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LOCAL PLANNING REPORT

Kent TS Transformation Capacity Region: Chatham-Kent/Lambton/Sarnia

Date: June 28th, 2017

Revision: Final

Prepared by: Kent Sub-region Local Planning Study Team



Organizations
Hydro One Networks Inc. (Lead Transmitter)
Hydro One Networks Inc. (Distribution)
Entegrus Inc.

Disclaimer

This Local Planning 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 Chatham-Kent/Lambton/Sarnia 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 study team participants.

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LOCAL PLANNING EXECUTIVE SUMMARY

REGION	Chatham-Kent/Lambton/Sarnia (the “Region”)		
LEAD	Hydro One Networks Inc. (“Hydro One”)		
START DATE	January 11, 2017	END DATE	June 28, 2017
1. INTRODUCTION			
<p>The purpose of this Local Planning (LP) report is to develop wires-only options and recommend a preferred solution that will address the local needs identified in the Needs Assessment (NA) report for the Chatham-Kent/Lambton/Sarnia Region dated June 12, 2016. The development of the LP report is in accordance with the regional planning process as set out in the Ontario Energy Board’s (OEB) Transmission System Code (TSC) and Distribution System Code (DSC) requirements and the “Planning Process Working Group (PPWG) Report to the Board”.</p> <p>Based on Section 6 of the NA report, the study team recommended that coordinated regional planning is not required to address the identified needs in the Chatham-Kent/Lambton/Sarnia Region. It concluded that thermal overloading at Kent TS T3/T4 is local in nature and this need will be addressed by wires options through local planning led by Hydro One with participation of the impacted LDCs.</p>			
2. LOCAL NEEDS ADDRESSED IN THIS REPORT			
Based on the historical load Kent TS T3/T4 has already exceeded its 10-Day Limited Time Rating (LTR). This report is developed to address the transformation capacity requirement at Kent TS.			
3. FINDINGS			
<p>Based on the load forecast and transfer capability information, there is sufficient transfer capability in the existing distribution system to lower the loading on Kent TS T3 to within its LTR following loss of T4.</p> <p>See Section 4 for further details.</p>			
4. CONCLUSION			
The local planning study team agreed that no action is required at this time.			

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1 Introduction

The Needs Assessment (NA) for Chatham-Kent/Lambton/Sarnia (“Region”) was triggered in response to the Ontario Energy Board’s (OEB) Regional Infrastructure Planning process approved in August 2013. The [NA report](#) can be found on Hydro One’s Regional Planning website. The study team identified Kent TS T3/T4 transformation capacity need in the Region over the next 10 years (2016 to 2025) and recommended that it should be further assessed through the Local Planning (LP) process.

1.1 Geographical Area and Existing Supply Network

Kent Transformer Station (“TS”) is a transmission substation that is located in the Municipality of Chatham-Kent in Southwestern Ontario and supplies the surrounding mainly-rural areas, including Chatham, Dover, Raleigh, Harwich, Howard and Orford. Kent TS is supplied by the 230 kV double circuit line L28C/L29C, from Lambton TS to Chatham SS. There are four transformers at Kent TS that take 230 kV and step it down to supply low voltage feeders at 27.6 kV. The four transformers are connected into two “Dual Element Spot Network” or DESN structures which provide redundancy in the form of duplication for most station components. The two larger transformers, namely T1 and T2, are rated at 75/100/125MVA and are connected in “Bermondsey” configuration. The two smaller transformers, T3 and T4, are rated at 25/33/42 MVA and are connected in “Jones” configuration. The simplified schematic of Kent TS is shown in Figure 1.

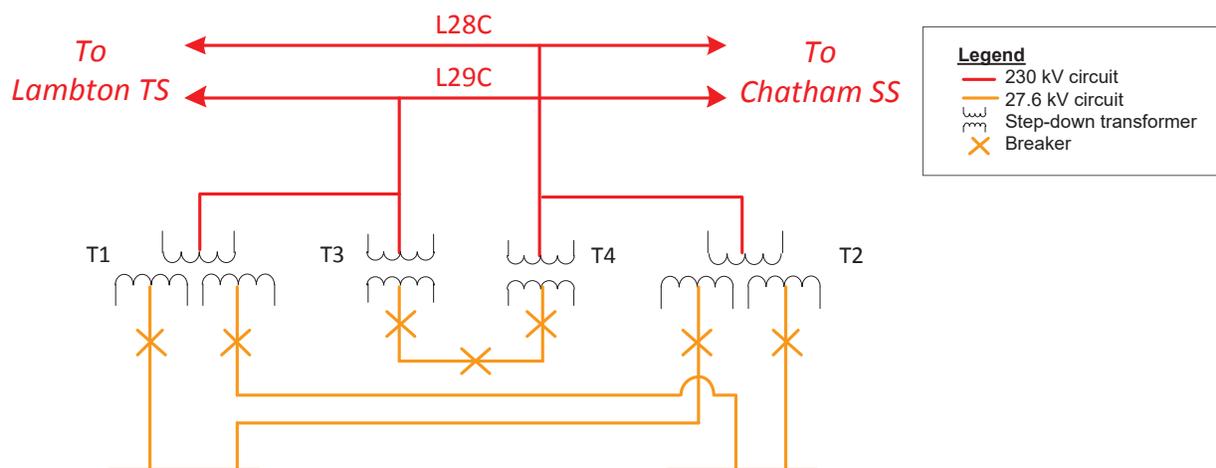


Figure 1 Schematic of Kent TS

Electricity distribution services to customers in the Kent sub-region is provided by Entegrus and Hydro One Distribution at the 27.6 kV level.

2 Load Forecast

To access the need at Kent TS, Entegrus Inc. (Entegrus) and Hydro One Distribution provided summer peak gross load forecasts for 2017 – 2026. Conservation and demand management (“CDM”) programs and distributed generation (“DG”) in the distribution network that are either currently in place or foreseen by the IESO were deducted from the gross forecast. The remaining forecast, also known as net load forecast, is summarized in Table 1.

Transformer Station	DESN ID	Customer Data	Summer Peak Load (MW)												
			Historical Data (MW)			Near Term Forecast (MW)					Medium Term Forecast (MW)				
			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Kent TS	T1/T2	Gross Load				117.0	119.5	122.2	124.9	127.5	130.1	132.8	135.5	138.0	140.6
		DG & CDM				4.4	5.8	7.1	8.3	9.2	10.1	10.8	11.7	13.3	15.3
		Net Load Forecast	84	91	84	113	114	116	117	119	121	122	124	125	126
	T3/T4	Gross Load				59.9	60.2	60.7	61.2	61.5	61.8	62.0	62.2	62.4	62.7
		DG & CDM				2.0	2.8	3.5	4.2	4.7	5.2	5.6	6.1	6.9	7.5
		Net Load Forecast	60	52	60	58	58	58	57	57	57	57	57	56	56

Table 1 Non-coincident net load forecast (MW)

3 Methodology and Assessment

The IESO Ontario Resource and Transmission Assessment Criteria (“ORTAC”) outlines the supply reliability planning requirements to ensure loading on transmission network does not exceed equipment ratings under both normal and contingency operating conditions. For transformer, in the event where one of the two transformers in a substation suffers an outage, namely a (N – 1) event, loading of the remaining transformer should not exceed its 10 – day limited time rating (“LTR”). This is based on the assumption that transformer could be forced out of service at any time leaving the remaining transformer to carry all of the load. The supply capability of a DESN station is determined by its most limiting element. Presently, the summer 10 – Day LTR of T4 is slightly higher than that of T3. At the time of this assessment, the summer 10 – Day LTR for Kent TS T3 is 59 MVA¹ (or 54 MW at 0.9 power factor).

Figure 2 shows the comparison of expected load at Kent DESNs against the respective supply capability. With increasing CDM contributions over the study period, the overload at Kent T3/T4

¹ 10 – Day LTR of 59 MVA is rated at 30 °C ambient temperature

is expected to decline from 6 MW to 2 MW.

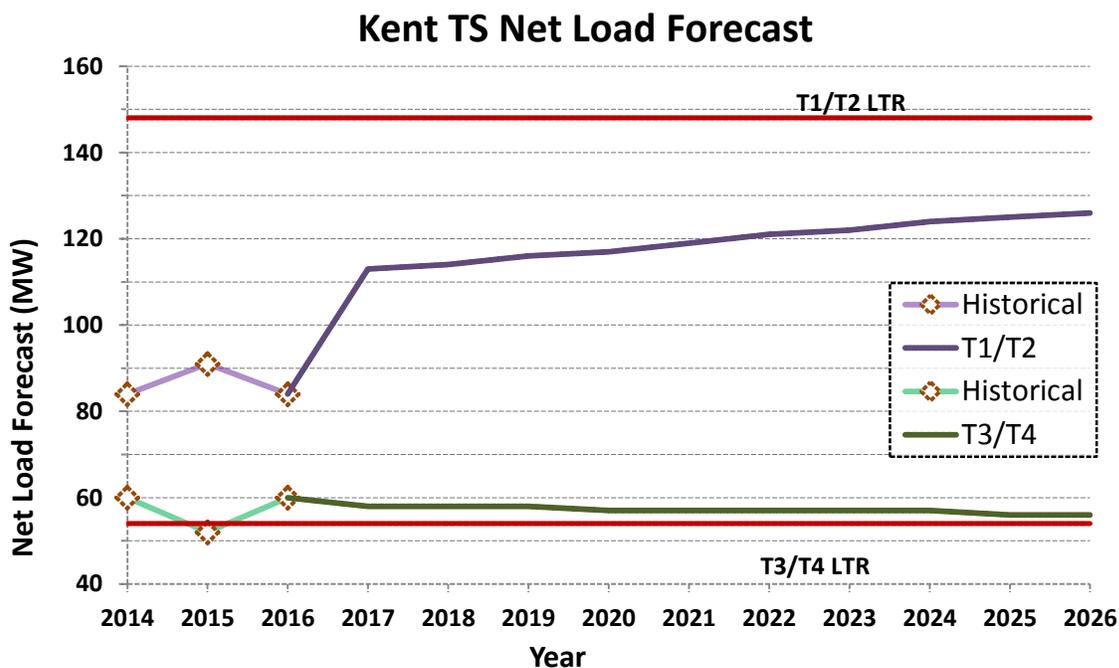


Figure 2: Kent TS Net Load Forecast

4 Findings

Currently, Kent T1 and T2 have the same summer 10 – day LTR of 155 MVA (or 148 MW at 0.95 power factor²) and as shown in Figure 2, loading at this pair of transformer is expected to remain below the Kent T1/T2 summer 10 – day LTR throughout the study period. In the event of Kent TS transformer T4 suffers an outage, Entegrus has confirmed there is existing transfer capability to transfer all of its load at Kent TS T3/T4 DESN to Kent TS T1/T2 DESN. In doing so, loading at Kent T3 can be brought back to below its LTR while supply to customers will remain uninterrupted.

5 Conclusion

Based on the information provided in this report, there is sufficient transfer capability on the existing system to mitigate the potential transformer overload at Kent TS over the ten year study period from 2017 to 2026. Therefore Hydro One Distribution, Entegrus Inc. and Hydro One Transmission agreed that no further action is required at this time. The next Regional Planning process is expected to initiate again within the next 5 years. The load forecast shall be examined at that point again and necessary steps shall be taken to address potential upcoming needs. The study team will monitor and track the loading at Kent TS and reconvene should unforeseen needs emerge prior to the next regional planning cycle.

² There are two existing low-voltage capacitor banks connected to Kent T1/T2 DESN; therefore, higher power factor is assumed.

6 References

- [1] [Planning Process Working Group \(PPWG\) Report to the Board: The Process for Regional Infrastructure Planning in Ontario – May 17, 2013](#)
- [2] [IESO Ontario Resource and Transmission Assessment Criteria \(ORTAC\)](#)
- [3] [Chatham-Lambton-Sarnia Needs Assessment Report – June 12, 2016](#)

Appendix A – List of Acronyms

Acronym	Description
DESN	Dual Element Spot Network
DSC	Distribution System Code
kV	Kilovolt
LDC	Local Distribution Company
LP	Local Planning
LTR	Limited Time Rating
MW	Megawatt
NA	Needs Assessment
OEB	Ontario Energy Board
PPWG	Planning Process Working Group
TS	Transformer Station
TSC	Transmission System Code