

An aerial photograph of a large lake surrounded by a dense forest. The sky is a mix of orange and yellow, suggesting a sunset or sunrise. The water reflects the sky and the surrounding trees. The forest is a mix of green and yellow, indicating some trees are starting to change color.

**LOCAL PLANNING REPORT**  
**East Lake Superior**  
**Transformation Capacity – Anjigami TS &**  
**Hollingsworth TS Area**

**Date: February 27, 2026**

**Local Planning Report**  
**East Lake Superior**  
**Transformation Capacity - Anjigami TS &**  
**Hollingsworth TS Area**  
**Date: February 27, 2026**

Lead Transmitter:

Hydro One Networks Inc. for Hydro One Sault Ste. Marie

Prepared by: East Lake Superior Technical Working Group



This report is prepared on behalf of the East Lake Superior Local Planning technical working group with the participation of representatives from the following organizations:

Name of TWG Participants
Algoma Power Inc.
Hydro One Networks Inc. (Transmission) for Hydro One Sault Ste. Marie

Page intentionally left blank

## Disclaimer

This Local Planning (LP) Report was prepared for the purpose of developing wires-only options and recommending a preferred solution(s) to address the local needs identified in the Needs Assessment (NA) report for the East Lake Superior Region that do not require further coordinated regional planning. The preferred solution(s) that have been identified through this Local Planning Report may be reevaluated based on the findings of further analysis. The load forecast and results reported in this Local Planning Report are based on the information and assumptions provided by the Technical Working Group participants. Updates may be made based on best available information throughout the planning process.

The TWG participants, their respective affiliated organizations, and Hydro One Networks Inc. (collectively, “the Authors”) shall not, under any circumstances whatsoever, be liable to each other, to any third party for whom the Local Planning Report was prepared (“the Intended Third Parties”) or to any other third party reading or receiving the Local Planning Report (“the Other Third Parties”). The Authors, Intended Third Parties and Other Third Parties acknowledge and agree that: (a) the Authors make no representations or warranties (express, implied, statutory or otherwise) as to this document or its contents, including, without limitation, the accuracy or completeness of the information therein; (b) the Authors, Intended Third Parties and Other Third Parties and their respective employees, directors and agents (the “Representatives”) shall be responsible for their respective use of the document and any conclusions derived from its contents; (c) and the Authors will not be liable for any damages resulting from or in any way related to the reliance on, acceptance or use of the document or its contents by the Authors, Intended Third Parties or Other Third Parties or their respective Representatives.

## Executive Summary

<b>REGION</b>	East Lake Superior Region (the “Region”)		
<b>LEAD</b>	Hydro One Networks Inc. (“HONI”)		
<b>START DATE:</b>	February, 2025	<b>END DATE:</b>	February 27, 2026

The purpose of this Local Planning (LP) report is to develop and assess wires-only options and recommend a preferred transmission solution to address the Transformation capacity need identified in the Third Cycle Needs Assessment (NA) Report (October 2024) and Scoping Assessment (SA) report (January 2025) for the East Lake Superior (ELS) Region. This report has been developed in accordance with the regional planning process set out in the Ontario Energy Board’s (OEB), Transmission System Code (TSC) and Distribution System Code (DSC), as well as the guidelines outlined in the Planning Process Working Group (PPWG) Report to the Board.

The capacity needs in the Hollingsworth TS and Anjigami TS areas are considered local and are addressed in this report. Based on the reference load forecast and the recent System Impact Assessment (SIA) application for a 25 MW load increase, the Hollingsworth T2 transformer is expected to exceed its continuous rating. In addition to the transformer overload, existing switches at Hollingsworth TS impose more restrictive capacity limits than the transformer itself and require replacement. Furthermore, bus ratings at Hollingsworth TS become more limiting than the T2 transformer rating when ambient temperatures exceed 22°C. This report has been developed to address the transformation capacity and equipment limitations at Hollingsworth TS.

Under the high growth load forecast, Circuit Limer No. 1 and Anjigami No. 1 are projected to exceed their continuous and Long-Term Emergency (LTE) ratings. Additionally, the Anjigami T1 transformer is expected to exceed its rating. This appears as a result from low voltages at the end of Circuit No. 4, which cause increased reactive power flow during a contingency event involving a loss of supply from Hollingsworth TS. Based on the region’s net load forecast, Anjigami T1 overload appears in 2041 winter forecast and Limer No.1 and Anjigami No.1 44 kV circuits overload occur in 2043 summer forecast. Refer to section #2 for more details.

The long-term solution to address load growth in the Hollingsworth and Anjigami local area is a new load serving station at/or near existing Highway 101 Switching Station.

In the interim, a demand management procedure and opening breaker 993 has been implemented to mitigate potential overloads on the Hollingsworth T2 transformer, disconnect switches and BUS1 ratings. The switches and BUS1 at Hollingsworth TS are being upgraded. After 2031, API is expected to be the sole load on the 44kV pocket. API will also consider the option of load management for larger load customers if the load grows sooner than anticipated. The Technical Working Group (TWG) will continue to monitor

load growth in the area and will initiate recommended plans if load materializes as forecasted. A new station typically takes 3-5 years to construct.

**Table 1: Near/Mid-term solution to address the local need**

Need Description	Recommended Plan/Update	Lead Responsibility	Timeframe
<b>Station Capacity Needs</b>			
Hollingsworth TS – Transformer, switches, BUS1 overload	Replace/Install switches and Bus1 at Hollingsworth TS.	HOSSM API	ongoing
Research flow monitoring RAS	Monitor load in the area. TWG to discuss RAS equipment status and flow monitoring in next regional planning cycle.	HONI	ongoing

## Table of Contents

1. INTRODUCTION.....	10
1.1 Study Area and Impacted Local Distribution Company.....	10
2. LOCAL NEEDS ADDRESSED IN THIS REPORT.....	11
2.1 LOAD FORECAST.....	11
2.2 Study Assumptions - Equipment Ratings & Conditions .....	15
2.3 LOCAL NEEDS & FINDINGS .....	16
3. ALTERNATIVES CONSIDERED AND ANALYSIS.....	19
3.1 Alternatives Considered.....	19
3.2 Alternatives Analysis .....	24
3.2.1 Option 1: Uprate & No Reconfiguration - Replace Transformer T2 at Hollingsworth TS with higher ratings .....	24
3.2.2 Option 2: Hollingsworth TS Reconfiguration - Add Transformer T3 (115kV/44kV) at Hollingsworth TS .....	24
3.2.3 Option 3a: Construct a new Transformer Station (115/44kV) to supply existing 44kv load pocket . .....	25
3.2.4 Option 3b: Reconfigure the existing HWY101 SS into a transformer station (115kV/44kV) to supply 44kV load pocket. ....	26
3.2.5 Option 4: Remedial Action Scheme (RAS).....	27
3.2.6 Option 5: Status Quo .....	27
3.3 Comparison of Options .....	28
3.3.1 System Reliability and Operational Issues .....	28
3.3.2 Voltage Performance Analysis .....	28
3.3.3 Thermal Capacity Analysis .....	29
3.3.4 Cost Analysis .....	29
3.3.5 High growth Forecast Analysis.....	29
4. PREFERRED SOLUTION .....	30
5. NEXT STEPS .....	32
6. REFERENCES.....	33

### List of Figures

Figure 1: Anjigami TS and Hollingsworth TS - Single Line Diagram.....	10
Figure 2: Anjigami TS and Hollingsworth TS – Study Area .....	11
Figure 3: Winter Non-Coincident Load Forecast.....	14
Figure 4: Summer Non-Coincident Load Forecast .....	14
Figure 5: Reference Load Forecast – Needs Timeline.....	18
Figure 6: High growth Load Forecast – Needs Timeline .....	18
Figure 7: Option #1 – Single Line Diagram.....	19
Figure 8: Option #2 – Single Line Diagram .....	20
Figure 9: Option #3a – Single Line Diagram .....	21
Figure 10: Option #3b – Single Line Diagram.....	22
Figure 11: proposed location for 3a option .....	25
Figure 12: proposed location for 3b option.....	26
Figure 13: High Growth Scenario– Single Line Diagram .....	30

### List of Tables

Table 1: Near/Mid-term solution to address the local need .....	7
Table 2: Load Forecast – Needs Assessment Winter & Summer .....	12
Table 3: Load Forecast – Reference Forecast for Winter & Summer .....	12
Table 4: Load Forecast – High growth Forecast for Winter & Summer .....	13
Table 5: Winter Ratings:.....	15
Table 6: Summer Ratings: .....	16
Table 7: Needs in the 44kV load pocket .....	17
Table 8: Needs in the 44kV load pocket .....	31
Table 9: Near/Mid-term solution to address the local need .....	32

## 1. INTRODUCTION

As part of the Ontario Energy Board’s (OEB) regional planning process, the Needs Assessment (NA) and Scoping Assessment (SA) for the third regional planning cycle of the East Lake Superior (ELS) region were completed in October 2024 and January 2025, respectively. The study assessed the electricity infrastructure supplying the ELS Region for the ten-year period starting from 2024 and it identified few needs in the area. The study team identified a station capacity need that is emerging in the region, and it was determined that the needs are local in nature and does not require regional coordination.

As outlined in the NA report, Technical Working Group (TWG) recommended Hydro One Networks Inc. (transmission) for Hydro One Sault Ste. Marie (HOSSM) and Algoma Power Inc. (API) collaborate on exploring potential solutions to address the Hollingsworth Transformer Station (TS) and Anjigami TS station capacity needs in the 44kV pocket.

The purpose of this Local Plan (LP) is to assess the load growth in the Hollingsworth TS and Anjigami TS 44kV pocket and ensure the adequate infrastructure is available to meet growing demand. The study team is to develop potential options to address the need and recommend a preferred solution(s). This assessment is based on the information provided by the transmission connected industrial customers (CTS-5 and CTS-6), API and HOSSM.

### 1.1 Study Area and Impacted Local Distribution Company

The transmission and distribution study area for this Local Planning report includes Hollingsworth TS and Anjigami TS, both of which are connected to Wawa TS. Hollingsworth TS is supplied from Wawa TS via the approximately 9.5km 115 kV Hollingsworth No.1 circuit. Anjigami TS connects to wawa TS via a short junction. Hollingsworth TS and Anjigami TS supply the same 44 kV load pocket and are interconnected through the 3.2 km Limer No. 1 44 kV circuit and the 7.1 km Anjigami No. 1 44 kV circuit, with both connections converging at Highway 101 Switching Station (SS). A single-line diagram of the study area is provided below.

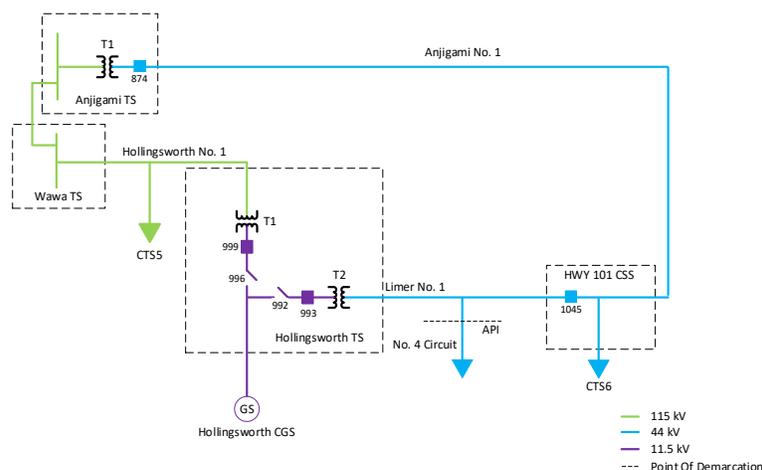


Figure 1: Anjigami TS and Hollingsworth TS - Single Line Diagram

Algoma Power Inc. (API) is the LDC connected radially to the 44 kV load pocket via 45.7 km Circuit No. 4 44 kV circuit. An industrial customer, designated as CTS6, is also connected to this load pocket via a tap from the Highway 101 SS. Under normal operating conditions, API and CTS6 is supplied from both Hollingsworth TS and Anjigami TS. If either transformer station is out of service, the load is supplied solely by the remaining in-service transformer station. Figure 2 below shows the study area.

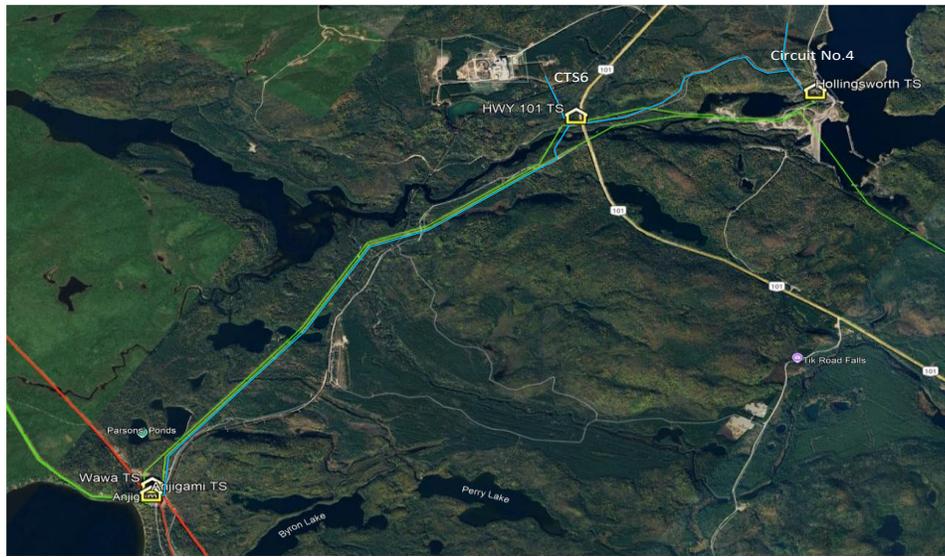


Figure 2: Anjigami TS and Hollingsworth TS – Study Area

## 2. LOCAL NEEDS ADDRESSED IN THIS REPORT

### 2.1 LOAD FORECAST

In accordance with the Regional Planning Process, a Needs Assessment report was completed in October 2024. API provided load forecasts for both winter and summer demand covering the years 2024 to 2033. Additionally, an industrial customer within the same 44 kV load pocket expressed plans to increase its load from approximately 1 MW to 11 MW by 2029.

More recently, API submitted an updated reference load forecast. The same industrial customer has revised its request for a 5MW of temporary load on the 44 kV load pocket between 2026 and 2030. Given the anticipated growth in the area, a study was conducted using two (2) load growth scenarios from 2024 to 2043: a reference forecast and a high growth forecast. The high growth scenario accounts for uncertainties in the load forecast and is intended to identify emerging needs and inform potential system advancement plans.

The historical base line for winter in the year 2023 is 17.3MW. Under the reference load forecast, the combined station's winter load is expected to grow 73.41% by 2027, with growth slowing to 46.82% by

2033. The high growth forecast projects the combined station’s winter load to increase by 68.8% by 2033 and approximately 111% by 2043. Under the reference forecast, until 2030, approximately 93% of the load in the 44 kV pocket is attributed to Circuit No.4, with the remaining 7% assigned to CTS6. Beyond 2030, the entire load is forecasted to shift to Circuit No.4. Detailed load forecasts for Circuit No. 4 and CTS6, including the Needs Assessment (NA) forecast, reference forecast, and high growth forecast, are presented in Tables 2, 3, and 4, and Figures 3 and 4 below.

**NA Forecast - Winter & Summer:**

**Table 2: Load Forecast – Needs Assessment Winter & Summer**

Station/DESN	Historical (MW)			Winter Non-Coincident Net Forecast (MW)									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>No. 4 Circuit</b>	15.0	16.7	16.6	26.5	26.9	27.2	27.5	27.9	28.1	28.3	28.8	29.0	29.4
<b>CTS6</b>	0.7	0.8	0.7	0.8	0.7	0.7	11.5	11.5	11.4	11.4	11.4	11.3	11.3
<b>Total</b>	15.7	17.5	17.3	27.3	27.6	27.9	39	39.4	39.5	39.7	40.2	40.3	40.7

Station/DESN	Historical (MW)			Summer Non-Coincident Net Forecast (MW)									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>No. 4 Circuit</b>	14.6	14.2	15.4	24.9	25.3	25.5	25.7	25.8	26.0	26.2	26.4	26.6	26.8
<b>CTS6</b>	0.3	0.4	0.4	0.4	0.4	0.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7
<b>Total</b>	14.9	14.6	15.8	25.3	25.7	25.9	37.4	37.5	37.7	37.9	38.1	38.3	38.5

**Revised Reference Forecast - Winter & Summer:**

**Table 3: Load Forecast – Reference Forecast for Winter & Summer**

Station/DESN	Historical (MW)			Winter Non-Coincident Net Forecast (MW)									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<b>No. 4 Circuit*</b>	15.0	16.7	16.6	22.8	24.4	24.4	25.4	25.4	25.4	25.3	25.4	25.4	25.4
<b>CTS6</b>	0.7	0.8	0.7	0.8	0.7	1.5	5	4	2	0.5	0	0	0
<b>Total</b>	15.7	17.5	17.3	23.6	25.1	25.9	30.4	29.4	27.4	25.8	25.4	25.4	25.4
				<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>	<b>2043</b>
<b>No. 4 Circuit*</b>				25.3	25.2	25.2	25.3	25.4	25.4	25.5	25.4	25.4	25.5
<b>CTS6</b>				0	0	0	0	0	0	0	0	0	0
<b>Total</b>				25.3	25.2	25.2	25.3	25.4	25.4	25.5	25.4	25.4	25.5

\*No.4 Circuit loading is at the Point of Demarcation\*

Station/DESN	Historical (MW)			Summer Non-Coincident Net Forecast (MW)									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
No. 4 Circuit *	14.6	14.2	15.4	21.4	22.9	22.9	23.9	23.8	23.8	23.7	23.7	23.7	23.8
CTS6	0.3	0.4	0.4	0.8	0.7	1.5	5	4	2	0.5	0	0	0
<b>Total</b>	<b>14.9</b>	<b>14.6</b>	<b>15.8</b>	<b>22.2</b>	<b>23.6</b>	<b>24.4</b>	<b>28.9</b>	<b>27.8</b>	<b>25.8</b>	<b>24.2</b>	<b>23.7</b>	<b>23.7</b>	<b>23.8</b>
				<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>	<b>2043</b>
No. 4 Circuit*				23.9	23.8	23.9	23.9	23.8	23.9	23.9	24.0	24.1	24.2
CTS6				0	0	0	0	0	0	0	0	0	0
<b>Total</b>				<b>23.9</b>	<b>23.8</b>	<b>23.9</b>	<b>23.9</b>	<b>23.8</b>	<b>23.9</b>	<b>23.9</b>	<b>24.0</b>	<b>24.1</b>	<b>24.2</b>

\*No.4 Circuit loading is at the Point of Demarcation\*

**High Growth Forecast - Winter & Summer:**

Table 4: Load Forecast – High growth Forecast for Winter & Summer

Station/DESN	Historical (MW)			Winter Non-Coincident Net Forecast (MW)									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
No. 4 Circuit*	15.0	16.7	16.6	22.8	24.8	25.7	25.9	26.6	27.7	28.5	28.9	29	29.2
CTS6	0.7	0.8	0.7	0.8	0.7	1.5	5	4	2	0.5	0	0	0
<b>Total</b>	<b>15.7</b>	<b>17.5</b>	<b>17.3</b>	<b>23.6</b>	<b>25.5</b>	<b>27.2</b>	<b>30.9</b>	<b>30.6</b>	<b>29.7</b>	<b>29.0</b>	<b>28.9</b>	<b>29.0</b>	<b>29.2</b>
				<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>	<b>2043</b>
No. 4 Circuit*				29.5	30.1	30.9	31.7	32.5	33.3	34.1	34.9	35.7	36.5
CTS6				0	0	0	0	0	0	0	0	0	0
<b>Total</b>				<b>29.5</b>	<b>30.1</b>	<b>30.9</b>	<b>31.7</b>	<b>32.5</b>	<b>33.3</b>	<b>34.1</b>	<b>34.9</b>	<b>35.7</b>	<b>36.5</b>

\*No.4 Circuit loading is at the Point of Demarcation\*

Station/DESN	Historical (MW)			Summer Non-Coincident Net Forecast (MW)									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
No. 4 Circuit *	14.6	14.2	15.4	21.4	23.5	23.9	24.5	25.1	25.7	26.3	26.9	27.5	28.1
CTS6	0.3	0.4	0.4	0.8	0.7	1.5	5	4	2	0.5	0	0	0
<b>Total</b>	<b>14.9</b>	<b>14.6</b>	<b>15.8</b>	<b>22.2</b>	<b>24.2</b>	<b>25.4</b>	<b>29.5</b>	<b>29.1</b>	<b>27.7</b>	<b>26.8</b>	<b>26.9</b>	<b>27.5</b>	<b>28.1</b>
				<b>2034</b>	<b>2035</b>	<b>2036</b>	<b>2037</b>	<b>2038</b>	<b>2039</b>	<b>2040</b>	<b>2041</b>	<b>2042</b>	<b>2043</b>
No. 4 Circuit*				28.7	29.3	29.9	30.5	31.1	31.7	32.3	32.9	33.5	34.1
CTS6				0	0	0	0	0	0	0	0	0	0
<b>Total</b>				<b>28.7</b>	<b>29.3</b>	<b>29.9</b>	<b>30.5</b>	<b>31.1</b>	<b>31.7</b>	<b>32.3</b>	<b>32.9</b>	<b>33.5</b>	<b>34.1</b>

\*No.4 Circuit loading is at the Point of Demarcation\*

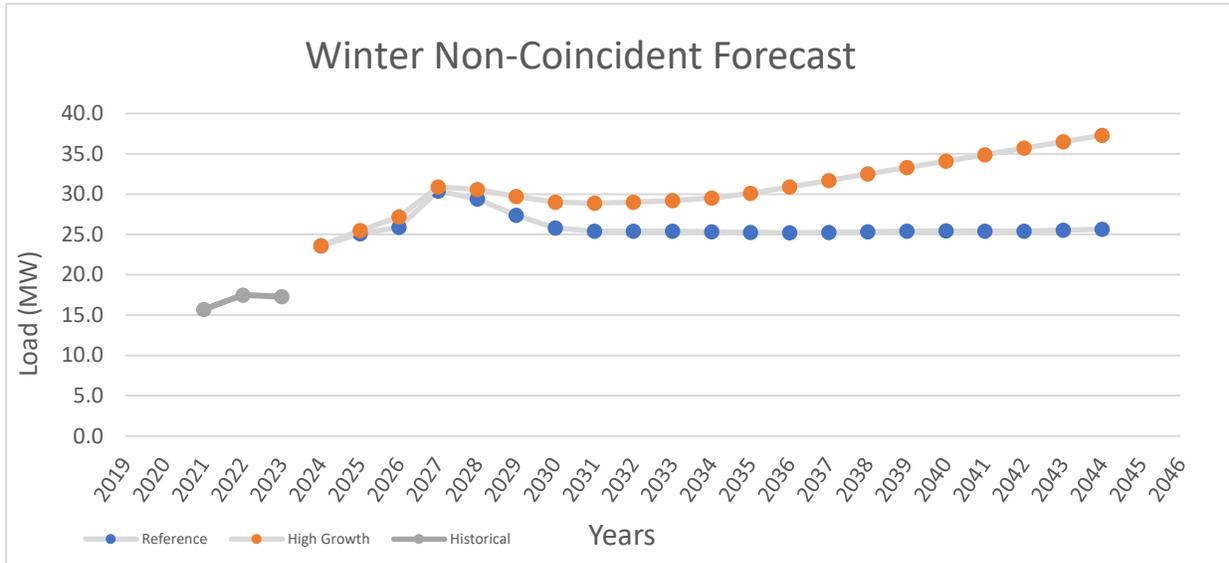


Figure 3: Winter Non-Coincident Load Forecast

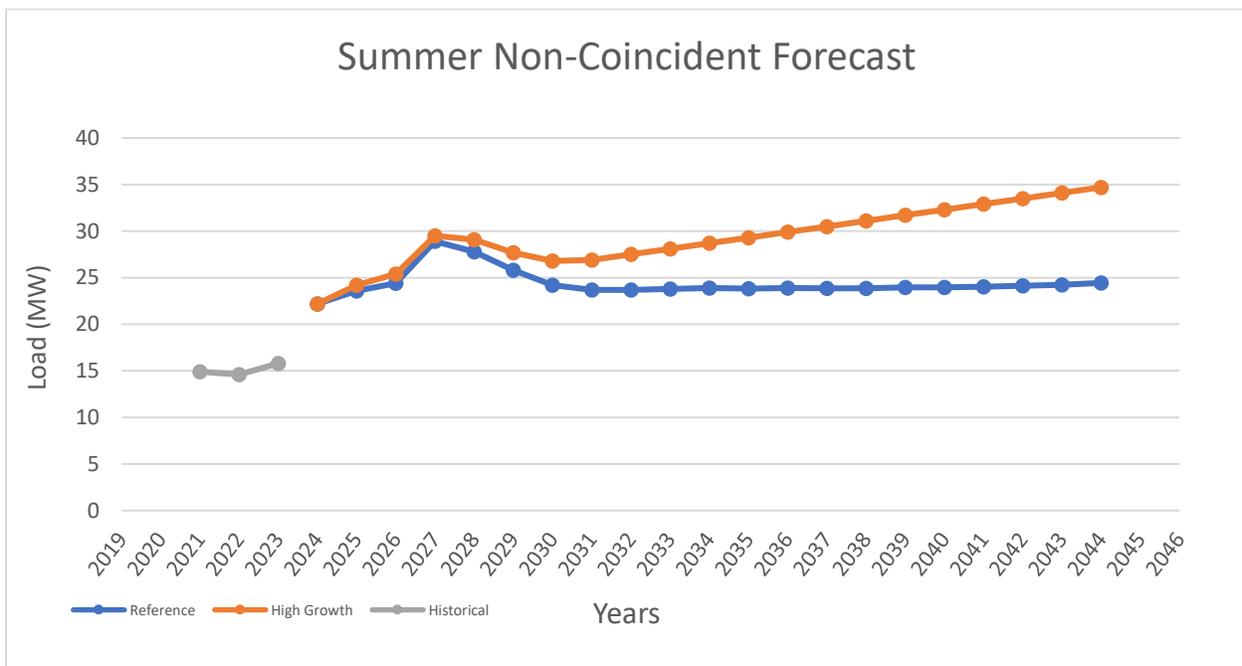


Figure 4: Summer Non-Coincident Load Forecast

## 2.2 Study Assumptions - Equipment Ratings & Conditions

### Study Assumptions

For reference forecast, the load for Circuit No. 4 was modeled to achieve a 90% power factor at the point of demarcation prior to the addition of capacitor support. With the capacitor in service at the end of Circuit No.4, the power factor improves to approximately 98–99% at the point of connection. The load values provided by API in the Circuit No. 4 forecast incorporate a corrected power factor of 98–99% at the point of demarcation. CTS6 was modelled with capacitor support as voltage collapse was observed during contingencies.

For the high-growth forecast scenario, the system was analyzed under the following assumptions:

- 1) The existing system configuration is assumed and the circuit No.4 load is at 25 MW with a 98–99% power factor at the point of demarcation.
- 2) Loading at the end of Circuit No. 4 was increased to meet the forecasted demand at the point of demarcation.
- 3) CTS6 was modelled with capacitor support as voltage collapse was observed during contingencies.

This study reflects the 25 MW load increase identified in SIA 2022-715 and assumes that the capacitors at the end of Circuit No.4 will be in service by 2024. Loads in the nearby vicinity were forecasted through the year 2033, with Hollingsworth CGS assumed to be out of service for the all in-service scenarios. The study also evaluates the thermal loading of circuits, transformers, breakers, and switches as part of the overall assessment.

### Equipment Ratings:

The limiting elements within the 44 kV pocket are Hollingsworth T2, switches, and BUS1 ratings at Hollingsworth TS. Anjigami T1 is not currently equipped with cooling fans; however, its rating can be increased to 53.3 MVA if fans are installed. Hollingsworth T1 can experience similar loading levels as T2 when the Hollingsworth CGS is out of service. Circuit ratings, along with station ratings for Hollingsworth and Anjigami, are provided below in table 5 & 6:

**Table 5: Winter Ratings:**

Transformers	Hollingsworth T1	115kV/11kV Ratings: 21/28MVA (39.4MVA 10 day LTR)
	Hollingsworth T2	11/44kV Ratings: 17/22/28 MVA
	Anjigami T1	115kV/44kV Ratings: 40MVA
Line Ratings	Limer No.1	46.3 MVA Continuous (no LTR)
	Anjigami 44kV circuit	46.3 MVA Continuous (no LTR)

Bus Ratings	Hollingsworth TS BUS 1	30.5 MVA @10degC & 4km/hr wind
-------------	------------------------	--------------------------------

**Table 6: Summer Ratings:**

Transformers	Hollingsworth T1	115kV/11kV Ratings: 21/28MVA (33.7MVA 10 day LTR)
	Hollingsworth T2	11/44kV Ratings: 17/22/28MVA
	Anjigami T1	115kV/44kV Ratings: 40MVA
Line Ratings	Limer No.1	39.7 MVA Continuous (no LTR)
	Anjigami 44kV circuit	39.7 MVA Continuous (no LTR)
Bus Ratings	Hollingsworth TS BUS 1	26.3 MVA @30degC & 4km/hr wind

**Asset Condition Assessment:**

Asset condition assessment is based on a range of considerations such as:

- Equipment deterioration due to aging infrastructure or other factors,
- Technical obsolescence due to outdated design,
- Lack of spare parts availability or manufacturer support, and/or
- Potential health and safety hazards, etc.

Based on asset condition assessments, Hollingsworth TS and Anjigami TS transformers remain in acceptable asset conditions, as a result, there are no investment plans to replace them in the next ten years. However, if any need arises before 10 years, it will be addressed in the next regional planning cycle.

## 2.3 LOCAL NEEDS & FINDINGS

**Reference Forecast:**

Under the existing configuration, where all elements are in service, Hollingsworth TS and Anjigami TS supply the load. During planned or unplanned outages at either station, the remaining station will supply the entire 44 kV load pocket radially. Under the contingency of Anjigami T1 out of service, the transformer, Bus1 and switches in Hollingsworth TS are expected to be overloaded based on forecasted load. Hollingsworth TS switches are expected to be overloaded as early as year 2024. Hollingsworth T2 is expected to reach approximately 98% of continuous rating as early as 2026. The Bus1 and Hollingsworth T2 is expected to be overloaded as early as year 2027. Beyond 2030, the loading on T2 is expected to reach

approximately 98% when Anjigami T1 is out of service. The Hollingsworth T1 has LTR rating and the reference forecast loading is below its LTR rating. When Hollingsworth CGS is out of service, Hollingsworth T1 is expected to experience loading levels similar to Hollingsworth T2. The needs timeline (Figure 5) below illustrates the anticipated system needs over the reference forecast horizon.

**High Growth Forecast:**

Considering the high-growth load forecast, an overload on Hollingsworth T2 could occur as early as 2026. Anjigami T1 may experience an overload in 2041 when it supplies the entire 44 kV load pocket due to an planned or unplanned outage at Hollingsworth TS. As load increases, low voltages at the end of Circuit No. 4, resulting in increased reactive power flow within the 44 kV system and cascading voltage effects on Anjigami TS. Similarly, in 2043, the 44 kV circuits Anjigami No.1 and Limer No.1, are expected to overload when the load is supplied radially from either Anjigami TS or Hollingsworth TS. Low voltages at the end of Circuit No. 4 contribute to increased reactive power flow and a resulting lower power factor. Providing reactive support as load grows can improve voltage levels at the end of Circuit No. 4, thereby enabling greater power flow and offset the overloads. The needs timeline (Figure 6) below illustrates the anticipated system needs over the high growth forecast horizon.

The resulting system needs and constraints are summarized in Table 7. The timeline of needs occurring can be seen in figure 5 & 6.

**Interim Solution:**

Once the total load in the 44 kV pocket exceeds the rating of Hollingsworth T2 28 MVA, operators must take pre-contingency action by opening breaker 993 at Hollingsworth TS. When ambient temperatures exceed 22°C, BUS1 becomes the limiting factor compared to Hollingsworth T2 ratings. Operators are to monitor flow on BUS1. As part of the recent System Impact Assessment (SIA) for the load increase on Circuit No. 4<sup>[1]</sup>, API is required to implement an interim demand management procedure to avoid transformer overloads during planned outages until switches and transformer replacement is completed. In addition, the transmitter must open breaker 993 at Hollingsworth TS as a pre-contingency action when the combined flow exceeds the ratings of the disconnect switches and transformer.

Table 7: Needs in the 44kV load pocket

Forecast	Need
Reference Load Forecast (Near Term)	<ul style="list-style-type: none"> <li>Hollingsworth TS – T2, switches, &amp; Bus 1 Overload</li> </ul>
High growth Load Forecast (Long term)	<ul style="list-style-type: none"> <li>Anjigami TS – Transformer Overload*</li> <li>Anjigami 44kV circuit &amp; Limer No.1 44kV circuit overloaded*</li> </ul>

\*Overload occurs due to low voltages at end of circuit No.4

TimeLine (2025 – 2044) – Transmission System Needs in Anjigami TS / Hollingsworth TS Area – Reference Forecast

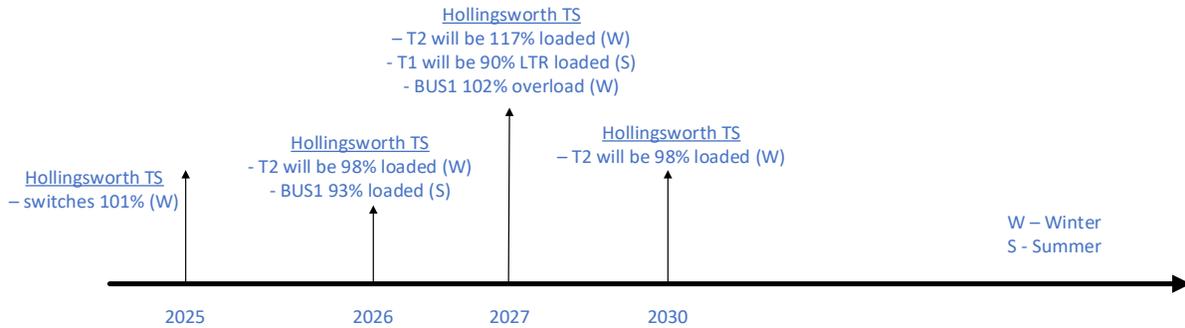


Figure 5: Reference Load Forecast – Needs Timeline

TimeLine (2024 – 2043) – Transmission System Needs in Anjigami TS / Hollingsworth TS Area – Aggressive Forecast

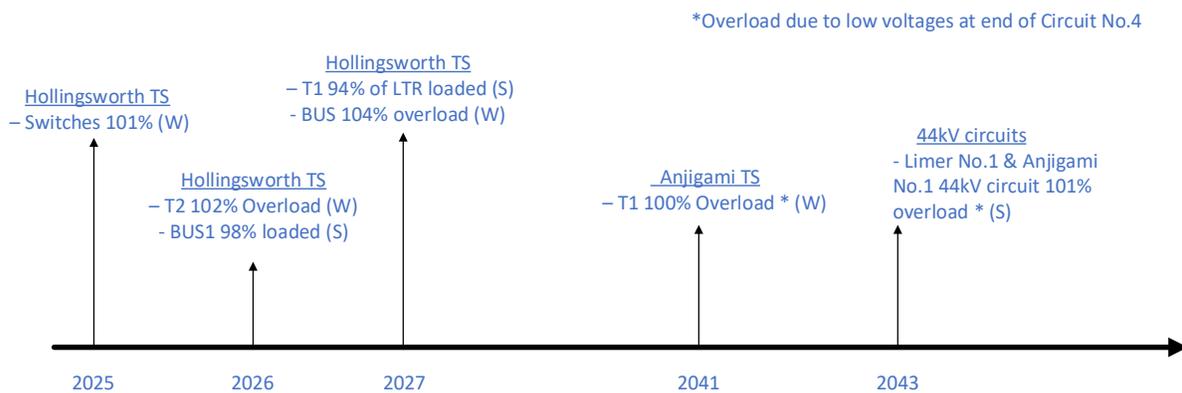


Figure 6: High growth Load Forecast – Needs Timeline

### 3. ALTERNATIVES CONSIDERED AND ANALYSIS

Hydro One Transmission and API collaboratively evaluated several alternatives to mitigate the needs, which are outlined below.

#### 3.1 Alternatives Considered

- **Option 1: Uprate without Reconfiguration - Replace Transformer T2 at Hollingsworth TS with a Higher-Rated Unit**

Under this option, the scope of work includes replacing the existing Hollingsworth T2 transformer with a higher rated one (1) new 44kV/11kV 25/42 MVA transformer. Associated disconnect switches and BUS1 will also be replaced. Implementation of this option may require expansion of existing station footprint, as well as foundation and spill containment upgrades to accommodate the new T2 transformer. The associated disconnect switches “996” and “992” are to be uprated to a minimum of 2000A, and the existing BUS1 1510 AAC conductor is to be replaced with a higher capacity conductor. This option configuration is shown in Figure 7.

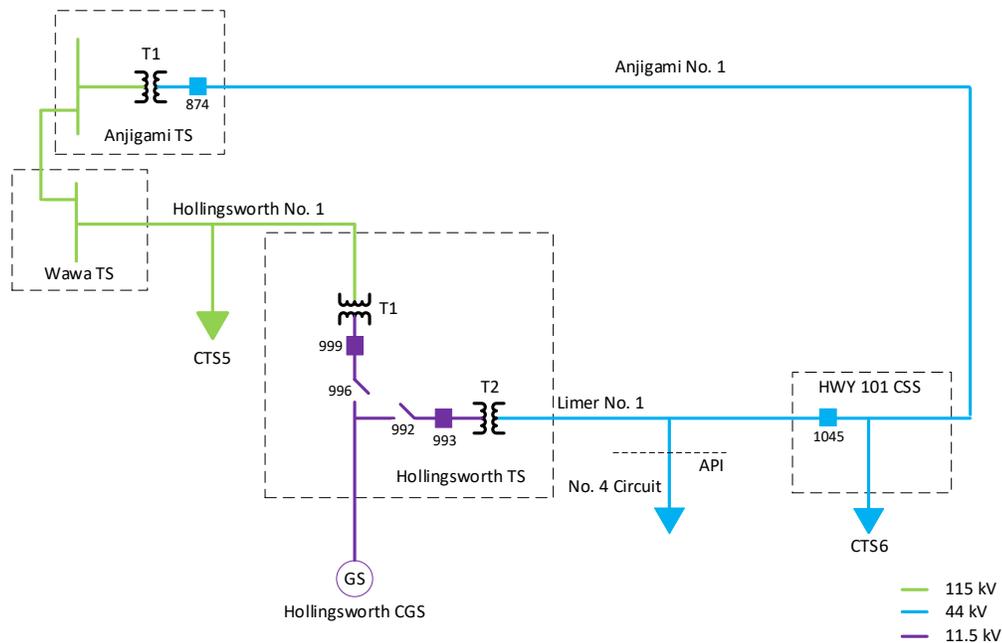


Figure 7: Option #1 – Single Line Diagram

- **Option 2: Hollingsworth TS Reconfiguration - Add Transformer T3 (115kV/44kV) at Hollingsworth TS to increase capacity**

This option addresses the station capacity constraint currently associated with the Hollingsworth T2 by installing a one (1) new higher-rated 115kV/44kV 25/42 transformer, along with associated switches and breaker. Implementation of this alternative requires expanding the existing station footprint to accommodate new T3 transformer. Under this proposed configuration, bus overload and disconnect switches will not be a limiting factor, as the 44 kV pocket will be supplied directly from the new 115/44 kV transformer. A Normally Open (N.O.) point will remain on T2, helping to maintain redundant system access to the generator, as shown in Figure 8.

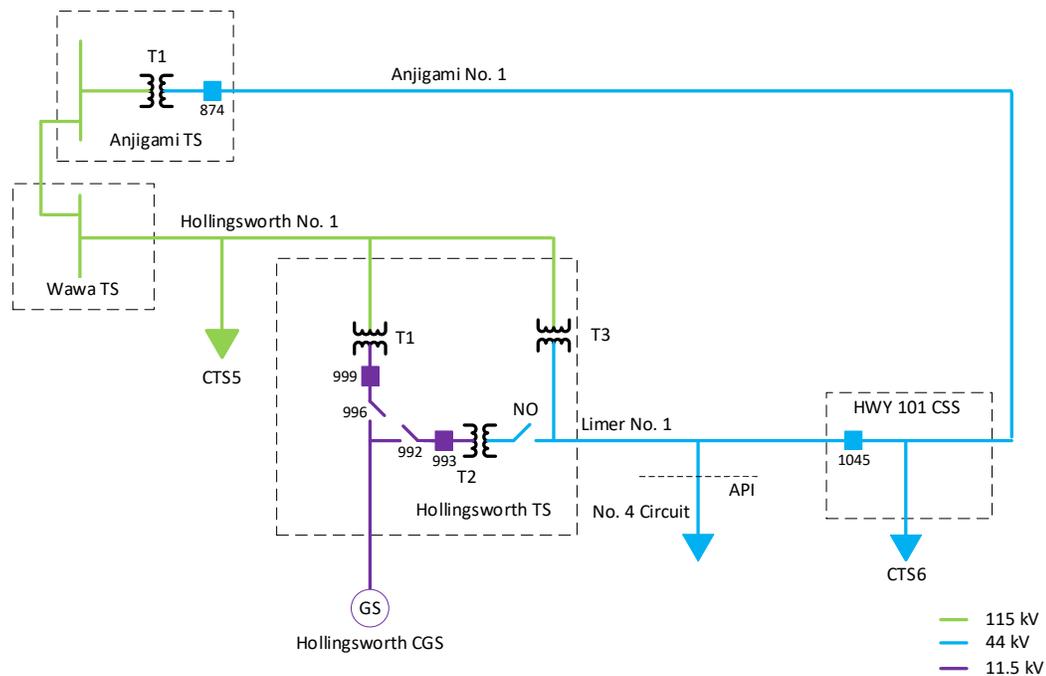


Figure 8: Option #2 – Single Line Diagram

- **Option 3: New Station and Reconfiguration of the 44KV load pocket**

**Option 3a: Construct a new Transformer Station (115/44kV) to supply existing 44kv load pocket**

This alternative involves constructing a new 115kV/44kV 25/33.3/41.7 MVA transformer station, connected via a tap of less than 1km from the Hollingsworth 115 kV circuit. The new station would require associated 44 kV circuit work, protection systems, control equipment, and real estate acquisition. Provision would also be made for a backup mobile transformer connection to ensure continuity of supply in the event that T1 is out of service. The configuration of this option is shown in Figure 9. This station could also serve as a long-term replacement for Anjigami TS in future. A possible location is shown in (Figure 11) and exact location of the station would depend on the feasibility and site assessment.

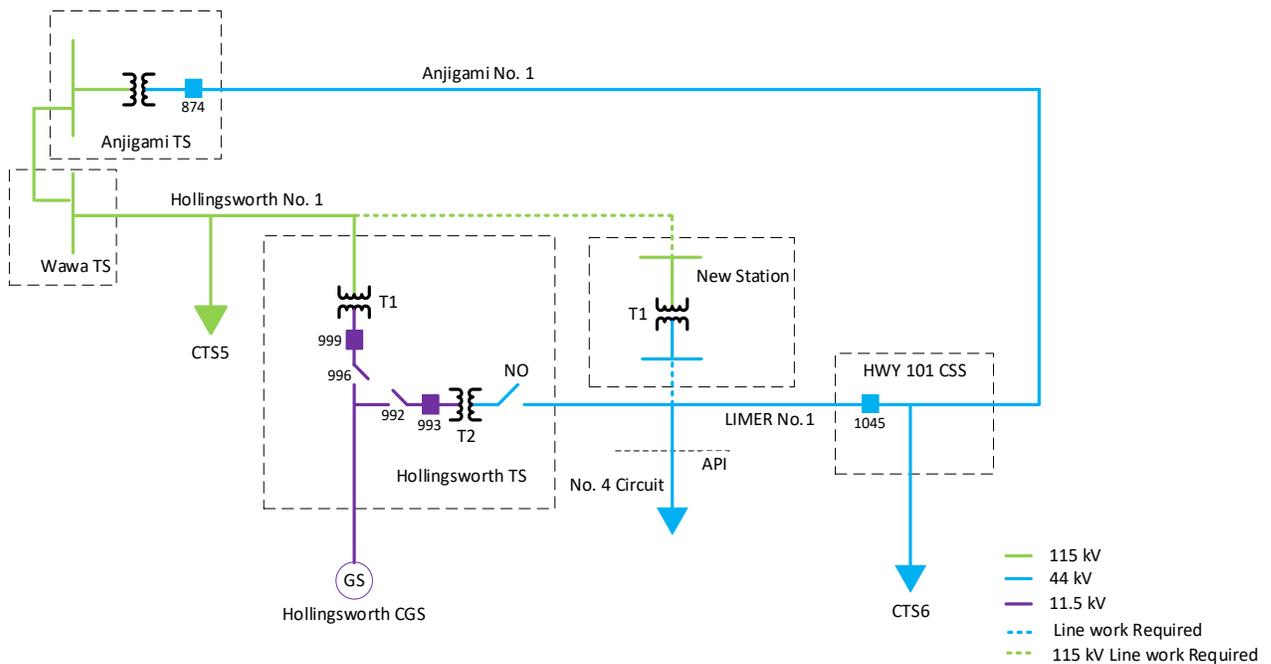


Figure 9: Option #3a – Single Line Diagram

**Option 3b: Reconfigure the existing HWY101 SS into a transformer station (115kV/44kV) to supply 44kV load pocket.**

An alternative to building a new station, this option involves converting the existing HWY101 Switching Station into a transformer station. The proposed configuration would include the installation of one (1) new T1 transformer rated at minimum 115/44 kV, 25/33.3/41.7 MVA, with provisions for backup mobile transformer connectivity. In addition, space would be reserved for a future permanent transformer, providing flexibility to accommodate system growth or redundancy requirements. This configuration is shown in Figure 10. This station could also serve as a long-term replacement for Anjigami TS in future.

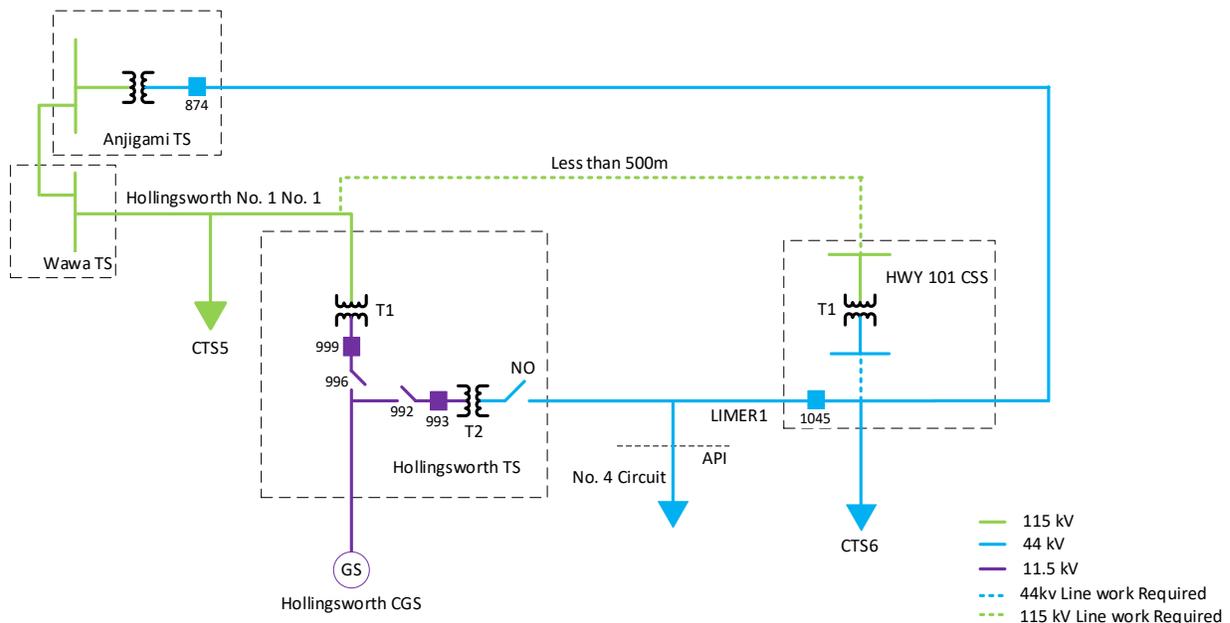


Figure 10: Option #3b – Single Line Diagram

- **Option 4: Remedial Action Scheme (RAS)**

This option involves implementing a Remedial Action Scheme (RAS) to manage the 44kV load pocket in the event of contingency such as loss of supply from Anjigami TS. The scheme would allow selective load rejection in the area to prevent overloading of limiting components at Hollingsworth TS.

- **Option 5: Status Quo**

Under this option, T2 transformer replacement is not undertaken at this time. HOSSM and API are working in conjunction to replace the Hollingsworth TS switches and BUS1, with an anticipated in-service date in 2027 allowing for 28MVA of flow. Until further system needs emerge, no further actions are required. HOSSM and LDC will continue to monitor load growth in the 44kV pocket and follow established operating procedures, including opening breaker 993 as required to mitigate potential overloads. Further review will be undertaken in the next planning cycle of regional planning, or sooner if load growth in the area materializes.

Under this option, API could also consider options with its larger load customers for load management beyond what is currently the outlined load shedding agreement if load does grow sooner than anticipated.

## 3.2 Alternatives Analysis

Options are assessed based on system reliability, transmission adequacy, future station capacity, voltage levels, thermal limitations, cost feasibility, and operational considerations. Additionally, each option is evaluated in context to existing operating procedures and the potential need for Remedial Action Schemes (RAS). Load restoration capability and customer interruption impacts are included as part of the analytical methodology to ensure the selected option supports both system resilience and operational reliability.

### 3.2.1 Option 1: Uprate & No Reconfiguration - Replace Transformer T2 at Hollingsworth TS with higher ratings

This option will meet the capacity requirements based on the reference load forecast at a minimum cost. Steady-state voltage levels comply with all criteria per Ontario Resource and Transmission Assessment Criteria (ORTAC) under n-1 transformer contingency. Replacing T2, BUS1, and associated disconnect switches at Hollingsworth TS would improve thermal loading conditions, enhance system reliability, and increase operational flexibility. This improves the interim solution and minimizes the need for voluntary demand management procedure for planned outage scenarios. Operators may not need to open breaker 993 as a pre-contingency action when combined flows from Anjigami TS and Hollingsworth TS exceed ratings.

However, practical constraints limit the feasibility of this option. The physical size of the new T2 transformer makes in-situ replacement challenging, and the existing station footprint cannot accommodate the required spacing. Expansion is further constrained by ground topography. Additionally, the proposed transformer would be a non-Hydro One standard transformer, potentially requiring a custom spare transformer to mitigate risks associated in event of T2 failure.

### 3.2.2 Option 2: Hollingsworth TS Reconfiguration - Add Transformer T3 (115kV/44kV) at Hollingsworth TS

This alternative addresses the station capacity need based on the reference load forecast by installing a one (1) 115kV/44kV 25/33.3/42 MVA Hydro One standard transformer. Using a standard transformer mitigates challenges typically associated with non-standard units, such as limited spare parts availability.

Under this configuration, thermal limitations of Hollingsworth T2, BUS1 overload, and disconnect switches would no longer constrain the system, as the 44 kV pocket will be supplied directly by the new 115/44 kV transformer, enhancing system efficiency. The voltages meets all steady-state voltage criteria per Ontario Resource and Transmission Assessment Criteria (ORTAC) with n-1 transformer contingency.

Despite these technical benefits, implementation is constrained by site limitations. The existing station footprint lacks sufficient space, and expansion is not feasible due to ground topography. Additional costs would also be incurred for the transformer, associated switches, breakers, bus work, structures, and station expansion.

### 3.2.3 Option 3a: Construct a new Transformer Station (115/44kV) to supply existing 44kv load pocket

This alternative increases supply capacity in the area by constructing a new 115kV/44kV Transformer Station to supply the 44kV load pocket. The existing capacities of Hollingsworth TS (28 MVA) and Anjigami TS (40 MVA), combined with a new station with a minimum 42 MVA capacity, would allow the area to be supplied with a total of 68 MVA under n-1 conditions.

Voltages meet all steady-state criteria per ORTAC under n-1 transformer contingency. This configuration enhances system reliability and operational flexibility by supplying power directly from 115 kV via a station located near Circuit No. 4. Locating the station close to the load minimizes line losses. The exact location would depend on the feasibility of a tap connection to the 115 kV line and ground topography, see figure 11.

Under this configuration, thermal limitations of Hollingsworth T2, BUS1 overload, and disconnect switches will not be a limiting factor under n-1 contingency. However, this option is expected to be the most expensive due to development of line tap 650m from Hollingsworth 115kV circuit, construction of new station and real estate acquisition.



Figure 11: proposed location for 3a option

### 3.2.4 Option 3b: Reconfigure the existing HWY101 SS into a transformer station (115kV/44kV) to supply 44kV load pocket.

This alternative enhances station capacity and ensures that the 44 kV load pocket remains adequately supplied during both planned and unplanned outages. It involves reconfiguring the existing HWY101 Switching Station into a 115 kV/44 kV transformer station. The HWY101 SS is located approximately 2.7 km from Circuit No. 4 Junction and 1.3 km from CTS6. This option is conceptually similar to Option 3a, with a difference of converting an existing switching station rather than constructing a new station. However, due to space limitations adjacent to HWY101 SS, this option is not feasible. An alternative would be to construct a new station on the opposite side of road next to HWY 101 SS.

Voltages meet all steady-state criteria per ORTAC under n-1 transformer contingency. The system reliability and operability would be improved by supplying power directly from 115 kV line tap (380m) via the upgraded station near HWY 101 SS, see figure 12. Thermal limitations of Hollingsworth T2, Bus1, and disconnect switches would no longer constrain the system. Thermal limitations of Hollingsworth T2, BUS1 overload, and disconnect switches will not be a limiting factor.

With simultaneous supply from new station near HWY101 SS and Anjigami TS, the section of the Limer No. 1 circuit (from HWY101 SS to Circuit No. 4 Tap) would carry the full load of circuit No.4. In the current configuration, Circuit No. 4 load is partly supplied from Hollingsworth TS and partly from HWY101 SS. This change may result in a slight increase in system losses and voltage drop compared to a greenfield station located closer to Circuit No. 4. The cost of this option is expected to be similar to Option 3a.



Figure 12: proposed location for 3b option

### 3.2.5 Option 4: Remedial Action Scheme (RAS)

This solution involves implementing a load rejection scheme to address overload resulting from contingencies such as loss of supply from Anjigami TS. Under this alternative, the station capacity at Hollingsworth TS will not be increased, and the overall supply capacity in the 44 kV load pocket remains unchanged. Thermal limitations of Hollingsworth T2, Bus1, and disconnect switches will persist at current levels.

The system's reliability and operational flexibility remain largely unchanged; however, this option improves the interim solution by reducing the need for voluntary demand management procedures during planned outage scenarios. Also, Operators may no longer need to open breaker 993 as a pre-contingency action when the combined flow from Anjigami TS and Hollingsworth TS exceeds ratings, as the RAS will automatically reject load during the contingency.

While this solution avoids the need to uprate limiting components at Hollingsworth TS, customers will experience interrupted service whenever the load rejection is triggered. The implementation cost is expected to be low compared to new station. However, recent new RAS installations are over \$1M. Next Regional Planning cycle will review a possible RAS implementation for equipment status monitoring and explore flow monitoring for RAS schemes.

### 3.2.6 Option 5: Status Quo

Under this alternative, no immediate action is required. The existing overloading issue at Hollingsworth TS is currently managed by opening breaker 993. In cases where the breaker cannot remain open, a voluntary demand management procedure is implemented to reduce load in the area. A temporary 5 MW load from industrial customer CTS6 is forecasted in 2027, which may require breaker 993 to be open for the duration of this peak, resulting in the 44 kV load pocket being supplied solely by Anjigami TS. This will temporarily reduce system reliability. However, considering typical project timelines, all options are expected to be in service after this temporary peak. Thus, avoiding the need to mitigate the CTS6 load directly.

By 2027, the only limiting equipment at Hollingsworth TS will be T2 transformer, while switches and Bus1 are expected to be replaced. The CTS6 load is forecasted to drop to 0 MW by 2031, leaving API as the sole remaining load in the 44 kV pocket. Under these conditions, the T2 transformer is expected to operate at approximately 98% of its rating under contingency. If load demand increases sooner than anticipated, API will consider load management options with large load customers beyond what is outlined in load shedding agreement. HOSSM and API will continue to monitor load growth in the area.

### 3.3 Comparison of Options

Solutions have been identified to address the capacity needs and meet the reference load forecast. Among these, one option would require load rejection to be implemented following a loss of supply from Anjigami TS. It should be noted that, due to space constraints at Hollingsworth TS, Options 1 and 2 may not be feasible for implementation. The Status Quo option remains a viable short-term approach, as system overloads can continue to be managed by opening breaker 993 when required.

#### 3.3.1 System Reliability and Operational Issues

- Option 1: If Hollingsworth T1 is out of service, the supply will be maintained via Hollingsworth CGS through T2 and Anjigami TS, preserving system operability.
- Options 2 and 3: These alternatives enhance the reliability of the 44 kV load pocket by providing transformation directly from 115 kV to 44 kV. By removing the existing 11kV intermediate transformation stage, Options 2 and 3 reduce dependency on the 11 kV system and improve overall transmission supply robustness.
- Option 4: This alternative, system reliability remains as for existing customers and load rejection is implemented for new customers.
- Option 5: For this alternative, the system reliability decreases relative to other options. However, all other options are expected to be in service after the temporary peak year. With the replacement of switches and Bus1, the most limiting equipments will be addressed, reducing the need to open the breaker at a lower loading at Hollingsworth TS.

As a result, Options 2 and 3 are expected to offer improved transmission supply reliability for the 44 kV load pocket through a more direct and resilient transformation arrangement.

#### 3.3.2 Voltage Performance Analysis

Under the reference load forecast, voltage performance improves when comparing Option #1 to Option #2. Option #2 supplies the 44 kV pocket directly from the 115 kV circuit, resulting in improved voltage levels. For option #5, with potential temporary supply solely from Anjigami TS, a slight voltage reduction is expected during peak conditions. The configurations in Options #3a and #3b also demonstrated improved voltage performance at the point of connection on Circuit No. 4 compared to Option #1. All configurations satisfy the ORTAC N-1 contingency criteria within the local pocket, with supply available from either transformer.

### 3.3.3 Thermal Capacity Analysis

Both the Limer No. 1 44 kV circuit and Anjigami No.1 44 kV circuit have a winter rating of 46 MVA (608 A) and a summer rating of 39.7 MVA (521 A). Under the reference load forecast, 25.4 MW (winter 2043) and 24.5 MW (summer 2043), these lines are not expected to be overloaded. Even at the peak loading of 30.4 MW projected for 2027, loading remains within the continuous thermal limits.

Across alternatives, each option provides an improvement in thermal performance at Hollingsworth TS:

- Options 2 and 3: Supply power directly from 115 kV to 44 kV, thereby mitigating thermal overloading of the switches and Bus 1.
- Option 4: Avoids thermal overloading through load rejection during contingency events.
- Option 5: Relies on operational control measures, with breaker 993 opened to manage thermal loading under high-demand scenarios.

### 3.3.4 Cost Analysis

When comparing Options 1 and 2, it is important to note that non-Hydro One standard transformers typically cost more than standard units. Option 2 involves station expansion, along with cutovers and protection upgrades, which are generally more expensive than an in-situ transformer replacement as proposed in Option 1. Overall, option 1 remains the most cost effective due to minimal modifications required. However, it is not practical due to station topology.

Option 3a & 3b is expected to be the highest cost, as it would require the construction of a new transformer station. Option #4 is considered lower-cost solution as it primarily involves implementing a RAS without major capital investments. Option #5 is considered lowest cost option overall, relying on existing operational measures such as opening breaker 993 to manage loading and maintain system operability.

### 3.3.5 High growth Forecast Analysis

Under the high growth forecast scenario, thermal overloads are projected at multiple points in the system over the planning horizon. These include Hollingsworth Transformer T2, the associated station bus, disconnect switches, 44kV circuits and the Anjigami TS.

Constructing a new transformer station (see Figure 11) would meet the high growth forecast. This would improve long-term system reliability, operational flexibility and capacity planning. Locating the new station as close as possible to Circuit No. 4 load would also help minimize line losses and voltage drop, improving overall system performance.

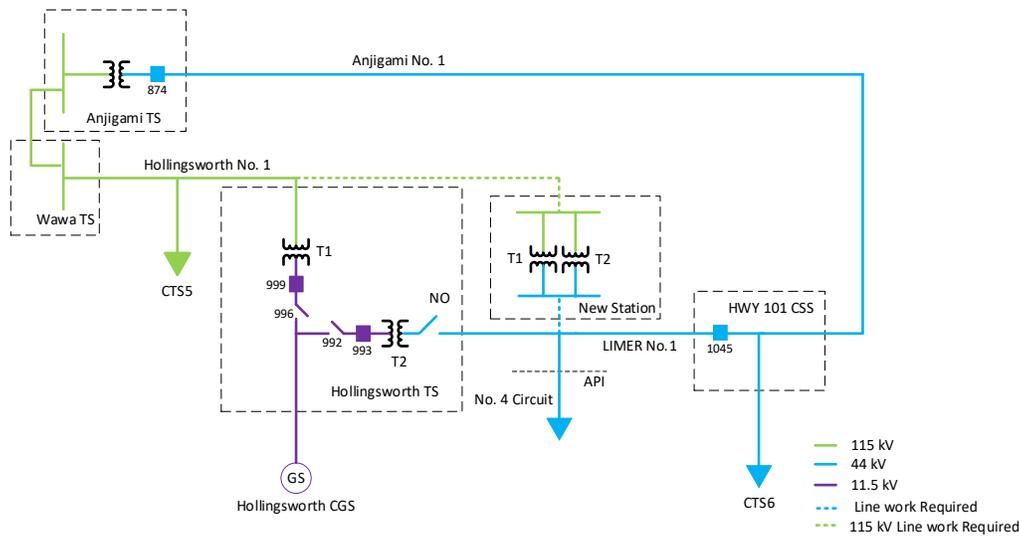


Figure 13: High Growth Scenario– Single Line Diagram

Additional reactive support may be required for all in-service configuration as well as under contingency scenarios involving loss of supply from either Anjigami TS or Hollingsworth TS. In these cases, voltage at the end of Circuit No. 4 is projected to fall below acceptable pre-contingency limits. As load growth materializes, further analysis will be necessary to assess the need for additional reactive support.

Thermal overloads are also projected for Anjigami TS, Limer No.1 and Anjigami No.1 44kV circuits. Observations indicate low voltages at the end of circuit No.4 under forecasted High growth load. To mitigate these overloads, voltage support can be added at the end of Circuit No. 4, which will reduce reactive power flow, lower losses, and decrease the total MVA flowing through the system. In addition, to mitigate the projected overload at Anjigami TS, the T1 transformer can be updated to 53.3 MVA through the installation of cooling fans. To accommodate higher loading in this area, the existing conductor Limer No.1 and Anjigami No.1 44kV circuits can be updated to 556.5 ASC. This represents the highest rating conductor feasible for the area. However, establishing a new station with two transformers near Circuit No. 4 would eliminate multiple overloaded sections of 44kV circuits.

## 4. PREFERRED SOLUTION

Based on the reference load forecast, thermal overloads are observed on the Hollingsworth TS disconnect switches, Transformer T2, and Bus 1 under the N-1 contingency scenario in which supply to the 44 kV system is solely from Hollingsworth TS. To mitigate these overloads, a voluntary interim demand management procedure has been implemented. In addition, system operators are instructed to monitor total 44 kV flow and open Breaker 993 pre-contingency if the total load exceeds T2 ratings, disconnect switches and BUS1. If load demand increases than anticipated, API will consider load management options

for larger load customers. Currently, HOSSM and API are jointly advancing to replace the switches and BUS1 at Hollingsworth TS, with an in-service date targeted for 2027.

Considering these conditions, the Technical Working Group (TWG) has reviewed all alternatives and recommended proceeding with Option #5 – Status Quo. This option maintains existing operating procedures while addressing some of the limiting components through the ongoing switch and bus replacement project, allowing Breaker 993 to remain closed for higher loading levels. As a result, system reliability and operational flexibility are enhanced without major capital investment.

Given that transformer replacement or new station construction would not be feasible within the timeframe of the temporary forecasted load increase, Option #5 represents the most practical and lowest-cost solution. It ensures continued supply to customers in the 44 kV pocket without the need for load rejection, while allowing flexibility for future review in the next regional planning cycle as system conditions evolve.

**Table 8: Needs in the 44kV load pocket**

Options	Description	Details	Cost	Timeline	Risk & Benefits
<b>Option 1</b> <b>Upgrading Without Reconfiguration</b>	Replace Transformer T2 at Hollingsworth TS with a higher-rated unit	<ul style="list-style-type: none"> <li>- Replace existing Transformer T2</li> <li>- Minor relay /protection updates</li> <li>- Bus1 uprate</li> </ul>	Low to medium	3 - 4 years	<ul style="list-style-type: none"> <li>- Space constraint</li> <li>- outage constraint</li> </ul>
<b>Option 2</b> <b>Station Expansion at Hollingsworth TS</b>	Add a new Transformer T3 (115/44 kV) at Hollingsworth TS	<ul style="list-style-type: none"> <li>- New T3 transformer</li> <li>- Station expansion</li> <li>- New 115kV termination</li> <li>- protection upgrades</li> <li>- Environmental approvals</li> </ul>	Medium	3 - 4 years	<ul style="list-style-type: none"> <li>- Space constraint</li> </ul>
<b>Option 3a</b> <b>New Transformer Station</b>	Construct a new transformer station T1 (115/44 kV) to supply the 44 kV pocket	<ul style="list-style-type: none"> <li>- New station</li> <li>- New transmission Tap connection</li> <li>- Real estate &amp; Environmental Approvals</li> </ul>	High	3 - 5 years	<ul style="list-style-type: none"> <li>- New Site</li> </ul>
<b>Option 3b</b> <b>Reconfigure HWY101 SS</b>	Convert HWY101 SS into a	<ul style="list-style-type: none"> <li>- existing site modification</li> <li>- Add transformer</li> <li>- Modify protections</li> </ul>	High	3 - 5 years	<ul style="list-style-type: none"> <li>- Space constraint</li> </ul>

	transformer station T1 (115/44 kV)	- Real estate & Environmental Approvals			
<b>Option 4 RAS</b>	Load Rejection following contingencies	- Implement RAS for circuit No.4	Low	2 years	- N/A
<b>Option 5 Status Quo</b>	-replace disconnect switches & Bus1	- Monitor load growth in area	Low	2 years	-N/A

## 5. NEXT STEPS

The Technical Working Group (TWG) will continue to monitor loading in the area to ensure system reliability. HOSSM and API will proceed with the replacement of switches and BUS1 to address the identified overload condition. Should the high growth load forecast materialize, the TWG may recommend initiating the next regional planning cycle earlier than scheduled to address additional limiting elements identified under that scenario. It is also recommended in the next Regional Planning to discuss equipment status monitoring and research flow monitoring for RAS schemes. With this, the RAS will enable the system to be ready for opening breaker 993 and/or Load rejection as required.

Table 9: Near/Mid-term solution to address the local need

Need Description	Recommended Plan/Update	Lead Responsibility	Timeframe
<b>Station Capacity Needs</b>			
Hollingsworth TS – Transformer, switches, BUS1 overload	Replace/Install switches and Bus1 with higher rating at Hollingsworth TS.	HOSSM API	ongoing
Research flow monitoring RAS	Monitor load in the area. TWG to discuss RAS equipment status and flow monitoring in next regional planning cycle.	HONI	ongoing

## 6. REFERENCES

- [1] Independent Electricity System Operator, [Ontario Resource and Transmission Assessment Criteria](#) (issue 5.0 August 22, 2007)
- [2] Hydro One, Third cycle ELS [Needs Assessment \(NA\)](#) (Issue October, 2024)
- [3] Independent Electricity System Operator, Third cycle ELS [Scoping Assessment \(SA\)](#) (Issue January, 2025)