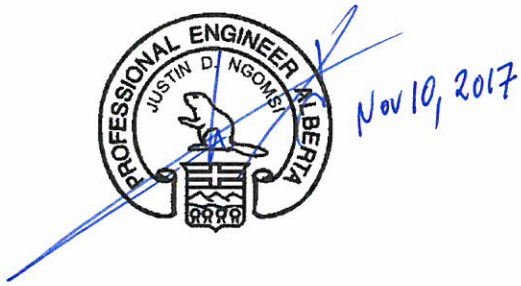
APPENDIX E DFO DISTRIBUTION DEFICIENCY REPORT AND SUPPLEMENT

EPCOR DISTRIBUTION & TRANSMISSION INC.

Distribution Deficiency Report (DDR) for

Riverview Service Area

Revision 9



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APEGA Permit to Practice P07061

Abbreviations

EDTI: EPCOR Distribution & Transmission Inc.

DDR: Distribution Deficiency Report

DFO: Distribution Facility Owner

N-0: all distribution circuits and transmission elements in service (normal state)

N-1: failure of a single transmission element or single distribution circuit (contingency state)

Pf: power factor = MW/MVA

POD: Point of Delivery

TFO: Transmission Facility Owner

TUC: Transportation/Utility Corridor

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1.0 SUMMARY

EPCOR Distribution & Transmission Inc. (EDTI) is requesting system access service from the Alberta Electric System Operator (AESO) to address existing capacity and reliability concerns in South and West Edmonton and meet forecasted load growth over the next 10 years. South Edmonton has been the fastest growing area in Edmonton over the past five years and EDTI expects this trend to continue into the future. In addition, EDTI continues to experience load growth in the northwest and southeast areas of Edmonton. The west and northwest areas of Edmonton are served by North Calder and Poundmaker PODs. The south and southeast areas of Edmonton are served by Summerside and East Industrial PODs. EDTI records show that there is currently insufficient distribution circuit capacity in the North Calder, Summerside and East Industrial areas during normal operating condition (N-0). Moreover, EDTI's load demand forecast indicates that by summer 2017 and summer 2020, there will be insufficient transformation capacity at Summerside and East Industrial PODs, respectively, under contingency condition (N-1). This assessment is based upon EDTI's distribution planning criteria for circuits and PODs, which states:

- All 25 kV distribution circuits should operate at or below their design load rating of 12 MVA under N-0
- All 25 kV distribution circuits should operate at or below their emergency load rating of 18 MVA under N-1
- All PODs should operate at or below their firm capacity

In this Distribution Deficiency Report (DDR), EDTI demonstrates that 14 new 25 kV distribution circuits are required over the next 10 years in order to address the existing and anticipated capacity and reliability concerns in South and West Edmonton. Four feeder breakers are currently available for use at EDTI's Poundmaker and Summerside PODs; therefore a balance of 10 new feeder breakers is required. To that end, the following solution alternatives were considered:

Distribution supply alternative

Alternative I

a) Transfer load between existing distribution circuits

Transmission supply alternatives

In its capacity as a Transmission Facility Owner (TFO), EDTI recommends the transmission facilities described below. This recommendation considers the TFO's design standards and practices that are applicable to PODs. Each of the alternatives uses the four existing feeder breakers at Summerside POD (24SU) and Poundmaker POD (23PM, 24PM and 34PM). Circuits 24SU, 23PM, 24PM and 34PM will be added respectively in 2018, 2018, 2018 and 2023.

Alternative II

b) Add a new 25 kV supply from existing Petrolia POD (816S), which would include two new 240/25 kV 45/60/75 MVA transformers, two new 25 kV distribution circuits in 2019, two new 25 kV distribution circuit in 2020, one new circuit in 2021 and one new 25 kV distribution circuit in 2022

c) Construct a new South East POD in 2021, which would include two new 240/25 kV 45/60/75 MVA transformers, three new 25 kV distribution circuits in 2021 and one new 25 kV distribution circuit in 2026

Alternative III

d) Add a new 25 kV supply from existing Jasper POD (E805S), which would include two new 240/25 kV 45/60/75 MVA transformers, two new 25 kV distribution circuits in 2019, two new 25 kV distribution circuit in 2020, one new circuit in 2021 and one new 25 kV distribution circuit in 2022

e) Construct a new South East POD in 2021, which would include two new 240/25 kV 45/60/75 MVA transformers, three new 25 kV distribution circuits in 2021 and one new 25 kV distribution circuit in 2026

Alternative IV

f) Add a new 25 kV supply from the existing Summerside POD, which would include one new 240/25 kV 45/60/75 MVA transformer, two new 25 kV distribution circuits in 2019, one new circuit in 2021 and one new 25 kV distribution circuit in 2022

g) Add a new 25 kV supply from the existing Poundmaker POD, which would include one new 240/25 kV 45/60/75 MVA transformer and two new 25 kV distribution circuits in 2020

h) Construct a new South East POD in 2021, which would include two new 240/25 kV 45/60/75 MVA transformers, three new 25 kV distribution circuits in 2021 and one new 25 kV distribution circuit in 2026

Alternative V

i) Construct a new Riverview POD with two new 240/25 kV 45/60/75 MVA transformers, two new 25 kV distribution circuits in 2019, two new 25 kV distribution circuits in 2020, one new circuit in 2021 and one new 25 kV distribution circuit in 2022

j) Add a new 25 kV supply from the existing Summerside POD, which would include one new 240/25 kV 45/60/75 MVA transformer, three new 25 kV distribution circuits in 2021 and one new 25 kV distribution circuit in 2026

Alternative VI

k) Construct a new Riverview POD with two new 240/25 kV 45/60/75 MVA transformers, two new 25 kV distribution circuits in 2019, two new 25 kV distribution circuit in 2020, one new circuit in 2021 and one new 25 kV distribution circuit in 2022

l) Construct a new South East POD in 2021, which would include two new 240/25 kV 45/60/75 MVA transformers, three new 25 kV distribution circuits in 2021 and one new circuit in 2026

Alternative VII

m) Rebuild the existing Summerside POD with three new 240/25 MVA 100 MVA transformers, three lineups of double bus GIS switchgear, sixteen 25 kV distribution circuits (the 7 existing Summerside circuits, one new circuit in 2018 using the existing 24SU feeder breaker, two new circuits in 2019, four new circuits in 2021, one new circuit in 2022, and one new circuit in 2026) along with a new building structure of sufficient size to house the new switchgear lineups

n) Add a new 25 kV supply from the existing Poundmaker POD, which would include one new 240/25 kV 45/60/75 MVA transformers and two new 25 kV distribution circuits in 2020

A brief comparison of the seven alternatives is provided in the table below:

Alternative	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Descriptor[1]	**D**	**P + SE**	**J + SE**	**SS_{TX3} + PM_{TX3} + SE**	**RV + SS_{TX3}**	**RV + SE**	**SS + PM_{TX3}**
Total Feeders Length (km)	0	97	162	97	72	59	110
N-0 Transformation Capacity Added (MVA)	0	300	300	300	225	300	225
Distribution Costs[2] ($2016)		b $95 M c $26 M **$121 M**	d $166 M e $26 M **$192 M**	f $69.6 M g $19.4 M h $26M **$115 M**	i $45 M j $42.5 M **$87.5 M**	k $45 M l $26 M **$71 M**	m $112.1 M n $19.4 M **$131.5 M**
Transmission Costs ($2016)		b N/V c $34.7 M **N/V**	d N/V e $34.7 M **N/V**	f $11.9 M g $14.9 M h $34.7 M **$61.5 M**	i $34.7 M j $11.9 M **$46.6 M**	k $34.7 M l $34.7 M **$69.4 M**	m $37.4 M n $14.9 M **$52.3 M**
Total Costs (+/- 30%, $2016)	**N/V[3]**	**N/V[4]**	**N/V[5]**	**$176.5 M**	**$134.1 M**	**$140.4 M**	**$183.8 M**

b, c, d, e, f, g, h, i, j, k, l, m and n refer to components of the various transmission alternatives, as described in pages 6 and 7

[1]: D = Distribution load transfers; P = Petrolia POD expanded; J = Jasper POD expanded; SE = New South East POD

SSTX3 = 3rd transformer added at Summerside POD; PMTX3 = 3rd transformer added at Poundmaker POD

SS = New Summerside POD; RV = New Riverview POD

[2]: These costs include ten new distribution circuits for each alternative

[3], [4], [5]: Alternatives were deemed not viable (N/V); therefore, costs estimates are not required

After reviewing these alternatives, EDTI has determined that alternatives 5 and 6 are its preferred alternatives. Both alternatives involve the construction of the Riverview POD in 2019. Alternatives 5 and 6 have the overall lowest costs and they provide the capacity increase needed to service the Riverview area, while the existing North Calder, Poundmaker, Summerside and East Industrial PODs will continue to serve load growth in the Northwest, West, South and East areas of Edmonton, respectively. The requested in-service date for the proposed development is October 01, 2019.

Additionally, EDTI intends to request additional transmission capacity in Southeast Edmonton to address capacity and reliability concerns identified in that area starting in 2021. Possible alternatives to resolve this deficiency include an additional supply from the Summerside POD or a new South East POD as described in alternatives 5 and 6, respectively. These alternatives will be discussed in a separate distribution deficiency report, which EDTI plans to submit to the AESO at a future date.

EDTI will be requesting a DTS contract capacity of 24 MW for the new Riverview POD, should EDTI's preferred alternative 5 or 6 be approved.

2.0 EXISTING SYSTEM DESCRIPTION

Figure 1: Existing 25 kV Service Areas and POD Locations

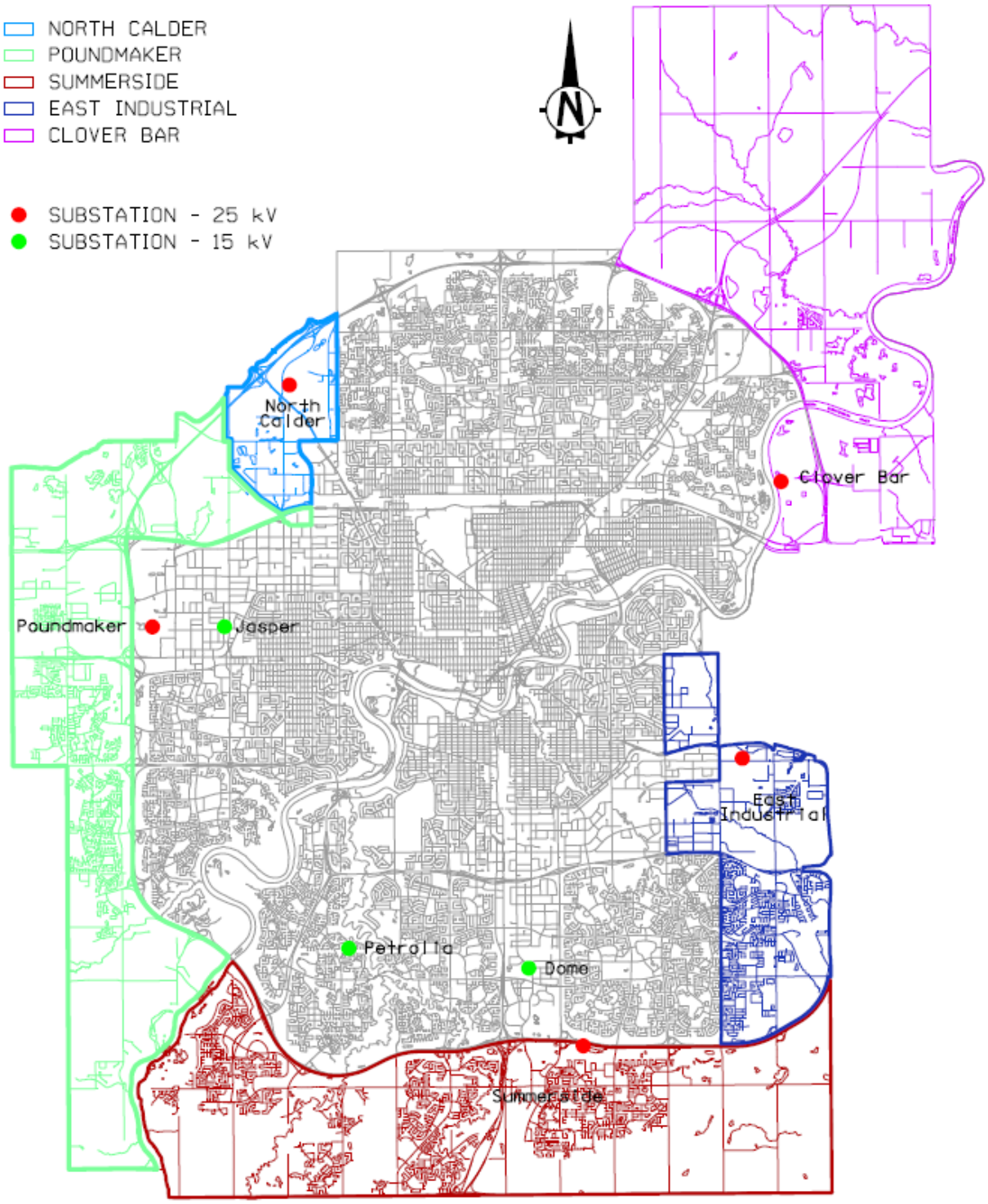
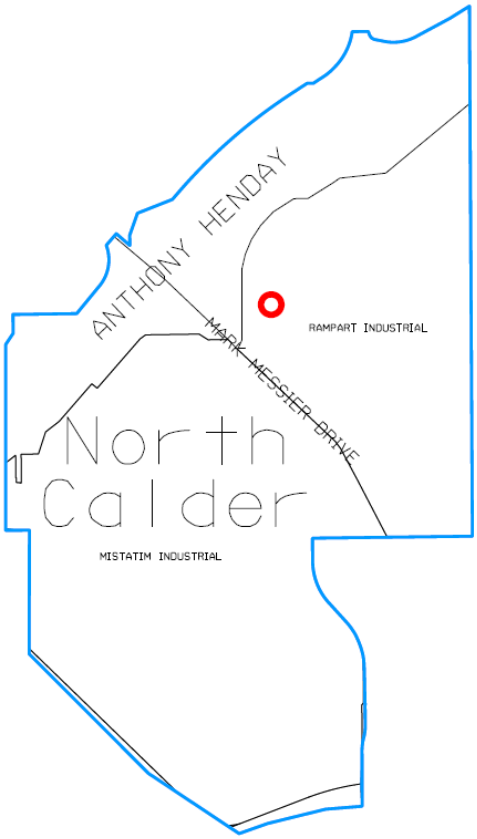


Figure 1 shows EDTI's service territory. It highlights areas of EDTI's distribution system that are serviced from 25 kV Points of Delivery (POD). These PODs include North Calder, Poundmaker, Summerside, East Industrial and Clover Bar. This report focuses solely on the distribution deficiencies in the North Calder, Poundmaker, Summerside and East Industrial areas. Clover Bar POD is not electrically connected to EDTI's other 25 kV PODs, given its geographic location. This explains the exclusion of the Clover Bar area from this report. Jasper, Petrolia and Dome are the 15 kV PODs that are in the immediate vicinity of the areas of interest. Each of the areas of interest is briefly described below.

Throughout this document, distribution circuits' names with suffixes SU, PM, RV, E, or SE refer respectively to Summerside, Poundmaker, Riverview, East Industrial or South East PODs. EDTI's distribution circuits 25L and 25R originate from the North Calder POD.

2.1 North Calder Area



North Calder POD is owned and operated by AltaLink. It serves both Fortis and EDTI distribution service areas. North Calder is equipped with two 138/25 kV 25/33/42 MVA transformers. Two 25 kV distribution circuits supplied from this POD serve EDTI's load. These circuits are 25L and 25R. 25L and 25R supply an area of around 14 sq. km that consists primarily of two industrial parks named Mistatim and Rampart. There is approximately 3 sq. km of vacant land in this area.

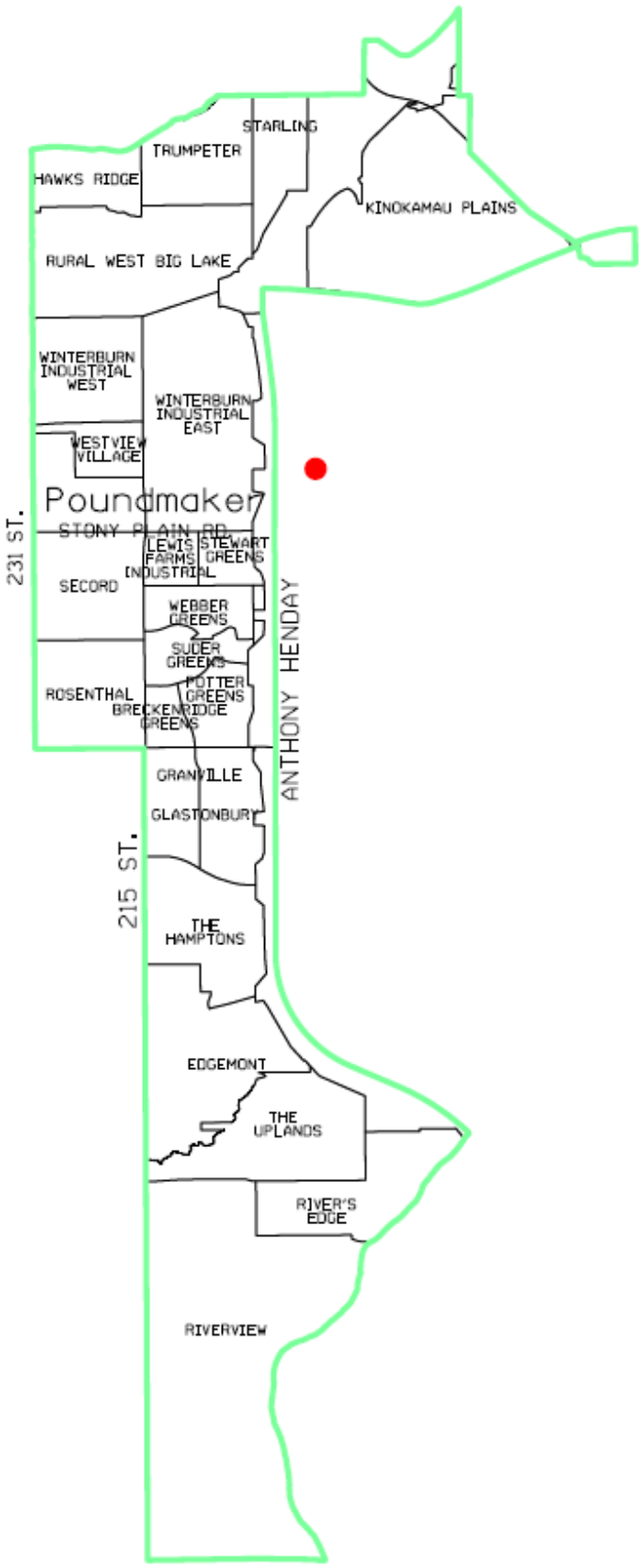
The average length of the circuits supplying EDTI's load in the North Calder is 6.6 km. The POD and transformer N-1 capacity is 42 MVA in summer and winter. Contractually, EDTI's portion of the total North Calder's supply capacity is 40.2%; therefore, EDTI is guaranteed only 16.9 MVA (0.402*42 MVA) under N-1 transformer contingency at North Calder. There are no other circuits available at the North Calder POD for use by EDTI. Circuit 25R has a tie with circuit 25L, and vice-versa. Also, both 25R and 25L are tied to circuit 22PM from Poundmaker POD, as summarized in the tie matrix below.

Table 1: North Calder Circuits' Ties Matrix

		Circuits' Ties		
		25L	25R	22PM
North Calder Circuits	25L		X	X
	25R	X		X

2.2 Poundmaker Area

Poundmaker POD is owned and operated by EDTI. It went into service in 2012 and it presently supplies an area of about 77 sq. km. in West Edmonton. The subarea north of Stony Plain Road is primarily industrial/commercial load whereas the subarea south of Stony Plain Road is primarily residential load. Winterburn and Kinokamau Plains industrial parks still have significant vacant land available for future growth. Big Lake, Edgemont, Lewis Farms and Riverview residential communities are forecasted to have significant growth over the next ten years. A portion of the Riverview community and the Edgemont community - about 17 sq. km - is presently supplied by Poundmaker POD.



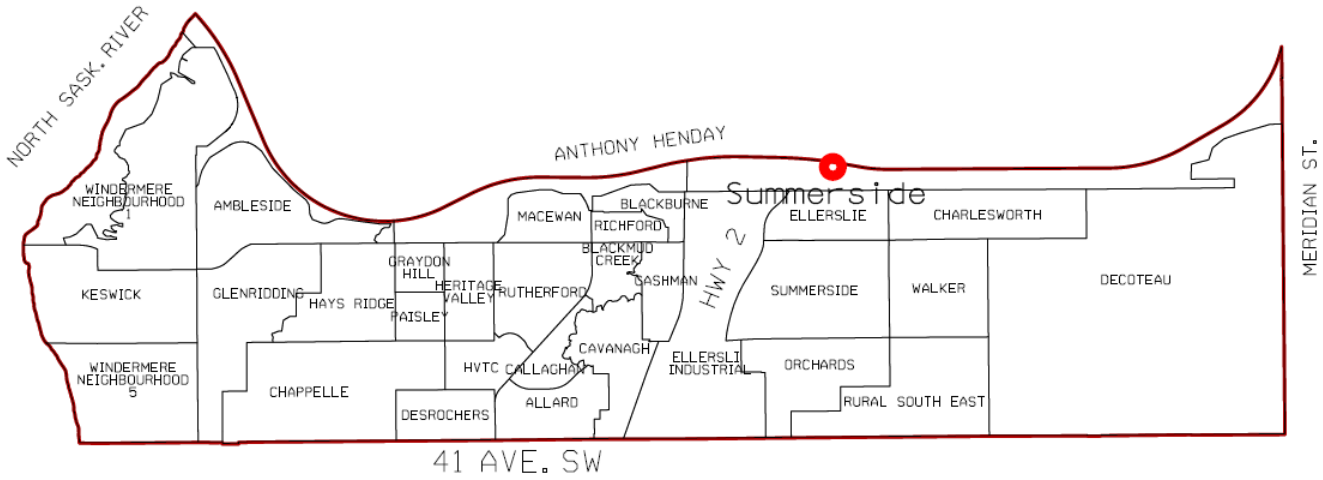
Poundmaker POD has two 240/25 kV 45/60/75 MVA transformers. There is room for a third transformer at the POD. The winter rating (0 deg. C) of these transformers is 56/71/89 MVA. The secondary switchgear is comprised of two double buses, with room for a third double bus, each of which has four 25 kV feeder breakers. Five of the feeder breakers have circuits presently connected to them. These circuits include 21PM, 22PM, 31PM, 32PM and 33PM. 31PM and 33PM supply load in the Summerside area. 23PM, 24PM and 34PM are the three remaining feeder breakers at Poundmaker that can be utilized for future needs. The average length of the circuits supplying the Summerside area from Poundmaker is 11.7 km. The longest circuit, 33PM, measures 16.5 km. The POD and transformer N-1 capacity is 75/89 MVA in summer/winter. The capacity of the Poundmaker POD is sufficient to meet the forecasted load demand over the next 10 years.

Poundmaker circuits are tied to each other, as summarized in the feeder tie matrix below. Also, circuit 22PM is tied to circuits 25R and 25L from North Calder. Moreover, circuit 33PM is tied to circuit 14SU from the Summerside POD.

Table 2: Poundmaker Circuits' Ties Matrix

		Circuits' Ties							
		21PM	22PM	31PM	32PM	33PM	25R	25L	14SU
Poundmaker Circuits	21PM				X	X			
	22PM			X	X		X	X	
	31PM	X	X		X	X			
	32PM	X	X	X					
	33PM	X		X					X

2.3 Summerside Area



Summerside POD is owned and operated by EDTI. It went into service in 2010 and it presently supplies an area of about 95 sq. km in South Edmonton. About half of the area is fully developed with residential and small commercial load. These residential communities include Windermere, the west part of Heritage Valley and the southern part of the Riverview. Significant load growth is forecasted to occur in the Ellerslie, Heritage Valley, Windermere, and Riverview communities. There is about 19 sq. km of residential area named Decoteau, located south of the Anthony Henday and east of 50th Street, which is largely undeveloped. Presently, Decoteau is supplied from Summerside POD, but as the south east part of Edmonton continues to grow, the Decoteau subarea may be supplied from East Industrial POD or an alternate source.

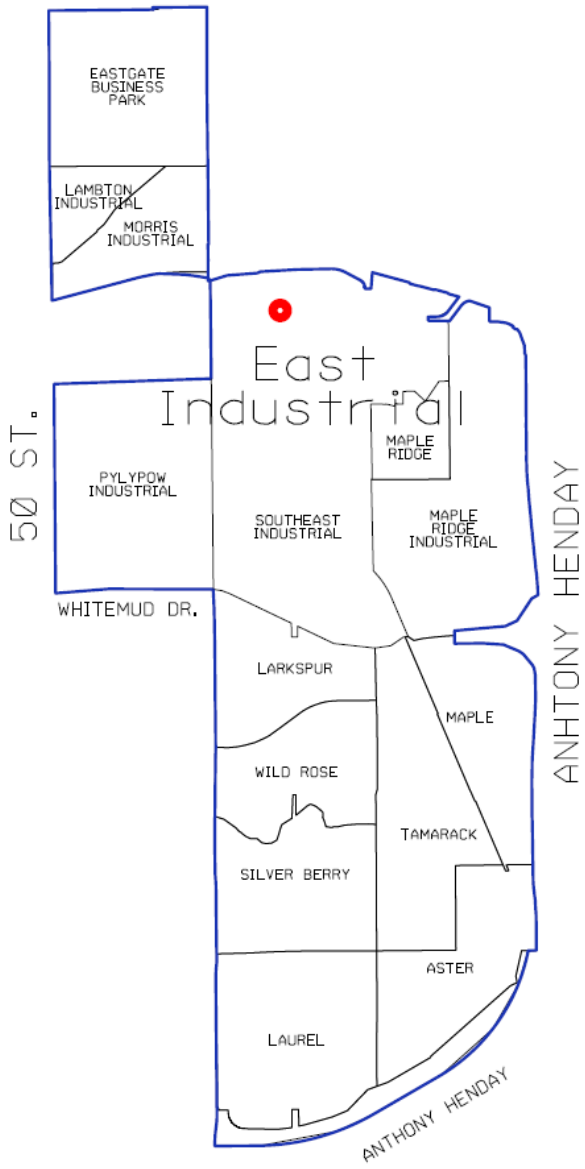
Summerside POD has two 240/25 kV 45/60/75 MVA transformers. There is room for a third transformer at the POD. The winter rating (0 deg. C) of these transformers is 56/71/89 MVA. The secondary switchgear is comprised of two buses, each of which has four 25 kV feeder breakers. Seven of the feeder breakers have circuits presently connected to them. These circuits include 11SU, 12SU, 13SU, 14SU, 21SU, 22SU and 23SU. This means that 24SU is the only feeder breaker available for future needs. The average length of the Summerside circuits is 10.8 km. The longest circuit, 14SU, measures 25 km. The POD and transformer N-1 capacity is 75/89 MVA in summer/winter. The connected distribution load is forecasted to exceed the POD's firm capacity of 75/89 MVA starting in 2017.

Summerside circuits are tied to each other, as summarized in the feeder tie matrix below. Also, circuits 12SU and 14SU are tied respectively to circuits 23E and 13E from East Industrial POD. Moreover, circuit 14SU has a tie point to circuit 33PM from Poundmaker POD.

Table 3: Summerside Circuits' Ties Matrix

		Circuits' Ties									
		11SU	12SU	13SU	14SU	21SU	22SU	23SU	23E	13E	33PM
Summerside Circuits	11SU		X			X		X			
	12SU	X				X			X		
	13SU				X		X	X			
	14SU			X		X		X		X	X
	21SU	X	X		X						
	22SU			X				X			
	23SU	X		X	X		X				

2.4 East Industrial Area



East Industrial POD is owned and operated by EDTI. It went into service in 1991 and it presently supplies an area of about 32 sq. km in south-east Edmonton. The subarea north of Whitemud Drive is primarily industrial load and the subarea south of Whitemud Drive is primarily residential load. Pylypow, Southeast and Maple Ridge Industrial parks still have significant vacant land available for future growth. The Meadows residential area, which includes the neighborhoods of Laurel, Aster, Tamarack, Silver Berry, Maple, Larkpur and Wildrose, is still forecasted to have significant growth over the next ten years. There is about 19 sq. km of residential area named Decoteau, located south of the Anthony Henday and east of 50th Street, which is largely undeveloped. Presently, Decoteau is supplied from Summerside POD, but as the south east part of Edmonton continues to grow, the Decoteau subarea may be supplied from East Industrial POD or an alternate source.

East Industrial POD has two 240/25 kV 37.5/50/63 MVA transformers. There is room for a third transformer at the POD. The winter rating (0 deg. C) of these transformers is 47/59/75 MVA. The secondary switchgear is comprised of two buses, each of which has four 25 kV feeder breaker cells. Seven of the feeder breakers have circuits presently connected to them. These circuits include 11E, 12E, 13E, 14E, 21E, 22E and 23E. Cell 24E has no breaker and is available to supply future load. The average length of the East Industrial circuits is 7.5 km. The longest circuit, 23E, measures 12.4 km. The POD and transformer N-1 capacity is 63/75MVA in summer/winter. The connected distribution load is forecasted to exceed the POD's firm capacity of 63 MVA starting in summer 2020.

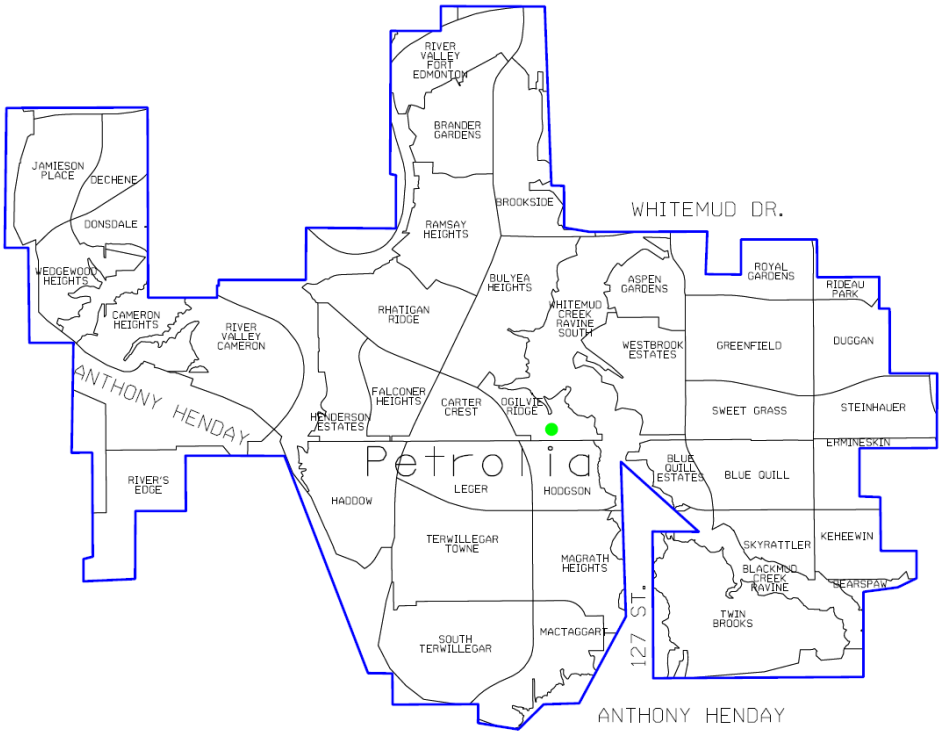
East Industrial circuits are tied to each other, as summarized in the feeder tie matrix below. Also, circuits 23E and 13E are tied respectively to circuits 12SU and 14SU from Summerside POD.

Table 4: East Industrial Circuits' Ties Matrix

		Circuits' Ties								
		11E	12E	13E	14E	21E	22E	23E	14SU	12SU
East Industrial Circuits	11E					X	X	X		
	12E			X				X		
	13E		X		X			X	X	
	14E			X				X		
	21E	X								
	22E	X								
	23E	X	X	X	X					X

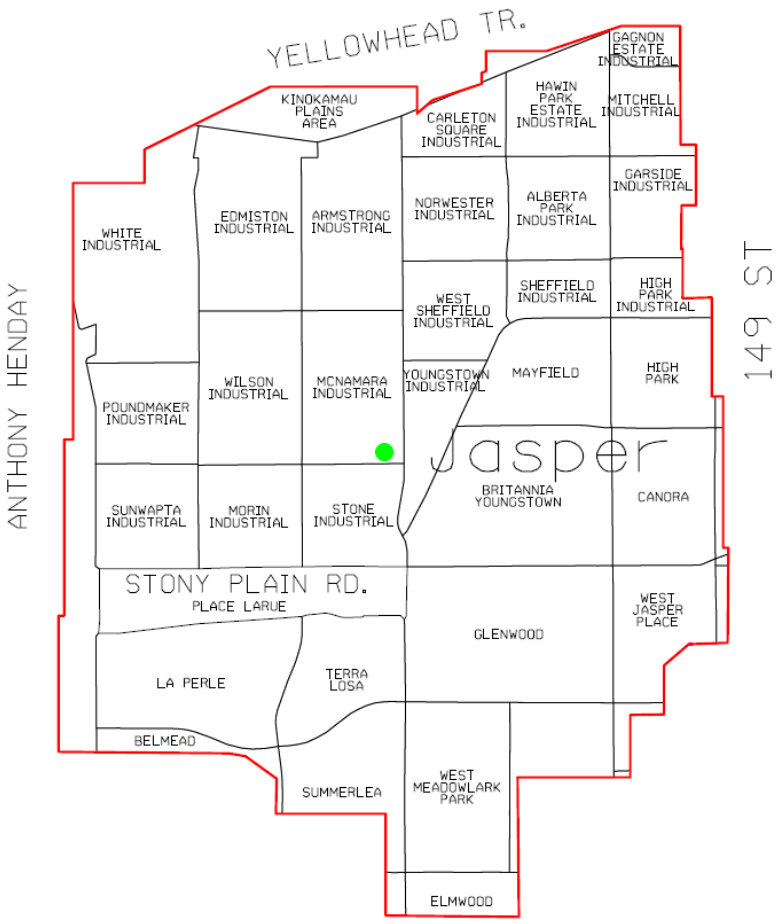
2.5 Petrolia Area

Petrolia POD is owned and operated by EDTI. It went into service in 1979 and it presently supplies an area of about 50 sq. km in Southwest Edmonton. Petrolia supplies primarily residential areas that are fully developed, with the exception of a few low density and medium density residential lots.



Petrolia POD has two 240/14.4 kV 50/66.7/83.3 MVA dual secondary winding transformers. The secondary switchgear is comprised of four buses, each of which has four 15 kV feeder breakers. There are 15 feeder breakers that have circuits connected to them. A single feeder breaker, P14, does not have a circuit connected to it and is available for use to supply future loads. The POD's firm capacity and the N-1 transformer capacity is 83.3/98.9 MVA in summer/winter. As shown in Tables 5 and 6 below, Petrolia POD has insufficient capacity. This is evidenced by historical peak loads that have consistently exceeded the POD's firm capacity of 83.3MVA. Presently, Petrolia supplies 15 kV distribution areas only, as it has no 25 kV transformations.

2.6 Jasper Area

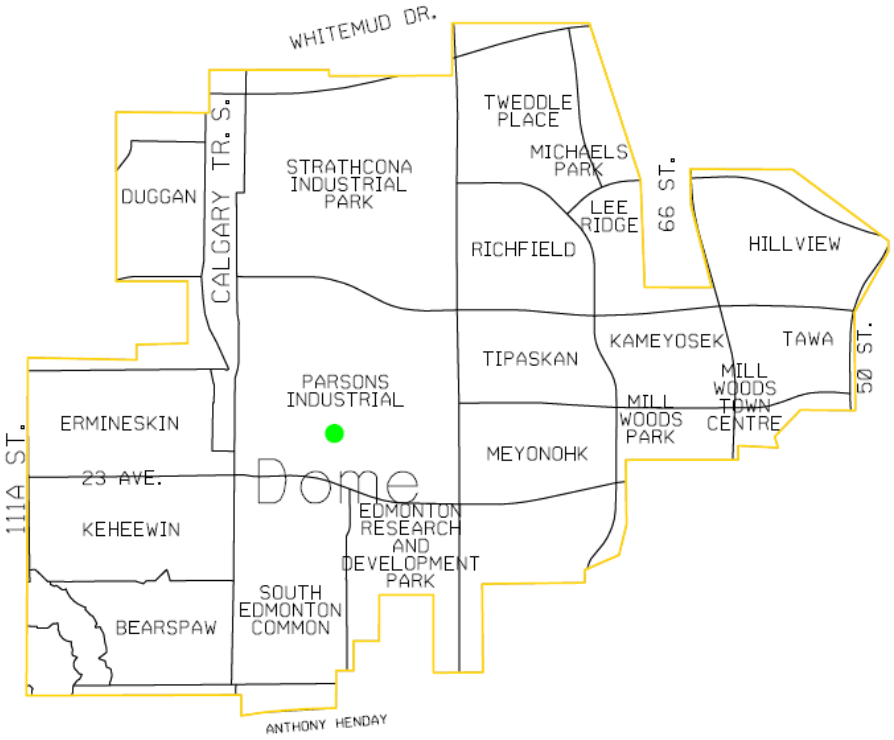


Jasper POD is owned and operated by EDTI. It went into service in 1980 and it presently supplies an area of about 24 sq. km in West Edmonton. The largest customer supplied from Jasper is West Edmonton Mall, with an annual peak load of around 28 MVA. The areas that still have some vacant land for development include White Industrial, Wilson Industrial, Poundmaker Industrial and Edmiston Industrial. The remaining land that is undeveloped in these industrial areas amounts to less than 1 sq. km.

Jasper POD has two 240/14.4 kV 166.7 MVA dual secondary winding transformers. The secondary switchgear is comprised of eight buses for a total of 23 feeder breakers. Feeder breaker J74 does not have a circuit connected to it and is available for use to supply future loads. While the N-1 transformer capacity is 166.7/198 MVA for summer/winter, the POD's firm capacity is restricted to 150 MVA because the Jasper POD experiences voltage regulation issues when its loading is greater than 150 MVA. As shown in Tables 5 and 6 below, the POD's firm capacity of 150 MVA were violated in previous years and is likely to be violated in the near future unless a mitigation measure is considered. Presently, Jasper supplies 15 kV distribution areas only, as it has no 25 kV transformations.

2.7 Dome Area

Dome POD went into service in 1984 and supplies an area of about 17 sq. km in South Edmonton. The areas supplied by Dome include the Strathcona Industrial Park, South Edmonton Common and the Edmonton Research & Development Park. Approximately 95% of these areas are fully developed. The undeveloped pockets of land to be serviced are forecasted to be primarily commercial or industrial once developed.



The POD has two 240/14.4 kV 167 MVA dual secondary winding transformers. The secondary switchgear is comprised of four buses each with four 15 kV feeder breakers. There are 14 feeder breakers that have circuits presently connected to them. A single feeder breaker, D14, is available for use to supply future loads.

While the N-1 transformer capacity is 167/198 MVA in summer/winter, the POD's firm capacity is limited to 100 MVA in summer and winter by circuit breakers that are rated 2000 amps. As shown in Tables 5 and 6 below, the POD's firm capacity of 100 MVA was violated in previous years and is likely to be violated in the near future unless a mitigation measure is implemented. Presently, Dome supplies 15 kV distribution areas only, as it has no 25 kV transformations.

3.0 EDTI DISTRIBUTION PLANNING CRITERIA

3.1 Circuit Loading Policy

Design Load Rating and Emergency Peak Load Rating are two important parameters that EDTI considers for distribution planning purposes.

- During normal operating condition (N-0), the loading on an EDTI distribution circuit shall not exceed the circuit's Design Load Rating, which corresponds to 2/3 of the circuit's Emergency Peak Load Rating. For 25 kV distribution feeders, EDTI has set the Design Load Rating to 12 MVA.
- During emergency condition (N-1), the loading on an EDTI distribution circuit shall not exceed the circuit's Normal Peak Load Rating for duration of more than three days.
- At no time shall the loading on an EDTI distribution circuit exceed the circuit's Emergency Peak Load Rating. For 25 kV distribution feeders, EDTI has set the Emergency Peak Load Rating to 18 MVA.

3.1.1 Design Load Rating

The Design Load Rating is the maximum acceptable distribution circuit load under normal operating conditions. The Design Load Rating for EDTI's 25 kV distribution circuits is set to 12 MVA. At 12 MVA, each circuit has reserve capacity to pick up 50% of the load on any adjacent circuit during contingency situations. In practice, it may be impossible to transfer the entire load on a faulted circuit to two adjacent circuits, due to circuit configurations, infrastructure limitations and load distributions. However, if all circuits are tied to two others, the tremendous amount of operational flexibility increases the probability that the majority of any circuit's unaffected load will be transferred during contingencies.

3.1.2 Normal Peak Load Rating

The Normal Peak Load Rating is the maximum load a cable can be operated at without reducing its service life. Normal daily load cycling, peak loading for 8 hours with the average load throughout the day no more than 75% of the peak ratings, is assumed. If the load criterion is exceeded, the cable will experience thermal degradation and accelerated cable failure. If loaded to a level between the Design Load Rating and the Normal Peak Load Rating, it will not be possible to take full advantage of the circuit load transfer capability to support N-1 contingency conditions.

3.1.3 Emergency Peak Load Rating

The Emergency Peak Load Rating is the maximum load that EDTI is willing to operate a circuit under an outage situation when load is transferred from an adjacent circuit that has experienced a contingency. The Emergency Peak Load Rating for EDTI's 25 kV distribution circuits is 18 MVA. It is expected that loss of cable life will occur, which is based upon "the assumption that the maximum number of emergency periods will not exceed 3 periods in any 12 consecutive months nor on average of 1 period per year for the life of the cable. The maximum duration of any one period should not exceed 36 hours."[1] If the cable loading exceeds the Emergency Peak Load Rating, it is expected that the feeder will experience acute thermal degradation resulting in an accelerated cable failure, ending the asset life of the cable.

3.1.4 Available Tie-away Capacity

The available tie-away capacity for any given circuit is the amount of additional load that the circuit's two most lightly loaded ties - under normal operating condition (N-0) - can accommodate without exceeding their Emergency Peak Load Rating. The Emergency Peak Load Rating for EDTI's 25 kV distribution circuits is 18 MVA. Mathematically, the available tie-away capacity for any circuit can be described as:

Available Tie-away Capacity or ATAC = $\{[18 - \text{Min}(I_1, I_2, \ldots I_n)] + [18 - \text{Min}(I_1, I_2, \ldots I_{n-1})]\}$

With $I_1, I_2, \ldots I_n$ representing peak load forecast -in MVA- for each of the circuit's n ties

- If the circuit's loading is less than or equal to the circuit's ATAC, then no load at risk exists
- If the circuit's loading is greater than to the circuit's ATAC, then load at risk exists

3.2 POD Loading Policy

The Firm Capacity of a POD is an important parameter that EDTI considers for distribution planning purposes. EDTI defines a POD's firm capacity as the maximum load that the POD can supply without overloading any transmission equipment under an N-1 contingency. N-1 contingencies include, but are not limited to, the loss of a single transmission line supply to a POD or the loss of a single transformer at a POD. The thermal capability of terminal equipment at the POD may further restrict the firm capacity. All PODs should operate at or below their firm capacity.

[1] CSA Standard C68.1 Appendix G, note 3

4.0 HISTORICAL AND FORECAST LOAD DEMAND

4.1 Load Forecasting Methodology

EDTI uses a hybrid and multilayered load forecasting methodology that combines economic theory, statistical techniques and end-use methods to forecast electricity peak demands at the system level, POD levels and distribution circuit levels. EDTI has determined that load demand in the Edmonton area is highly sensitive to weather conditions. Furthermore, EDTI found that 98% of growth in non-weather sensitive load during the period from 2011 to 2016 can be explained by only three parameters that include gross domestic product (GDP), population growth and housing starts. EDTI's load forecasting methodology can be summarized as follows:

- Weather normalization – As electricity peak demands in the Edmonton region are sensitive to weather conditions, EDTI's historical peak load demands -both summer and winter- are separated into two components (weather sensitive load and non-weather sensitive load) using the Jackknife analysis. Non-weather sensitive peak demands have higher correlation with load growth factors in the city of Edmonton and they allow for more accurate regression models. Based on the past seventeen years of daily temperature during system peak, EDTI has determined the 10th, 50th and 90th percentile temperature, which are provided in the table below. EDTI produces a 10th, 50th and 90th percentile forecast at the system level, POD levels and distribution circuit levels.

	Summer	**Winter**
10^{th} percentile	28.3°C	-16.4°C
50^{th} percentile	30.7°C	-26.3°C
90^{th} percentile	34.0°C	-32.8°C

- System level load forecasting – Multiple linear regression analysis is deployed to model the system level coincident load based on historical hourly system loading data, historical and forecasted GDP for the Edmonton area, historical and forecasted housing starts, historical and forecasted population growth.

- POD level coincident and non-coincident peaks – EDTI categorizes each POD as residential, mixed/commercial, or industrial depending on the POD's load profile. Residential PODs are the most sensitive to weather conditions whereas industrial PODs are the least sensitive. Depending on the type of the POD, weather sensitivity is adjusted and different predictors are used for the regression analysis. In addition, an area study is performed for each POD to set the upper limit of load growth and historical growth is examined to validate the regression model. Lastly, any anticipated load transfers and special loads are included. Coincident peaks are computed from the POD non-coincident peaks using coincidence factors derived from historical data.

- Circuit level coincident and non-coincident peaks – The POD level non-coincidental peaks are allocated to each circuit and adjusted based on responsibility factors (circuit's loading at the time of the POD's peak divided by the circuit's peak demand) to calculate both coincidental and non-coincidental circuit peak demands. The size of vacant lands, customers' applications for load connection and special loads are also considered to refine the forecast.

- The winter/summer power factor recorded at each of the PODs in 2016 is used as the winter/summer forecast for years 2017 to 2026. While apparent power [MVA] is forecasted using the methodology described above, active power [MW] is a calculated value that assumes the 2016 power factor.

4.2 Load Forecasting Results

Non-coincident peak load demand for the past five years and the next 10 years are provided in Table 5 and Table 6 for the summer and winter season respectively. POD peak load data, including active power [MW], apparent power [MVA] and power factor [pf], is provided for North Calder, Poundmaker, Summerside, East Industrial, Jasper, Petrolia and Dome. Circuit peak load data - in MVA - is provided only for 25 kV distribution circuits at North Calder, Poundmaker, Summerside and East Industrial. Highlighted in red are violations of either EDTI's circuit loading policy or EDTI's POD loading policy discussed in section 3.0. Table 5 and Table 6 show only the 25 kV distribution circuits that are in service.

Peak day temperatures -provided in Table 5 and Table 6- correspond to the highest temperatures that were recorded in the city of Edmonton on the days the various PODs reached their respective seasonal peaks. It should be noted that two adjacent PODs may reach their respective seasonal peaks on two different days.

Table 5: Non-Coincident Summer Peak Load Demand (Pre-Mitigation)

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside POD N-1 Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Summerside POD [MVA]	32.1	49.7	55.2	64.6	66.4	**76.4**	**82.6**	**89.1**	**94.4**	**99.9**	**105.2**	**109.1**	**112.9**	**115.4**	**117.8**
Summerside POD [MW]	31.9	49.2	54.8	64.2	66.0	**75.9**	**82.1**	**88.6**	**93.8**	**99.3**	**104.6**	**108.4**	**112.2**	**114.7**	**117.1**
Summerside POD Power Factor	0.991	0.990	0.992	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
Peak Day Temperature [°C]	32.6	33.7	31.2	34.1	27.4	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
11SU [MVA]	**17.7**	**16.0**	**19.7**	**13.8**	11.7	**13.4**	**14.5**	**15.6**	**16.6**	**17.5**	**18.5**	**19.2**	**19.8**	**20.3**	**20.7**
12SU [MVA]	5.9	6.9	7.6	8.4	9.6	11.0	11.9	**12.8**	**13.6**	**14.4**	**15.1**	**15.7**	**16.2**	**16.6**	**16.9**
13SU [MVA]	-	-	-	**13.4**	**13.8**	**15.9**	**17.2**	**18.5**	**19.6**	**20.7**	**21.8**	**22.6**	**23.4**	**24.0**	**24.4**
14SU [MVA]	-	-	-	-	7.2	8.3	9.0	9.7	10.3	10.8	11.4	11.8	**12.3**	**12.5**	**12.8**
21SU [MVA]	9.4	7.0	8.9	10.3	7.3	8.4	9.1	9.8	10.4	11.0	11.6	**12.0**	**12.4**	**12.7**	**13.0**
22SU [MVA]	-	**20.0**	**20.2**	**14.3**	11.4	**13.1**	**14.1**	**15.2**	**16.1**	**17.1**	**18.0**	**18.6**	**19.3**	**19.7**	**20.1**
23SU [MVA]	-	-	-	8.5	9.4	10.9	11.7	**12.7**	**13.4**	**14.2**	**14.9**	**15.5**	**16.1**	**16.4**	**16.7**
Poundmaker POD N-1 Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Poundmaker POD [MVA]	-	34.7	35.2	38.1	39.0	46.0	49.6	53.3	55.6	57.9	60.0	63.0	66.1	69.2	72.3
Poundmaker POD [MW]	-	32.3	34.7	37.3	38.1	45.0	48.5	52.1	54.4	56.6	58.7	61.6	64.6	67.7	70.7
Poundmaker POD Power Factor	-	0.930	0.985	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
Peak Day Temperature [°C]	-	27.3	31.2	34.1	28.1	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
21PM [MVA]	11.1	10.1	11.3	**12.2**	7.2	7.5	8.1	8.8	9.1	9.5	9.9	10.4	10.9	11.4	11.9
22PM [MVA]	8.0	8.9	8.9	9.3	9.1	10.7	11.5	**12.4**	**12.9**	**13.5**	**14.0**	**14.7**	**15.4**	**16.2**	**16.9**
31PM [MVA]	10.5	8.4	9.5	11.0	7.9	10.0	10.8	11.6	**12.1**	**12.6**	**13.1**	**13.7**	**14.4**	**15.1**	**15.8**
32PM [MVA]	8.2	7.5	7.6	8.1	7.5	8.6	9.3	10.0	10.4	10.8	11.3	11.8	**12.4**	**13.0**	**13.6**
33PM [MVA]	-	-	-	-	9.2	10.1	11.0	11.8	**12.3**	**12.8**	**13.3**	**14.0**	**14.6**	**15.3**	**16.0**
East Industrial POD N-1 Capacity [MVA]	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0
East Industrial POD [MVA]	50.6	51.6	55.6	58.2	55.5	58.7	60.3	62.8	**65.2**	**67.6**	**69.8**	**72.0**	**74.4**	**76.7**	**79.1**
East Industrial POD [MW]	47.2	48.5	51.9	54.6	52.1	55.1	56.6	59.0	**61.2**	**63.5**	**65.5**	**67.6**	**69.9**	**72.0**	**74.3**
East Industrial POD Power Factor	0.933	0.940	0.932	0.937	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939
Peak Day Temperature [°C]	30.6	33.7	29.3	34.1	27.9	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
11E [MVA]	7.5	7.5	8.0	6.9	6.5	6.9	7.1	7.4	7.7	7.9	8.2	8.5	8.7	9.0	9.3
12E [MVA]	7.5	8.9	10.1	11.9	10.1	10.7	11.0	11.5	12.4	**13.3**	**14.1**	**14.9**	**15.8**	**16.6**	**17.5**
13E [MVA]	-	-	-	-	-	7.0	7.2	7.5	7.7	8.0	8.3	8.6	8.9	9.1	9.4
14E [MVA]	9.5	9.8	10.6	11.4	11.4	**12.1**	**12.4**	**12.9**	**13.4**	**13.9**	**14.3**	**14.8**	**15.3**	**15.7**	**16.2**
21E [MVA]	11.9	9.5	10.4	**12.7**	10.7	11.3	11.7	**12.1**	**12.1**	**12.1**	**12.1**	**12.1**	**12.2**	**12.2**	**12.2**
22E [MVA]	**12.2**	**12.3**	**13.4**	**12.5**	11.0	4.6	4.8	5.0	5.2	5.4	5.6	5.7	5.9	6.1	6.3
23E [MVA]	5.3	5.6	6.8	7.0	8.7	9.2	9.4	9.8	10.2	10.6	10.9	11.3	11.6	**12.0**	**12.4**
North Calder POD N-1 Capacity [MVA]	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD [MVA]	**23.7**	**20.6**	**22.3**	**22.6**	**21.3**	**21.7**	**22.1**	**22.5**	**22.9**	**23.3**	**23.7**	**24.1**	**24.5**	**25.0**	**25.4**
North Calder POD [MW]	**21.8**	**19.2**	**20.6**	**21.0**	**19.8**	**20.2**	**20.5**	**20.9**	**21.3**	**21.6**	**22.0**	**22.4**	**22.8**	**23.2**	**23.6**
North Calder POD Power Factor	0.918	0.934	0.923	0.931	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
Peak Day Temperature [°C]	32.6	27.3	28.8	28.2	23.6	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
25L [MVA]	**12.1**	**14.6**	**16.9**	**16.2**	**16.7**	**16.8**	**17.1**	**17.4**	**17.8**	**18.1**	**18.4**	**18.7**	**19.1**	**19.4**	**19.7**
25R [MVA]	10.1	5.7	5.7	5.9	6.0	6.3	6.4	6.5	6.7	6.8	6.9	7.0	7.1	7.3	7.4
Jasper POD N-1 Capacity [MVA]	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Jasper POD [MVA]	**170.2**	**152.0**	**152.9**	138.9	136.5	141.0	141.8	142.2	142.6	143.0	143.3	144.7	146.2	147.7	149.1
Jasper POD [MW]	**158.3**	**140.8**	**142.1**	129.5	128.3	132.5	133.3	133.7	134.0	134.4	134.7	136.0	137.4	138.8	140.2
Jasper POD Power Factor	0.930	0.926	0.930	0.932	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
Peak Day Temperature [°C]	32.6	33.7	31.2	34.1	28.7	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Petrolia POD N-1 Capacity [MVA]	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3
Petrolia POD [MVA]	**87.1**	**90.1**	**85.8**	**91.8**	82.4	**91.5**	**92.0**	**92.4**	**93.0**	**93.5**	**94.0**	**94.5**	**95.0**	**95.5**	**96.0**
Petrolia POD [MW]	**83.4**	**86.4**	**82.4**	**88.6**	79.9	**88.8**	**89.2**	**89.6**	**90.2**	**90.7**	**91.2**	**91.7**	**92.2**	**92.6**	**93.1**
Petrolia POD Power Factor	0.958	0.959	0.960	0.965	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
Peak Day Temperature [°C]	30.6	33.7	31.2	34.1	27.3	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Dome POD N-1 Capacity [MVA]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Dome POD [MVA]	**107.3**	**108.1**	**103.9**	98.0	88.3	88.3	88.3	88.3	88.9	89.9	91.3	92.8	94.3	95.7	97.0
Dome POD [MW]	**99.2**	**100.1**	**96.2**	91.3	82.1	82.1	82.1	82.1	82.7	83.6	84.9	86.3	87.7	89.0	90.2
Dome POD Power Factor	0.924	0.925	0.927	0.931	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
Peak Day Temperature [°C]	28.0	33.7	31.2	34.1	26.8	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0

Table 6: Non-Coincident Winter Peak Demand (Pre-Mitigation)

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside POD N-1 Capacity [MVA]	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
Summerside POD [MVA]	50.9	58.9	67.7	71.1	79.4	87.8	**95.0**	**102.4**	**108.6**	**114.8**	**121.0**	**125.4**	**129.9**	**132.7**	**135.4**
Summerside POD [MW]	50.8	58.8	67.7	71.0	79.4	87.8	**95.0**	**102.4**	**108.6**	**114.8**	**121.0**	**125.4**	**129.9**	**132.7**	**135.4**
Summerside POD Power Factor	0.998	0.998	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Peak Day Temperature [°C]	-28.8	-31.6	-31.6	-30.2	-23.9	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
11SU [MVA]	**18.1**	**19.2**	**12.6**	10.0	11.1	**12.3**	**13.3**	**14.3**	**15.2**	**16.1**	**16.9**	**17.6**	**18.2**	**18.6**	**19.0**
12SU [MVA]	6.2	9.2	11.9	**13.2**	**12.5**	**13.8**	**15.0**	**16.1**	**17.1**	**18.1**	**19.0**	**19.7**	**20.4**	**20.9**	**21.3**
13SU [MVA]	-	-	**19.0**	**13.7**	**14.1**	**15.6**	**16.9**	**18.2**	**19.3**	**20.4**	**21.4**	**22.2**	**23.0**	**23.5**	**24.0**
14SU [MVA]	-	-	-	7.0	8.4	9.3	10.0	10.8	11.4	**12.1**	**12.7**	**13.2**	**13.7**	**14.0**	**14.3**
21SU [MVA]	11.5	9.8	11.6	7.6	9.4	10.4	11.3	**12.2**	**12.9**	**13.6**	**14.3**	**14.9**	**15.4**	**15.7**	**16.1**
22SU [MVA]	**14.5**	**20.7**	**14.3**	11.3	**14.0**	**15.5**	**16.7**	**18.0**	**19.1**	**20.2**	**21.3**	**22.1**	**22.9**	**23.3**	**23.8**
23SU [MVA]	-	-	-	10.0	11.7	**12.9**	**13.9**	**15.0**	**15.9**	**16.8**	**17.7**	**18.4**	**19.0**	**19.5**	**19.9**
Poundmaker POD N-1 Capacity [MVA]	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
Poundmaker POD [MVA]	37.5	36.8	37.2	40.8	44.4	48.9	52.8	56.7	59.1	61.5	63.8	67.7	71.0	74.3	77.6
Poundmaker POD [MW]	37.2	36.4	36.8	40.6	44.3	48.8	52.7	56.6	59.0	61.4	63.7	67.6	70.9	74.2	77.4
Poundmaker POD Power Factor	0.992	0.990	0.991	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
Peak Day Temperature [°C]	-31.0	-21.1	-25.4	-26.3	-23.9	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
21PM [MVA]	-	11.1	**12.4**	**13.6**	8.3	9.0	9.7	10.4	10.9	11.3	11.8	**12.5**	**13.1**	**13.7**	**14.3**
22PM [MVA]	-	8.0	8.5	8.8	10.0	10.8	11.6	**12.5**	**13.1**	**13.6**	**14.1**	**15.0**	**15.7**	**16.5**	**17.2**
31PM [MVA]	-	11.5	10.5	11.5	9.8	10.6	11.5	**12.3**	**12.8**	**13.4**	**13.9**	**14.8**	**15.5**	**16.2**	**16.9**
32PM [MVA]	-	8.5	8.5	8.5	9.0	9.8	10.5	11.3	11.8	**12.3**	**12.8**	**13.6**	**14.2**	**14.9**	**15.6**
33PM [MVA]	-	-	-	-	11.5	**12.4**	**13.4**	**14.4**	**15.0**	**15.6**	**16.2**	**17.2**	**18.1**	**18.9**	**19.8**
East Industrial POD N-1 Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
East Industrial POD [MVA]	47.3	52.0	53.4	55.3	54.2	55.8	57.4	59.7	62.0	64.3	66.4	68.5	70.8	72.9	**75.2**
East Industrial POD [MW]	45.6	49.8	51.1	53.4	52.5	54.1	55.7	57.9	60.1	62.4	64.4	66.4	68.7	70.7	**72.9**
East Industrial POD Power Factor	0.963	0.959	0.958	0.967	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
Peak Day Temperature [°C]	-16.6	-25.1	-15.1	-20.5	-24.4	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
11E [MVA]	7.0	6.6	6.9	5.8	6.0	6.2	6.3	6.6	6.8	7.1	7.3	7.6	7.8	8.0	8.3
12E [MVA]	8.8	9.8	11.1	11.6	**12.1**	**12.4**	**12.8**	**13.3**	**14.3**	**15.2**	**16.0**	**16.9**	**17.8**	**18.7**	**19.6**
13E [MVA]	-	-	-	-	6.9	7.5	7.7	8.0	8.3	8.6	8.9	9.2	9.5	9.8	10.1
14E [MVA]	9.8	9.8	10.7	11.4	11.6	11.9	**12.2**	**12.7**	**13.2**	**13.7**	**14.1**	**14.6**	**15.1**	**15.5**	**16.0**
21E [MVA]	10.1	10.2	10.2	10.9	10.3	10.6	10.9	11.3	11.3	11.3	11.3	11.3	11.4	11.4	11.4
22E [MVA]	**12.9**	**13.0**	**13.4**	**13.9**	**12.2**	5.0	5.1	5.4	5.6	5.8	6.0	6.1	6.4	6.5	6.7
23E [MVA]	6.0	5.5	6.2	9.1	9.2	9.4	9.7	10.1	10.5	10.9	11.2	11.6	**12.0**	**12.3**	**12.7**
North Calder POD N-1 Capacity [MVA]	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD [MVA]	**23.3**	**19.9**	**21.0**	**21.3**	**22.3**	**21.2**	**21.6**	**22.0**	**22.4**	**22.8**	**23.2**	**23.6**	**24.0**	**24.5**	**24.9**
North Calder POD [MW]	**21.8**	**18.9**	**19.9**	**20.1**	**21.1**	**20.1**	**20.5**	**20.9**	**21.2**	**21.6**	**22.0**	**22.4**	**22.8**	**23.2**	**23.6**
North Calder POD Power Factor	0.936	0.949	0.950	0.943	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
Peak Day Temperature [°C]	-2.2	-25.1	-18.4	-19.0	-4.7	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
25L [MVA]	**12.5**	**14.4**	**15.0**	**15.3**	**15.8**	**16.5**	**16.8**	**17.1**	**17.4**	**17.7**	**18.0**	**18.3**	**18.7**	**19.0**	**19.3**
25R [MVA]	5.1	5.5	5.7	5.8	5.9	6.2	6.3	6.4	6.5	6.6	6.8	6.9	7.0	7.1	7.3
Jasper POD N-1 Capacity [MVA]	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Jasper POD [MVA]	141.2	120.8	123.1	118.5	120.6	117.5	118.3	118.6	118.9	119.2	119.5	120.7	121.9	123.1	124.4
Jasper POD [MW]	135.2	115.4	118.3	111.8	115.3	112.3	113.1	113.4	113.7	114.0	114.2	115.4	116.5	117.7	118.9
Jasper POD Power Factor	0.958	0.955	0.961	0.944	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956
Peak Day Temperature [°C]	-32.1	-30.6	-27.3	-26.1	-24.4	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
Petrolia POD N-1 Capacity [MVA]	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9
Petrolia POD [MVA]	90.0	90.6	91.7	91.1	90.6	91.4	91.9	92.4	92.9	93.4	93.9	94.4	94.9	95.4	95.9
Petrolia POD [MW]	88.5	89.0	90.2	89.8	89.1	89.8	90.3	90.8	91.3	91.8	92.3	92.8	93.3	93.8	94.3
Petrolia POD Power Factor	0.983	0.983	0.984	0.986	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
Peak Day Temperature [°C]	-31.0	-20.4	-31.6	-30.2	-23.9	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
Dome POD N-1 Capacity [MVA]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Dome POD [MVA]	87.4	86.3	86.4	88.6	81.2	80.5	80.5	80.5	81.0	82.0	83.2	84.6	85.9	87.2	88.4
Dome POD [MW]	83.5	83.1	83.4	85.0	77.8	77.1	77.1	77.1	77.6	78.6	79.7	81.0	82.3	83.5	84.7
Dome POD Power Factor	0.956	0.963	0.965	0.959	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958
Peak Day Temperature [°C]	-31.0	-25.1	-19.8	-18.9	-16.5	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8

4.3 North Calder POD

North Calder is an AltaLink's POD. Contractually, EDTI is guaranteed a capacity of only 16.9 MVA under N-1 condition. As shown in Table 5 and Table 6, EDTI's load that is supplied from the North Calder POD has long exceeded the contracted capacity of 16.9 MVA. In summer 2016, EDTI's drew 21.5 MVA from the North Calder POD. EDTI's load in the North Calder area is forecasted to reach 25.4 MVA by summer 2026. Moreover, 25R and 25L are the only two circuits that serve EDTI's load in the North Calder area. As shown in Table 5 and Table 6, 25L has long exceeded its design rating of 12 MVA. In summer 2016, EDTI recorded a peak load of 16.7 MVA on circuit 25L.

4.4 Poundmaker POD

Poundmaker POD is not forecasted to exceed its N-1 transformer supply capability within the next 10 years. However, loading on all existing Poundmaker distribution circuits are forecasted to exceed their design rating of 12 MVA by winter 2023. In fact, as shown in Table 6, 33PM, 31PM, 22PM, 32PM and 21PM are forecasted to exceed their design rating – for the first time – in winter 2017, 2019, 2019, 2021, and 2023 respectively. EDTI expects these violations to persist in subsequent years if no action is taken.

4.5 Summerside POD

Seven of the eight 25 kV feeder breakers at Summerside POD have circuits connected to them. As shown in Table 6, by summer 2017, load demand at Summerside POD is forecasted to exceed the POD's N-1 transformer capability. Furthermore, peak load on all Summerside distribution circuits is forecasted to exceed their design rating of 12 MVA – for the first time – by winter 2021. In fact, in winter 2016 already, three summerside circuits -12SU, 13SU and 22SU- exceeded their design rating of 12 MVA; in winter 2017, 11SU and 23SU are forecasted to exceed their design rating; in winter 2019, 21SU is forecasted to exceed its design rating; in winter 2021, 14SU is forecasted to exceed its design rating. EDTI expects these violations to persist in subsequent years if no action is taken.

4.6 East Industrial POD

By summer 2020, load demand at East Industrial POD is forecasted to exceed the POD's N-1 transformer capability for the first time. With both Summerside and East Industrial exceeding their N-1 transformer supply capability, permanent load transfers between the two PODs is not feasible without transmission and/or distribution development. Moreover, the peak load on all East Industrial distribution circuits - with exception of 11E - is forecasted to exceed the design rating of 12 MVA by winter 2024. In fact, in winter 2016 already, two of East Industrial distribution circuits -12E and 22E- did exceed their design rating of 12 MVA; in summer 2017, 14E is forecasted to exceed its design rating; in summer 2019, 21E is forecasted to exceed its design rating; in winter 2024, 23E is forecasted to exceed its design rating. EDTI expects these violations to persist in subsequent years if no action is taken.

4.7 Adjacent PODs

Three 15 kV PODs exist in the vicinity of the areas of interest. These PODs include Jasper, Petrolia and Dome. As shown in Table 5, Petrolia POD has insufficient capacity. In fact, the loading at Petrolia POD has long exceeded POD's N-1 capacity. Dome and Jasper PODs are likely to exceed their respective N-1 capacity by 2026. Nevertheless, any existing available distribution system capacity at either Jasper POD or Dome POD cannot assist in meeting the new demand for electricity in the south and west Edmonton areas of interest that are currently supplied from the 25 kV PODs.

5.0 DISTRIBUTION DEFICIENCY ASSESSMENT

According to EDTI's circuit loading policy, if a distribution circuit is rendered unavailable, 100% of the loading on that circuit should be transferable to two adjacent circuits. In this section, each of EDTI's distribution circuits in North Calder, Poundmaker, Summerside and East Industrial areas is analyzed in order to determine the circuit's available tie-away capacity. Load at risk exists whenever there is insufficient tie-away capacity on two adjacent circuits. This analysis leverages the tie-away matrix for each POD that is discussed in section 2.

5.1 North Calder

Tables 7 and 8 present annual peak load forecasts for each of the distribution circuits in the North Calder area. In addition, the corresponding tie-away capacity and load at risk are provided. Violations of EDTI's circuit loading policy are highlighted in red.

Table 7: Summer Load at Risk at North Calder POD (Pre-Mitigation)

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
POD Firm Capacity [MVA]	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD [MVA]	**23.7**	**20.6**	**22.3**	**22.6**	**21.3**	**21.7**	**22.1**	**22.5**	**22.9**	**23.3**	**23.7**	**24.1**	**24.5**	**25.0**	**25.4**
Load at Risk [MVA]	**6.8**	**3.7**	**5.4**	**5.7**	**4.4**	**4.8**	**5.2**	**5.6**	**6.0**	**6.4**	**6.8**	**7.2**	**7.6**	**8.1**	**8.5**
Circuit Design Load Rating [MVA]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Circuit Emergency Load Rating [MVA]	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
25L [MVA]	**12.1**	**14.6**	**16.9**	**16.2**	**16.7**	**16.8**	**17.1**	**17.4**	**17.8**	**18.1**	**18.4**	**18.7**	**19.1**	**19.4**	**19.7**
Available Tie-Away Capacity [MVA]	17.9	21.4	21.4	20.8	20.9	19.0	18.1	17.1	16.4	15.7	15.1	14.3	13.5	12.5	11.7
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**	**1.4**	**2.4**	**3.3**	**4.4**	**5.6**	**6.9**	**8.0**
25R [MVA]	10.1	5.7	5.7	5.9	6.0	6.3	6.4	6.5	6.7	6.8	6.9	7.0	7.1	7.3	7.4
Available Tie-Away Capacity [MVA]	15.9	12.5	10.2	10.5	10.2	8.5	7.4	6.2	5.3	4.4	3.6	2.6	1.5	0.4	0.0
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**	**1.4**	**2.4**	**3.3**	**4.4**	**5.6**	**6.9**	**7.4**

Table 8: Winter Load at Risk at North Calder POD (Pre-Mitigation)

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
POD Firm Capacity [MVA]	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD [MVA]	**23.3**	**19.9**	**21.0**	**21.3**	**22.3**	**21.2**	**21.6**	**22.0**	**22.4**	**22.8**	**23.2**	**23.6**	**24.0**	**24.5**	**24.9**
Load at Risk [MVA]	**6.4**	**3.0**	**4.1**	**4.4**	**5.4**	**4.3**	**4.7**	**5.1**	**5.5**	**5.9**	**6.3**	**6.7**	**7.1**	**7.6**	**8.0**
Circuit Design Load Rating [MVA]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Circuit Emergency Load Rating [MVA]	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
25L [MVA]	**12.5**	**14.4**	**15.0**	**15.3**	**15.8**	**16.5**	**16.8**	**17.1**	**17.4**	**17.7**	**18.0**	**18.3**	**18.7**	**19.0**	**19.3**
Available Tie-Away Capacity [MVA]	12.9	22.5	21.8	21.4	20.1	19.0	18.1	17.1	16.4	15.8	15.1	14.1	13.3	12.4	11.5
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.0**	**1.9**	**2.9**	**4.2**	**5.4**	**6.6**	**7.8**
25R [MVA]	5.1	5.5	5.7	5.8	5.9	6.2	6.3	6.4	6.5	6.6	6.8	6.9	7.0	7.1	7.3
Available Tie-Away Capacity [MVA]	5.5	13.6	12.5	11.9	10.2	8.7	7.6	6.4	5.5	4.7	3.9	2.7	1.6	0.5	0.0
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	**1.0**	**1.9**	**2.9**	**4.2**	**5.4**	**6.6**	**7.3**

5.2 Poundmaker

Tables 9 and 10 present annual peak load forecasts for each of the distribution circuits in the Poundmaker area. In addition, the corresponding tie-away capacity and load at risk are provided. Violations of EDTI's circuit loading policy are highlighted in red.

Table 9: Summer Load at Risk at Poundmaker POD (Pre-Mitigation)

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
POD Firm Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Poundmaker POD [MVA]		34.7	35.2	38.1	39.0	46.0	49.6	53.3	55.6	57.9	60.0	63.0	66.1	69.2	72.3
Load at Risk [MVA]	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
Circuit Design Load Rating [MVA]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Circuit Emergency Load Rating [MVA]	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
21PM [MVA]	11.1	10.1	11.3	**12.2**	7.2	7.5	8.1	8.8	9.1	9.5	9.9	10.4	10.9	11.4	11.9
Available Tie-Away Capacity [MVA]	9.8	10.5	10.4	9.9	19.3	17.3	15.7	14.2	13.3	12.4	11.4	10.2	9.0	7.7	6.4
Load at Risk [MVA]	**1.3**	0.0	**0.9**	**2.3**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**	**1.9**	**3.7**	**5.5**
22PM [MVA]	8.0	8.9	8.9	9.3	9.1	10.7	11.5	**12.4**	**12.9**	**13.5**	**14.0**	**14.7**	**15.4**	**16.2**	**16.9**
Available Tie-Away Capacity [MVA]	17.7	22.8	22.7	22.0	22.5	21.1	20.3	19.5	18.9	18.4	17.8	17.2	16.5	15.7	15.0
Load at Risk [MVA]	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	**0.5**	**1.9**
31PM [MVA]	10.5	8.4	9.5	11.0	7.9	10.0	10.8	11.6	**12.1**	**12.6**	**13.1**	**13.7**	**14.4**	**15.1**	**15.8**
Available Tie-Away Capacity [MVA]	16.9	18.4	17.1	15.7	21.3	19.9	18.6	17.2	16.5	15.7	14.8	13.8	12.7	11.6	10.5
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.7**	**3.5**	**5.3**
32PM [MVA]	8.2	7.5	7.6	8.1	7.5	8.6	9.3	10.0	10.4	10.8	11.3	11.8	**12.4**	**13.0**	**13.6**
Available Tie-Away Capacity [MVA]	17.5	18.7	17.6	15.7	20.9	18.5	17.1	15.6	14.8	13.9	13.0	11.9	10.7	9.5	8.3
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.7**	**3.5**	**5.3**
33PM [MVA]					9.2	10.1	11.0	11.8	**12.3**	**12.8**	**13.3**	**14.0**	**14.6**	**15.3**	**16.0**
Available Tie-Away Capacity [MVA]					20.9	20.2	18.9	17.5	16.6	15.7	14.7	13.8	12.8	12.1	11.3
Load at Risk [MVA]					0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**	**1.8**	**3.2**	**4.7**

Table 10: Winter Load at Risk at Poundmaker POD (Pre-Mitigation)

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
POD Firm Capacity [MVA]	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
Poundmaker POD [MVA]	37.5	36.8	37.2	40.8	44.4	48.9	52.8	56.7	59.1	61.5	63.8	67.7	71.0	74.3	77.6
Load at Risk [MVA]	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
Circuit Design Load Rating [MVA]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Circuit Emergency Load Rating [MVA]	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
21PM [MVA]		11.1	**12.4**	**13.6**	8.3	9.0	9.7	10.4	10.9	11.3	11.8	**12.5**	**13.1**	**13.7**	**14.3**
Available Tie-Away Capacity [MVA]		9.5	9.5	9.5	15.5	13.8	12.1	10.3	9.2	8.1	7.0	5.2	3.7	2.2	0.6
Load at Risk [MVA]		**1.6**	**2.9**	**4.1**	0.0	0.0	0.0	**0.1**	**1.7**	**3.2**	**4.8**	**7.3**	**9.4**	**11.5**	**13.7**
22PM [MVA]		8.0	8.5	8.8	10.0	10.8	11.6	**12.5**	**13.1**	**13.6**	**14.1**	**15.0**	**15.7**	**16.5**	**17.2**
Available Tie-Away Capacity [MVA]		22.0	21.8	21.7	21.1	20.0	19.2	18.3	17.7	17.1	16.4	15.5	14.8	14.0	13.1
Load at Risk [MVA]		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.9**	**2.5**	**4.1**
31PM [MVA]		11.5	10.5	11.5	9.8	10.6	11.5	**12.3**	**12.8**	**13.4**	**13.9**	**14.8**	**15.5**	**16.2**	**16.9**
Available Tie-Away Capacity [MVA]		16.9	15.1	13.9	18.7	17.2	15.8	14.3	13.3	12.4	11.4	9.9	8.7	7.4	6.1
Load at Risk [MVA]		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.0**	**2.5**	**4.9**	**6.8**	**8.8**	**10.8**
32PM [MVA]		8.5	8.5	8.5	9.0	9.8	10.5	11.3	11.8	**12.3**	**12.8**	**13.6**	**14.2**	**14.9**	**15.6**
Available Tie-Away Capacity [MVA]		16.5	17.0	15.7	17.9	16.4	14.8	13.3	12.3	11.3	10.3	8.7	7.4	6.1	4.8
Load at Risk [MVA]		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.0**	**2.5**	**4.9**	**6.8**	**8.8**	**10.8**
33PM [MVA]					11.5	**12.4**	**13.4**	**14.4**	**15.0**	**15.6**	**16.2**	**17.2**	**18.1**	**18.9**	**19.8**
Available Tie-Away Capacity [MVA]					19.3	17.7	16.3	14.8	13.7	12.6	11.5	10.3	9.2	8.3	4.8
Load at Risk [MVA]					0.0	0.0	0.0	0.0	**1.3**	**3.0**	**4.7**	**6.9**	**8.9**	**10.6**	**15.0**

5.3 Summerside

Tables 11 and 12 present annual peak load forecasts for each of the distribution circuits in the Summerside area. In addition, the corresponding tie-away capacity and load at risk are provided. Violations of EDTI's circuit loading policy are highlighted in red.

Table 11: Summer Load at Risk at Summerside POD (Pre-Mitigation)

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
POD Firm Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Summerside POD [MVA]	32.1	49.7	55.2	64.6	66.4	**76.4**	**82.6**	**89.1**	**94.4**	**99.9**	**105.2**	**109.1**	**112.9**	**115.4**	**117.8**
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	**1.4**	**7.6**	**14.1**	**19.4**	**24.9**	**30.2**	**34.1**	**37.9**	**40.4**	**42.8**
Circuit Design Load Rating [MVA]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Circuit Emergency Load Rating [MVA]	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
11SU [MVA]	**17.7**	**16.0**	**19.7**	**13.8**	11.7	**13.4**	**14.5**	**15.6**	**16.6**	**17.5**	**18.5**	**19.2**	**19.8**	**20.3**	**20.7**
Available Tie-Away Capacity [MVA]	20.7	22.1	19.5	19.1	19.3	16.7	15.2	13.5	12.2	10.8	9.5	8.5	7.5	6.9	6.3
Load at Risk [MVA]	0.0	0.0	**0.2**	0.0	0.0	0.0	0.0	**2.1**	**4.4**	**6.7**	**9.0**	**10.7**	**12.3**	**13.4**	**14.4**
12SU [MVA]	5.9	6.9	7.6	8.4	9.6	11.0	11.9	**12.8**	**13.6**	**14.4**	**15.1**	**15.7**	**16.2**	**16.6**	**16.9**
Available Tie-Away Capacity [MVA]	21.3	23.4	20.3	18.7	20.0	18.4	17.5	10.6	15.4	14.4	13.5	12.7	12.0	11.3	10.6
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2.2**	0.0	**0.0**	**1.6**	**3.0**	**4.2**	**5.3**	**6.3**
13SU [MVA]				**13.4**	**13.8**	**15.9**	**17.2**	**18.5**	**19.6**	**20.7**	**21.8**	**22.6**	**23.4**	**24.0**	**24.4**
Available Tie-Away Capacity [MVA]				9.5	19.4	16.8	15.3	13.6	12.3	11.0	9.7	8.7	7.6	7.1	6.5
Load at Risk [MVA]				**3.9**	0.0	0.0	**1.9**	**4.9**	**7.3**	**9.7**	**12.1**	**13.9**	**15.8**	**16.9**	**17.9**
14SU [MVA]					7.2	8.3	9.0	9.7	10.3	10.8	11.4	11.8	**12.3**	**12.5**	**12.8**
Available Tie-Away Capacity [MVA]					28.7	20.6	19.7	18.7	17.9	17.0	16.1	15.4	14.7	14.2	13.6
Load at Risk [MVA]					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21SU [MVA]	9.4	7.0	8.9	10.3	7.3	8.4	9.1	9.8	10.4	11.0	11.6	**12.0**	**12.4**	**12.7**	**13.0**
Available Tie-Away Capacity [MVA]	12.4	13.1	8.7	13.8	19.2	16.7	15.1	13.5	12.1	10.8	9.5	8.5	7.5	6.9	6.3
Load at Risk [MVA]	0.0	0.0	**0.2**	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**	**2.1**	**3.5**	**4.9**	**5.8**	**6.7**
22SU [MVA]		**20.0**	**20.2**	**14.3**	11.4	**13.1**	**14.1**	**15.2**	**16.1**	**17.1**	**18.0**	**18.6**	**19.3**	**19.7**	**20.1**
Available Tie-Away Capacity [MVA]				14.1	12.8	9.2	7.1	4.8	3.0	1.1	0.0	0.0	0.0	0.0	0.0
Load at Risk [MVA]				**0.2**	0.0	**3.9**	**7.0**	**10.4**	**13.1**	**16.0**	**18.0**	**18.6**	**19.3**	**19.7**	**20.1**
23SU [MVA]				8.5	9.4	10.9	11.7	**12.7**	**13.4**	**14.2**	**14.9**	**15.5**	**16.1**	**16.4**	**16.7**
Available Tie-Away Capacity [MVA]				8.8	17.4	14.6	12.9	11.1	9.6	8.1	6.6	5.6	4.4	3.8	3.1
Load at Risk [MVA]				0.0	0.0	0.0	0.0	**1.6**	**3.8**	**6.1**	**8.3**	**9.9**	**11.7**	**12.6**	**13.6**

Table 12: Winter Load at Risk at Summerside POD (Pre-Mitigation)

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
POD Firm Capacity [MVA]	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
Summerside POD [MVA]	50.9	58.9	67.7	71.1	79.4	87.8	**95.0**	**102.4**	**108.6**	**114.8**	**121.0**	**125.4**	**129.9**	**132.7**	**135.4**
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	**6.0**	**13.4**	**19.6**	**25.8**	**32.0**	**36.4**	**40.9**	**43.7**	**46.4**
Circuit Design Load Rating [MVA]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Circuit Emergency Load Rating [MVA]	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
11SU [MVA]	**18.1**	**19.2**	**12.6**	10.0	11.1	**12.3**	**13.3**	**14.3**	**15.2**	**16.1**	**16.9**	**17.6**	**18.2**	**18.6**	**19.0**
Available Tie-Away Capacity [MVA]	18.3	17.0	12.5	18.4	14.9	12.7	10.8	8.8	7.2	5.6	4.0	2.7	1.6	0.8	0.0
Load at Risk [MVA]	0.0	**2.2**	**0.1**	0.0	0.0	0.0	**2.5**	**5.5**	**8.0**	**10.5**	**12.9**	**14.9**	**16.6**	**17.8**	**19.0**
12SU [MVA]	6.2	9.2	11.9	**13.2**	**12.5**	**13.8**	**15.0**	**16.1**	**17.1**	**18.1**	**19.0**	**19.7**	**20.4**	**20.9**	**21.3**
Available Tie-Away Capacity [MVA]	18.5	20.7	18.2	19.3	17.4	16.2	15.0	13.7	12.6	11.5	10.5	9.5	8.6	8.0	7.2
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2.4**	**4.5**	**6.6**	**8.5**	**10.2**	**11.8**	**12.9**	**14.1**
13SU [MVA]			**19.0**	**13.7**	**14.1**	**15.6**	**16.9**	**18.2**	**19.3**	**20.4**	**21.4**	**22.2**	**23.0**	**23.5**	**24.0**
Available Tie-Away Capacity [MVA]			3.7	8.0	15.9	13.8	12.1	10.2	8.7	7.1	5.6	4.4	3.3	2.5	1.8
Load at Risk [MVA]			**15.3**	**5.7**	0.0	**1.8**	**4.8**	**8.0**	**10.6**	**13.3**	**15.8**	**17.8**	**19.7**	**21.0**	**22.2**
14SU [MVA]				7.0	8.4	9.3	10.0	10.8	11.4	**12.1**	**12.7**	**13.2**	**13.7**	**14.0**	**14.3**
Available Tie-Away Capacity [MVA]				18.4	19.7	18.3	17.0	15.8	14.8	13.8	12.8	11.9	11.1	10.5	9.8
Load at Risk [MVA]				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.3**	**2.6**	**3.5**	**4.5**
21SU [MVA]	11.5	9.8	11.6	7.6	9.4	10.4	11.3	**12.2**	**12.9**	**13.6**	**14.3**	**14.9**	**15.4**	**15.7**	**16.1**
Available Tie-Away Capacity [MVA]	11.7	7.6	11.5	12.8	16.5	14.4	12.7	10.9	9.4	7.8	6.4	5.2	4.1	3.4	2.7
Load at Risk [MVA]	0.0	**2.2**	**0.1**	0.0	0.0	0.0	0.0	**1.3**	**3.5**	**5.8**	**7.9**	**9.7**	**11.3**	**12.3**	**13.4**
22SU [MVA]	**14.5**	**20.7**	**14.3**	11.3	**14.0**	**15.5**	**16.7**	**18.0**	**19.1**	**20.2**	**21.3**	**22.1**	**22.9**	**23.3**	**23.8**
Available Tie-Away Capacity [MVA]				12.3	10.2	7.5	5.2	2.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Load at Risk [MVA]				0.0	**3.8**	**8.0**	**11.5**	**15.2**	**18.3**	**20.2**	**21.3**	**22.1**	**22.9**	**23.3**	**23.8**
23SU [MVA]				10.0	11.7	**12.9**	**13.9**	**15.0**	**15.9**	**16.8**	**17.7**	**18.4**	**19.0**	**19.5**	**19.9**
Available Tie-Away Capacity [MVA]				14.7	16.5	14.4	12.7	10.9	9.4	7.8	6.4	5.2	4.1	3.4	2.7
Load at Risk [MVA]				0.0	0.0	0.0	**1.2**	**4.1**	**6.5**	**9.0**	**11.3**	**13.2**	**14.9**	**16.1**	**17.2**

5.4 East Industrial

Tables 13 and 14 present annual peak load forecasts for each of the distribution circuits in the Poundmaker area. In addition, the corresponding tie-away capacity and load at risk are provided. Violations of EDTI's circuit loading policy are highlighted in red.

Table 13: Summer Load at Risk at East Industrial POD (Pre-Mitigation)

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
POD Firm Capacity [MVA]	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0
East Industrial POD [MVA]	50.6	51.6	55.6	58.2	55.5	58.7	60.3	62.8	**65.2**	**67.6**	**69.8**	**72.0**	**74.4**	**76.7**	**79.1**
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2.2**	**4.6**	**6.8**	**9.0**	**11.4**	**13.7**	**16.1**
Circuit Design Load Rating [MVA]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Circuit Emergency Load Rating [MVA]	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
11E [MVA]	7.5	7.5	8.0	6.9	6.5	6.9	7.1	7.4	7.7	7.9	8.2	8.5	8.7	9.0	9.3
Available Tie-Away Capacity [MVA]	18.8	20.9	18.8	16.3	16.6	20.1	19.5	18.9	18.7	18.5	18.3	18.2	17.9	17.7	17.5
Load at Risk [MVA]	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
12E [MVA]	7.5	8.9	10.1	11.9	10.1	10.7	11.0	11.5	**12.4**	**13.3**	**14.1**	**14.9**	**15.8**	**16.6**	**17.5**
Available Tie-Away Capacity [MVA]	12.7	12.4	11.2	11.0	9.3	19.8	19.4	18.7	18.1	17.4	16.8	16.1	15.5	14.9	14.2
Load at Risk [MVA]	0.0	0.0	0.0	**0.9**	**0.8**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**	**1.7**	**3.3**
13E [MVA]						7.0	7.2	7.5	7.7	8.0	8.3	8.6	8.9	9.1	9.4
Available Tie-Away Capacity [MVA]	23.2	21.5	19.1	17.6	20.1	18.5	17.6	16.5	15.5	14.6	13.7	12.9	12.1	11.5	10.8
Load at Risk [MVA]	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
14E [MVA]	9.5	9.8	10.6	11.4	11.4	**12.1**	**12.4**	**12.9**	**13.4**	**13.9**	**14.3**	**14.8**	**15.3**	**15.7**	**16.2**
Available Tie-Away Capacity [MVA]	12.7	12.4	11.2	11.0	9.3	19.8	19.4	18.7	18.1	17.4	16.8	16.1	15.5	14.9	14.2
Load at Risk [MVA]	0.0	0.0	0.0	**0.4**	**2.1**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.8**	**2.0**
21E [MVA]	11.9	9.5	10.4	**12.7**	10.7	11.3	11.7	**12.1**	**12.1**	**12.1**	**12.1**	**12.1**	**12.2**	**12.2**	**12.2**
Available Tie-Away Capacity [MVA]	10.5	10.5	10.0	11.1	11.5	11.1	10.9	10.6	10.3	10.1	9.8	9.5	9.3	9.0	8.7
Load at Risk [MVA]	**1.4**	0.0	**0.4**	**1.6**	0.0	**0.2**	**0.8**	**1.5**	**1.8**	**2.0**	**2.3**	**2.6**	**2.9**	**3.2**	**3.5**
22E [MVA]	**12.2**	**12.3**	**13.4**	**12.5**	11.0	4.6	4.8	5.0	5.2	5.4	5.6	5.7	5.9	6.1	6.3
Available Tie-Away Capacity [MVA]	10.5	10.5	10.0	11.1	11.5	11.1	10.9	10.6	10.3	10.1	9.8	9.5	9.3	9.0	8.7
Load at Risk [MVA]	**1.7**	**1.8**	**3.4**	**1.4**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23E [MVA]	5.3	5.6	6.8	7.0	8.7	9.2	9.4	9.8	10.2	10.6	10.9	11.3	11.6	**12.0**	**12.4**
Available Tie-Away Capacity [MVA]	30.1	29.1	28.4	29.1	29.5	22.1	21.7	21.1	15.9	20.1	19.5	18.9	18.4	17.9	17.3
Load at Risk [MVA]	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

Table 14: Winter Load at Risk at East Industrial POD (Pre-Mitigation)

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
POD Firm Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
East Industrial POD [MVA]	47.3	52.0	53.4	55.3	54.2	55.8	57.4	59.7	62.0	64.3	66.4	68.5	70.8	72.9	**75.2**
Load at Risk [MVA]	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	**0.2**
Circuit Design Load Rating [MVA]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Circuit Emergency Load Rating [MVA]	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
11E [MVA]	7.0	6.6	6.9	5.8	6.0	6.2	6.3	6.6	6.8	7.1	7.3	7.6	7.8	8.0	8.3
Available Tie-Away Capacity [MVA]	19.9	20.3	19.6	16.0	16.5	20.4	20.0	19.3	19.1	18.9	18.7	18.6	18.2	18.1	17.9
Load at Risk [MVA]	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
12E [MVA]	8.8	9.8	11.1	11.6	**12.1**	**12.4**	**12.8**	**13.3**	**14.3**	**15.2**	**16.0**	**16.9**	**17.8**	**18.7**	**19.6**
Available Tie-Away Capacity [MVA]	12.0	12.5	11.8	8.9	19.9	19.3	18.6	17.9	17.2	16.5	15.9	15.2	14.5	13.9	13.2
Load at Risk [MVA]	0.0	0.0	0.0	**2.7**	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**1.7**	**3.3**	**4.8**	**6.4**
13E [MVA]					6.9	7.3	7.7	8.0	8.3	8.6	8.9	9.2	9.5	9.8	10.1
Available Tie-Away Capacity [MVA]					18.4	17.3	16.3	15.1	14.1	13.0	12.1	11.2	10.3	9.7	9.0
Load at Risk [MVA]					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**1.1**
14E [MVA]	9.8	9.8	10.7	11.4	11.6	11.9	**12.2**	**12.7**	**13.2**	**13.7**	**14.1**	**14.6**	**15.1**	**15.5**	**16.0**
Available Tie-Away Capacity [MVA]	12.0	12.5	11.8	8.9	19.9	19.3	18.6	17.9	17.2	16.5	15.9	15.2	14.5	13.9	13.2
Load at Risk [MVA]	0.0	0.0	0.0	**2.5**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.6**	**1.6**	**2.8**
21E [MVA]	10.1	10.2	10.2	10.9	10.3	10.6	10.9	11.3	11.3	11.3	11.3	11.3	11.4	11.4	11.4
Available Tie-Away Capacity [MVA]	11.0	11.4	11.1	12.2	12.0	11.8	11.7	11.4	11.2	10.9	10.7	10.4	10.2	10.0	9.7
Load at Risk [MVA]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.1**	**0.4**	**0.6**	**0.9**	**1.2**	**1.4**	**1.7**
22E [MVA]	**12.9**	**13.0**	**13.4**	**13.9**	**12.2**	5.0	5.1	5.4	5.6	5.8	6.0	6.1	6.4	6.5	6.7
Available Tie-Away Capacity [MVA]	11.0	11.4	11.1	12.2	12.0	11.8	11.7	11.4	11.2	10.9	10.7	10.4	10.2	10.0	9.7
Load at Risk [MVA]	**1.9**	**1.6**	**2.3**	**1.7**	**0.2**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23E [MVA]	6.0	5.5	6.2	9.1	9.2	9.4	9.7	10.1	10.5	10.9	11.2	11.6	12.0	**12.3**	**12.7**
Available Tie-Away Capacity [MVA]	22.8	20.2	18.4	18.8	23.1	22.5	22.0	21.4	20.9	20.3	19.8	19.2	18.7	18.2	17.6
Load at Risk [MVA]	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

5.5 Summary of Load at Risk

If no action is taken, it is forecasted that up to 196 MVA of distribution load will be at risk by winter 2026. The breakdown of load at risk by POD and by year is provided in Table 15. All shown quantities are in MVA.

Table 15: Summary of Load at Risk by POD (Pre-Mitigation)

Substation	Season	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside	S	0	0	0	4	0	4	9	21	29	39	51	60	68	74	79
	W	0	4	16	6	4	10	20	37	51	65	78	89	100	107	114
Poundmaker	S	1	0	1	2	0	0	0	0	0	0	0	0	7	14	23
	W	0	2	3	4	0	0	0	0	3	8	15	24	33	42	54
East Industrial	S	3	2	4	4	3	0	1	2	2	2	2	3	3	6	9
	W	2	2	2	7	0	0	0	0	0	0	1	3	5	8	12
North Calder	S	7	4	5	6	4	5	5	6	6	6	7	9	11	14	15
	W	6	3	4	4	5	4	5	5	6	6	6	8	11	13	15
Total	**S**	**11**	**6**	**11**	**16**	**7**	**9**	**15**	**28**	**36**	**47**	**60**	**71**	**90**	**108**	**126**
	W	**8**	**11**	**25**	**21**	**9**	**14**	**25**	**42**	**60**	**80**	**99**	**124**	**149**	**170**	**196**

Of the 196 MVA of distribution load forecasted to be at risk by winter 2026, 9 MVA was at risk in 2016 and 80 MVA is forecasted to be at risk by 2021.

196 MVA divided by 12 MVA equates to 16; 12 MVA being the Design Load Rating for EDTI's 25 kV distribution circuits. This is a top-down approach for determining the number of distribution circuits required to alleviate all load at risk described in Tables 7 to 14. Hence, up to 16 new distribution circuits may be required by 2026.

A more practical approach or bottom-up approach consists in gradually adding new distribution circuits as load at risk emerges. As outlined below, the gradual addition of 14 new distribution circuits –starting in 2018- can be effective in maintaining all 25 kV distribution circuits -in the areas of interest- below their Design Load Rating of 12 MVA up to 2026.

1. Add a new circuit in 2018 to offload 12SU
2. Add a new circuit in 2018 to offload 32PM
3. Add a new circuit in 2018 to offload 22PM and 25L
4. Add a new circuit in 2019 to offload 13SU
5. Add a new circuit in 2019 to offload 14SU, 22SU and 23SU
6. Add a new circuit in 2020 to offload 33PM
7. Add a new circuit in 2020 to offload 31PM
8. Add a new circuit in 2021 to offload 22RV
9. Add a new circuit in 2021 to offload 11SU
10. Add a new circuit in 2021 to offload 21SU and 12E
11. Add a new circuit in 2021 to offload 12E and 14E
12. Add a new circuit in 2022 to offload 22SU and 23SU
13. Add a new circuit in 2023 to offload 22PM and 24PM
14. Add a new circuit in 2026 to offload 23E

6.0 SOLUTION ALTERNATIVES

The distribution deficiency assessment in section 5 has demonstrated the need for fourteen 25 kV distribution feeders to meet the distribution capacity requirements for South and West Edmonton over the next 10 years. Given that four 25 kV feeder breakers are currently available for use at existing EDTI's PODs - 3 feeder breakers at Poundmaker POD (23PM, 24PM, and 34PM) and 1 feeder breaker at Summerside POD (24SU) - a balance of ten new 25 kV feeder breakers is required. According to load forecast tables for alternatives 4, 5, 6 and 7 provided in sections 9.7 and 9.8, 24SU, 23PM, 24PM, and 34PM will serve the same load in all the alternatives considered. Hence, the distribution feeder lengths and the associated costs for the 24SU, 23PM, 24PM and 34PM distribution feeders will not differ between the alternatives. Therefore, 24SU, 23PM, 24PM and 34PM are not relevant for the comparative evaluation of the alternatives.

To obtain the balance of ten 25 kV feeder breakers, the following solution alternatives were explored:

6.1 Alternative I

This alternative adds no distribution capacity to the south and west Edmonton areas. It consists in transferring load between existing distribution circuits. While the areas of interest are surrounded by 15 kV distribution circuits, it is not possible to create distribution ties between 15kV and 25 kV circuits to alleviate the 25 kV circuits overloading for either future growth or emergency operation. As demonstrated in section 5, there is not enough available 25 kV distribution circuit capacity at North Calder, Poundmaker, Summerside and East Industrial PODs to serve the existing and forecasted demand for electricity in South and West Edmonton. While four feeder breakers are currently available for use (3 breakers at Poundmaker and 1 breaker at Summerside), the distribution deficiency assessment of section 5 has demonstrated that a total of 14 circuits would be required to satisfy EDTI distribution capacity requirements over the next 10 years. Hence, a deficit of 10 feeder breakers exists, which makes this alternative technically unacceptable. Given that this alternative is not a viable distribution solution, EDTI does not consider further economic assessment, including distribution cost estimates, to be of value.

6.2 Alternative II

As demonstrated in section 5, a minimum of 10 new distribution circuits is required over the next 10 years to meet the distribution capacity needs in the south and west Edmonton areas. Under this alternative, 6 of the 10 new distribution circuits will originate from an expanded Petrolia POD and the other 4 distribution circuits will originate from a future South East POD.

EDTI TFO sizes its transformers based on their ability to serve all substation load under an N-1 contingency of a transformer. For the expanded Petrolia substation, it means that two transformers would be needed. Each transformer should be capable of serving all 8 feeders, given a diversity factor of 0.78; this means that each transformer should have a minimum rating of 75 MVA. EDTI TFO notes that its power transformers have an average life of 50 years; therefore, EDTI requests that provisions be made to enable the connection of 8 feeders in the medium term at the expanded Petrolia substation. EDTI DFO foresees that these feeders will eventually be loaded to their design rating of 12 MVA each. In fact, Southwest Edmonton is the fastest growing part of the City of Edmonton, with an annual average load growth rate of more than 10% over the past 5 years. As a result, EPCOR DFO foresees a need for 8 feeders in southwest Edmonton in the medium term.

Petrolia POD presently has 15 kV distribution supplies with no 25 kV transformations. This alternative consists of a new 25 kV supply from existing Petrolia POD (816S), which would include two 240/25 kV 45/60/75 MVA transformers, two new 25 kV distribution circuits in 2019, two new 25 kV distribution circuit in 2020, one new circuit in 2021 and one new 25 kV distribution circuit in 2022. In addition, this alternative requires a new South East POD in 2021, which would include two new 240/25 kV 45/60/75 MVA transformers, three new 25 kV distribution circuits in 2021 and one new 25 kV distribution circuit in 2026.

This alternative adds 300 MVA of distribution capacity to the south and west Edmonton areas.

Furthermore, this alternative makes use of the four existing feeder breakers at Summerside POD (24SU) and Poundmaker POD (23PM, 24PM and 34PM). The 25 kV distribution circuits 24SU, 23PM, 24PM and 34PM will be added respectively in 2018, 2018, 2018, and 2023.

Table 16 summarizes the transmission and distribution requirements and concerns for this alternative. The list of facilities was completed in consultation with EDTI TFO.

Table 16: **Alternative 2 - Summary of Transmission and Distribution Requirements and Concerns**

Alternative #2:

- **Upgrade Petrolia Substation (2019)**
- **New South East Substation (2021)**

Transmission

Transformers

Description	*Number*
75 MVA, 240/25 kV LTC transformer (Petrolia)	2
75 MVA, 240/25 kV LTC transformer (South East)	2

Transmission lines

Description	*Length (km)*
240 kV line (Petrolia)	0
In/Out 240 kV line (South East)	~0.4

Breakers

Description	*Number*
240 kV bus-tie breaker (Petrolia x2, South East x4)	6
25 kV transformer breaker (Petrolia x2, South East x2)	4
25 kV feeder breaker (Petrolia x8, South East x8)	16
25 kV bus-tie breaker (Petrolia x2, South East x2)	4
25 kV bus-coupler breaker (Petrolia x2, South East x2)	4

Distribution

Circuits

Number & Description	**Total Length (km)**
Ten (10) new underground 25 kV distribution circuits planned in the next 10 years (Petrolia POD x6, South East POD x4)	97

Operational/construction/other limitations

1. Land availability: Additional land would be required for substation extension. It is impossible to secure the necessary land due to significant social impact, as described on page 40
2. A new 25 kV medium voltage switchgear building is required
3. Constructability challenges: finding alignments for 6 new circuits - from Petrolia POD - running through a mature, already utility congested residential area would be extremely challenging and costly

The area surrounding Petrolia POD is already largely developed with residential subdivisions and park areas. EDTI TFO has reviewed the transmission work that would be required to implement this solution and EDTI has identified concerns relating to social impacts and impacts on the environment:

- EDTI has significant concerns related to the social impacts of expanding the Petrolia POD. Specifically, there is insufficient space at the Petrolia POD to install the equipment required to complete this alternative, therefore this alternative would require expansion of the Petrolia POD to accommodate new transmission equipment. The Petrolia POD is surrounded to the North and West by a berm that separates it from a residential area, to the south by an AltaLink transmission line, and to the west by an urban park, including a community park and baseball diamond. As such, the only possible way to expand the POD would be to the east, which will directly and adversely affect local residents due to the loss of the community park. This is a significant social impact that EDTI does not consider acceptable given the availability of alternatives with minimal or no social impacts.

- Groundwater at some areas within and around the Petrolia POD has been found to be contaminated with hydrocarbons due to a transformer spill in the early 1980s. EDTI is currently investigating the extent of this contamination through delineation, and is not certain of the full extent of the contamination. EDTI cannot construct an extension of the Petrolia POD if it would interfere with the future management of this contamination.

Based on this, EDTI TFO does not consider this alternative to be a viable solution due to the social impacts that would result from expanding the POD into a community park and baseball diamond. Given that this is not a viable transmission solution, EDTI does not consider further economic assessment, including further feasibility assessment of distribution circuit constructability in a fully developed neighborhood, or development of transmission or distribution cost estimates, to be an efficient use of resources.

6.3 Alternative III

As demonstrated in section 5, a minimum of 10 new distribution circuits is required over the next 10 years to meet the distribution capacity needs in the south and west Edmonton areas. Under this alternative, 6 of the 10 new distribution circuits will originate from an expanded Jasper POD and the other 4 distribution circuits will originate from a future South East POD.

EDTI TFO sizes its transformers based on their ability to serve all substation load under an N-1 contingency of a transformer. For the expanded Jasper substation, it means that two transformers would be needed. Each transformer should be capable of serving all 8 feeders, given a diversity factor of 0.78; this means that each transformer should have a minimum rating of 75 MVA. EDTI TFO notes that its power transformers have an average life of 50 years; therefore, EDTI requests that provisions be made to enable the connection of 8 feeders in the medium term at the expanded Jasper substation. EDTI DFO foresees that these feeders will eventually be loaded to their design rating of 12 MVA each. In fact, Southwest Edmonton is the fastest growing part of the City of Edmonton, with an annual average load growth rate of more than 10% over the past 5 years. As a result, EPCOR DFO foresees a need for 8 feeders in southwest Edmonton in the medium term.

Jasper POD presently has 15 kV distribution supplies with no 25 kV transformations. This alternative consists of a new 25 kV supply from existing Jasper POD (E805S), which would include two 240/25 kV 45/60/75 MVA transformers, two new 25 kV distribution circuits in 2019, two new 25 kV distribution circuit in 2020, one new circuit in 2021 and one new 25 kV distribution circuit in 2022. In addition, this alternative requires a new South East POD in 2021, which would include two new 240/25 kV 45/60/75 MVA transformers, three new 25 kV distribution circuits in 2021 and one new 25 kV distribution circuit in 2026.

This alternative adds 300 MVA of distribution capacity to the south and west Edmonton areas.

Furthermore, this alternative makes use of the four existing feeder breakers at Summerside POD (24SU) and Poundmaker POD (23PM, 24PM and 34PM). The 25 kV distribution circuits 24SU, 23PM, 24PM and 34PM will be added respectively in 2018, 2018, 2018, and 2023.

Table 17 summarizes the transmission and distribution requirements and concerns for this alternative. The list of facilities was completed in consultation with EDTI TFO.

Table 17: Alternative 3 – Summary of Transmission and Distribution Requirements and Concerns

Alternative #3:

- **Upgrade Jasper Substation (2019)**
- **New South East Substation (2021)**

Transmission

Transformers

Description	*Number*
75 MVA, 240/25 kV LTC transformer (Jasper)	2
75 MVA, 240/25 kV LTC transformer (South East)	2

Transmission lines

Description	*Length (km)*
240 kV line (Jasper)	0
In/Out 240 kV line (South East)	~0.4

Breakers

Description	*Number*
240 kV bus-tie breaker (Jasper x2, South East x4)	6
25 kV transformer breaker (Jasper x2, South East x2)	4
25 kV feeder breaker (Jasper x8, South East x8)	16
25 kV bus-tie breaker (Jasper x2, South East x2)	4
25 kV bus-coupler breaker (Jasper x2, South East x2)	4

Distribution

Circuits

Number & Description	**Total Length (km)**
Ten (10) new underground 25 kV distribution circuits planned in the next 10 years (Jasper POD x6, South East POD x4)	162

Operational/construction/other limitations

1. Land availability: Additional land would be required for substation extension. It is impossible to secure the necessary land at a reasonable cost, as described on page 43
2. A new 25 kV medium voltage switchgear building is required
3. Constructability challenges: finding alignments for 6 new circuits – from Jasper POD - running through mature congested neighborhoods would be challenging and costly
4. Technical challenges: The long circuits for this alternative pose protection, safety, voltage management, distribution line losses and reliability challenges

The area surrounding Jasper POD is already largely developed with commercial businesses and City infrastructure. EDTI TFO has reviewed the transmission work that would be required to implement this solution, and has identified the following concerns:

- There is insufficient space at the Jasper POD to install the equipment required to complete this alternative, therefore this alternative would require expansion of the Jasper POD to accommodate new transmission equipment

- The Jasper POD is bordered to the east, south and west by City of Edmonton roads (170 St, 105 Ave and 172 St, respectively), and to the North by several commercial businesses (Kal Tire, and another multi-unit commercial structure). As a result, EDTI TFO considers that these lands are not available for expansion of the Jasper POD

Based on this, EDTI TFO does not consider this alternative to be a viable solution due to insufficient space in and around the Jasper POD to accommodate the transmission portion of this alternative. Given that this is not a viable transmission solution, EDTI does not consider further economic assessment, including further feasibility assessment of distribution circuit constructability in a fully developed neighborhood, or development of transmission or distribution cost estimates, to be an efficient use of resources.

6.4 Alternative IV

As demonstrated in section 5, a minimum of 10 new distribution circuits is required over the next 10 years to meet the distribution capacity needs in south and west Edmonton areas. Under this alternative, 4 of the 10 new distribution circuits will originate from an expanded Summerside POD, another 4 distribution circuits will originate from a future South East POD and the remaining 2 distribution circuits will originate from an expanded Poundmaker POD.

EDTI TFO sizes its transformers based on their ability to serve all substation load under an N-1 contingency of a transformer. Currently, the Summerside and Poundmaker PODs are equipped with two - 240/25 kV 45/60/75 MVA - transformers each. The need for 4 new distribution circuits at the expanded Summerside POD and 2 new distribution circuits at the expanded Poundmaker POD means that the Summerside POD and the Poundmaker POD require one additional transformer of the same size as their existing transformers. EDTI TFO notes that its power transformers have an average life of 50 years; therefore, EDTI requests that provisions be made in the medium term to enable the connection of 4 feeders at the expanded Summerside substation and 4 feeders at the expanded Poundmaker substation. EDTI DFO foresees that these feeders will eventually be loaded to their design rating of 12 MVA each. In fact, Southwest Edmonton is the fastest growing part of the City of Edmonton, with an annual average load growth rate of more than 10% over the past 5 years. As a result, EPCOR DFO foresees a need for 8 feeders in the medium term.

This alternative requires a new 25 kV supply from the existing Summerside POD, which would include a third 240/25 kV 45/60/75 MVA transformer (TX3), two new 25 kV distribution circuits in 2019, one new circuit in 2021 and one new 25 kV distribution circuit in 2022. All four circuits from TX3 would need to be routed west to serve the area located between the North Saskatchewan River to the west, north-west and south-west, Anthony Henday (ring road/TUC) to the north, north-east, and the City's boundary to the south and 127 Street to the east.

In addition, this alternative requires a new 25 kV supply from the existing Poundmaker POD, which would include a third 240/25 kV 45/60/75 MVA transformer and two new 25 kV distribution circuits in 2020. These new circuits routed south to serve the area located between the North Saskatchewan River to the east, Anthony Henday (ring road/TUC) and 45 Avenue to the north, and the City's boundary to the west and south.

Moreover, this alternative requires a new South East POD in 2021, which would include two 240/25 kV 45/60/75 MVA transformers, three new 25 kV distribution circuits in 2021 and one new 25 kV distribution circuit in 2026. The new South East POD is presented here as a solution alternative for addressing the growing load demand in the south east part of Edmonton. The South East POD and other possible alternatives will be discussed in a separate distribution deficiency report, which EDTI plans to submit to the AESO at a future date.

This alternative adds 300 MVA of distribution capacity to the south and west Edmonton areas. Furthermore, this alternative makes use of the four existing feeder breakers at Summerside POD (24SU) and Poundmaker POD (23PM, 24PM and 34PM). The 25 kV distribution circuits 24SU, 23PM, 24PM and 34PM will be added respectively in 2018, 2018, 2018, and 2023.

Table 18 summarizes the transmission and distribution requirements and concerns for this alternative. The list of facilities was completed in consultation with EDTI TFO.

Table 18: Alternative 4 - Summary of Transmission and Distribution Requirements and Concerns

Alternative #4:

- **Upgrade Summerside Substation (2019)**
- **Upgrade Poundmaker Substation (2019)**
- **New South East Substation (2021)**

Transmission

Transformers

Description	*Number*
75 MVA, 240/25 kV LTC transformer (Summerside)	1
75 MVA, 240/25 kV LTC transformer (Poundmaker)	1
75 MVA, 240/25 kV LTC transformer (South East)	2

Transmission lines

Description	*Length (km)*
In/Out 240 kV line (South East)	~0.4

Breakers

Description	*Number*
240 kV bus-tie breaker (Summerside x1, Poundmaker x1, South East x4)	6
25 kV transformer breaker (Summerside x1, Poundmaker x1, South East x2)	4
25 kV feeder breaker (Summerside x4, Poundmaker x4, South East x8)	16
25 kV bus-tie breaker (Summerside x1, Poundmaker x2, South East x2)	5
25 kV bus-coupler breaker (Poundmaker x1, South East x2)	3

Distribution

Circuits

Number & Description	**Total Length (km)**
Ten (10) new underground 25 kV distribution circuits planned in the next 10 years (Summerside x4, Poundmaker x2, South East x4)	97

Operational/construction/other limitations

As shown in Tables 27 and 29, two of the four feeder breakers being requested at Poundmaker POD (not the existing unused feeder breakers 23PM, 24PM, and 34PM) are unlikely to be used within the next 10 years

6.5 Alternative V

As demonstrated in section 5, a minimum of 10 new distribution circuits is required over the next 10 years to meet the distribution capacity needs in the south and west Edmonton areas. Under this alternative, 6 of the 10 new distribution circuits will originate from the proposed Riverview POD and the remaining 4 distribution circuits will originate from an expanded Summerside POD.

EDTI TFO sizes its transformers based on their ability to serve all substation load under an N-1 contingency of a transformer. For the Riverview substation, it means that two transformers would be needed. Each transformer should be capable of serving all 8 feeders, given a diversity factor of 0.78; this means that each transformer should have a minimum rating of 75 MVA. EDTI TFO notes that its power transformers have an average life of 50 years; therefore, EDTI requests that provisions be made to enable the connection of 8 feeders in the medium term at the Riverview substation. EDTI DFO foresees that these feeders will eventually be loaded to their design rating of 12 MVA each. In fact, Southwest Edmonton is the fastest growing part of the City of Edmonton, with an annual average load growth rate of more than 10% over the past 5 years. As a result, EPCOR DFO foresees a need for 8 feeders in southwest Edmonton in the medium term.

This alternative consists of a new Riverview POD with two 240/25 kV 45/60/75 MVA transformers, two new 25 kV distribution circuits in 2019, two new 25 kV distribution circuits in 2020, one new circuit in 2021 and one new 25 kV distribution circuit in 2022. Two of the eight Riverview feeders will not be needed until after the 10-year forecast that is included in the DDR; therefore, the need for these two feeders is not reflected in the load tables.

In addition, this alternative requires a new 25 kV supply from the existing Summerside POD, which would include one 240/25 kV 45/60/75 MVA transformer, three new 25 kV distribution circuits in 2021 and one new 25 kV distribution circuit in 2026.

This alternative adds 225 MVA of distribution capacity to the south and west Edmonton areas.

Furthermore, this alternative makes use of the four existing feeder breakers at Summerside POD (24SU) and Poundmaker POD (23PM, 24PM and 34PM). The 25 kV distribution circuits 24SU, 23PM, 24PM and 34PM will be added respectively in 2018, 2018, 2018, and 2023.

Table 19 summarizes the transmission and distribution requirements and concerns for this alternative. The list of facilities was completed in consultation with EDTI TFO.

Figure 2: Alternative V - Proposed Service Areas for South and West Edmonton

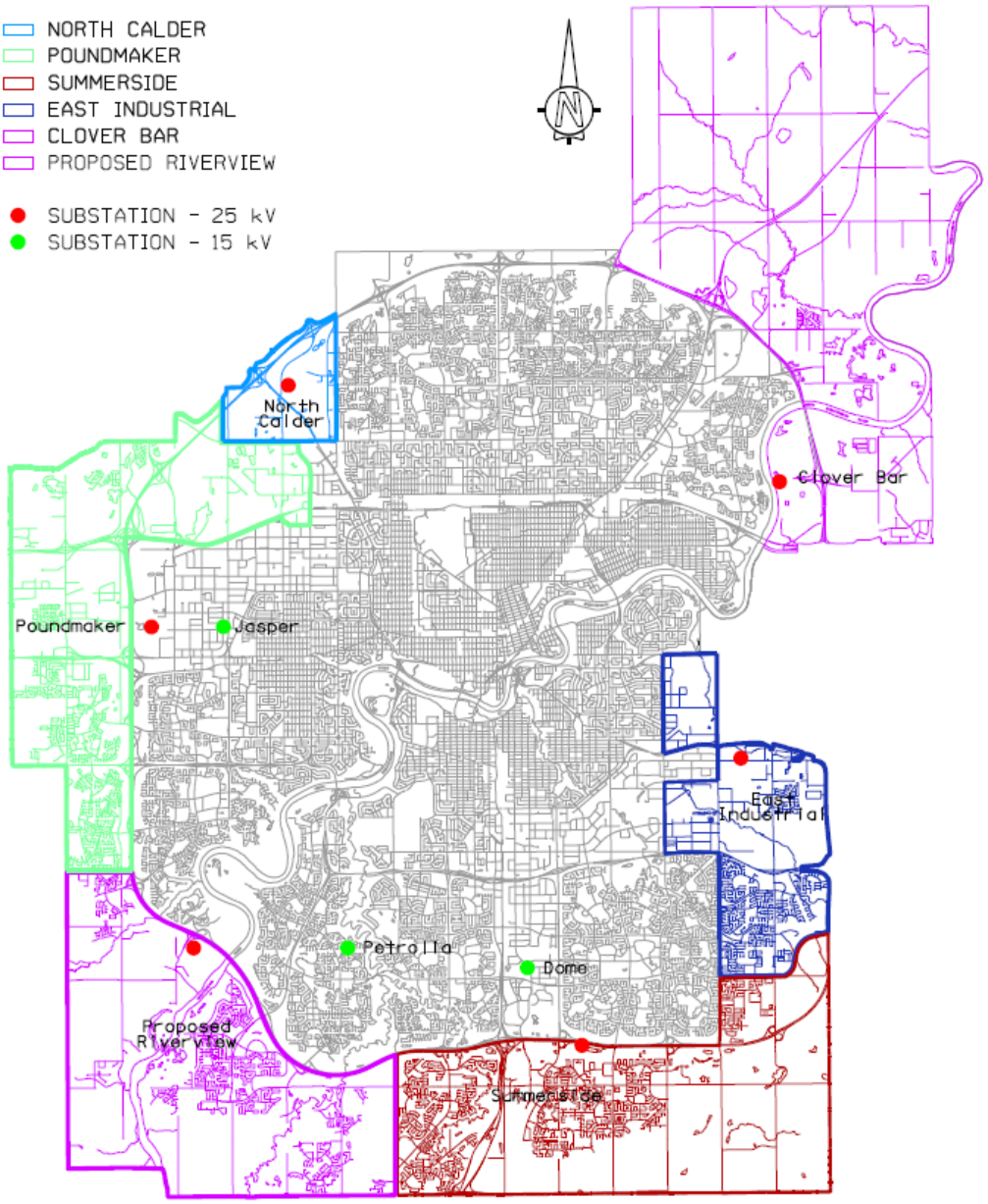


Table 19: Alternative 5 - Summary of Transmission and Distribution Requirements and Concerns

Alternative #5:

- **New Riverview Substation (2019)**
- **Upgrade Summerside Substation (2021)**

Transmission

Transformers

Description	*Number*
75 MVA, 240/25 kV LTC transformer (Riverview)	2
75 MVA, 240/25 kV LTC transformer (Summerside)	1

Transmission lines

Description	*Length (km)*
In/Out 240 kV line (Riverview)	~0.4

Breakers

Description	*Number*
240 kV bus-tie breaker (Riverview x4, Summerside x1)	5
25 kV transformer breaker (Riverview x2, Summerside x1)	3
25 kV feeder breaker (Riverview x8, Summerside x4)	12
25 kV bus-tie breaker (Riverview x2, Summerside x1)	3
25 kV bus-coupler breaker (Riverview x2)	2

Distribution

Circuits

Number & Description	**Total Length (km)**
Ten (10) new underground 25 kV distribution circuits planned in the next 10 years (Riverview x6, Summerside x4)	72

Operational/construction/other limitations

1. Four of the six Riverview circuits require a river crossing
2. There are no spare breakers for the future needs of South Edmonton

This alternative redefines the 25kV service areas and it introduces the Riverview service area, as depicted in Figure 2. As result, the size of existing Summerside, Poundmaker, East Industrial and North Calder service areas is reduced to offload distribution circuits in those service areas. The Riverview service area consists of an east part and a west part.

The east part is situated between the North Saskatchewan River to the west, north-west and south-west, Anthony Henday (ring road/TUC) to the north and north-east, the City's boundary to the south and 127 Street to the east. The total gross area of 12 square miles includes Windermere area (about 8 square miles between the river to the west and the Whitemud creek to the east) and Heritage Valley area (about 4 square miles between the Whitemud creek and 127 Street). This area is presently supplied by three 25 kV circuits designated 13SU, 14SU and 22SU from Summerside POD.

The west part is located between the North Saskatchewan River to the east, south-east, Anthony Henday (ring road/TUC) and 45 Avenue to the north, and the City's boundary to the west and south. The total gross area of 7.1 square miles includes Riverview area (about 5.5 square miles between the river, Anthony Henday and the City's boundaries) and Edgemont (about 1.6 square miles south of 45 Ave and north of Riverview area). This area is presently supplied by two 25 kV circuits designated 31PM and 33PM from Poundmaker POD.

Under this alternative, four of the 6 Riverview circuits will serve the east part while the other 2 circuits will serve the west part. This alternative involves shifting load from the Summerside and Poundmaker PODs to the Riverview POD. This alternative would allow EDTI to install additional transmission capacity that is closer to the load than any existing PODs, and thus reduce the length of each of the distribution circuits. As a result, this alternative would free up capacity at EDTI's Summerside and Poundmaker PODs that could be used to meet forecasted new demands for electricity in the south-east (Summerside) and north-west (Poundmaker and North Calder) areas of Edmonton, thus delaying or eliminating the need for future transmission development in those areas.

The expansion of the Summerside POD is presented here as a solution alternative for addressing the growing load demand in the south east part of Edmonton. The Summerside expansion and other possible alternatives will be discussed in a separate distribution deficiency report, which EDTI plans to submit to the AESO at a future date.

6.6 Alternative VI

As demonstrated in section 5, a minimum of 10 new distribution circuits is required over the next 10 years to meet the distribution capacity needs in the south and west Edmonton areas. Under this alternative, 6 of the 10 new distribution circuits will originate from the proposed Riverview POD and the remaining 4 distribution circuits will originate from a future South East POD.

EDTI TFO sizes its transformers based on their ability to serve all substation load under an N-1 contingency of a transformer. For the Riverview substation, it means that two transformers would be needed. Each transformer should be capable of serving all 8 feeders, given a diversity factor of 0.78; this means that each transformer should have a minimum rating of 75 MVA. EDTI TFO notes that its power transformers have an average life of 50 years; therefore, EDTI requests that provisions be made to enable the connection of 8 feeders in the medium term at the Riverview substation. EDTI DFO foresees that these feeders will eventually be loaded to their design rating of 12 MVA each. In fact, Southwest Edmonton is the fastest growing part of the City of Edmonton, with an annual average load growth rate of more than 10% over the past 5 years. As a result, EPCOR DFO foresees a need for 8 feeders in southwest Edmonton in the medium term.

This alternative consists of a new Riverview POD with two 240/25 kV 45/60/75 MVA transformers, two new 25 kV distribution circuits in 2019, two new 25 kV distribution circuit in 2020, one new circuit in 2021 and one new 25 kV distribution circuit in 2022. Two of the eight Riverview feeders will not be needed until after the 10-year forecast that is included in the DDR; therefore, the need for these two feeders is not reflected in the load tables.

In addition, this alternative requires a new South East POD in 2021, which would include two 240/25 kV 45/60/75 MVA transformers, three new 25 kV distribution circuits in 2021 and one new circuit in 2026.

This alternative adds 300 MVA of distribution capacity to the south and west Edmonton areas.

Furthermore, this alternative makes use of the four existing feeder breakers at Summerside POD (24SU) and Poundmaker POD (23PM, 24PM and 34PM). The 25 kV distribution circuits 24SU, 23PM, 24PM and 34PM will be added respectively in 2018, 2018, 2018, and 2023.

This alternative redefines the 25kV service areas as depicted in Figure 3. Two new service areas - Riverview and South East - are introduced. As result, the size of existing Summerside, East Industrial and Poundmaker and North Calder service areas is reduced to offload distribution circuits in those areas.
The new South East POD is presented here as a solution alternative for addressing the growing load demand in the south east part of Edmonton. The South East POD and other possible alternatives will be discussed in a separate distribution deficiency report, which EDTI plans to submit to the AESO at a future date. The addition of Riverview and South East PODs results in shorter distribution circuits totaling 59 km. This alternative is similar to alternative 5. Here, in place of the third transformer at the Summerside POD, EDTI is requesting the new South East POD.

Table 20 summarizes the transmission and distribution requirements and concerns for this alternative. The list of facilities was completed in consultation with EDTI TFO.

Figure 3: Alternative VI - Proposed 25 kV Service Areas and POD Locations

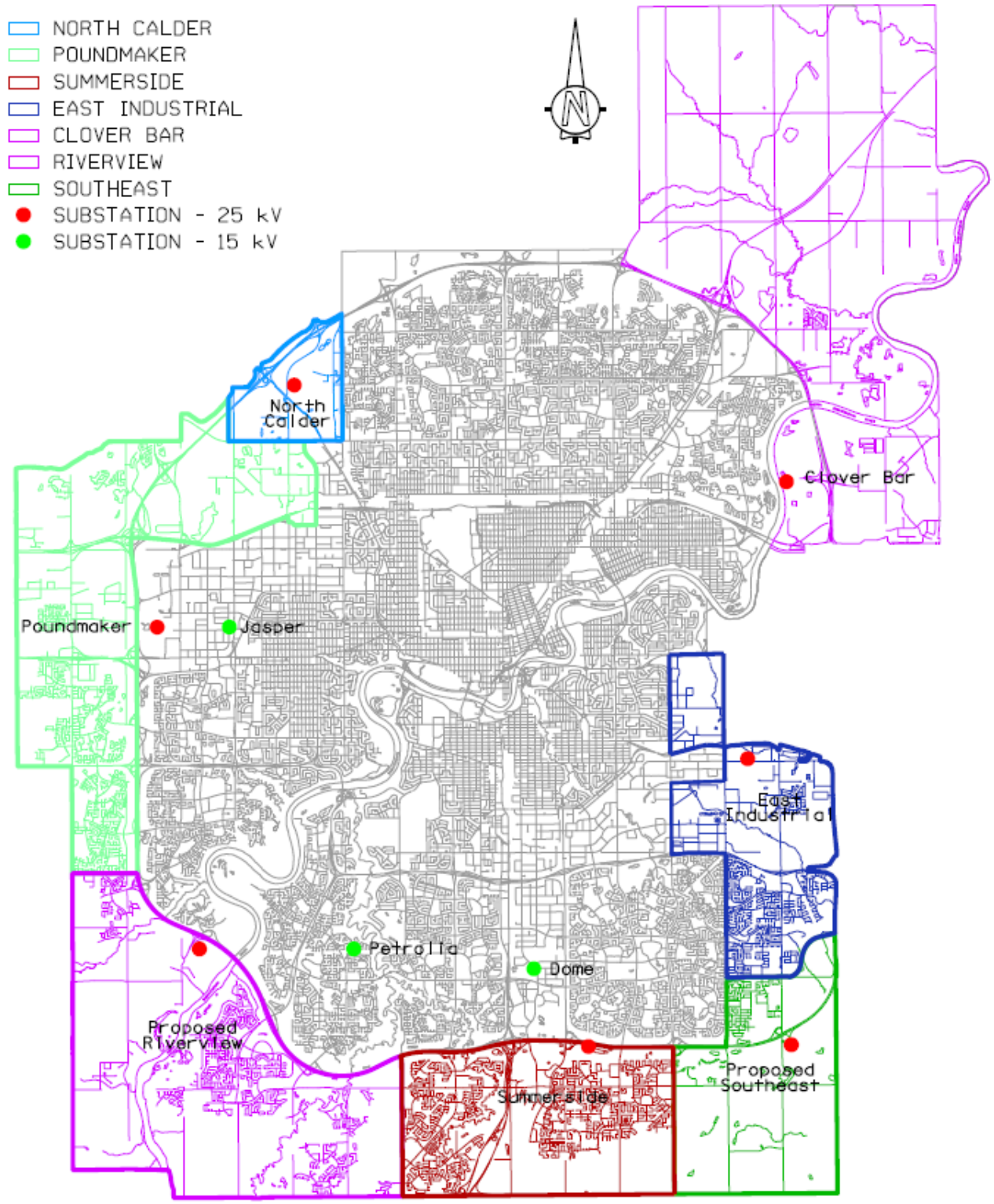


Table 20: Alternative 6 - Summary of Transmission and Distribution Requirements and Concerns

Alternative #6:

- **New Riverview Substation (2019)**
- **New South East Substation (2021)**

Transmission

Transformers

Description	*Number*
75 MVA, 240/25 kV LTC transformer (Riverview)	2
75 MVA, 240/25 kV LTC transformer (South East)	2

Transmission lines

Description	*Length (km)*
In/Out 240 kV line (Riverview)	~0.4
In/Out 240 kV line (South East)	~0.4

Breakers

Description	*Number*
240 kV bus-tie breaker (Riverview x4, South East x4)	8
25 kV transformer breaker (Riverview x2, South East x2)	4
25 kV feeder breaker (Riverview x8, South East x8)	16
25 kV bus-tie breaker (Riverview x2, South East x2)	4
25 kV bus-coupler breaker (Riverview x2, South East x2)	4

Distribution

Circuits

Number & Description	**Total Length (km)**
Ten (10) new underground 25 kV distribution circuits planned in the next 10 years (Riverview x6, South East x4)	59

Operational/construction/other limitations

Four of the 6 Riverview circuits require a river crossing

6.7 Alternative VII

As demonstrated in section 5, a minimum of 10 new distribution circuits is required over the next 10 years to meet the distribution capacity needs in the south and west Edmonton areas. Under this alternative, 8 of the 10 new distribution circuits will originate from a new Summerside POD and the remaining 2 distribution circuits will originate from an expanded Poundmaker POD.

This alternative, however, involves salvaging the existing Summerside POD, which is equipped with two 240/25 kV 45/60/75 MVA transformers and eight feeder breakers, then constructing a new Summerside POD with three new 240/25 MVA 100 MVA transformers, three lineups of double bus GIS switchgear, sixteen 25 kV distribution circuits (the 7 existing Summerside circuits, one new circuit in 2018 using the existing 24SU feeder breaker, two new circuits in 2019, four new circuits in 2021, one new circuit in 2022 and one new circuit in 2026) along with a new building structure of sufficient size to house the new switchgear lineups.

In addition, this alternative requires a new 25 kV supply from the existing Poundmaker POD, which would include one 240/25 kV 45/60/75 MVA transformers and two new 25 kV distribution circuits in 2020.

Furthermore, this alternative makes use of the four existing feeder breakers at Summerside POD (24SU) and Poundmaker POD (23PM, 24PM and 34PM). The 25 kV distribution circuits 24SU, 23PM, 24PM and 34PM will be added respectively in 2018, 2018, 2018, and 2023.

This alternative redefines the 25kV service areas as depicted in Figure 4. Summerside and Poundmaker service areas are expanded to pick up additional load in East Industrial and North Calder areas respectively. As result, the size of existing East Industrial and North Calder service is reduced to offload distribution circuits in those service areas.

This alternative adds 225 MVA of distribution capacity to the south and west Edmonton areas and it involves longer distribution circuits totaling 110 km.

Table 21 summarizes the transmission and distribution requirements and concerns for this alternative. The list of facilities was completed in consultation with EDTI TFO.

EDTI TFO has reviewed the transmission work that would be required to implement this solution and has determined that it is not possible to construct alternative 7 by 2019. EDTI TFO estimates that the earliest technically feasible in-service date is 2021 due to the following challenges:

- This alternative involves construction in the vicinity of energized equipment. These construction activities include both installation of new equipment as well as removal and replacement of existing equipment such as power transformers that are currently required to serve load. In addition, this alternative requires transferring feeders between switchgear lineups

- This alternative involves the removal and replacement of existing equipment that currently serves load and it requires extensive outage for up to one year. However, outages of this duration would interfere with EDTI DFO's ability to serve the distribution load in the south Edmonton area. As such, construction activities would be constrained by windows of opportunity available for the required transmission outages

- This alternative involves working in the vicinity of energized equipment, which is slower than greenfield construction due to operational restrictions and safety measures and necessary safety precautions

- If the construction of the new Summerside POD is not completed by end of 2019 as required by EDTI DFO, then EDTI DFO will be unable to serve the growing load demand in Southwest Edmonton. Furthermore, this delay will expose several Summerside distribution circuits to loading that are well beyond their acceptable limits resulting in cables failure.

Based on the above, EDTI TFO does not consider alternative 7 to be a viable solution.

Figure 4: Alternative VII - Proposed 25 kV Service Areas and POD Locations

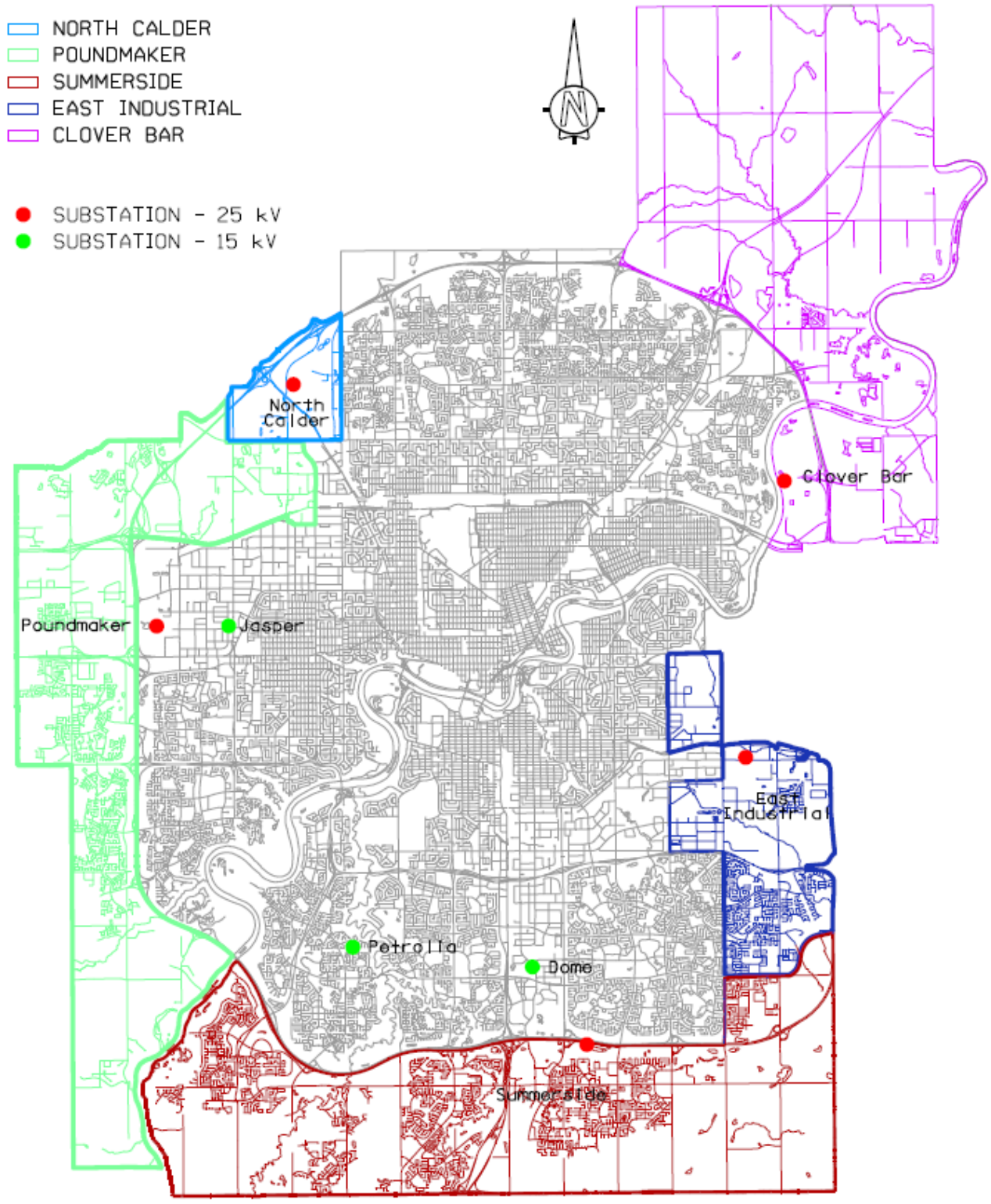


Table 21: Alternative VII - Summary of Transmission and Distribution Requirements and Concerns

Alternative #7:

- **Rebuild Summerside Substation (2019)**
- **Upgrade Poundmaker Substation (2019)**

Transmission

Transformers

Description	*Number*
100 MVA, 240/25 kV LTC transformer (Summerside)	3
75 MVA, 240/25 kV LTC transformer (Poundmaker)	1

Transmission lines

Description	*Length (km)*
240 kV line (Summerside)	0
240 kV line (Poundmaker)	0

Breakers

Description	*Number*
240 kV bus-tie breaker (Summerside x1, Poundmaker x1)	2
25 kV transformer breaker (Summerside x3, Poundmaker x1)	4
25 kV feeder breaker (Summerside x18, Poundmaker x4)	22
25 kV bus-tie breaker (Summerside x4, Poundmaker x2)	6
25 kV bus-coupler breaker (Summerside x3, Poundmaker x1)	4

Distribution

Circuits

Number & Description	**Total Length (km)**
Ten (10) new underground 25 kV distribution circuits planned in the next 10 years (Summerside x8, Poundmaker x2)	110

Operational/construction/other limitations

1. As shown in Tables 36 and 38, two of the four feeder breakers being requested at Poundmaker POD (not the existing unused feeder breakers 23PM, 24PM, and 34PM) are unlikely to be used within the next 10 years
2. Constructability challenges: The relocation of existing Summerside circuits to the new substation will be challenging and it may result in widespread power interruptions to customers
3. While the new Summerside substation is required in 2019, EDTI TFO has indicated that the substation will not be available until 2021 due to constructability challenges described on page 56

7.0 COSTS ESTIMATION

The comparison of costs for all the alternatives considered is shown in Table 22 below. The costs associated with 24SU, 23PM, 24PM and 34PM are irrelevant for this comparative evaluation. These four 25 kV feeder breakers are currently available for use at the existing Poundmaker POD (23PM, 24PM, and 34PM) and Summerside POD (24SU). According to load forecast tables for alternatives 4, 5, 6 and 7 provided in sections 9.7 and 9.8, 24SU, 23PM, 24PM, and 34PM will serve the same load in all the alternatives considered. Hence, the distribution feeder lengths and the associated costs for the 24SU, 23PM, 24PM and 34PM distribution feeders will not differ between the alternatives.

Table 22: Costs Comparison

Alternative	Description	Costs (+/- 30%, $2016)
I	**Distribution Solution**	
	Not technically feasible	-
	Total for Alternative 1	**N/V[1]**
II	**New 25 kV supply from Existing Petrolia Substation + South East POD**	
	Distribution Circuit Costs[4]	$121 M
	Transmission Costs	N/V
	Total for Alternative 2	**N/V[2]**
III	**New 25 kV supply from Existing Jasper Substation + South East POD**	
	Distribution Circuit Costs[4]	$192 M
	Transmission Costs	N/V
	Total for Alternative 3	**N/V[3]**
IV	**3rd Transformer at Summerside + 3rd Transformer Poundmaker + South East POD**	
	Distribution Circuit Costs[4]	$115 M
	Transmission Costs	$61.5 M
	Total for Alternative 4	**$176.5 M**
V	**New Riverview POD + 3rd Transformer at Summerside**	
	Distribution Circuit Costs[4]	$87.5 M
	Transmission Costs	$46.6 M
	Total for Alternative 5	**$134.1 M**
VI	**New Riverview POD + South East POD**	
	Distribution Circuit Costs[4]	$71 M
	Transmission Costs	$69.4 M
	Total for Alternative 6	**$140.4 M**
VII	**Rebuild Summerside with 3 x 100 MVA transformers + 3rd Transformer Poundmaker**	
	Distribution Circuit Costs[4]	$131.5 M
	Transmission Costs	$52.3 M
	Total for Alternative 7	**$183.8 M**

[1], [2], [3]: Alternatives were deemed not viable (N/V); therefore, costs estimates are not provided

[4]: These costs include ten new distribution circuits for each alternative

Table 22 shows that alternative 5 and 6 have the overall lowest costs. Both alternatives involve the construction of the requested Riverview POD in 2019.

8.0 RECOMMENDATION

Alternatives 5 or 6 are EDTI's preferred developments to address the need outlined in this document. Both alternatives have the lowest cost and they involve the construction of the Riverview POD in 2019. Alternative 1 is not technically feasible. Alternatives 2 and 3 are not viable transmission solutions due to the lack of available land to expand the POD. More specifically, acquiring land in this part of the city would result in significant social impacts to local stakeholders that are considered unacceptable. Alternative 4 costs more than alternatives 5 or 6. Alternative 7 is not viable because the earliest technically feasible in-service date is 2021, given the constructability challenges that EDTI TFO anticipates. Moreover, alternative 7 is the most expensive of all the alternatives.

Furthermore, EDTI prefers alternative 6 over alternative 5. Alternative 6 adds 300 MVA of transformation capacity as compared to 225 MVA for alternative 5. Also, alternative 6 involves the shortest distribution circuits' length of all the alternatives.

9.0 PROPOSED MITIGATION STRATEGY

The proposed mitigation strategy is based on alternative 6, which involves the construction of the Riverview POD in 2019 and the South East POD in 2021.

9.1 Petrolia POD N-1 Constraint

Upon completion of the requested South East POD, the following sequence of distribution system load transfers would take place in order to mitigate the N-1 transformer overload at Petrolia POD:

- Distribution load from Petrolia POD will be permanently transferred to Dome POD, then
- Distribution load from Dome POD will be permanently transferred to Summerside POD, then
- Distribution load from Summerside POD will be permanently transferred to the South East POD

9.2 Summerside POD N-1 Constraint

Upon completion of the requested Riverview POD, the following sequence of distribution system load transfers would take place in order to offload Summerside POD:

- 11RV will be added in 2019 to offload 13SU
- 14RV will be added in 2022 to offload 22SU and 23SU
- 22RV will be added in 2019 to offload 14SU, 22SU and 23SU

Upon completion of the requested South East POD, the following sequence of distribution system load transfers would take place in order to further offload Summerside POD:

- 11SE will be added in 2021 to offload 11SU
- 12SE will be added in 2021 to offload 21SU

9.3 East Industrial POD N-1 Constraint

Upon completion of the requested South East POD, the following sequence of distribution system load transfers would take place in order to offload East Industrial POD:

- 12SE will be added in 2021 to offload 12E
- 22SE will be added in 2021 to offload 14E and further reduce the loading on 12E
- 21SE will be added in 2026 to offload 23E

9.4 North Calder POD N-1 Constraint

- 24PM will be added in 2018 to offload 25L

9.5 Poundmaker POD N-1 Constraint

Upon completion of the requested Riverview POD, the following sequence of distribution system load transfers would take place in order to offload Poundmaker POD:

- 12RV will be added in 2020 to offload 33PM
- 21RV will be added in 2020 to offload 31PM

9.6 Distribution Circuits Constraints

The recommended strategy requests the addition of 14 distribution circuits to help keep circuits' loading - across South and West Edmonton - below the Design Load Rating of 12MVA over the next 10 years.

- 24SU will be added in 2018 to offload 12SU
- 23PM will be added in 2018 to offload 32PM
- 24PM will be added in 2018 to offload 22PM and 25L
- 11RV will be added in 2019 to offload 13SU
- 22RV will be added in 2019 to offload 14SU, 22SU and 23SU
- 12RV will be added in 2020 to offload 33PM
- 21RV will be added in 2020 to offload 31PM
- 23RV will be added in 2021 to offload 22RV
- 11SE will be added in 2021 to offload 11SU
- 12SE will be added in 2021 to offload 21SU and 12E
- 22SE will be added in 2021 to offload 12E and 14E
- 14RV will be added in 2022 to offload 22SU and 23SU
- 34PM will be added in 2023 to offload 22PM and 24PM
- 21SE will be added in 2026 to offload 23E

9.7 Effectiveness of Recommended Strategy

The effectiveness of the recommended strategy is evident in Tables 23, 24, 25 and 26, where the loading on all 25kV distribution circuits in the areas of interest, namely North Calder, Poundmaker, Riverview, Summerside, East Industrial, and South East, are managed to stay below their Design Load Rating of 12 MVA. The 14 new distribution circuits are highlighted in grey in Tables 23 to 26.

Table 23: Alternative VI - Non-Coincident Summer Peak Demand (Post-Mitigation) - Part 1 of 2

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside POD N-1 Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Summerside POD [MVA]	32.1	49.7	55.2	64.6	66.4	**76.4**	**82.6**	68.8	72.9	63.2	58.5	60.8	63.2	64.6	66.1
Summerside POD [MW]	31.9	49.2	54.8	64.2	66.0	**75.9**	**82.1**	68.4	72.5	62.8	58.2	60.4	62.8	64.2	65.7
Summerside POD Power Factor	0.991	0.990	0.992	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
Peak Day Temperature [°C]	32.6	33.7	31.2	34.1	27.4	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
11SU [MVA]	**17.7**	**16.0**	**19.7**	**13.8**	11.7	**13.4**	**14.5**	**15.6**	**16.6**	7.5	7.9	8.2	8.5	8.7	8.9
12SU [MVA]	5.9	6.9	7.6	8.4	9.6	11.0	5.9	6.4	6.8	7.2	7.5	7.8	8.1	8.3	8.4
13SU [MVA]	-	-	-	**13.4**	**13.8**	**15.9**	**17.2**	8.5	9.0	9.5	10.0	10.4	10.8	11.0	11.2
14SU [MVA]	-	-	-	-	7.2	8.3	9.0	7.7	8.2	8.6	9.1	9.4	9.8	9.9	10.2
21SU [MVA]	9.4	7.0	8.9	10.3	7.3	8.4	9.1	9.8	10.4	7.0	7.4	7.6	7.9	8.1	8.3
22SU [MVA]	-	**20.0**	**20.2**	**14.3**	11.4	**13.1**	**14.1**	9.4	10.0	10.6	6.7	7.0	7.2	7.4	7.5
23SU [MVA]	-	-	-	8.5	9.4	10.9	11.7	10.2	10.8	11.4	7.9	8.2	8.5	8.7	8.8
24SU [MVA]	-	-	-	-	-	-	6.0	6.5	6.9	7.3	7.6	7.9	8.2	8.4	8.5
Poundmaker POD N-1 Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Poundmaker POD [MVA]	-	34.7	35.2	38.1	39.0	46.0	59.1	63.0	54.1	56.1	57.9	60.4	63.2	63.1	65.5
Poundmaker POD [MW]	-	32.3	34.7	37.3	38.1	45.1	57.8	61.6	52.9	54.9	56.6	59.1	61.8	61.7	64.1
Poundmaker POD Power Factor	-	0.930	0.985	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
Peak Day Temperature [°C]	-	27.3	31.2	34.1	28.1	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
21PM [MVA]	11.1	10.1	11.3	**12.2**	7.2	7.5	8.1	8.8	9.1	9.5	9.9	10.4	10.9	8.7	9.1
22PM [MVA]	8.0	8.9	8.9	9.3	9.1	10.7	9.5	10.2	10.7	11.2	11.6	7.7	8.0	8.4	8.8
23PM [MVA]	-	-	-	-	-	-	4.5	4.9	5.1	5.3	5.5	5.8	6.1	6.4	6.7
24PM [MVA]	-	-	-	-	-	-	11.5	11.8	**12.2**	**12.4**	**12.7**	8.5	8.7	8.9	9.1
31PM [MVA]	10.5	8.4	9.5	11.0	7.9	10.0	10.8	11.6	7.1	7.4	7.7	8.0	8.5	8.9	9.3
32PM [MVA]	8.2	7.5	7.6	8.1	7.5	8.6	4.8	5.2	5.4	5.6	5.8	6.1	6.4	6.7	7.0
33PM [MVA]	-	-	-	-	9.2	10.1	11.0	11.8	5.9	6.1	6.4	6.7	7.0	7.3	7.7
34PM [MVA]	-	-	-	-	-	-	-	-	-	-	-	9.0	9.4	9.7	10.1
East Industrial POD N-1 Capacity [MVA]	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0
East Industrial POD [MVA]	50.6	51.6	55.6	58.2	55.5	58.2	59.8	62.3	**64.7**	54.8	56.3	58.0	59.7	61.6	60.8
East Industrial POD [MW]	47.2	48.5	51.9	54.6	52.1	54.8	56.4	58.9	**61.3**	51.5	52.8	54.5	56.1	57.9	57.1
East Industrial POD Power Factor	0.933	0.940	0.932	0.937	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939
Peak Day Temperature [°C]	30.6	33.7	29.3	34.1	27.9	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
11E [MVA]	7.5	7.5	8.0	6.9	6.5	6.9	7.1	7.4	7.7	7.9	8.2	8.5	8.7	9.0	9.3
12E [MVA]	7.5	8.9	10.1	11.9	10.1	10.7	11.0	11.5	**12.4**	7.0	7.5	7.9	8.4	8.9	9.4
13E [MVA]	-	-	-	-	-	7.0	7.2	7.5	7.8	8.1	8.4	8.6	8.9	9.2	9.5
14E [MVA]	9.5	9.8	10.6	11.4	11.4	**12.1**	**12.4**	**12.9**	**13.4**	7.9	8.1	8.4	8.7	8.9	9.2
21E [MVA]	11.9	9.5	10.4	**12.7**	10.7	10.8	11.2	11.6	11.6	11.6	11.6	11.6	11.7	11.7	11.7
22E [MVA]	**12.2**	**12.3**	**13.4**	**12.5**	11.0	4.6	4.8	5.0	5.2	5.4	5.6	5.7	5.9	6.1	6.3
23E [MVA]	5.3	5.6	6.8	7.0	8.7	9.2	9.4	9.8	10.2	10.6	10.9	11.3	11.6	**12.0**	9.6
24E [MVA]															

Table 24: Alternative VI - Non-Coincident Summer Peak Demand (Post-Mitigation) – Part 2 of 2

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
North Calder POD N-1 Capacity [MVA]	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD [MVA]	**23.7**	**20.6**	**22.3**	**22.6**	**21.3**	**21.7**	12.6	12.8	12.9	13.2	13.4	13.6	13.8	14.1	14.4
North Calder POD [MW]	**21.8**	**19.2**	**20.6**	**21.0**	**19.8**	**20.2**	11.7	11.9	12.0	12.2	12.5	12.7	12.9	13.1	13.4
North Calder POD Power Factor	0.918	0.934	0.923	0.931	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
Peak Day Temperature [ºC]	32.6	27.3	28.8	28.2	23.6	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
25L [MVA]	**12.1**	**14.6**	**16.9**	**16.2**	**16.7**	**16.8**	7.6	7.7	7.9	8.0	8.1	8.3	8.4	8.5	8.7
25R [MVA]	10.1	5.7	5.7	5.9	6.0	6.3	6.4	6.5	6.7	6.8	6.9	7.0	7.1	7.3	7.4
Riverview POD N-1 Capacity [MVA]	-	-	-	-	-	-	-	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Riverview POD [MVA]	-	-	-	-	-	-	-	20.3	32.9	34.6	44.5	46.1	47.8	51.7	52.9
Riverview POD [MW]	-	-	-	-	-	-	-	20.1	32.6	34.2	44.1	45.7	47.3	51.2	52.4
Riverview POD Power Factor	-	-	-	-	-	-	-	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
Peak Day Temperature [ºC]	-	-	-	-	-	-	-	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
11RV [MVA]	-	-	-	-	-	-	-	10.0	10.6	11.2	11.8	**12.2**	**12.6**	10.7	10.9
12RV [MVA]	-	-	-	-	-	-	-	-	6.4	6.7	6.9	7.3	7.6	8.0	8.3
14RV [MVA]	-	-	-	-	-	-	-	-	-	-	8.5	8.8	9.2	9.3	9.5
21RV [MVA]	-	-	-	-	-	-	-	-	5.0	5.2	5.4	5.7	5.9	6.2	6.5
22RV [MVA]	-	-	-	-	-	-	-	10.3	10.9	6.5	6.9	7.1	7.4	7.5	7.7
23RV [MVA]	-	-	-	-	-	-	-	-	-	5.0	5.3	5.4	5.6	10.8	11.0
13RV [MVA]															
24RV [MVA]															
South East POD N-1 Capacity [MVA]	-	-	-	-	-	-	-	-	-	75.0	75.0	75.0	75.0	75.0	75.0
South East POD [MVA]	-	-	-	-	-	-	-	-	-	26.3	27.6	28.7	29.8	30.7	34.4
South East POD [MW]	-	-	-	-	-	-	-	-	-	26.0	27.3	28.4	29.5	30.4	34.1
South East POD Power Factor	-	-	-	-	-	-	-	-	-	0.990	0.990	0.990	0.990	0.990	0.990
Peak Day Temperature [ºC]	-	-	-	-	-	-	-	-	-	34.0	34.0	34.0	34.0	34.0	34.0
11SE [MVA]	-	-	-	-	-	-	-	-	-	10.0	10.6	11.0	11.3	11.6	11.8
12SE [MVA]	-	-	-	-	-	-	-	-	-	8.5	9.0	9.4	9.9	10.2	10.6
21SE [MVA]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8
22SE [MVA]	-	-	-	-	-	-	-	-	-	7.8	8.0	8.3	8.6	8.8	9.1
13SE [MVA]															
14SE [MVA]															
23SE [MVA]															
24SE [MVA]															

Table 25: Alternative VI - Non-Coincident Winter Peak Demand (Post-Mitigation) – Part 1 of 2

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside POD N-1 Capacity [MVA]	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
Summerside POD [MVA]	50.9	58.9	67.7	71.1	79.4	87.8	**95.0**	79.8	84.6	74.9	70.3	72.8	75.4	77.0	78.5
Summerside POD [MW]	50.8	58.8	67.7	71.0	79.4	87.8	**95.0**	79.8	84.6	74.9	70.3	72.8	75.4	77.0	78.5
Summerside POD Power Factor	0.998	0.998	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Peak Day Temperature [°C]	-28.8	-31.6	-31.6	-30.2	-23.9	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
11SU [MVA]	**18.1**	**19.2**	**12.6**	10.0	11.1	**12.3**	**13.3**	**14.3**	**15.2**	6.1	6.4	6.7	6.9	7.1	7.2
12SU [MVA]	6.2	9.2	11.9	**13.2**	**12.5**	**13.8**	7.0	7.5	8.0	8.5	8.9	9.2	9.5	9.8	10.0
13SU [MVA]	-	-	**19.0**	**13.7**	**14.1**	**15.6**	**16.9**	8.2	8.6	9.1	9.5	9.8	10.1	10.3	10.5
14SU [MVA]	-	-	-	7.0	8.4	9.3	10.0	8.5	9.0	9.5	10.0	10.4	10.8	11.0	11.3
21SU [MVA]	11.5	9.8	11.6	7.6	9.4	10.4	11.3	**12.2**	**12.9**	9.1	9.6	10.0	10.3	10.5	10.8
22SU [MVA]	**14.5**	**20.7**	**14.3**	11.3	**14.0**	**15.5**	**16.7**	10.7	11.4	**12.0**	8.7	9.0	9.3	9.5	9.7
23SU [MVA]	-	-	-	10.0	11.7	**12.9**	**13.9**	**12.0**	**12.7**	**13.4**	9.2	9.5	9.8	10.1	10.3
24SU [MVA]	-	-	-	-	-	-	8.0	8.6	9.1	9.6	10.1	10.5	10.9	11.1	11.3
Poundmaker POD N-1 Capacity [MVA]	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
Poundmaker POD [MVA]	37.5	36.8	37.2	40.8	44.4	48.9	61.8	65.8	54.4	56.3	58.2	61.3	64.0	64.2	66.7
Poundmaker POD [MW]	37.2	36.4	36.8	40.6	44.3	48.8	61.7	65.7	54.3	56.2	58.1	61.2	63.9	64.0	66.6
Poundmaker POD Power Factor	0.992	0.990	0.991	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
Peak Day Temperature [°C]	-31.0	-21.1	-25.4	-26.3	-23.9	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
21PM [MVA]	-	11.1	**12.4**	**13.6**	8.3	9.0	9.7	10.4	10.9	11.3	11.8	**12.5**	**13.1**	11.2	11.7
22PM [MVA]	-	8.0	8.5	8.8	10.0	10.8	9.6	10.3	10.8	11.3	11.7	7.9	8.3	8.7	9.1
23PM [MVA]	-	-	-	-	-	-	5.2	5.6	5.9	6.1	6.4	6.8	7.1	7.4	7.8
24PM [MVA]	-	-	-	-	-	-	11.0	11.3	11.6	11.8	**12.1**	7.9	8.1	8.4	8.6
31PM [MVA]	-	11.5	10.5	11.5	9.8	10.6	11.5	**12.3**	6.8	7.1	7.4	7.9	8.2	8.6	9.0
32PM [MVA]	-	8.5	8.5	8.5	9.0	9.8	5.3	5.7	6.0	6.2	6.5	6.9	7.2	7.5	7.9
33PM [MVA]	-	-	-	-	11.5	**12.4**	**13.4**	**14.4**	7.0	7.3	7.6	8.0	8.5	8.8	9.3
34PM [MVA]	-	-	-	-	-	-	-	-	-	-	-	9.0	9.3	9.7	10.0
East Industrial POD N-1 Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
East Industrial POD [MVA]	47.3	52.0	53.4	55.3	54.2	55.8	57.4	59.7	62.0	51.3	52.8	54.3	56.0	57.7	56.5
East Industrial POD [MW]	45.6	49.8	51.1	53.4	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5
East Industrial POD Power Factor	0.963	0.959	0.958	0.967	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
Peak Day Temperature [°C]	-16.6	-25.1	-15.1	-20.5	-24.4	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
11E [MVA]	7.0	6.6	6.9	5.8	6.0	6.2	6.3	6.6	6.8	7.1	7.3	7.6	7.8	8.0	8.3
12E [MVA]	8.8	9.8	11.1	11.6	**12.1**	**12.4**	**12.8**	**13.3**	**14.3**	8.2	8.6	9.1	9.6	10.1	10.6
13E [MVA]	-	-	-	-	6.9	7.5	7.7	8.0	8.3	8.6	8.9	9.2	9.5	9.8	10.1
14E [MVA]	9.8	9.8	10.7	11.4	11.6	11.9	**12.2**	**12.7**	**13.2**	7.7	7.9	8.2	8.5	8.7	9.0
21E [MVA]	10.1	10.2	10.2	10.9	10.3	10.6	10.9	11.3	11.3	11.3	11.3	11.3	11.4	11.4	11.4
22E [MVA]	**12.9**	**13.0**	**13.4**	**13.9**	**12.2**	5.0	5.1	5.4	5.6	5.8	6.0	6.1	6.4	6.5	6.7
23E [MVA]	6.0	5.5	6.2	9.1	9.2	9.4	9.7	10.1	10.5	10.9	11.2	11.6	**12.0**	**12.3**	9.7
24E [MVA]															

Table 26: Alternative VI - Non-Coincident Winter Peak Demand (Post-Mitigation) – Part 2 of 2

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
North Calder POD N-1 Capacity [MVA]	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD [MVA]	**23.3**	**19.9**	**21.0**	**21.3**	**22.3**	**21.2**	12.6	12.9	13.1	13.4	13.6	13.9	14.1	14.5	14.7
North Calder POD [MW]	**21.8**	**18.9**	**19.9**	**20.1**	**21.1**	**20.1**	11.9	12.2	12.4	12.7	12.9	13.2	13.4	13.7	14.0
North Calder POD Power Factor	0.936	0.949	0.950	0.943	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
Peak Day Temperature [°C]	-2.2	-25.1	-18.4	-19.0	-4.7	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
25L [MVA]	**12.5**	**14.4**	**15.0**	**15.3**	**15.8**	**16.5**	7.8	7.9	8.1	8.2	8.4	8.5	8.7	8.8	9.0
25R [MVA]	5.1	5.5	5.7	5.8	5.9	6.2	6.3	6.4	6.5	6.6	6.8	6.9	7.0	7.1	7.3
Riverview POD N-1 Capacity [MVA]	-	-	-	-	-	-	-	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
Riverview POD [MVA]	-	-	-	-	-	-	-	22.6	38.0	40.0	50.7	52.8	54.8	58.8	60.4
Riverview POD [MW]	-	-	-	-	-	-	-	22.4	37.6	39.6	50.2	52.3	54.3	58.2	59.8
Riverview POD Power Factor	-	-	-	-	-	-	-	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
Peak Day Temperature [°C]	-	-	-	-	-	-	-	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
11RV [MVA]	-	-	-	-	-	-	-	10.0	10.7	11.3	**11.9**	**12.4**	**12.9**	10.7	11.0
12RV [MVA]	-	-	-	-	-	-	-	-	8.0	8.3	8.6	9.2	9.6	10.1	10.5
14RV [MVA]	-	-	-	-	-	-	-	-	-	-	9.0	9.4	9.7	9.9	10.1
21RV [MVA]	-	-	-	-	-	-	-	-	6.0	6.3	6.5	6.9	7.3	7.6	7.9
22RV [MVA]	-	-	-	-	-	-	-	**12.6**	**13.3**	9.1	9.6	10.0	10.3	10.5	10.8
23RV [MVA]	-	-	-	-	-	-	-	-	-	5.0	5.2	5.5	5.6	10.7	11.0
13RV [MVA]															
24RV [MVA]															
South East POD N-1 Capacity [MVA]	-	-	-	-	-	-	-	-	-	89.0	89.0	89.0	89.0	89.0	89.0
South East POD [MVA]	-	-	-	-	-	-	-	-	-	27.5	28.8	30.0	31.2	32.1	36.2
South East POD [MW]	-	-	-	-	-	-	-	-	-	27.5	28.8	30.0	31.2	32.1	36.2
South East POD Power Factor	-	-	-	-	-	-	-	-	-	1.000	1.000	1.000	1.000	1.000	1.000
Peak Day Temperature [°C]	-	-	-	-	-	-	-	-	-	-32.8	-32.8	-32.8	-32.8	-32.8	-32.8
11SE [MVA]	-	-	-	-	-	-	-	-	-	10.0	10.5	10.9	11.3	11.6	11.8
12SE [MVA]	-	-	-	-	-	-	-	-	-	9.5	10.0	10.5	10.9	11.3	11.7
21SE [MVA]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.0
22SE [MVA]	-	-	-	-	-	-	-	-	-	8.0	8.3	8.6	9.0	9.3	9.6
13SE [MVA]															
14SE [MVA]															
23SE [MVA]															
24SE [MVA]															

9.8 Load Forecast Tables for Alternatives IV, V and VII

9.8.1 Alternative IV

The effectiveness of alternative 4 is evident in Tables 27, 28, 29 and 30, where the loading on all 25kV distribution circuits in the areas of interest, namely North Calder, Poundmaker, Summerside, East Industrial, and South East are managed to stay below their Design Load Rating of 12 MVA. The 14 new distribution circuits are highlighted in grey in Tables 27 to 30.

Table 27: Alternative IV - Non-Coincident Summer Peak Demand (Post-Mitigation) - Part 1 of 2

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside POD N-1 Capacity MVA	75.0	75.0	75.0	75.0	75.0	75.0	75.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Summerside POD MVA	32.1	49.7	55.2	64.6	66.4	**76.4**	**82.6**	**89.1**	**94.4**	**85.9**	**90.7**	**94.0**	**97.4**	**102.3**	**104.3**
Summerside POD MW	31.9	49.2	54.8	64.2	66.0	**75.9**	**82.1**	**88.6**	**93.8**	**85.4**	**90.2**	**93.4**	**96.8**	**101.7**	**103.6**
Summerside POD pf	0.991	0.990	0.992	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
11SU MVA	**17.7**	**16.0**	**19.7**	**13.8**	11.7	**13.4**	**14.5**	**15.6**	**16.6**	7.5	7.9	8.2	8.5	8.7	8.9
12SU MVA	5.9	6.9	7.6	8.4	9.6	11.0	5.9	6.4	6.8	7.2	7.5	7.8	8.1	8.3	8.4
13SU MVA	-	-	-	**13.4**	**13.8**	**15.9**	**17.2**	8.5	9.0	9.5	10.0	10.4	10.8	11.0	11.2
14SU MVA	-	-	-	-	7.2	8.3	9.0	7.7	8.2	8.6	9.1	9.4	9.8	9.9	10.2
21SU MVA	9.4	7.0	8.9	10.3	7.3	8.4	9.1	9.8	10.4	7.0	7.4	7.6	7.9	8.1	8.3
22SU MVA	-	**20.0**	**20.2**	**14.3**	11.4	**13.1**	**14.1**	9.4	10.0	10.6	6.7	7.0	7.2	7.4	7.5
23SU MVA	-	-	-	8.5	9.4	10.9	11.7	10.2	10.8	11.4	7.9	8.2	8.5	8.7	8.8
24SU MVA	-	-	-	-	-	-	6.0	6.5	6.9	7.3	7.6	7.9	8.2	8.4	8.5
31SU MVA	-	-	-	-	-	-	-	10.0	10.6	11.2	11.8	**12.2**	**12.6**	10.7	10.9
32SU MVA	-	-	-	-	-	-	-	10.3	10.9	6.5	6.9	7.1	7.4	7.5	7.7
33SU MVA	-	-	-	-	-	-	-	-	-	5.0	5.3	5.4	5.6	10.8	11.0
34SU MVA	-	-	-	-	-	-	-	-	-	-	8.5	8.8	9.2	9.3	9.5
Poundmaker POD N-1 Capacity MVA	75.0	75.0	75.0	75.0	75.0	75.0	75.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Poundmaker POD MVA	-	34.7	35.2	38.1	39.0	46.0	59.1	63.0	65.5	68.0	70.2	73.4	**76.7**	**77.2**	**80.4**
Poundmaker POD MW	-	32.3	34.7	37.3	38.1	45.1	57.8	61.6	64.1	66.5	68.7	71.8	**75.0**	**75.5**	**78.6**
Poundmaker POD pf	-	0.930	0.985	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
11PM MVA	-	-	-	-	-	-	-	-	6.4	6.7	6.9	7.3	7.6	8.0	8.3
12PM MVA	-	-	-	-	-	-	-	-	5.0	5.2	5.4	5.7	5.9	6.2	6.5
13PM MVA															
14PM MVA															
21PM MVA	11.1	10.1	11.3	**12.2**	7.2	7.5	8.1	8.8	9.1	9.5	9.9	10.4	10.9	8.7	9.1
22PM MVA	8.0	8.9	8.9	9.3	9.1	10.7	9.5	10.2	10.7	11.2	11.6	7.7	8.0	8.4	8.8
23PM MVA	-	-	-	-	-	-	4.5	4.9	5.1	5.3	5.5	5.8	6.1	6.4	6.7
24PM MVA	-	-	-	-	-	-	11.5	11.8	**12.2**	**12.4**	**12.7**	8.5	8.7	8.9	9.1
31PM MVA	10.5	8.4	9.5	11.0	7.9	10.0	10.8	11.6	7.1	7.4	7.7	8.0	8.5	8.9	9.3
32PM MVA	8.2	7.5	7.6	8.1	7.5	8.6	4.8	5.2	5.4	5.6	5.8	6.1	6.4	6.7	7.0
33PM MVA	-	-	-	-	9.2	10.1	11.0	11.8	5.9	6.1	6.4	6.7	7.0	7.3	7.7
34PM MVA	-	-	-	-	-	-	-	-	-	-	-	9.0	9.4	9.7	10.1

Table 28: Alternative IV - Non-Coincident Summer Peak Demand (Post-Mitigation) - Part 2 of 2

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
East Industrial POD N-1 Capacity MVA	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0
East Industrial POD MVA	50.6	51.6	55.6	58.2	55.5	58.2	59.8	62.3	**64.7**	54.8	56.3	58.0	59.7	61.6	60.8
East Industrial POD MW	47.2	48.5	51.9	54.6	52.1	54.8	56.4	58.9	**61.3**	51.5	52.8	54.5	56.1	57.9	57.1
East Industrial POD pf	0.933	0.940	0.932	0.937	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939
11E MVA	7.5	7.5	8.0	6.9	6.5	6.9	7.1	7.4	7.7	7.9	8.2	8.5	8.7	9.0	9.3
12E MVA	7.5	8.9	10.1	11.9	10.1	10.7	11.0	11.5	**12.4**	7.0	7.5	7.9	8.4	8.9	9.4
13E MVA	-	-	-	-	-	7.0	7.2	7.5	7.8	8.1	8.4	8.6	8.9	9.2	9.5
14E MVA	9.5	9.8	10.6	11.4	11.4	**12.1**	**12.4**	**12.9**	**13.4**	7.9	8.1	8.4	8.7	8.9	9.2
21E MVA	11.9	9.5	10.4	**12.7**	10.7	10.8	11.2	11.6	11.6	11.6	11.6	11.6	11.7	11.7	11.7
22E MVA	**12.2**	**12.3**	**13.4**	**12.5**	11.0	4.6	4.8	5.0	5.2	5.4	5.6	5.7	5.9	6.1	6.3
23E MVA	5.3	5.6	6.8	7.0	8.7	9.2	9.4	9.8	10.2	10.6	10.9	11.3	11.6	12.0	9.6
24E MVA															
North Calder POD N-1 Capacity MVA	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD MVA	**23.7**	**20.6**	**22.3**	**22.6**	**21.3**	**21.7**	12.6	12.8	12.9	13.2	13.4	13.6	13.8	14.1	14.4
North Calder POD MW	**21.8**	**19.2**	**20.6**	**21.0**	**19.8**	**20.2**	11.7	11.9	12.0	12.2	12.5	12.7	12.9	13.1	13.4
North Calder POD pf	0.918	0.934	0.923	0.931	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
25L MVA	**12.1**	**14.6**	**16.9**	**16.2**	**16.7**	**16.8**	7.6	7.7	7.9	8.0	8.1	8.3	8.4	8.5	8.7
25R MVA	10.1	5.7	5.7	5.9	6.0	6.3	6.4	6.5	6.7	6.8	6.9	7.0	7.1	7.3	7.4
South East POD N-1 Capacity MVA	-	-	-	-	-	-	-	-	-	75.0	75.0	75.0	75.0	75.0	75.0
South East POD MVA	-	-	-	-	-	-	-	-	-	26.3	27.6	28.7	29.8	30.7	34.4
South East POD MW	-	-	-	-	-	-	-	-	-	26.0	27.3	28.4	29.5	30.4	34.1
South East POD pf	-	-	-	-	-	-	-	-	-	0.990	0.990	0.990	0.990	0.990	0.990
11SE MVA	-	-	-	-	-	-	-	-	-	10.0	10.6	11.0	11.3	11.6	11.8
12SE MVA	-	-	-	-	-	-	-	-	-	8.5	9.0	9.4	9.9	10.2	10.6
13SE MVA															
14SE MVA															
21SE MVA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8
22SE MVA	-	-	-	-	-	-	-	-	-	7.8	8.0	8.3	8.6	8.8	9.1
23SE MVA															
24SE MVA															

Table 29: Alternative IV - Non-Coincident Winter Peak Demand (Post-Mitigation) - Part 1 of 2

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside POD N-1 Capacity MVA	89.0	89.0	89.0	89.0	89.0	89.0	89.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0
Summerside POD MVA	50.9	58.9	67.7	71.1	79.4	87.8	**95.0**	**102.4**	**108.6**	**100.3**	**105.8**	**109.5**	**113.4**	**118.2**	**120.4**
Summerside POD MW	50.8	58.8	67.7	71.0	79.4	87.8	**95.0**	**102.4**	**108.6**	**100.3**	**105.8**	**109.5**	**113.4**	**118.2**	**120.4**
Summerside POD pf	0.998	0.998	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
11SU MVA	**18.1**	**19.2**	**12.6**	10.0	11.1	**12.3**	**13.3**	**14.3**	**15.2**	6.1	6.4	6.7	6.9	7.1	7.2
12SU MVA	6.2	9.2	11.9	**13.2**	**12.5**	**13.8**	7.0	7.5	8.0	8.5	8.9	9.2	9.5	9.8	10.0
13SU MVA	-	-	**19.0**	**13.7**	**14.1**	**15.6**	**16.9**	8.2	8.6	9.1	9.5	9.8	10.1	10.3	10.5
14SU MVA	-	-	-	7.0	8.4	9.3	10.0	8.5	9.0	9.5	10.0	10.4	10.8	11.0	11.3
21SU MVA	11.5	9.8	11.6	7.6	9.4	10.4	11.3	**12.2**	**12.9**	9.1	9.6	10.0	10.3	10.5	10.8
22SU MVA	**14.5**	**20.7**	**14.3**	11.3	**14.0**	**15.5**	**16.7**	10.7	11.4	**12.0**	8.7	9.0	9.3	9.5	9.7
23SU MVA	-	-	-	10.0	11.7	**12.9**	**13.9**	12.0	**12.7**	**13.4**	9.2	9.5	9.8	10.1	10.3
24SU MVA	-	-	-	-	-	-	8.0	8.6	9.1	9.6	10.1	10.5	10.9	11.1	11.3
31SU MVA	-	-	-	-	-	-	-	10.0	10.7	11.3	11.9	**12.4**	**12.9**	10.7	11.0
32SU MVA	-	-	-	-	-	-	-	**12.6**	**13.3**	9.1	9.6	10.0	10.3	10.5	10.8
33SU MVA	-	-	-	-	-	-	-	-	-	5.0	5.2	5.5	5.6	10.7	11.0
34SU MVA	-	-	-	-	-	-	-	-	-	-	9.0	9.4	9.7	9.9	10.1
Poundmaker POD N-1 Capacity MVA	89.0	89.0	89.0	89.0	89.0	89.0	89.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0
Poundmaker POD MVA	37.5	36.8	37.2	40.8	44.4	48.9	61.8	65.8	68.4	70.9	73.4	77.4	80.9	81.8	85.2
Poundmaker POD MW	37.2	36.4	36.8	40.6	44.3	48.8	61.7	65.7	68.2	70.8	73.2	77.3	80.7	81.7	85.0
Poundmaker POD pf	0.992	0.990	0.991	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
11PM MVA	-	-	-	-	-	-	-	-	8.0	8.3	8.6	9.2	9.6	10.1	10.5
12PM MVA	-	-	-	-	-	-	-	-	6.0	6.3	6.5	6.9	7.3	7.6	7.9
13PM MVA															
14PM MVA															
21PM MVA	-	11.1	**12.4**	**13.6**	8.3	9.0	9.7	10.4	10.9	11.3	11.8	**12.5**	**13.1**	11.2	11.7
22PM MVA	-	8.0	8.5	8.8	10.0	10.8	9.6	10.3	10.8	11.3	11.7	7.9	8.3	8.7	9.1
23PM MVA	-	-	-	-	-	-	5.2	5.6	5.9	6.1	6.4	6.8	7.1	7.4	7.8
24PM MVA	-	-	-	-	-	-	11.0	11.3	11.6	11.8	**12.1**	7.9	8.1	8.4	8.6
31PM MVA	-	11.5	10.5	11.5	9.8	10.6	11.5	**12.3**	6.8	7.1	7.4	7.9	8.2	8.6	9.0
32PM MVA	-	8.5	8.5	8.5	9.0	9.8	5.3	5.7	6.0	6.2	6.5	6.9	7.2	7.5	7.9
33PM MVA	-	-	-	-	11.5	**12.4**	**13.4**	**14.4**	7.0	7.3	7.6	8.0	8.5	8.8	9.3
34PM MVA	-	-	-	-	-	-	-	-	-	-	-	9.0	9.3	9.7	10.0

Table 30: Alternative IV - Non-Coincident Winter Peak Demand (Post-Mitigation) - Part 2 of 2

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
East Industrial POD N-1 Capacity MVA	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
East Industrial POD MVA	47.3	52.0	53.4	55.3	54.2	55.8	57.4	59.7	62.0	51.3	52.8	54.3	56.0	57.7	56.5
East Industrial POD MW	45.6	49.8	51.1	53.4	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5
East Industrial POD pf	0.963	0.959	0.958	0.967	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
11E MVA	7.0	6.6	6.9	5.8	6.0	6.2	6.3	6.6	6.8	7.1	7.3	7.6	7.8	8.0	8.3
12E MVA	8.8	9.8	11.1	11.6	**12.1**	**12.4**	**12.8**	**13.3**	**14.3**	8.2	8.6	9.1	9.6	10.1	10.6
13E MVA	-	-	-	-	6.9	7.5	7.7	8.0	8.3	8.6	8.9	9.2	9.5	9.8	10.1
14E MVA	9.8	9.8	10.7	11.4	11.6	11.9	**12.2**	**12.7**	**13.2**	7.7	7.9	8.2	8.5	8.7	9.0
21E MVA	10.1	10.2	10.2	10.9	10.3	10.6	10.9	11.3	11.3	11.3	11.3	11.3	11.4	11.4	11.4
22E MVA	**12.9**	**13.0**	**13.4**	**13.9**	**12.2**	5.0	5.1	5.4	5.6	5.8	6.0	6.1	6.4	6.5	6.7
23E MVA	6.0	5.5	6.2	9.1	9.2	9.4	9.7	10.1	10.5	10.9	11.2	11.6	12.0	**12.3**	9.7
24E MVA															
North Calder POD N-1 Capacity MVA	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD MVA	**23.3**	**19.9**	**21.0**	**21.3**	**22.3**	**21.2**	12.6	12.9	13.1	13.4	13.6	13.9	14.1	14.5	14.7
North Calder POD MW	**21.8**	**18.9**	**19.9**	**20.1**	**21.1**	**20.1**	11.9	12.2	12.4	12.7	12.9	13.2	13.4	13.7	14.0
North Calder POD pf	0.936	0.949	0.950	0.943	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
25L MVA	**12.5**	**14.4**	**15.0**	**15.3**	**15.8**	**16.5**	7.8	7.9	8.1	8.2	8.4	8.5	8.7	8.8	9.0
25R MVA	5.1	5.5	5.7	5.8	5.9	6.2	6.3	6.4	6.5	6.6	6.8	6.9	7.0	7.1	7.3
South East POD N-1 Capacity MVA	-	-	-	-	-	-	-	-	-	89.0	89.0	89.0	89.0	89.0	89.0
South East POD MVA	-	-	-	-	-	-	-	-	-	27.5	28.8	30.0	31.2	32.1	36.2
South East POD MW	-	-	-	-	-	-	-	-	-	27.5	28.8	30.0	31.2	32.1	36.2
South East POD pf	-	-	-	-	-	-	-	-	-	1.000	1.000	1.000	1.000	1.000	1.000
11SE MVA	-	-	-	-	-	-	-	-	-	10.0	10.5	10.9	11.3	11.6	11.8
12SE MVA	-	-	-	-	-	-	-	-	-	9.5	10.0	10.5	10.9	11.3	11.7
13SE MVA															
14SE MVA															
21SE MVA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.0
22SE MVA	-	-	-	-	-	-	-	-	-	8.0	8.3	8.6	9.0	9.3	9.6
23SE MVA															
24SE MVA															

9.8.2 Alternative V

The effectiveness of alternative 5 is evident in Tables 31, 32, 33 and 34, where the loading on all 25kV distribution circuits in the areas of interest, namely North Calder, Poundmaker, Summerside, Riverview and East Industrial are managed to stay below their Design Load Rating of 12 MVA. The 14 new distribution circuits are highlighted in grey in Tables 31 to 34.

Table 31: Alternative V - Non-Coincident Summer Peak Demand (Post-Mitigation) - Part 1 of 2

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside POD N-1 Capacity MVA	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	150.0	150.0	150.0	150.0	150.0	150.0
Summerside POD MVA	32.1	49.7	55.2	64.6	66.4	**76.4**	**82.6**	68.8	72.9	89.5	86.1	89.5	93.0	95.3	100.5
Summerside POD MW	31.9	49.2	54.8	64.2	66.0	**75.9**	**82.1**	68.4	72.5	89.0	85.6	89.0	92.4	94.7	99.9
Summerside POD pf	0.991	0.990	0.992	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
11SU MVA	**17.7**	**16.0**	**19.7**	**13.8**	11.7	**13.4**	**14.5**	**15.6**	**16.6**	7.5	7.9	8.2	8.5	8.7	8.9
12SU MVA	5.9	6.9	7.6	8.4	9.6	11.0	5.9	6.4	6.8	7.2	7.5	7.8	8.1	8.3	8.4
13SU MVA	-	-	-	**13.4**	**13.8**	**15.9**	**17.2**	8.5	9.0	9.5	10.0	10.4	10.8	11.0	11.2
14SU MVA	-	-	-	-	7.2	8.3	9.0	7.7	8.2	8.6	9.1	9.4	9.8	9.9	10.2
21SU MVA	9.4	7.0	8.9	10.3	7.3	8.4	9.1	9.8	10.4	7.0	7.4	7.6	7.9	8.1	8.3
22SU MVA	-	**20.0**	**20.2**	**14.3**	11.4	**13.1**	**14.1**	9.4	10.0	10.6	6.7	7.0	7.2	7.4	7.5
23SU MVA	-	-	-	8.5	9.4	10.9	11.7	10.2	10.8	11.4	7.9	8.2	8.5	8.7	8.8
24SU MVA	-	-	-	-	-	-	6.0	6.5	6.9	7.3	7.6	7.9	8.2	8.4	8.5
31SU MVA	-	-	-	-	-	-	-	-	-	10.0	10.6	11.0	11.3	11.6	11.8
32SU MVA	-	-	-	-	-	-	-	-	-	8.5	9.0	9.4	9.9	10.2	10.6
33SU MVA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8
34SU MVA	-	-	-	-	-	-	-	-	-	7.8	8.0	8.3	8.6	8.8	9.1
Poundmaker POD N-1 Capacity MVA	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Poundmaker POD MVA	-	34.7	35.2	38.1	39.0	46.0	59.1	63.0	54.1	56.1	57.9	60.4	63.2	63.1	65.5
Poundmaker POD MW	-	32.3	34.7	37.3	38.1	45.1	57.8	61.6	52.9	54.9	56.6	59.1	61.8	61.7	64.1
Poundmaker POD pf	-	0.930	0.985	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
21PM MVA	11.1	10.1	11.3	**12.2**	7.2	7.5	8.1	8.8	9.1	9.5	9.9	10.4	10.9	8.7	9.1
22PM MVA	8.0	8.9	8.9	9.3	9.1	10.7	9.5	10.2	10.7	11.2	11.6	7.7	8.0	8.4	8.8
23PM MVA	-	-	-	-	-	-	4.5	4.9	5.1	5.3	5.5	5.8	6.1	6.4	6.7
24PM MVA	-	-	-	-	-	-	11.5	11.8	**12.2**	**12.4**	**12.7**	8.5	8.7	8.9	9.1
31PM MVA	10.5	8.4	9.5	11.0	7.9	10.0	10.8	11.6	7.1	7.4	7.7	8.0	8.5	8.9	9.3
32PM MVA	8.2	7.5	7.6	8.1	7.5	8.6	4.8	5.2	5.4	5.6	5.8	6.1	6.4	6.7	7.0
33PM MVA	-	-	-	-	9.2	10.1	11.0	11.8	5.9	6.1	6.4	6.7	7.0	7.3	7.7
34PM MVA	-	-	-	-	-	-	-	-	-	-	-	9.0	9.4	9.7	10.1

Table 32: Alternative V - Non-Coincident Summer Peak Demand (Post-Mitigation) - Part 2 of 2

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
East Industrial POD N-1 Capacity MVA	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0
East Industrial POD MVA	50.6	51.6	55.6	58.2	55.5	58.2	59.8	62.3	**64.7**	54.8	56.3	58.0	59.7	61.6	60.8
East Industrial POD MW	47.2	48.5	51.9	54.6	52.1	54.8	56.4	58.9	**61.3**	51.5	52.8	54.5	56.1	57.9	57.1
East Industrial POD pf	0.933	0.940	0.932	0.937	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939
11E MVA	7.5	7.5	8.0	6.9	6.5	6.9	7.1	7.4	7.7	7.9	8.2	8.5	8.7	9.0	9.3
12E MVA	7.5	8.9	10.1	11.9	10.1	10.7	11.0	11.5	**12.4**	7.0	7.5	7.9	8.4	8.9	9.4
13E MVA	-	-	-	-	-	7.0	7.2	7.5	7.8	8.1	8.4	8.6	8.9	9.2	9.5
14E MVA	9.5	9.8	10.6	11.4	11.4	**12.1**	**12.4**	**12.9**	**13.4**	7.9	8.1	8.4	8.7	8.9	9.2
21E MVA	11.9	9.5	10.4	**12.7**	10.7	10.8	11.2	11.6	11.6	11.6	11.6	11.6	11.7	11.7	11.7
22E MVA	**12.2**	**12.3**	**13.4**	**12.5**	11.0	4.6	4.8	5.0	5.2	5.4	5.6	5.7	5.9	6.1	6.3
23E MVA	5.3	5.6	6.8	7.0	8.7	9.2	9.4	9.8	10.2	10.6	10.9	11.3	11.6	12.0	9.6
24E MVA															
North Calder POD N-1 Capacity MVA	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD MVA	**23.7**	**20.6**	**22.3**	**22.6**	**21.3**	**21.7**	12.6	12.8	12.9	13.2	13.4	13.6	13.8	14.1	14.4
North Calder POD MW	**21.8**	**19.2**	**20.6**	**21.0**	**19.8**	**20.2**	11.7	11.9	12.0	12.2	12.5	12.7	12.9	13.1	13.4
North Calder POD pf	0.918	0.934	0.923	0.931	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
25L MVA	**12.1**	**14.6**	**16.9**	**16.2**	**16.7**	**16.8**	7.6	7.7	7.9	8.0	8.1	8.3	8.4	8.5	8.7
25R MVA	10.1	5.7	5.7	5.9	6.0	6.3	6.4	6.5	6.7	6.8	6.9	7.0	7.1	7.3	7.4
Riverview POD N-1 Capacity MVA	-	-	-	-	-	-	-	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Riverview POD MVA	-	-	-	-	-	-	-	20.3	32.9	34.6	44.5	46.1	47.8	51.7	52.9
Riverview POD MW	-	-	-	-	-	-	-	20.1	32.6	34.2	44.1	45.7	47.3	51.2	52.4
Riverview POD pf	-	-	-	-	-	-	-	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
11RV MVA	-	-	-	-	-	-	-	10.0	10.6	11.2	11.8	**12.2**	**12.6**	10.7	10.9
12RV MVA	-	-	-	-	-	-	-	-	6.4	6.7	6.9	7.3	7.6	8.0	8.3
13RV MVA															
14RV MVA	-	-	-	-	-	-	-	-	-	-	8.5	8.8	9.2	9.3	9.5
21RV MVA	-	-	-	-	-	-	-	-	5.0	5.2	5.4	5.7	5.9	6.2	6.5
22RV MVA	-	-	-	-	-	-	-	10.3	10.9	6.5	6.9	7.1	7.4	7.5	7.7
23RV MVA	-	-	-	-	-	-	-	-	-	5.0	5.3	5.4	5.6	10.8	11.0
24RV MVA															

Table 33: Alternative V - Non-Coincident Winter Peak Demand (Post-Mitigation) - Part 1 of 2

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside POD N-1 Capacity MVA	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	178.0	178.0	178.0	178.0	178.0	178.0
Summerside POD MVA	50.9	58.9	67.7	71.1	79.4	87.8	**95.0**	79.8	84.6	102.4	99.1	102.8	106.6	109.1	114.7
Summerside POD MW	50.8	58.8	67.7	71.0	79.4	87.8	**95.0**	79.8	84.6	102.4	99.1	102.8	106.6	109.1	114.7
Summerside POD pf	0.998	0.998	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
11SU MVA	**18.1**	**19.2**	**12.6**	10.0	11.1	**12.3**	**13.3**	**14.3**	**15.2**	6.1	6.4	6.7	6.9	7.1	7.2
12SU MVA	6.2	9.2	11.9	**13.2**	**12.5**	**13.8**	7.0	7.5	8.0	8.5	8.9	9.2	9.5	9.8	10.0
13SU MVA	-	-	**19.0**	**13.7**	**14.1**	**15.6**	**16.9**	8.2	8.6	9.1	9.5	9.8	10.1	10.3	10.5
14SU MVA	-	-	-	7.0	8.4	9.3	10.0	8.5	9.0	9.5	10.0	10.4	10.8	11.0	11.3
21SU MVA	11.5	9.8	11.6	7.6	9.4	10.4	11.3	**12.2**	**12.9**	9.1	9.6	10.0	10.3	10.5	10.8
22SU MVA	**14.5**	**20.7**	**14.3**	11.3	**14.0**	**15.5**	**16.7**	10.7	11.4	**12.0**	8.7	9.0	9.3	9.5	9.7
23SU MVA	-	-	-	10.0	11.7	**12.9**	**13.9**	12.0	**12.7**	**13.4**	9.2	9.5	9.8	10.1	10.3
24SU MVA	-	-	-	-	-	-	8.0	8.6	9.1	9.6	10.1	10.5	10.9	11.1	11.3
31SU MVA	-	-	-	-	-	-	-	-	-	10.0	10.5	10.9	11.3	11.6	11.8
32SU MVA	-	-	-	-	-	-	-	-	-	9.5	10.0	10.5	10.9	11.3	11.7
33SU MVA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.0
34SU MVA	-	-	-	-	-	-	-	-	-	8.0	8.3	8.6	9.0	9.3	9.6
Poundmaker POD N-1 Capacity MVA	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
Poundmaker POD MVA	37.5	36.8	37.2	40.8	44.4	48.9	61.8	65.8	54.4	56.3	58.2	61.3	64.0	64.2	66.7
Poundmaker POD MW	37.2	36.4	36.8	40.6	44.3	48.8	61.7	65.7	54.3	56.2	58.1	61.2	63.9	64.0	66.6
Poundmaker POD pf	0.992	0.990	0.991	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
21PM MVA	-	11.1	**12.4**	**13.6**	8.3	9.0	9.7	10.4	10.9	11.3	11.8	**12.5**	**13.1**	11.2	11.7
22PM MVA	-	8.0	8.5	8.8	10.0	10.8	9.6	10.3	10.8	11.3	11.7	7.9	8.3	8.7	9.1
23PM MVA	-	-	-	-	-	-	5.2	5.6	5.9	6.1	6.4	6.8	7.1	7.4	7.8
24PM MVA	-	-	-	-	-	-	11.0	11.3	11.6	11.8	**12.1**	7.9	8.1	8.4	8.6
31PM MVA	-	11.5	10.5	11.5	9.8	10.6	11.5	**12.3**	6.8	7.1	7.4	7.9	8.2	8.6	9.0
32PM MVA	-	8.5	8.5	8.5	9.0	9.8	5.3	5.7	6.0	6.2	6.5	6.9	7.2	7.5	7.9
33PM MVA	-	-	-	-	11.5	**12.4**	**13.4**	**14.4**	7.0	7.3	7.6	8.0	8.5	8.8	9.3
34PM MVA	-	-	-	-	-	-	-	-	-	-	-	9.0	9.3	9.7	10.0

Table 34: Alternative V - Non-Coincident Winter Peak Demand (Post-Mitigation) - Part 2 of 2

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
East Industrial POD N-1 Capacity MVA	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
East Industrial POD MVA	47.3	52.0	53.4	55.3	54.2	55.8	57.4	59.7	62.0	51.3	52.8	54.3	56.0	57.7	56.5
East Industrial POD MW	45.6	49.8	51.1	53.4	52.5	54.1	55.7	57.9	60.1	49.8	51.2	52.6	54.3	56.0	54.8
East Industrial POD pf	0.963	0.959	0.958	0.967	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
11E MVA	7.0	6.6	6.9	5.8	6.0	6.2	6.3	6.6	6.8	7.1	7.3	7.6	7.8	8.0	8.3
12E MVA	8.8	9.8	11.1	11.6	**12.1**	**12.4**	**12.8**	**13.3**	**14.3**	8.2	8.6	9.1	9.6	10.1	10.6
13E MVA	-	-	-	-	6.9	7.5	7.7	8.0	8.3	8.6	8.9	9.2	9.5	9.8	10.1
14E MVA	9.8	9.8	10.7	11.4	11.6	11.9	**12.2**	**12.7**	**13.2**	7.7	7.9	8.2	8.5	8.7	9.0
21E MVA	10.1	10.2	10.2	10.9	10.3	10.6	10.9	11.3	11.3	11.3	11.3	11.3	11.4	11.4	11.4
22E MVA	**12.9**	**13.0**	**13.4**	**13.9**	**12.2**	5.0	5.1	5.4	5.6	5.8	6.0	6.1	6.4	6.5	6.7
23E MVA	6.0	5.5	6.2	9.1	9.2	9.4	9.7	10.1	10.5	10.9	11.2	11.6	12.0	**12.3**	9.7
24E MVA															
North Calder POD N-1 Capacity MVA	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD MVA	**23.3**	**19.9**	**21.0**	**21.3**	**22.3**	**21.2**	12.6	12.9	13.1	13.4	13.6	13.9	14.1	14.5	14.7
North Calder POD MW	**21.8**	**18.9**	**19.9**	**20.1**	**21.1**	**20.1**	11.9	12.2	12.4	12.7	12.9	13.2	13.4	13.7	14.0
North Calder POD pf	0.936	0.949	0.950	0.943	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
25L MVA	**12.5**	**14.4**	**15.0**	**15.3**	**15.8**	**16.5**	7.8	7.9	8.1	8.2	8.4	8.5	8.7	8.8	9.0
25R MVA	5.1	5.5	5.7	5.8	5.9	6.2	6.3	6.4	6.5	6.6	6.8	6.9	7.0	7.1	7.3
Riverview POD N-1 Capacity MVA	-	-	-	-	-	-	-	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0
Riverview POD MVA	-	-	-	-	-	-	-	22.6	38.0	40.0	50.7	52.8	54.8	58.8	60.4
Riverview POD MW	-	-	-	-	-	-	-	22.4	37.6	39.6	50.2	52.3	54.3	58.2	59.8
Riverview POD pf	-	-	-	-	-	-	-	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990
11RV MVA	-	-	-	-	-	-	-	10.0	10.7	11.3	11.9	**12.4**	**12.9**	10.7	11.0
12RV MVA	-	-	-	-	-	-	-	-	8.0	8.3	8.6	9.2	9.6	10.1	10.5
13RV MVA															
14RV MVA	-	-	-	-	-	-	-	-	-	-	9.0	9.4	9.7	9.9	10.1
21RV MVA	-	-	-	-	-	-	-	-	6.0	6.3	6.5	6.9	7.3	7.6	7.9
22RV MVA	-	-	-	-	-	-	-	**12.6**	**13.3**	9.1	9.6	10.0	10.3	10.5	10.8
23RV MVA	-	-	-	-	-	-	-	-	-	5.0	5.2	5.5	5.6	10.7	11.0
24RV MVA															

9.8.3 Alternative VII

Tables 35, 36, 37 and 38 assume that the new Summerside POD can be constructed by summer 2019. Under this assumption the loading on all 25kV distribution circuits in the areas of interest, namely North Calder, Poundmaker, Summerside, and East Industrial can be managed to stay below their Design Load Rating of 12 MVA. The 14 new distribution circuits would be those highlighted in grey in Tables 35 to 38. It should be noted that circuits 31SU and 32SU are needed by summer 2019 to serve the growing load demand in Southwest Edmonton, according to Tables 35 and 37.

However, as discussed in section 6.7, EDTI TFO has indicated that the earliest possible in-service date for the new Summerside POD is 2021, given the constructability challenges that EDTI anticipates.

Table 35: Alternative VII – Non-Coincident Summer Peak Demand (Post-Mitigation) – Part 1 of 2

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside POD N-1 Capacity MVA	75.0	75.0	75.0	75.0	75.0	75.0	75.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Summerside POD MVA	32.1	49.7	55.2	64.6	66.4	**76.4**	**82.6**	89.1	94.4	112.2	118.3	122.7	127.2	133.0	138.7
Summerside POD MW	31.9	49.2	54.8	64.2	66.0	**75.9**	**82.1**	88.6	93.8	111.6	117.6	121.9	126.5	132.2	137.8
Summerside POD pf	0.991	0.990	0.992	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
11SU MVA	**17.7**	**16.0**	**19.7**	**13.8**	11.7	**13.4**	**14.5**	**15.6**	**16.6**	7.5	7.9	8.2	8.5	8.7	8.9
12SU MVA	5.9	6.9	7.6	8.4	9.6	11.0	5.9	6.4	6.8	7.2	7.5	7.8	8.1	8.3	8.4
13SU MVA	-	-	-	**13.4**	**13.8**	**15.9**	**17.2**	8.5	9.0	9.5	10.0	10.4	10.8	11.0	11.2
14SU MVA	-	-	-	-	7.2	8.3	9.0	7.7	8.2	8.6	9.1	9.4	9.8	9.9	10.2
15SU MVA	-	-	-	-	-	-	-	-	-	10.0	10.6	11.0	11.3	11.6	11.8
16SU MVA															
21SU MVA	9.4	7.0	8.9	10.3	7.3	8.4	9.1	9.8	10.4	7.0	7.4	7.6	7.9	8.1	8.3
22SU MVA	-	**20.0**	**20.2**	**14.3**	11.4	**13.1**	**14.1**	9.4	10.0	10.6	6.7	7.0	7.2	7.4	7.5
23SU MVA	-	-	-	8.5	9.4	10.9	11.7	10.2	10.8	11.4	7.9	8.2	8.5	8.7	8.8
24SU MVA	-	-	-	-	-	-	6.0	6.5	6.9	7.3	7.6	7.9	8.2	8.4	8.5
25SU MVA	-	-	-	-	-	-	-	-	-	8.5	9.0	9.4	9.9	10.2	10.6
26SU MVA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8
31SU[a] MVA	-	-	-	-	-	-	-	10.0	10.6	11.2	11.8	**12.2**	**12.6**	10.7	10.9
32SU[b] MVA	-	-	-	-	-	-	-	10.3	10.9	6.5	6.9	7.1	7.4	7.5	7.7
33SU MVA	-	-	-	-	-	-	-	-	-	5.0	5.3	5.4	5.6	10.8	11.0
34SU MVA	-	-	-	-	-	-	-	-	-	-	8.5	8.8	9.2	9.3	9.5
35SU MVA	-	-	-	-	-	-	-	-	-	7.8	8.0	8.3	8.6	8.8	9.1
36SU MVA															

[a], [b]: The distribution circuits 31SU and 32SU are required in 2019. However, EDTI TFO has indicated that the earliest in-service date for new Summerside POD is 2021

Table 36: Alternative VII - Non-Coincident Summer Peak Demand (Post-Mitigation) – Part 2 of 2

Summer	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Poundmaker POD N-1 Capacity MVA	75.0	75.0	75.0	75.0	75.0	75.0	75.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Poundmaker POD MVA	-	34.7	35.2	38.1	39.0	46.0	59.1	63.0	65.5	68.0	70.2	73.4	76.7	77.2	80.4
Poundmaker POD MW	-	32.3	34.7	37.3	38.1	45.1	57.8	61.6	64.1	66.5	68.7	71.8	75.0	75.5	78.6
Poundmaker POD pf	-	0.930	0.985	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
11PM MVA	-	-	-	-	-	-	-	-	6.4	6.7	6.9	7.3	7.6	8.0	8.3
12PM MVA	-	-	-	-	-	-	-	-	5.0	5.2	5.4	5.7	5.9	6.2	6.5
13PM MVA															
14PM MVA															
21PM MVA	11.1	10.1	11.3	**12.2**	7.2	7.5	8.1	8.8	9.1	9.5	9.9	10.4	10.9	8.7	9.1
22PM MVA	8.0	8.9	8.9	9.3	9.1	10.7	9.5	10.2	10.7	11.2	11.6	7.7	8.0	8.4	8.8
23PM MVA	-	-	-	-	-	-	4.5	4.9	5.1	5.3	5.5	5.8	6.1	6.4	6.7
24PM MVA	-	-	-	-	-	-	11.5	11.8	**12.2**	**12.4**	**12.7**	8.5	8.7	8.9	9.1
31PM MVA	10.5	8.4	9.5	11.0	7.9	10.0	10.8	11.6	7.1	7.4	7.7	8.0	8.5	8.9	9.3
32PM MVA	8.2	7.5	7.6	8.1	7.5	8.6	4.8	5.2	5.4	5.6	5.8	6.1	6.4	6.7	7.0
33PM MVA	-	-	-	-	9.2	10.1	11.0	11.8	5.9	6.1	6.4	6.7	7.0	7.3	7.7
34PM MVA	-	-	-	-	-	-	-	-	-	-	-	9.0	9.4	9.7	10.1
East Industrial POD N-1 Capacity MVA	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0
East Industrial POD MVA	50.6	51.6	55.6	58.2	55.5	58.2	59.8	62.3	**64.7**	54.8	56.3	58.0	59.7	61.6	60.8
East Industrial POD MW	47.2	48.5	51.9	54.6	52.1	54.8	56.4	58.9	**61.3**	51.5	52.8	54.5	56.1	57.9	57.1
East Industrial POD pf	0.933	0.940	0.932	0.937	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939
11E MVA	7.5	7.5	8.0	6.9	6.5	6.9	7.1	7.4	7.7	7.9	8.2	8.5	8.7	9.0	9.3
12E MVA	7.5	8.9	10.1	11.9	10.1	10.7	11.0	11.5	**12.4**	7.0	7.5	7.9	8.4	8.9	9.4
13E MVA	-	-	-	-	-	7.0	7.2	7.5	7.8	8.1	8.4	8.6	8.9	9.2	9.5
14E MVA	9.5	9.8	10.6	11.4	11.4	**12.1**	**12.4**	**12.9**	**13.4**	7.9	8.1	8.4	8.7	8.9	9.2
21E MVA	11.9	9.5	10.4	**12.7**	10.7	10.8	11.2	11.6	11.6	11.6	11.6	11.6	11.7	11.7	11.7
22E MVA	**12.2**	**12.3**	**13.4**	**12.5**	11.0	4.6	4.8	5.0	5.2	5.4	5.6	5.7	5.9	6.1	6.3
23E MVA	5.3	5.6	6.8	7.0	8.7	9.2	9.4	9.8	10.2	10.6	10.9	11.3	11.6	12.0	9.6
24E MVA															
North Calder POD N-1 Capacity MVA	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD MVA	**23.7**	**20.6**	**22.3**	**22.6**	**21.3**	**21.7**	12.6	12.8	12.9	13.2	13.4	13.6	13.8	14.1	14.4
North Calder POD MW	**21.8**	**19.2**	**20.6**	**21.0**	**19.8**	**20.2**	11.7	11.9	12.0	12.2	12.5	12.7	12.9	13.1	13.4
North Calder POD pf	0.918	0.934	0.923	0.931	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
25L MVA	**12.1**	**14.6**	**16.9**	**16.2**	**16.7**	**16.8**	7.6	7.7	7.9	8.0	8.1	8.3	8.4	8.5	8.7
25R MVA	10.1	5.7	5.7	5.9	6.0	6.3	6.4	6.5	6.7	6.8	6.9	7.0	7.1	7.3	7.4

Table 37: Alternative VII - Non-Coincident Winter Peak Demand (Post-Mitigation) – Part 1 of 2

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Summerside POD N-1 Capacity MVA	89.0	89.0	89.0	89.0	89.0	89.0	89.0	237.0	237.0	237.0	237.0	237.0	237.0	237.0	237.0
Summerside POD MVA	50.9	58.9	67.7	71.1	79.4	87.8	**95.0**	102.4	108.6	127.8	134.6	139.5	144.6	150.3	156.6
Summerside POD MW	50.8	58.8	67.7	71.0	79.4	87.8	**95.0**	102.4	108.6	127.8	134.6	139.5	144.6	150.3	156.6
Summerside POD pf	0.998	0.998	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
11SU MVA	**18.1**	**19.2**	**12.6**	10.0	11.1	**12.3**	**13.3**	**14.3**	**15.2**	6.1	6.4	6.7	6.9	7.1	7.2
12SU MVA	6.2	9.2	11.9	**13.2**	**12.5**	**13.8**	7.0	7.5	8.0	8.5	8.9	9.2	9.5	9.8	10.0
13SU MVA	-	-	**19.0**	**13.7**	**14.1**	**15.6**	**16.9**	8.2	8.6	9.1	9.5	9.8	10.1	10.3	10.5
14SU MVA	-	-	-	7.0	8.4	9.3	10.0	8.5	9.0	9.5	10.0	10.4	10.8	11.0	11.3
15SU MVA	-	-	-	-	-	-	-	-	-	10.0	10.5	10.9	11.3	11.6	11.8
16SU MVA															
21SU MVA	11.5	9.8	11.6	7.6	9.4	10.4	11.3	**12.2**	**12.9**	9.1	9.6	10.0	10.3	10.5	10.8
22SU MVA	**14.5**	**20.7**	**14.3**	11.3	**14.0**	**15.5**	**16.7**	10.7	11.4	**12.0**	8.7	9.0	9.3	9.5	9.7
23SU MVA	-	-	-	10.0	11.7	**12.9**	**13.9**	12.0	**12.7**	**13.4**	9.2	9.5	9.8	10.1	10.3
24SU MVA	-	-	-	-	-	-	8.0	8.6	9.1	9.6	10.1	10.5	10.9	11.1	11.3
25SU MVA	-	-	-	-	-	-	-	-	-	9.5	10.0	10.5	10.9	11.3	11.7
26SU MVA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.0
31SU[a] MVA	-	-	-	-	-	-	-	10.0	10.7	11.3	11.9	**12.4**	**12.9**	10.7	11.0
32SU[b] MVA	-	-	-	-	-	-	-	**12.6**	**13.3**	9.1	9.6	10.0	10.3	10.5	10.8
33SU MVA	-	-	-	-	-	-	-	-	-	5.0	5.2	5.5	5.6	10.7	11.0
34SU MVA	-	-	-	-	-	-	-	-	-	-	9.0	9.4	9.7	9.9	10.1
35SU MVA	-	-	-	-	-	-	-	-	-	8.0	8.3	8.6	9.0	9.3	9.6
36SU MVA															

[a], [b]: The distribution circuits 31SU and 32SU are required in 2019. However, EDTI TFO has indicated that the earliest in-service date for new Summerside POD is 2021

Table 38: Alternative VII - Non-Coincident Winter Peak Demand (Post-Mitigation) – Part 2 of 2

Winter	Historical					Forecast									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Poundmaker POD N-1 Capacity MVA	89.0	89.0	89.0	89.0	89.0	89.0	89.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0	178.0
Poundmaker POD MVA	37.5	36.8	37.2	40.8	44.4	48.9	61.8	65.8	68.4	70.9	73.4	77.4	80.9	81.8	85.2
Poundmaker POD MW	37.2	36.4	36.8	40.6	44.3	48.8	61.7	65.7	68.2	70.8	73.2	77.3	80.7	81.7	85.0
Poundmaker POD pf	0.992	0.990	0.991	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
11PM MVA	-	-	-	-	-	-	-	-	8.0	8.3	8.6	9.2	9.6	10.1	10.5
12PM MVA	-	-	-	-	-	-	-	-	6.0	6.3	6.5	6.9	7.3	7.6	7.9
13PM MVA															
14PM MVA															
21PM MVA	-	11.1	**12.4**	**13.6**	8.3	9.0	9.7	10.4	10.9	11.3	11.8	**12.5**	**13.1**	11.2	11.7
22PM MVA	-	8.0	8.5	8.8	10.0	10.8	9.6	10.3	10.8	11.3	11.7	7.9	8.3	8.7	9.1
23PM MVA	-	-	-	-	-	-	5.2	5.6	5.9	6.1	6.4	6.8	7.1	7.4	7.8
24PM MVA	-	-	-	-	-	-	11.0	11.3	11.6	11.8	**12.1**	7.9	8.1	8.4	8.6
31PM MVA	-	11.5	10.5	11.5	9.8	10.6	11.5	**12.3**	6.8	7.1	7.4	7.9	8.2	8.6	9.0
32PM MVA	-	8.5	8.5	8.5	9.0	9.8	5.3	5.7	6.0	6.2	6.5	6.9	7.2	7.5	7.9
33PM MVA	-	-	-	-	11.5	**12.4**	**13.4**	**14.4**	7.0	7.3	7.6	8.0	8.5	8.8	9.3
34PM MVA	-	-	-	-	-	-	-	-	-	-	-	9.0	9.3	9.7	10.0
East Industrial POD N-1 Capacity MVA	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
East Industrial POD MVA	47.3	52.0	53.4	55.3	54.2	55.8	57.4	59.7	62.0	51.3	52.8	54.3	56.0	57.7	56.5
East Industrial POD MW	45.6	49.8	51.1	53.4	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5
East Industrial POD pf	0.963	0.959	0.958	0.967	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
11E MVA	7.0	6.6	6.9	5.8	6.0	6.2	6.3	6.6	6.8	7.1	7.3	7.6	7.8	8.0	8.3
12E MVA	8.8	9.8	11.1	11.6	**12.1**	**12.4**	**12.8**	**13.3**	**14.3**	8.2	8.6	9.1	9.6	10.1	10.6
13E MVA	-	-	-	-	6.9	7.5	7.7	8.0	8.3	8.6	8.9	9.2	9.5	9.8	10.1
14E MVA	9.8	9.8	10.7	11.4	11.6	11.9	**12.2**	**12.7**	**13.2**	7.7	7.9	8.2	8.5	8.7	9.0
21E MVA	10.1	10.2	10.2	10.9	10.3	10.6	10.9	11.3	11.3	11.3	11.3	11.3	11.4	11.4	11.4
22E MVA	**12.9**	**13.0**	**13.4**	**13.9**	**12.2**	5.0	5.1	5.4	5.6	5.8	6.0	6.1	6.4	6.5	6.7
23E MVA	6.0	5.5	6.2	9.1	9.2	9.4	9.7	10.1	10.5	10.9	11.2	11.6	12.0	**12.3**	9.7
24E MVA															
North Calder POD N-1 Capacity MVA	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
North Calder POD MVA	**23.3**	**19.9**	**21.0**	**21.3**	**22.3**	**21.2**	12.6	12.9	13.1	13.4	13.6	13.9	14.1	14.5	14.7
North Calder POD MW	**21.8**	**18.9**	**19.9**	**20.1**	**21.1**	**20.1**	11.9	12.2	12.4	12.7	12.9	13.2	13.4	13.7	14.0
North Calder POD pf	0.936	0.949	0.950	0.943	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948	0.948
25L MVA	**12.5**	**14.4**	**15.0**	**15.3**	**15.8**	**16.5**	7.8	7.9	8.1	8.2	8.4	8.5	8.7	8.8	9.0
25R MVA	5.1	5.5	5.7	5.8	5.9	6.2	6.3	6.4	6.5	6.6	6.8	6.9	7.0	7.1	7.3

10.0 REVISION HISTORY

Revision	Issue Date	Author	Change Tracking
1	Aug. 21, 2015	Isabella Ciocoiu Steve Swystun	
2	Sept. 2, 2015	Steve Swystun	New alternative 2 was added. Preferred alternative changed from #3 to #4. Additional notes added to Tables. Revisions based on AESO R1 comments.
3	June 8, 2016	Steve Swystun	Riverside name changed to Riverview throughout document. Revisions made to all Tables. Figure 5.1.3-1 updated and title changed to 5.1.4-1 alternative 4. Some wording changes throughout document to improve clarity.
4	Jan. 13, 2017	Steve Swystun	Sections 4, 5, 6 and Figure 5.1.4-1 updated.
5	Jan. 26, 2017	Steve Swystun	Further revisions to all sections and all tables. Updated all figures and single line drawing.
6	Feb. 22, 2017	Steve Swystun	Revisions throughout document based upon AESO R5 comments.
7	Mar. 3, 2017	Steve Swystun	Updated Tables 4.3-1, 4.4-1, 5.1.4-1 and 5.1.4-2 Additions to sections 1.0, 3.1, 5.1.1, 5.1.3, 5.1.4 and 6.0.

8	June 18, 2017	Justin Ngomsi	Overhauled and rewrote the DDR with the emphasis on EDTI's distribution capacity requirements and plan for the entire South and West Edmonton that is currently served from 25 kV PODs, including North Calder, Poundmaker, Summerside and East Industrial
9	November 10, 2017	Justin Ngomsi	Revised sections of the document for greater clarity

EPCOR DISTRIBUTION & TRANSMISSION INC.

Distribution Deficiency Report (DDR) for Riverview Service Area

Technical Supplement

Revision 0

November 10, 2017

TABLE OF CONTENTS

1.0 INTRODUCTION

This Distribution Deficiency Report (DDR) Technical supplement provides EDTI's most up-to date load information for the the Summerside POD, Poundmaker POD, East Industrial POD, North Calder POD, Jasper POD, Petrolia POD and Dome POD. The information in column F of Table 1 represents the actual non-coincident peak load demand that was recorded during 2017 summer season. These actual values supersede the forecasted values previously provided in Table 5 of the DDR for the Riverview Service Area for year 2017.

2.0 LOAD FORECASTING RESULTS

Table 1: Non-Coincident Summer Peak Load Demand (Pre-Mitigation)

	Summer	Historical						Forecast								
		A 2012	B 2013	C 2014	D 2015	E 2016	F 2017	G 2018	H 2019	I 2020	J 2021	K 2022	L 2023	M 2024	N 2025	O 2026
1	Summerside POD N-1 Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
2	Summerside POD [MVA]	32.1	49.7	55.2	64.6	66.4	72.8	**82.6**	**89.1**	**94.4**	**99.9**	**105.2**	**109.1**	**112.9**	**115.4**	**117.8**
3	Summerside POD [MW]	31.9	49.2	54.8	64.2	66.0	71.7	**82.1**	**88.6**	**93.8**	**99.3**	**104.6**	**108.4**	**112.2**	**114.7**	**117.1**
4	Summersdie POD Power Factor	0.991	0.990	0.992	0.994	0.994	0.985	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
5	Peak Day Temperature [°C]	32.6	33.7	31.2	34.1	27.4	29.5	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
6	Poundmaker POD N-1 Capacity [MVA]	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
7	Poundmaker POD [MVA]	-	34.7	35.2	38.1	39.0	**45.6**[#]	49.6	53.3	55.6	57.9	60.0	63.0	66.1	69.2	72.3
8	Poundmaker POD [MW]	-	32.3	34.7	37.3	38.1	43.9	48.5	52.1	54.4	56.6	58.7	61.6	64.6	67.7	70.7
9	Poundmaker POD Power Factor	-	0.930	0.985	0.978	0.978	0.964	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978
10	Peak Day Temperature [°C]	-	27.3	31.2	34.1	28.1	29.5	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
11	East Industrial POD N-1 Capacity [MVA]	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0
12	East Industrial POD [MVA]	50.6	51.6	55.6	58.2	55.5	55.1	60.3	62.8	**65.2**	**67.6**	**69.8**	**72.0**	**74.4**	**76.7**	**79.1**
13	East Industrial POD [MW]	47.2	48.5	51.9	54.6	52.1	51.8	56.6	59.0	**61.2**	**63.5**	**65.5**	**67.6**	**69.9**	**72.0**	**74.3**
14	East Industrial POD Power Factor	0.933	0.940	0.932	0.937	0.939	0.940	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939	0.939
15	Peak Day Temperature [°C]	30.6	33.7	29.3	34.1	27.9	32.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
16	North Calder POD N-1 Capacity [MVA]	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
17	North Calder POD [MVA]	**23.7**	**20.6**	**22.3**	**22.6**	**21.3**	**16.7**[#]	**22.1**	**22.5**	**22.9**	**23.3**	**23.7**	**24.1**	**24.5**	**25.0**	**25.4**
18	North Calder POD [MW]	**21.8**	**19.2**	**20.6**	**21.0**	**19.8**	**15.8**	**20.5**	**20.9**	**21.3**	**21.6**	**22.0**	**22.4**	**22.8**	**23.2**	**23.6**
19	North Calder POD Power Factor	0.918	0.934	0.923	0.931	0.930	0.949	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
20	Peak Day Temperature [°C]	32.6	27.3	28.8	28.2	23.6	27.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
21	Jasper POD N-1 Capacity [MVA]	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
22	Jasper POD [MVA]	**170.2**	**152.0**	**152.9**	138.9	136.5	141.6	141.8	142.2	142.6	143.0	143.3	144.7	146.2	147.7	149.1
23	Jasper POD [MW]	**158.3**	**140.8**	**142.1**	129.5	128.3	126.4	133.3	133.7	134.0	134.4	134.7	136.0	137.4	138.8	140.2
24	Jasper POD Power Factor	0.930	0.926	0.930	0.932	0.940	0.893	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
25	Peak Day Temperature [°C]	32.6	33.7	31.2	34.1	28.7	30.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
26	Petrolia POD N-1 Capacity [MVA]	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3
27	Petrolia POD [MVA]	**87.1**	**90.1**	**85.8**	**91.8**	82.4	83.2	**92.0**	**92.4**	**93.0**	**93.5**	**94.0**	**94.5**	**95.0**	**95.5**	**96.0**
28	Petrolia POD [MW]	**83.4**	**86.4**	**82.4**	**88.6**	79.9	80.6	**89.2**	**89.6**	**90.2**	**90.7**	**91.2**	**91.7**	**92.2**	**92.6**	**93.1**
29	Petrolia POD Power Factor	0.958	0.959	0.960	0.965	0.970	0.969	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
30	Peak Day Temperature [°C]	30.6	33.7	31.2	34.1	27.3	29.5	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
31	Dome POD N-1 Capacity [MVA]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
32	Dome POD [MVA]	**107.3**	**108.1**	**103.9**	98.0	88.3	93.7	88.3	88.3	88.9	89.9	91.3	92.8	94.3	95.7	97.0
33	Dome POD [MW]	**99.2**	**100.1**	**96.2**	91.3	82.1	92.8	82.1	82.1	82.7	83.6	84.9	86.3	87.7	89.0	90.2
34	Dome POD Power Factor	0.924	0.925	0.927	0.931	0.930	0.990	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930	0.930
35	Peak Day Temperature [°C]	28.0	33.7	31.2	34.1	26.8	32.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0

Note: # - In early 2017, 4 MVA of load was transferred from 25L to 22PM; refer to cells F7 and F17