., Halton Hills Hydro Inc., Hydro One Networks Inc., Milton Hydro Distribution Inc. and Oakville Hydro Electricity Distribution Inc. A listing of the LDCs along with the associated supply stations is given in Appendix C. The high-voltage system in this Region also provides supply to one direct transmission connected custormer's transformer station. An electrical single line diagram for the GTA West Region facilities is shown in Figure 3-1.

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

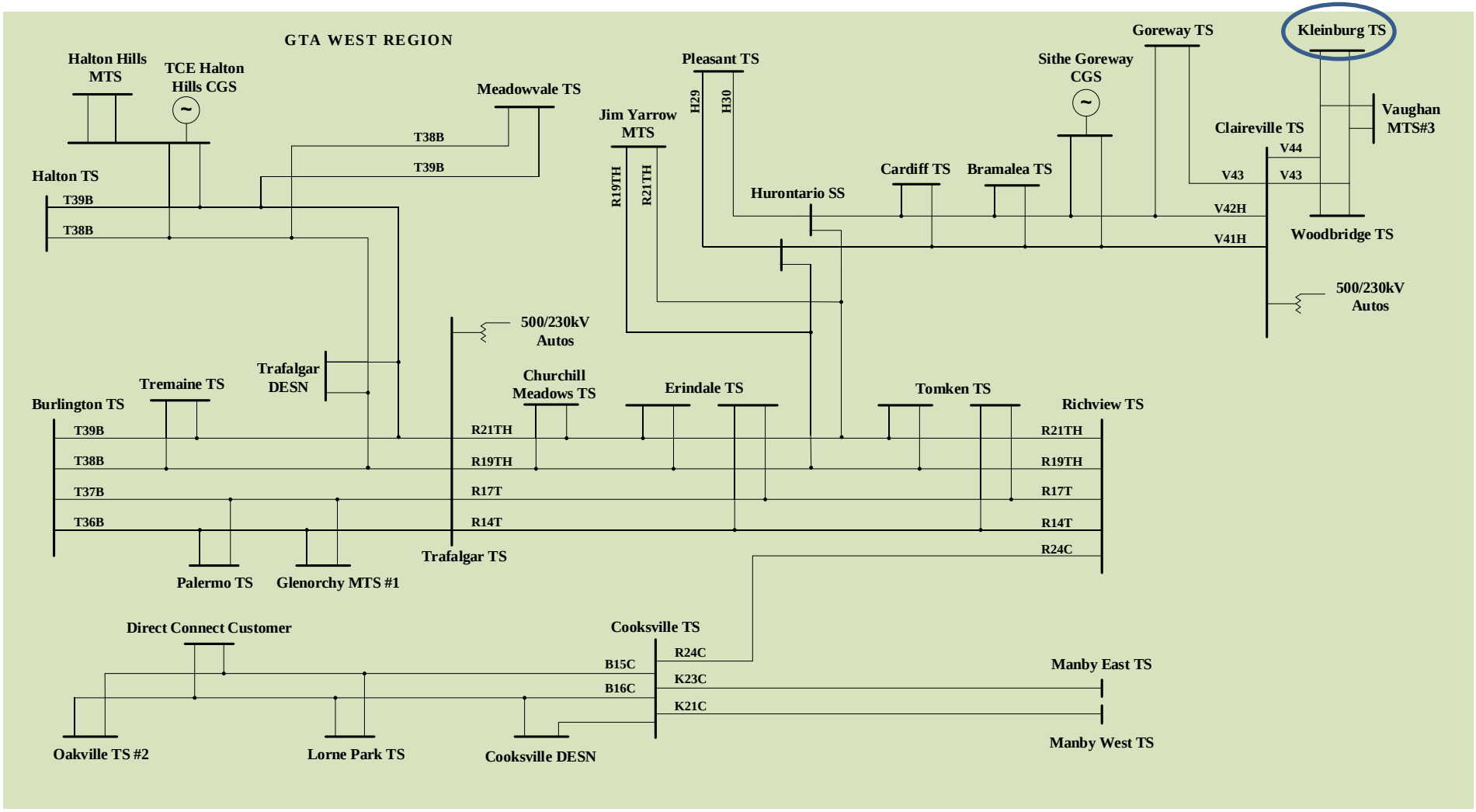

Figure 3-1 GTA West Region Single Line Diagram

4. TRANSMISSION FACILITIES COMPLETED AND/OR UNDERWAY IN THE LAST TEN YEARS

IN THE LAST TEN YEARS A NUMBER OF TRANSMISSION PROJECTS HAVE BEEN PLANNED AND UNDERTAKEN BY HYDRO ONE, OR ARE UNDERWAY, AIMED AT IMPROVING THE SUPPLY CAPABILITY AND RELIABILITY IN THE GTA WEST REGION.

A summary and brief description of the major projects completed and/or currently underway over the last ten years is provided below:

- Churchill Meadows TS (2010) – built a new step down transformer station consisting of two 75/125 MVA transformers in Mississauga supplied from 230 kV circuits R19TH and R21TH. This station provided additional load meeting capability to meet Alectra Inc. requirements.
- Hurontario SS and underground cable work (2010) - built a new switching station Hurontario SS, 4.2 km of double circuit 230 kV Line from Hurontario SS to Cardiff TS and 3.3 km of underground cable from Hurontario SS to Jim Yarrow MTS. The new switching station and associated line work connects the R19T/R21T circuits and the V42/V43H circuits to provide relief and improved reliability to Pleasant TS and Jim Yarrow MTS.
- Halton Hills GS (2010) – connected a new 683 MW gas-fired combined cycle generation station in Halton Hills connected to 230 kV circuits T38B and T39B. This generation station provided necessary local power to supply the GTA West Region.
- Glenorchy MTS#1 (2011) – connected new Oakville Hydro-owned Glenorchy MTS to 230 kV circuits T36B and T37B. This station provided additional load meeting capability to meet Oakville Hydro requirements
- Tremaine TS (2012) – built a new step down transformer station consisting of two 75/125 MVA transformers in Burlington supplied from 230 kV circuits T38B and T39B. This station provided additional load meeting capability to meet Burlington Hydro and Milton Hydro requirements.
- Richview TS x Trafalgar TS 230 kV Line Upgrade (Currently Underway) – The two 230 kV double circuits lines R14T/R17T and R19TH/T21TH between Richview TS and Trafalgar TS are being upgraded to provide additional bulk power transfer capability. The planned in-service date is Q2 2026.
- In addition to Hydro One, Halton Hills Hydro has also built the new Halton Hills Hydro MTS in 2019. This is a 230/28kV station with two 50/83MVA transformers and is connected to the 230 kV bus of the Halton Hills GS. This station has provided load meeting capability to supply Halton Hills Hydro loads.

5. FORECAST AND STUDY ASSUMPTIONS

5.1 Load Forecast

The load in the GTA West Region is expected to grow at an average rate of approximately 1.6% annually from 2021 to 2031, and 1.2% annually from 2031 to 2041. The growth rate varies across the region ranging from 1.4% in the Central Mississauga area to 2.4% in the West Oakville /Milton/Halton Hills area.

Figure 5-1 shows the GTA West Region extreme summer weather net load forecast from 2021 to 2041. The forecast shown is the regional non-coincident forecast, representing the sum of the load in the area for the 20 step-down transformer stations. The regional non-coincident peak load is forecast to increase from approximately 3184 MW in 2021 to 4212 MW in 2041. Non-coincident forecast for the individual stations in the region is available in Appendix D, and is used to determine any need for station capacity relief.

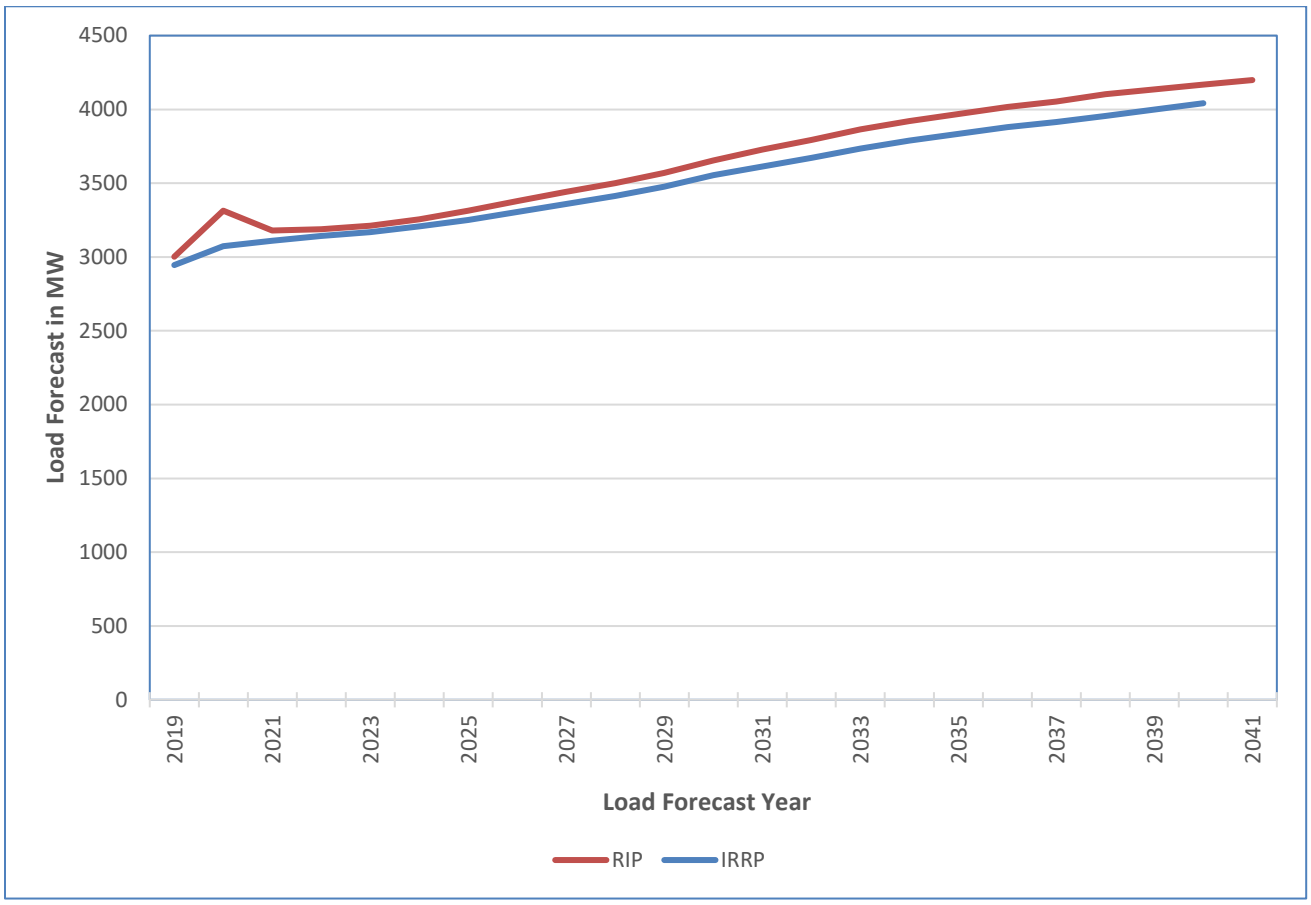

Figure 5-1 GTA West Region Non–Coincident Net Summer Peak Load Forecast

The regional non-coincident load forecast was developed by projecting the 2021 summer peak loads corrected for extreme weather, using the area stations growth rates as per the July 2021 IESO GTA West IRRP with

subsequent additional load forecast information provided by Alectra and Milton Hydro[3]. The IRRP forecast is shown for comparison. The growth rate accounts for CDM measures and connected DG. Details on CDM and connected DG information used to update the stations forecast in this report are provided in the GTA West IRRP [3] and are not repeated in this report.

5.2 Other Study Assumptions

The following other assumptions are made in this report.

- The study period for the RIP assessments is 2021-2031. However, a longer term forecast up to 2041 is provided to identify long-term needs and align with the IESO GTA West IRRP.
- All planned facilities for which work has been initiated and are listed in Section 4 are assumed to be in-service.
- Summer is the critical period with respect to line and transformer loadings. The assessment is based therefore based on summer peak loads.
- Station capacity adequacy is assessed by comparing the non-coincident peak load with the station's normal planning supply capacity, assuming a 90% lagging power factor for stations having no low-voltage capacitor banks and 95% lagging power factor for stations having low-voltage capacitor banks, or on the basis of historical power factor data.
- Normal planning supply capacity for transformer stations in the region is determined by the summer 10-day Limited Time Rating (LTR).
- Line capacity adequacy is assessed by using peak loads in the area.

[3] As a result of the need to refurbish Palermo TS and the decision to upgrade the station transformers (see Section 7.1), Milton Hydro plan to increase the loading on Palermo TS and have reduced their forecast for Halton TS.

6. ADEQUACY OF EXISTING FACILITIES AND REGIONAL NEEDS

THIS SECTION REVIEWS THE ADEQUACY OF THE EXISTING TRANSMISSION SYSTEM AND TRANSFORMER STATION FACILITIES SUPPLYING THE GTA WEST REGION AND LISTS THE FACILITIES REQUIRING REINFORCEMENT OVER THE 2021-2031 PERIOD.

Within the current regional planning cycle, three regional assessments have been conducted for the GTA West Region. The findings of these assessments are inputs to this RIP. These assessments are:

1) GTA West Region Needs Assessment (NA) Report, May 9, 2019
2) GTA West Region Scoping Assessment (SA) Report, August 8, 2019
3) GTA West (Peel Halton) Integrated Regional Resource Plan (IRRP) and Appendices, July 2021

The NA and IRRP reports identified a number of needs as a result of the forecasted load demand and condition of major high voltage transmission assets. This section reviews the adequacy of the transmission lines and stations in the GTA West Region based on the updated regional load forecast provided in Appendix D. Sections 6.1 to 6.2 present the results of this review. Asset replacement needs identified in the previous NA report are discussed in Section 6.3 of this report. Load security and load restoration needs are discussed in Section 6.4.

6.1 500 kV and 230 kV Transmission Facilities

All 500 kV and 230 kV transmission circuits in the GTA West Region with the exception of the Hurontario SS to Pleasant TS 230 kV circuits H29 and H30 are classified as part of the Bulk Electricity System (“BES”). They connect the Region to the rest of Ontario’s transmission system. The 230 kV circuits also serve local area stations within the region and the power flow on them depends on the bulk system transfers as well as the local area loads.

6.1.1 500/230 kV Transformation Facilities

Bulk power supply to the GTA West Region is provided by 500/230 kV autotransformers at Trafalgar TS and Claireville TS, as well as 230 kV supply from Burlington TS, Richview TS and Manby TS. Additional support is provided from the 230 kV generation facilities at Halton Hills GS and Sithe Goreway GS. Both Claireville TS and Trafalgar TS are expected to require relief in the 2030s.

6.1.2 230 kV Transmission Circuits

The 230kV circuits in the region are as follows (please refer to Figure 3-1):

1. Claireville TS to Hurontario SS (230 kV Circuits V41H, V42H, V43) – Supply Bramalea TS, Cardiff TS, and Goreway TS
2. Hurontario SS to Pleasant TS (230 kV Circuits H29, H30) – Supply Pleasant TS

3. Trafalgar TS to Burlington TS (230 kV Circuits T36B, T37B, T38B, T39B) – Supply Glenorchy MTS #1, Palermo TS, and Tremaine TS
4. Trafalgar TS to Halton TS (Radial Tap from 230 kV Circuits T38B, T39B) – Supply Trafalgar DESN, Meadowvale TS and Halton TS
5. Richview TS to Trafalgar TS (230 kV Circuits R14T, R17T) – Supply Erindale TS and Tomken TS
6. Richview TS to Trafalgar TS, with tap to Hurontario SS (230 kV Circuits R19TH, R21TH) – Supply Churchill Meadows TS, Erindale TS, Jim Yarrow MTS, and Tomken TS
7. Richview TS and Manby TS to Cooksville TS (230 kV Circuits R24C, K21C, K23C, B15C, B16C) – Supply Cooksville DESN, Ford Oakville CTS, Lorne Park TS, and Oakville TS #2.

The Richview TS x Trafalgar TS 230 kV circuits, R14T/R17T and R19TH/R21TH, are part of the "Flow East toward Toronto" interface ("FETT") and the flow on these circuits is expected to increase as a result of the change in generation resource following the retirement of the Pickering Nuclear Generating Station in 2025. As the result, these circuits need to be upgraded. OEB Leave to Construct ("Section 92") approvals have been obtained for the project and work is underway on reconductoring these circuits with new conductors that have a 2000A summer continuous rating. The planned in-service date for the project is Q2 2026.

Other line sections expected to exceed their ratings during the study period are listed in Table 6-1 below.

Table 6-1 GTA West Region - Lines Sections Exceeding ratings

No.	Line	Section	Contingency	Line Rating MW	Year Line Rating exceeded
1	H29/H30	Hurontario SS x Pleasant TS	N-1[1]	419	2027
2	T38B/T39B	Lantz Jct x Trafalgar DESN	N-1[1]	535	2033
3	R19TH/R21TH	Hanlan Jct x Hurontario TS	N-1-1[2,3]	416	2021

[1] Loss of one circuit of the double circuit line
[2] R19TH is overloaded when H29 and V42H are out of service
[3] R21TH is overloaded when H30 and V41H are out of service

The planned solutions to address these needs are discussed further in Section 7 of the report.

6.2 Step-Down Transformation Facilities

There are a total of twenty (20) step-down transformer stations in the GTA West Region as listed in Table 6-2. Nineteen (19) supply electricity to LDCs and one is a transmission connected industrial customer station. Of the nineteen stations, three (3) are owned and operated by the LDCs.

The stations summer peak load forecast is given in Appendix D Table D-1.

Table 6-2 GTA West Region - Step-Down Transformer Stations

Bramalea TS	Glenorchy MTS#1	Kleinburg TS	Pleasant TS
Cardiff TS	Goreway TS	Lorne Park TS	Tomken TS
Churchill Meadows TS	Halton Hills MTS	Meadowvale TS	Trafalgar TS
Cooksville TS	Halton TS	Oakville TS #2	Tremaine TS
Erindale TS	Jim Yarrow MTS	Palermo TS	Customer #1 CTS

This RIP reviewed the step-down transformation capacity for the stations within the GTA West Region. The NA and IRRP studies had previously indicated that a second Halton TS DESN would be required by summer 2022. Subsequent to those studies, and as part of the discussions for this RIP, Milton Hydro provided a revised load forecast with new load being supplied from Glenorchy MTS #1, Halton Hills MTS, and Palermo TS. As a result of this update,the need for the second Halton TS DESN has been deferred to 2033. Based on the load forecast, the following stations would require capacity relief during the 2021-2031 study period as shown in Table 6-3 below. The need timeframe defines the time when the peak load forecast exceeds the DESN's Summer 10-day LTR.

Table 6-3 GTA West Region - Step-Down Transformer Stations Requiring Relief

Station	Capacity (MW)	2021 Loading (MW)	Need Date
Palermo TS: T1/T2 DESN refurbishment	110	124	2027
Pleasant TS: T1/T2 DESN	148	138	2027
Erindale TS: T1/T2 DESN	181	142	2028
Cardiff TS: T1/T2 DESN	113	103	2029
Erindale: T5/T6 DESN	185	142	2031

Further, based on the load forecast, the stations requiring relief beyond 2031 are listed below:

- Jim Yarrow MTS: T3/T4 DESN – 2032
- Kleinburg TS: T1/T2 DESN – 2032
- Goreway TS: T5/T6 DESN – 2034
- Bramalea TS: T3/T4 DESN – 2036
- Tremaine TS: T1/T2 DESN – 2039

6.3 Asset Replacement Needs for Major High Voltage (HV) Transmission Equipment

A number of Hydro One facilities in the GTA West Region will require replacement over the 2021-2031 study period. These needs are determined by asset condition based on a range of considerations such as equipment deterioration, technical obsolescence due to outdated design, lack of spare parts availability or manufacturer support, and/or potential health and safety hazards.

Asset replacement work is planned over the study period at area transformer stations listed in Table 6-4. Palermo TS work is discussed in Section 7.1. Details for the remaining stations are provided in Section 7.5.

Table 6-4 GTA West Region - Planned Replacement Work

No.	Station	Planned I/S Date
1	Palermo TS	2026
2	Bramalea TS	2028
3	Tomken TS	2029
4	Lorne Park TS	2030

6.4 Load Security and Load Restoration

Load security and load restoration needs were reviewed as part of the current study. For load security ORTAC requires that no more than 600 MW of load be lost as a result of a double circuit contingency.

Further, loads are to be restored in the restoration times specified as follows:

- All loads must be restored within 8 hours.
- Load interrupted in excess of 150 MW must be restored within 4 hours.
- Load interruped in excess of 250 MW must be restored within 30 minutes.

6.4.1 T38B/T39B Load Security

The 2021 IRRP had identified that the loading on the double circuit 230kV line T38B/T39B corridor was forecast to exceed the 600 MW limit by 2025. However, as mentioned in Sections 5 and 6.2, Milton Hydro plan to increase loading on Palermo TS and have updated the forecast for Halton TS. As a result, the loading on T38B/T39B circuits has been reduced. The current revised forecast (See Table 6-5) indicates that the non-coincident connected load on the T38B/T39B circuits will exceed the 600 MW limit by 2030.

Table 6-5 GTA West Region – Load connected to 230kV double circuit line T38B/T39B

Circuit	Limit MW	Act.	Forecast - Connected Load (MW)										
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2041
T38B/T39B	600	523	516	529	555	566	580	578	584	598	**613**	631	843

This load security need is further discussed in section 7.6

6.4.2 Load Restoration

Load restoration needs in the Region were previously identified in the NA, SA and IRRP. These were again reviewed by the Working Group in the RIP. The lines, stations served and the loads at the end of the study period on the lines in the Region are given in Table 6-6 below:

Table 6-6 GTA West Region – Load Connected to Various Transmission Lines

No.	Lines/ Circuits	Connected Stations	Line Length (km)	Year 2031 Connected Load (MW)	Load subject to 30 minute criteria (MW)
1	B15/B16	Lorne Park TS, Oakville #2 TS	12.5	278	28
2	H29/H30	Pleasant TS	8.5	459	209
3	R14T/R17T	Erindale TS (T1/T2) & (T3/T4), Tomken T1/T2	21.7	479	229
4	R19TH/ R21TH	Churchill Meadows TS, Erindale TS (T5/T6), Tomken TS (T3/T4), Jim Yarrow TS	33.3	583	333
5	T36B/T37B	Palermo TS, Glenorchy MTS#1	24.5	272	22
6	T38B/T39B[1]	Tremaine TS, Trafalgar DESN, Halton TS, Meadowvale TS and Halton Hills MTS	42.7	631	381
7	V41H/V42H	Bramalea TS, Cardiff TS	17/26.3[2]	435	185
8	V42H/V43	Goreway TS	17/21.4[2]	269	19
9	V43/V44	Woodbridge TS, Vaughan MTS#3, Kleinburg TS[3]	21.4/12[2]	498	248

[1] Trafalgar DESN, Halton TS, Meadowvale TS and Halton Hills TS are on a radial tap connected to the T38B/T39B line.

[2] Tap length for the two circuits are different

[3]Vaughan MTS#3 and Woodbridge TS are also supplied from the V43/V44 line and loads are taken from the 2020 GTA North RIP report.

The Table shows that all lines in the Region have connected load greater than 250MW. For lines 1, 5, 8 the load in excess of 250MW is small and transfers can be managed at the distribution levels. For all other lines, the load in excess of 250MW cannot be restored within 30 minutes. However, all lines are short; reliability of the lines is good and the incidents of overlapping outages very rare. The lines are located in the GTA, with good accessibility for maintenance crews and Hydro One expects all loads to be restored within 4 hours with at least one circuit back into service.

Any mitigation measure to meet the 30 minute restoration requires building new lines and/or installing additional switching facilities. The work will be extremely expensive and have substantial environmental and public impact. Given the past reliability performance and expectation to restore the load within 4 hours, the TWG does not recommend any further action.

7. REGIONAL PLANS

THIS SECTION DISCUSSES NEEDS, PRESENTS WIRES ALTERNATIVES AND THE PREFERRED WIRES OPTIONS FOR ADDRESSING THE ELECTRICAL SUPPLY NEEDS FOR THE GTA WEST REGION..

The electrical infrastructure needs for the GTA West Region are summarized in Table 7-1. These needs include those previously identified in the GTA West NA and IRRP as well as those resulting from the adequacy assessment carried out as part of this RIP report. The details of the project/plan to address these needs are provided in Sections 7.1 through 7.7.

Table 7-1 GTA West Region – Identified Near, Medium-Term and Long Term Needs

Section	Facilities	Need	Timing
7.1	Palermo TS	Transformers T3 and T4 replacement. Milton Hydro capacity requirements	2026
7.2	H29/H30: Hurontario TS x Pleasant TS	Line upgrade required to supply Pleasant TS	2027
7.3	R19TH/R21H	Overload under certain outage conditions	Existing
7.4	Pleasant TS: T1/T2 DESN	Load exceeding DESN capacity	2027
7.4	Erindale TS: T1/T2 DESN	Load exceeding DESN capacity	2028
7.4	Cardiff TS: T1/T2 DESN	Load exceeding DESN capacity	2029
7.4	Kleinburg TS: T1/T2 DESN	Load exceeding DESN capacity	2030
7.4	Erindale: T5/T6 DESN	Load exceeding DESN capacity	2031
7.5	Bramalea TS	Transformer T3 and T4 replacement	2028
7.5	Tomken TS	Transformers T1 and T2 replacement	2029
7.5	Lorne Park TS	Transformer T2 replacement	2030
7.6	Load Security	T38B/T39 Loading	2030
7.7	Load Restoration	ORTAC 30 minutes restoration criteria not met.	---[1]
7.8	Longer Term Needs	Capacity Exceeded Lines - T38B/T39B: Lantz Jct x Trafalgar DESN Stations - Jim Yarrow MTS: T3/T4 DESN Kleinburg TS: T1/T2 (27.6kV) DESN Goreway TS: T5/T6 DESN Bramalea TS:T3/T4 DESN Tremaine TS: T1T2 DESN	 2033 2032 2032 2034 2036 2039

[1]No action is planned. Please see sections 6.4.2 and 7.7.

7.1 Palermo TS: T3/T4 Replacement and Milton Hydro Capacity Requirements

7.1.1 Description

Palermo TS is a 230/27.6 kV transformer station that facilitates load delivery to Burlington Hydro Inc., Milton Hydro Inc. and Oakville Hydro customers in the cities of Burlington, Milton and Oakville, respectively (see Figure 7-1). Peak station demand was about 124 MW in summer 2021 as compared to the station 10 day LTR of 110 MW.

The transformers, T3 and T4, at Palermo TS are over 50 years old and based on asset condition assessment require replacement in the near-term. The current plan is to replace these transformers by Q4 2026.

Palermo TS is currently a “restricted station” due to short circuit constraints and new DER resources cannot connect to feeders from the station.

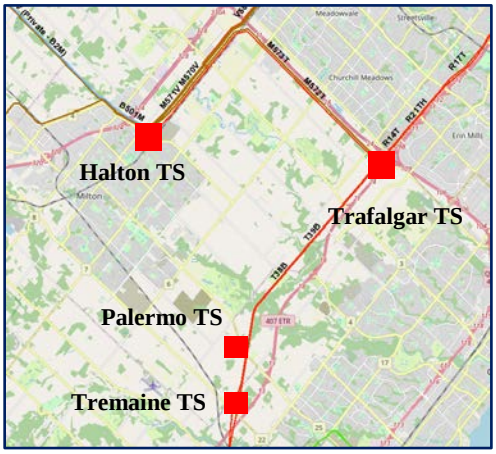

Figure 7-1 Palermo TS

The earlier NA and IRRP reports had identified the need for adding a second DESN at Halton TS by 2022 and that the loading on Tremaine TS would be exceeded by 2033. The IRRP had also identified upsizing the Palermo TS transformers as a more cost effective alternative to replacing the transformer like for like. As part of this RIP, Milton Hydro reviewed their load forecast and now plan to utilize the increased capacity at Palermo TS, thereby deferring the need for a second DESN at Halton TS to 2033. The Palermo TS upgrade also defers the need for providing relief for Tremaine TS to 2039. The Palermo TS forecast is given below in Table 7-2 and reflects the revised loading provided by Milton Hydro and assumes that Burlington Hydro and Oakville Hydro existing load on Palermo TS remains constant.

Table 7-2 Palermo TS Load Forecast

Station	LTR (MW)	Act.	Load Forecast										
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2041
Palermo TS	110/180[1]	124	115	113	113	112	112	129	133	134	135	137	155

[1]The station existing LTR is 110 MW. With new 75/125MVA transformers the LTR will increase to 180 MW.

7.1.2 Alternatives and Recommendation

The following alternatives were considered to address Palermo TS T3/T4 replacement need as well as meet future demand requirements:

- **Alternative 1 - Maintain Status Quo**: This alternative was considered and rejected as it does not address the risk of failure due to asset condition and would result in increased maintenance expenses and will not meet Hydro One’s obligation to provide reliable supply to the customers.

- **Alternative 2 – Replace T3/T4 with similar type and size equipment as per current standard:** Under this alternative the existing T3/T4 transformers at Palermo TS will be replaced with new 50/83 MVA, 230/27.6 kV transformers. This alternative would address the need and maintain reliable supply to the customers in the area. It would not however, provide additional capacity to meet the future load growth as per the load forecast. It would also not allow additional DER resources to connect to the station since the short circuit constraints will remain due to the lower impedances of the 50/83MVA transformers.
- **Alternative 3 – Replace T3/T4 with larger size 230/27.6 kV, 75/125MVA transformers:** This alternative would require replacing the existing T3/T4 transformers with larger size transformers. Since the new transformers will be dual-winding transformers, the existing low voltage switchyard will need to be modified and additional feeders added to utilize the increased capacity. The modified station will have dual 27.6 kV buses with reduced fault current level and station capacity will increase from current 110 MW to 180 MW. This alternative will thus provide additional capacity to meet future load growth and the reduced fault current will permit DER resources to connect to the station.

The TWG recommends Alternative 3 as the preferred and cost effective alternative for addressing the need and taking "right-sizing" into consideration. It provides capacity to meet future load growth, removes the restriction on DER to connect to the station, maintains reliable supply to the customers in the area while increasing system resiliency and flexibility. While the incremental cost difference between the 50/83MVA and the 75/125MVA transformers is small (<$1M), planning estimates for the LV yard expansion and additional feeder positions are between $7-10M.

7.2 230 kV Circuits H29/H30 Conductor Upgrade

7.2.1 Description

Pleasant TS is located in Brampton and has two 230/27.6 kV DESNs and one 230/44kV DESN. The station is supplied by the 230 kV double circuit line H29/H30 from Hurontario SS (see Figure 7-2). The station serves Alectra – Brampton loads. The summer 2021 peak station load was about 383 MW.

The existing conductor used for 230 kV circuits H29/H30 going to Pleasant TS is 795.0 kcmil ACSR 26/7 with summer long term emergency rating of 1090 A (at 127°C). This rating limits the maximum load-carrying capacity to approximately 419 MW of load at Pleasant TS. As mentioned in Table 6.1 the line flows are forecast to exceed line rating by summer 2027.

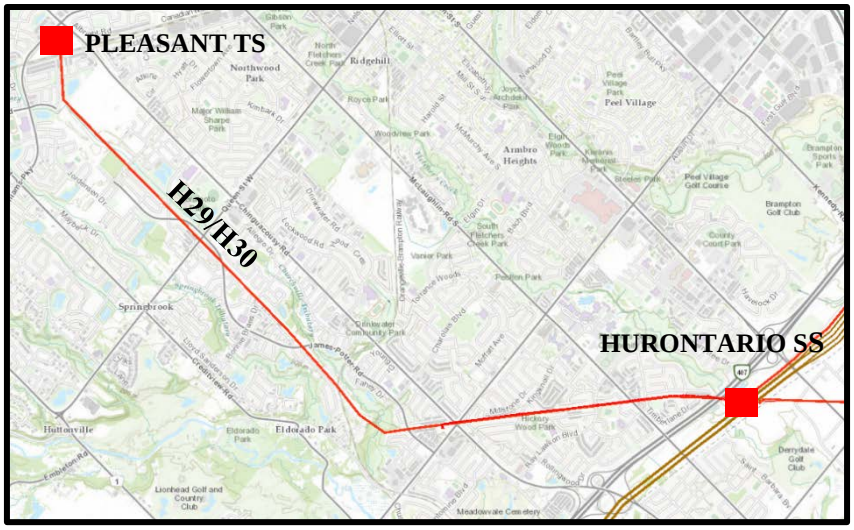

Figure 7-2 Radial Circuits of H29/H30 Supplying Pleasant TS

7.2.2 Alternatives and Recommendation

The following alternatives were considered to address upgrading of the H29/H30 line:

1. **Alternative 1 - Maintain Status Quo**: This alternative was considered and rejected as it does not provide adequate transmission capacity to supply the load demand at Pleasant TS.
2. **Alternative 2 – Upgrade Line conductor:** This alternative covers upgrading the line by replacing the existing conductor with a conductor with a higher current rating.

Other alternatives such as building a second 230 kV line to Pleasant TS or transferring load away from Pleasant TS were considered and ruled out as impractical and not cost effective.

The TWG recommends Alternative 2 as the technically preferred and cost effective alternative for reinforcing the supply to Pleasant TS. Hydro One will consider transmission losses while selecting the conductor. OEB approval under Section 92 of the Electricity Act will be required. The estimated cost of the project is about $8M.

7.3 230 kV Circuits R19TH/R21TH - Overload under certain outage conditions

7.3.1 Description

The loads at Jim Yarrow MTS and Pleasant TS are supported by the 230 kV line V41H/V42H from Claireville and the R19TH/R21TH line as shown in Figure 7-3, Under certain outage conditions all loads at Pleasant TS and half the load on Jim Yarrow MTS can end up on one of the R19TH or the R21TH section between Hanlan Jct and Hurontario SS.

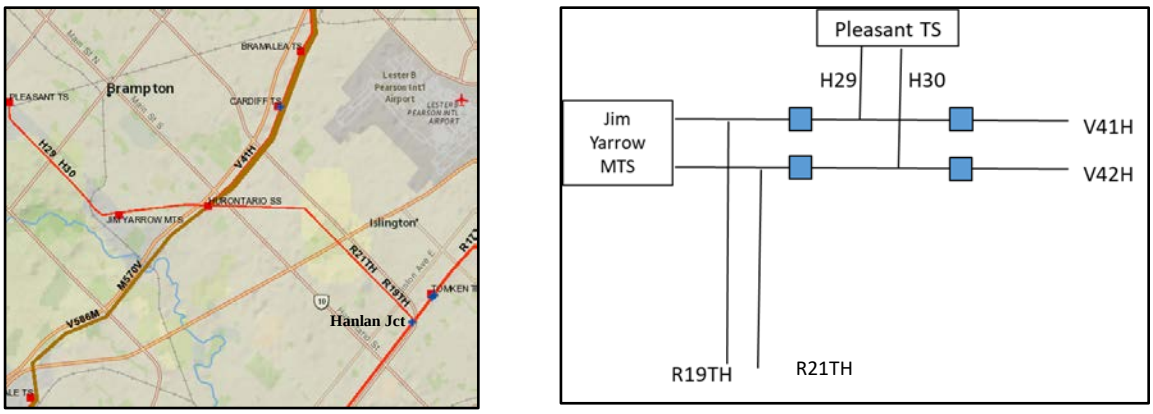

Figure 7-3 Supply to Jim Yarrow MTS and Pleasant TS

The two outage scenarios are:

- R19TH overloaded for overlapping outages of V41H and H30 (V41H out of service and H30 lost or H30 out of service and V41H lost).
- R21TH overloaded for overlapping outages of V42H and H29) (V42H out of service and H29 lost or H29 out of service and V42H lost).

7.3.2 Alternatives and Recommendation

The IRRP had considered a number of alternatives to address this issue ranging from a local load rejection scheme at Pleasant TS to reinforcing the supply to Hurontario SS.

Following discussions with IESO and Hydro One Operating groups, given the fact that the possibility of the overlapping outages is rare, manual operator action can be taken to relieve the line overloads and will be adequate over the near to medium-term (till 2030). Hydro One has implemented an operating procedure under which Jim Yarrow MTS load is transferred to R21TH if V41H or H30 are out of service pre-contingency and to R19TH if V42H or H29 are out of service pre-contingency.

The TWG recommends that the loading on the R19TH/R21TH and the performance of the manual scheme be monitored. The timing (currently forecast to be around 2030) and the preferred option alternative for the LR scheme will be reviewed in the next planning cycle.

7.4 Station Capacity - DESN Stations Exceeding LTR

As discussed in Section 6.2 the loading on five DESN stations – Palermo TS T3/T4, Erindale TS T1/T2, Pleasant TS T1/T2, Cardiff TS T1/T2, Erindale T5/T6 - is expected to exceed station LTR during the 2021-2031 study period. Palermo TS has been discussed in Section 7.1. The remaining stations are discussed here.

All these remaining DESNs supply Alectra utilities load. Erindale TS and Cardiff TS supply load in Mississauga and Pleasant TS supplies load in Brampton (Figure 7-4). The stations forecast loads and need dates are given in Table 7-3 below.

Table 7-3 Forecast Loads on DESNs Overloaded during Plan Period

Station	LTR MW	Act.	Load Forecast											Need Date
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2041	
Pleasant TS T1/T2 DESN	148	138	142	147	147	147	148	**149**	150	151	152	154	162	**2027**
Erindale TS T1/T2 DESN	181	142	147	151	156	162	168	175	**182**	190	192	195	211	**2028**
Cardiff TS T1/T2 DESN	114	103	102	100	99	102	106	110	114	**119**	120	121	128	**2029**
Erindale TS T5/T6 DESN	195	142	141	139	137	145	153	163	172	182	193	**196**	230	**2031**

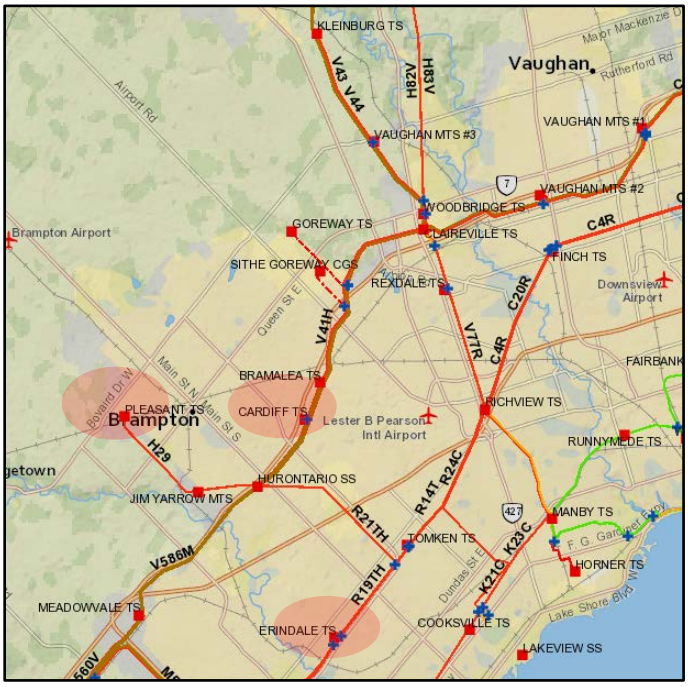

Figure 7-4 GTA West Region - Pleasant TS, Cardiff TS and Erindale TS

Options for providing the required relief for Erindale TS T1/T2 DESN were previously investigated in 2015 Local Planning Report for Erindale TS [4]. As discussed in the 2019 GTA West Region NA Report [2], this need is being managed by Alectra and no transmission upgrades are required.

The loading issues at the Pleasant TS T1/T2 DESN, Cardiff TS T1/T2 DESN, and the Erindale TS T5/T6 DESN are similar to those of Erindale T1/T2 DESN. The TWG recommends that these loading issues be managed at the Distribution level in the near term and it will be reviewing the station loadings in the next regional planning cycle.

7.5 Asset Replacement for Major HV Transmission Equipment

As discussed in Section 6.3, Hydro One has identified the need for replacement of major HV transmission assets over the next ten years at a number of GTA West Region Hydro One stations – Palermo TS, Bramalea TS, Tomken TS and Lorne Park TS –. Palermo TS T3/T4 replacement is discussed in section 7.1.

Details of thework at the remaining stations along with their planned in-service year are given in Table 7-4 below:

Table 7-4 GTA West Region – Asset Replacement Plans

No.	Station	Planned work	In-service year(1)
1	Bramalea TS	The work includes replacement of the 230/44kV, 50/83MVA transformers, T3 and T4 with larger size 230/44kV, 75/125MVA units.	2028
2	Tomken TS	The work includes like-for-like replacement of 230/44 kV, 75/125 MVA transformers T1 and T2.	2029
3	Lorne Park TS	The work includes like-for-like replacement of 230/27.6 kV, 50/83MVA transformer T2.	2030

(1) The planned in-service year is tentative and is subject to change

The above asset replacement plans have taken “right sizing” into consideration. Based on the load forecast, Bramalea TS T3/T4 transformers will be replaced with larger size 75/125MVA units as the load forecast indicates that increased capacity would be required by 2036. The Lorne Park TS T2 transformer is planned to be replaced with “like-for-like” 50/83MVA units and Tomken TS T1/T2 transformers will be replaced with “like-for-like” 75/125MVA units (which is the largest standard size for these transformers).

The TWG recommends that Hydro One proceed with the above work to ensure that the system meet reliability criteria and supply to customers is not affected.

7.6 Load Security – 230 kV circuits T38B/T39B

7.6.1 Load Security

As discussed in Section 6.4.1 loads connected to the 230 kV circuits T38B/T39B will exceed the 600 MW by summer 2030. The circuit T38B/T39B will not be able to meet the ORTAC supply security criteria, which states that no more than 600 MW can be interrupted by configuration.

7.6.2 Alternatives and Recommendations

There were a number of alternatives suggested in the IRRP to ensure compliance with the ORTAC load security criteria. These included sectionalizing the T38B/ T39B circuits using breakers or re-terminating the stations to reduce loads connected to the T38B/T39B circuits. However, as per the current forecast, load is not expected to exceed 600 MW till summer 2030 due to the lower than expected load at Halton TS and Milton Hydro supplying some of the projected area load from the upsized Palermo TS.

The TWG recommends that Hydro One continue to monitor the load and that it wll review the the need the next regional planning cycle.

7.7 Load Restoration

Load restoration following outages was discussed in Section 6.4.2 As mentioned, there are a number of lines that do not meet the IESO criteria of the restoration of all load above 250 MW in 30 minutes.

However, given the high cost for mitigation measures, the low probability of the event happening and the ability to restore load within 4 hours, the TWG agrees that no further action is required.

7.8 Long Term Considerations

7.8.1 Capacity needs for 2032-2041

A number of capacity needs were identified in Section 6 over the longer term. These are summarized here.

1. Line capacity – Loading on a small 300m section of the T38B/T39B line, between Lantz Jct and Trafalgar DESN, will exceed the line rating by 2033.
2. Station Capacity – The following stations are expected to require relief:

- Jim Yarrow MTS: T3/T4 DESN - 2032
- Kleinburg TS: T1/T2 (27.6 kV) - 2032
- Goreway TS: T5/T6 DESN - 2034
- Bramalea TS: T3/T4 DESN – 2036[4]
- Tremaine TS: T1/T2 DESN - 2039

The TWG will be reviewing these needs in the next regional planning cycle.

7.8.2 Long-Term Growth & NWGTA Electricity Corridor Need

The 2015 GTA West RIP had indicated the need for a new transmission corridor connecting Milton TS in the west to Kleinburg TS in the east. The corridor was proposed to provide the necessary transmission infrastructure required to support the load growth expected in the in northern part of the GTA West region as a result of the Provincial Government growth plans.

The Ministry of Energy and the Independent Electricity System Operator (IESO) have been working on the proposal to identify and protect a corridor of land for the future transmission corridor [5]

The TWG supports the initiative for the development of the new corridor as it will be essential to meet the future area growth. The progress of corridor development will be reviewed in the next regional planning cycle.

[4] This need will be addressed by the planned replacement of Bramalea TS T3 and T4 230/44kV, 50/83MVA transformers in 2028 with larger size 75/125MVA units.

8. CONCLUSIONS

THIS REGIONAL INFRASTRUCTURE PLAN REPORT CONCLUDES THE REGIONAL PLANNING PROCESS FOR THE GTA WEST REGION.

The major infrastructure investments recommended by the Technical Working Group (TWG) in the near and medium-term planning horizon (2021-2031) are provided in Table 8-1 below, along with their planned in-service dates and budgetary estimates for planning purposes.

Table 8-1 Recommended Plans in Toronto Region over the Next 10 Years

No.	Need	Recommended Action Plan	Lead	Timing	Budgetary Estimates[1]
1	Palermo TS: Transformers T3 and T4 replacement. Also increased capacity required for Milton Hydro	Replace existing transformers with larger 75/125MVA units and modify/upgrade existing LV switchyard	Hydro One	2026	$30M
2	Relief required for H29/H30 line supplying Pleasant TS	Reconductor line to meet expected load demand	Hydro One	2027	$8M
3	Section of R19TH/R21H overloaded under certain outage conditions	Review Mitigation[2]	Hydro One	2030	TBD[3]
4	Station loading exceeds LTR • Pleasant TS: T1/T2 DESN • Erindale TS: T1/T2 DESN • Cardiff TS: T1/T2 DESN • Erindale: T5/T6 DESN	Balance load between DESNs	Alectra/ Hydro One	 2027 2028 2029 2031	TBD[3]
5	Asset Replacement: • Bramalea TS • Tomken TS • Lorne Park TS	Refurbish/replace major high voltage transmission equipment	Hydro One	 2028 2030 2030	 $20M $49M $14M
6	T38B/T39 Loading exceed load security criteria	Review Mitigation[2]	Hydro One	2030	TBD[3]

[1] Excludes cost for distribution infrastructure.

[2] The IRRP had proposed alternatives for mitigation. The alternatives and project timing will be reviewed and finalized in the next regional planning cycle.

[3] TBD – To be determined. The costs will depend on the alternative selected and therefore are not available at this time.

The GTA West TWG recommends that:

- Hydro One and LDCs to continue with the implementation of infrastructure investments listed in Table 8-1.
- All the other identified needs/options will be further reviewed by the TWG in the next regional planning cycle.

The next regional planning cycle for the GTA West Region must be triggered within five years, beginning with the Needs Assessment (“NA”) phase. It is expected that the next NA will start in Q1 2024. If a need(s) emerges before this time, the next regional planning cycle can be started earlier to address the need(s).

9. REFERENCES

[1] GTA West Integrated Regional Resource Plan, July 2021

[2] Needs Assessment Report GTA West, May 2019

[3] GTA West Regional Infrastructure Plan - January 25, 2016

[4] Local Planning Report – Erindale TS T1/T2 DESN Capacity Relief, July, 2015

[5] Proposal for NWGTA Transmission Corridor - Revised Study November 18, 2020

APPENDIX A. GTA WEST REGION - STATIONS

Station (DESN)	Voltage (kV)	Supply Circuits
Bramalea TS T1/T2	230/27.6	V41H/V42H
Bramalea TS T3/T4	230/44	V41H/V42H
Bramalea TS T5/T6	230/27.6	V41H/V42H
Cardiff TS T1/T2	230/27.6	V41H/V42H
Churchill Meadows TS T1/T2	230/44	R19TH / R21TH
Cooksville TS T1/T2	230/27.6	B16C/K21C
Cooksville TS T3/T4	230/27.6	B16C/K21C
Erindale TS T1/T2	230/27.6	R14T / R17T
Erindale TS T3/T4	230/44	R14T / R17T
Erindale TS T5/T6	230/44	R19TH / R21TH
Glenorchy MTS#1	230/27.6	T36B / T37B
Goreway TS (T1/T2, T5/T6)	230/27.6	V42H / V43
Goreway TS T5/T6	230/27.6	V42H / V43
Goreway TS T4	230/44	V43
Jim Yarrow MTS T1/T2	230/27.6	R19TH / R21TH
Halton Hills Hydro MTS	230/27.6	T38B/T39B
Halton TS T3/T4	230/27.6	T38B/T39B
Kleinburg TS T1/T2	230/27.6	V43/V44
Kleinburg TS T1/T2	230/44	V43/V44
Lorne Park TS T1/T2	230/27.6	B15C / B16C
Meadowvale TS T1/T2	230/27.6	T38B / T39B
Oakville TS # 2 T1/T2	230/27.6	B15C / B16C
Oakville TS # 2 T5/T6	230/27.6	B15C / B16C
Palermo TS T3/T4	230/27.6	T36B / T37B
Pleasant TS T1/T2	230/44	H29 / H30
Pleasant TS T5/T6	230/27.6	H29 / H30
Pleasant TS T7/T8	230/27.6	H29 / H30
Tomken TS (T1/T2)	230/44	R14T/R17T
Tomken TS (T3/T4)	230/44	R19TH/R21TH
Trafalgar TS T1/T2	230/27.6	T38B/T39B
Tremaine TS T1/T2	230/27.6	T38B/T39B

APPENDIX B. GTA WEST REGION - TRANSMISSION LINES

No.	Circuit ID	From Station	To Station	Voltage (kV)
1	H29/H30	Hurontario SS	Pleasant TS	230
2	R14T/R17T	Richview TS	Trafalgar TS	230
3	R19TH/R21TH	Richview TS	Trafalgar TS/ Hurontario SS	230
4	T36B/T37B	Trafalgar TS	Burlington TS	230
5	T38B/ T39B	Trafalgar TS	Burlington TS	230
6	V41H/V42H	Claireville TS	Hurontario SS	230
7	V43/V44	Claireville TS	Kleinburg TS	230
8	B15C/B16C	Cooksville TS	Oakville TS	230
9	K21C/K23C	Manby TS	Cooksville TS	230
10	R24C	Richview TS	Cooksville TS	230

APPENDIX C. GTA WEST REGION - DISTRIBUTORS

Distributor Name	Station Name	Connection Type
Alectra Utilities Corporation	Bramalea TS	Tx / Dx
	Cardiff TS	Tx
	Churchill Meadows TS	Tx
	Cooksville TS	Tx
	Erindale TS	Tx
	Goreway TS	Tx
	Jim Yarrow MTS	Tx
	Kleinburg TS	Tx
	Lorne Park TS	Tx
	Meadowvale TS	Tx
	Oakville TS#2	Dx
	Pleasant TS	Tx
	Tomken TS	Tx
Distributor Name	**Station Name**	**Connection Type**
Burlington Hydro	Palermo TS	Tx
	Tremaine TS	Tx
Distributor Name	**Station Name**	**Connection Type**
Halton Hills Hydro Inc.	Halton TS	Tx / Dx
	Halton Hills MTS	Tx
	Pleasant TS	Dx
Distributor Name	**Station Name**	**Connection Type**
Hydro One Networks Inc.	Bramalea TS	Tx
	Halton TS	Tx
	Oakville TS #2	Tx
	Palermo TS	Tx
	Pleasant TS	Tx
	Trafalgar TS	Tx
Distributor Name	**Station Name**	**Connection Type**
Milton Hydro	Halton TS	Tx
	Palermo TS	Dx
	Tremaine TS	Tx
Distributor Name	**Station Name**	**Connection Type**
Oakville Hydro Electricity Distribution Inc.	Glenorchy MTS#1	Tx
	Oakville TS#2	Tx
	Palermo TS	Tx
	Trafalgar TS	Dx

APPENDIX D. GTA WEST REGION - STATIONS LOAD FORECAST

GTA West Non-Coincident Station Load Forecast (MW)

Station	DESN ID	Bus ID	LTR (MW)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Bramalea TS	**T1/T2**	BY (27.6 kV)	185	103	128	97	96	98	101	101	101	102	103	105	107	108	109	111	112	113	114	114	115	116	116	117
	T3/T4	JQ (44kV)	106	110	95	103	102	101	100	100	100	99	100	101	102	103	104	105	106	106	107	108	108	109	110	110
	T5/T6	EZ (44kV)	159	92	86	98	101	100	99	99	100	100	100	101	102	102	103	104	105	105	106	106	106	107	107	107
Bramalea TS Total			450	305	309	297	299	299	300	299	300	301	303	307	310	313	316	320	322	324	326	328	330	331	333	335
Cardiff TS	**T1/T2**	BQ (27.6 kV)	114	102	89	103	102	100	99	102	106	110	114	119	120	121	122	124	124	125	125	126	126	127	127	128
Churchill Meadows TS	**T1/T2**	BY (44kV)	173	107	110	106	105	103	102	101	101	101	101	102	104	105	107	108	109	110	111	112	113	114	115	116
Cooksville TS	**T1/T2**	EZ (27.6kV)	120	47	44	51	50	49	53	56	58	62	66	67	68	69	70	71	72	72	73	73	74	74	75	76
	T3/T4	JQ (27.6 kV)	120	60	63	59	59	62	66	70	72	72	72	72	73	74	75	76	77	78	78	79	80	80	81	81
Cooksville TS Total			239	107	107	110	109	112	119	126	130	134	138	140	141	143	145	147	149	150	151	152	153	155	156	157
Erindale TS	**T5/T6**	BJ (44kV)	195	116	154	142	141	139	137	145	153	163	172	182	193	196	198	201	203	205	206	217	227	228	229	230
	T1/T2	EQ (27.6 kV)	181	153	178	142	147	151	156	162	168	175	182	190	192	195	197	200	202	203	205	207	208	209	210	211
	T3/T4	ZY (44kV)	193	129	156	139	141	142	144	143	143	144	144	146	147	150	152	154	155	157	158	159	161	162	163	164
Erindale TS Total			569	398	488	424	429	432	438	449	464	483	498	518	532	540	547	554	560	565	569	582	596	599	602	605
Glenorchy MTS #1	**T1/T2**	JQ (27.6 kV)	153	55	62	74	95	103	106	113	118	123	127	129	132	134	137	99	102	104	106	105	105	105	105	105
Goreway TS	**T1/T2**	JQ (27.6 kV)	184	60	73	53	54	58	61	65	69	72	75	78	79	81	82	84	85	86	87	88	88	89	90	91
	T4	M36 (44kV)	78	27	26	22	21	20	19	19	19	19	19	19	20	20	20	21	21	21	21	21	21	21	21	22
	T5/T6	BY (27.6 kV)	173	160	173	153	152	152	152	153	155	157	159	162	165	168	170	173	174	175	176	177	178	178	179	180
Goreway TS Total			435	247	272	228	228	230	233	237	243	248	253	259	264	269	273	277	279	282	284	285	287	288	290	292
Halton Hills MTS	**T1/T2**	(27.6	83	8	3	18	18	18	30	33	38	30	35	43	54	66	79	45	52	52	52	53	53	53	53	54
Halton TS	**T3/T4**	JQ (27.6 kV)	186	160	151	153	144	150	155	158	161	161	160	163	163	163	163	164	164	163	163	164	164	163	163	163
Halton TS#2	**T1/T2**	(blank)	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89	97	107	116	125	136	148	160	174
Jim Yarrow MTS	**T1/T2**	AB (28kV)	157	124	138	135	135	133	134	137	140	143	146	149	153	156	159	162	163	164	166	166	167	168	168	169
Kleinburg TS	**T1/T2**	JQ (44kV)	99	84	89	83	83	83	82	83	83	83	84	84	83	83	84	84	84	83	85	85	85	85	85	85
	T1/T2	BY (27.6 kV)	97	60	65	59	58	59	68	80	80	80	80	80	80	79	99	99	99	100	100	100	100	100	100	100
Kleinburg TS Total			196	144	154	142	141	142	151	163	163	163	164	164	163	163	183	182	182	183	184	184	184	184	184	184

Station	DESN ID	Bus ID	LTR (MW)	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Lorne Park TS	T1/T2	BJ (27.6 kV)	137	78	109	83	87	89	89	88	88	88	88	89	90	91	93	94	95	96	96	97	98	99	99	100
Meadowvale TS	T1/T2	EZ (44kV)	181	112	152	119	118	121	124	128	132	136	136	137	138	140	142	144	145	146	148	149	150	151	152	154
Oakville TS #2	T1/T2	EZ (27.6 kV)	175	139	145	160	159	157	155	155	154	154	154	155	156	156	157	158	158	158	159	159	159	160	160	160
Palermo TS	T3/T4	BY (27.6 kV)	180	113	129	125	115	113	113	112	112	129	133	134	135	137	139	141	142	144	146	147	149	151	153	155
Pleasant TS	T1/T2	JQ (44K)	148	113	128	138	142	147	147	147	148	149	150	151	152	154	155	156	157	159	160	160	161	161	162	163
	T5/T6	BY, EZ (27.6 kV)	181	165	182	154	154	154	154	155	156	156	157	158	160	161	162	163	164	165	166	167	168	168	169	170
	T7/T8	FV (27.6 kV)	188	89	128	90	90	90	95	102	110	117	124	130	137	144	150	157	159	161	163	164	165	166	166	168
Pleasant TS Total			517	367	438	383	387	391	396	404	413	422	431	440	449	459	468	477	481	485	489	491	493	495	497	500
Tomken TS	T1/T2	BY (44kV)	164	162	111	129	128	126	124	123	123	123	123	125	126	135	144	153	154	155	157	158	159	160	162	163
	T3/T4	EZ (44kV)	183	105	130	127	126	124	122	121	121	121	121	123	124	126	128	129	137	146	154	155	156	157	159	160
Tomken TS Total			347	267	241	257	253	249	247	245	245	244	245	247	251	261	271	282	292	301	310	313	315	318	320	323
Trafalgar TS	T1/T2	BY (27.6 kV)	124	68	76	107	106	105	104	103	103	103	103	103	103	103	103	104	104	103	103	103	103	103	103	103
Tremaine TS	T1/T2	BY (27.6 kV)	189	71	112	126	130	136	142	144	146	148	150	152	155	159	163	168	173	178	183	183	189	192	196	196
Customer #1 CTS	T1/T2	BY (27.6 kV)	83	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Total			4868	3002	3314	3184	3188	3213	3266	3327	3388	3450	3510	3578	3643	3710	3796	3866	3923	3972	4018	4056	4101	4137	4174	4212

Notes:

- Load forecast is based on the IESO July 2021 IRRP forecast and adjusted for input provided by Alectra, Milton Hydro and Hydro One Distribution..
- Halton TS# 2 is assumed to be in service in 2033

APPENDIX E. LIST OF ACRONYMS

Acronym	Description
A	Ampere
BES	Bulk Electric System
BPS	Bulk Power System
CDM	Conservation and Demand Management
CIA	Customer Impact Assessment
GS	Generating Station
CTS	Customer Transformer Station
DESN	Dual Element Spot Network
DER	Ditributed Energy Resource
DG	Distributed Generation
DSC	Distribution System Code
GS	Generating Station
GTA	Greater Toronto Area
HV	High Voltage
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Plan
kV	Kilovolt
LDC	Local Distribution Company
LP	Local Plan
LTE	Long Term Emergency
LTR	Limited Time Rating
LV	Low Voltage
MTS	Municipal Transformer Station
MW	Megawatt
MVA	Mega Volt-Ampere
MVAR	Mega Volt-Ampere Reactive
NA	Needs Assessment
NERC	North American Electric Reliability Corporation
NGS	Nuclear Generating Station
NPCC	Northeast Power Coordinating Council Inc.
NUG	Non-Utility Generator
OEB	Ontario Energy Board
OPA	Ontario Power Authority
ORTAC	Ontario Resource and Transmission Assessment Criteria
PF	Power Factor
PPWG	Planning Process Working Group
RIP	Regional Infrastructure Plan
ROW	Right-of-Way
SA	Scoping Assessment
SIA	System Impact Assessment
SPS	Special Protection Scheme
SS	Switching Station
TS	Transformer Station
TSC	Transmission System Code
UFLS	Under Frequency Load Shedding
ULTC	Under Load Tap Changer
UVLS	Under Voltage Load Rejection Scheme