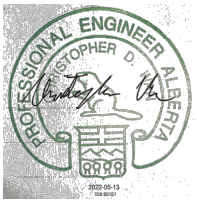
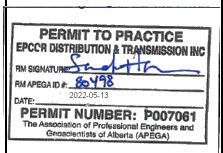
EPCOR DISTRIBUTION & TRANSMISSION INC.

Distribution Deficiency Report (DDR) for Castle Downs

Revision 1

Company	Role	Name	Date	Signature
EDTI	Prepared	Chris Wan, P. Eng.	May 13, 2022	
EDTI	Approved	Sarah Hanson, P.Eng.	May 13, 2022	

Abbreviations

AESO: Alberta Electric System Operator

AUC: Alberta Utilities Commission

CCP: Customer Connection Process

EDTI: EPCOR Distribution & Transmission Inc.

EVs: Electric Vehicles

DDR: Distribution Deficiency Report

DFO: Distribution Facility Owner

ISD: In Service Date

N-0: All elements in service (normal state)

N-1: Failure of a single element (emergency state)

PF: Power factor = MW/MVA

POD: Point of Delivery

S: Summer

TUC: Transportation/Utility Corridor

W: Winter

Contents

1.0 EXECUTIVE SUMMARY

As per the Alberta Electric System Operator (AESO) Customer Connection Process (CCP), EPCOR Distribution & Transmission Inc. (EDTI) is submitting this Distribution Deficiency Report (DDR) in conjunction with the System Access Service Request (SASR) to fulfill Stage 0 requirements.

EDTI has identified that the existing Castle Downs substation POD cannot supply its load during N-1 contingencies due to load growth in Castle Downs and the surrounding PODs of Kennedale, Namao and Woodcroft.

The 2021 summer peak at Castle Downs was 114.9 MVA and the year-to-date winter peak for 2021 is currently 99.5 MVA. The 2023 and 2031 winter peak forecasted load at Castle Downs is 101.2 MVA and 115.4 MVA respectively. In the event of a forced outage to the 240/14.4kV transformer at the Castle Downs substation, the substation will be in violation of its thermal limits during winter by 1.2 MVA in 2023 and 15.4 MVA by 2031 in restoring supply to the Castle Downs POD.

EDTI records show that the above loading is in violation of EDTI's planning criteria for circuit and substation loading which states:

1. A substation's firm supply capability is the maximum load a substation can supply without overloading any transmission equipment under an N-1 contingency. N-1 contingencies include but are not limited to:
    - Loss of a single transmission line supply to a substation
    - Loss of a single transformer at a substation
2. All 15 kV distribution circuits should operate at or below design load ratings under N-0.
3. All 15 kV distribution circuits should operate at or below emergency load ratings under N-1.
4. Circuit lengths should not impose any technical challenges on the distribution system.

The existing equipment capacities at Castle Downs substation are shown in Table 1.1 below. Per the table, the limiting capacity at the substation is currently the 15 kV switchgear during an N-1 operating state, at 100 MVA, compared to the transformation capacity during an N-1 operating state of 167.7 MVA.

Table 1.1 Existing Castle Downs Substation Capacities

Substation	Castle Downs
Transformation Installed Capacity	T1, T2: 240/14.4 kV, 100/120/133.3/167.7 MVA
240kV Substation Capacity	920L (W) : 419 MVA (summer) / 499 MVA (winter) 920L (E): 419 MVA (summer) / 499 MVA (winter) 240CV5: 475 MVA (summer) / 503 MVA (winter)
Peak Station Load (15kV)	114.9 MVA (2021 summer) 99.1 MVA (2020 winter)
15 kV Switchgear (N-1)	100 MVA (2 x 2000A breakers feeding switchgears)
Firm Transformation (N-1)	167.7 MVA
Firm Substation Capacity (N-1)	100 MVA * Due to the secondary breaker limitation at Castle Downs, the transformer during N-1 should operate at a maximum capacity of 100MVA i.e. approximately 50MVA each on the secondary windings

In this Distribution Deficiency Report (DDR), EDTI DFO demonstrates transmission investment is required in order to address the existing and anticipated capacity and reliability concerns in North Edmonton. The following solution alternatives were considered:

Distribution supply alternative

EDTI DFO has evaluated the distribution alternatives described below.

Alternative I – Distribution Switching

a) Load transfer from Castle Downs POD to adjacent PODs Kennedale, Namao and Woodcroft using existing distribution circuits.

Transmission supply alternatives

EDTI DFO has evaluated the transmission alternatives described below. These alternatives are based on EDTI DFO's present understanding of EDTI TFO's design standards and practices that are applicable to PODs.

Alternative II – Capacity increase of Castle Downs POD

a) Increase the capacity of the Castle Downs POD in 2024, by installing new 15kV switchgear capacity;

b) Rebalance 15 kV distribution circuits to utilize new switchgear and reduce loading on existing switchgear.

Alternative III – New circuits from East Terminal POD and Namao POD

This alternative is only possible following completion of project P7078 – City of Edmonton Transmission Reinforcement in 2026, which installs a new POD currently designated as East Terminal to replace existing

Kennedale POD, and increases the N-1 capacity of Namao POD. The new East Terminal POD also includes an increase in N-1 capacity compared to the original Kennedale POD.

a) Transfer 7.9 MVA load to Namao POD using one existing distribution circuit and install one new 15 kV distribution to off-load Castle Downs in 2026; and

b) Install two new 15 kV distribution circuits in 2026 using spare breaker positions installed at the new East Terminal POD as part of project P7078 – City of Edmonton Transmission Reinforcement;

After reviewing these alternatives, it was determined that Alternative II, increasing the switchgear capacity at the Castle Downs POD, is EDTI's preferred alternative to provide the requested capacity increase needed to service the Castle Downs area. The requested in-service date for the proposed development is June 01, 2024.

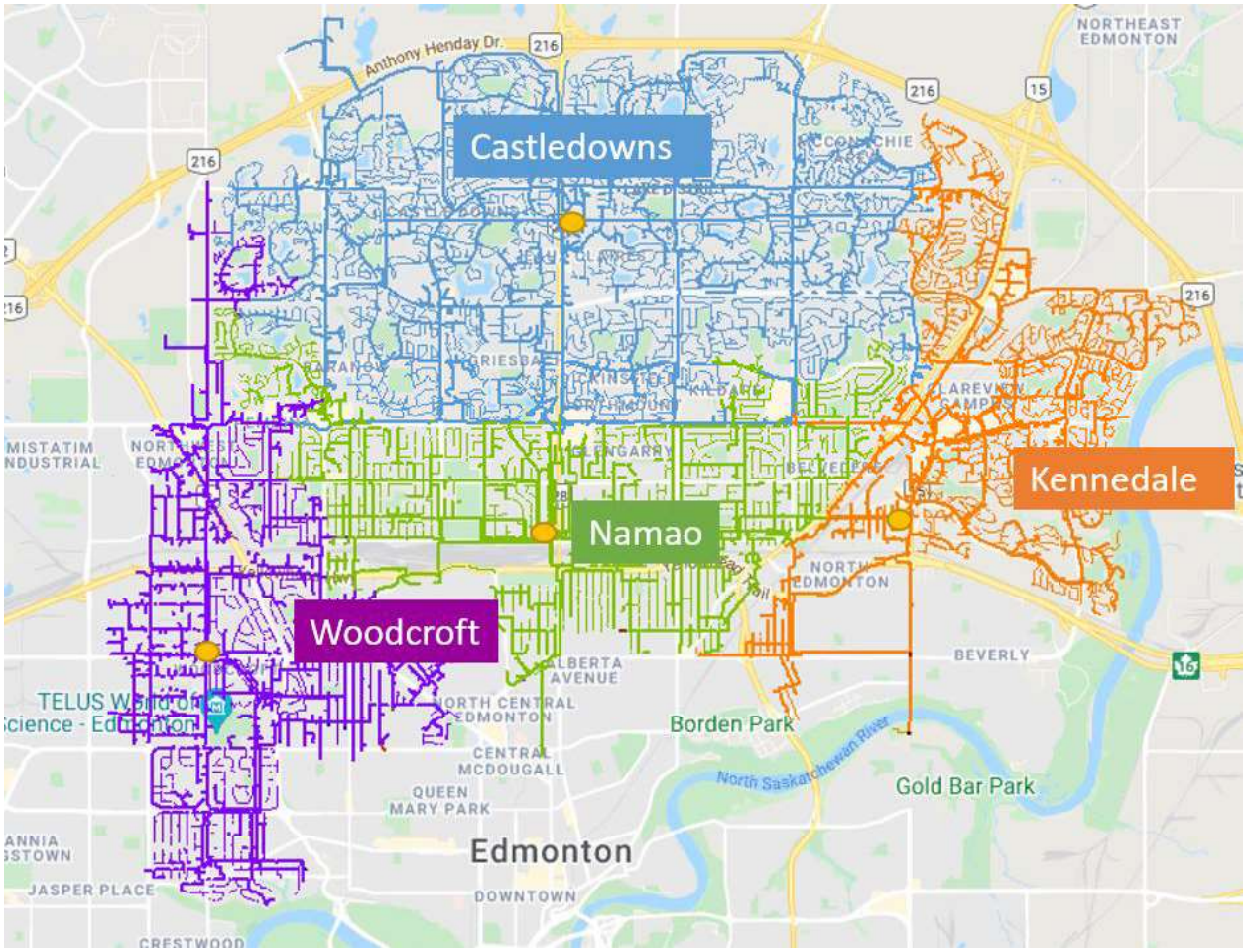
Should EDTI's preferred alternative be selected, EDTI will be requesting a DTS contract increase from 84.67 MW to 99.25 MW at the Castle Downs POD.

2.0 EXISTING SYSTEM DESCRIPTION

Figure 2.0 shows the existing Castle Downs Service Area. The service area is approximately 48 km^2 in size and covers a large amount of North Edmonton. It is at the outer limits of the 15 kV service area of the EDTI Distribution system. Castle Downs POD predominantly serves residential customer load. Load growth is occurring in the Griesbach, Crystallina Nera, Rapperswill/Canossa, and McConachie areas, where developable land remains.

Adjacent 15 kV PODs Woodcroft, Namao, and Kennedale surround the Castle Downs POD on the East, South and West respectively.

Figure 2.0
Castle Downs Service Area



2.1 CASTLE DOWNS SUBSTATION CONFIGURATION

Figure 2.1 shows that each of the four 15 kV buses at the Castle Downs POD are fed by a transformer winding through a 2000A (50 MVA) breaker. Under N-1 loss of either T1 or T2 at Castle Downs POD, all load at the Castle Downs POD would be fed through the other transformer and thermally constrained by the two breakers feeding the switchgear, for a total N-1 Firm Capacity of 100 MVA. Transformers T1 and T2 are rated 100/120/133.3/167.7 MVA each, and the N-1 Transformation Capacity is 167.7 MVA as shown in Table 2.1.

Table 2.1 Existing Castle Downs Substation Capacities

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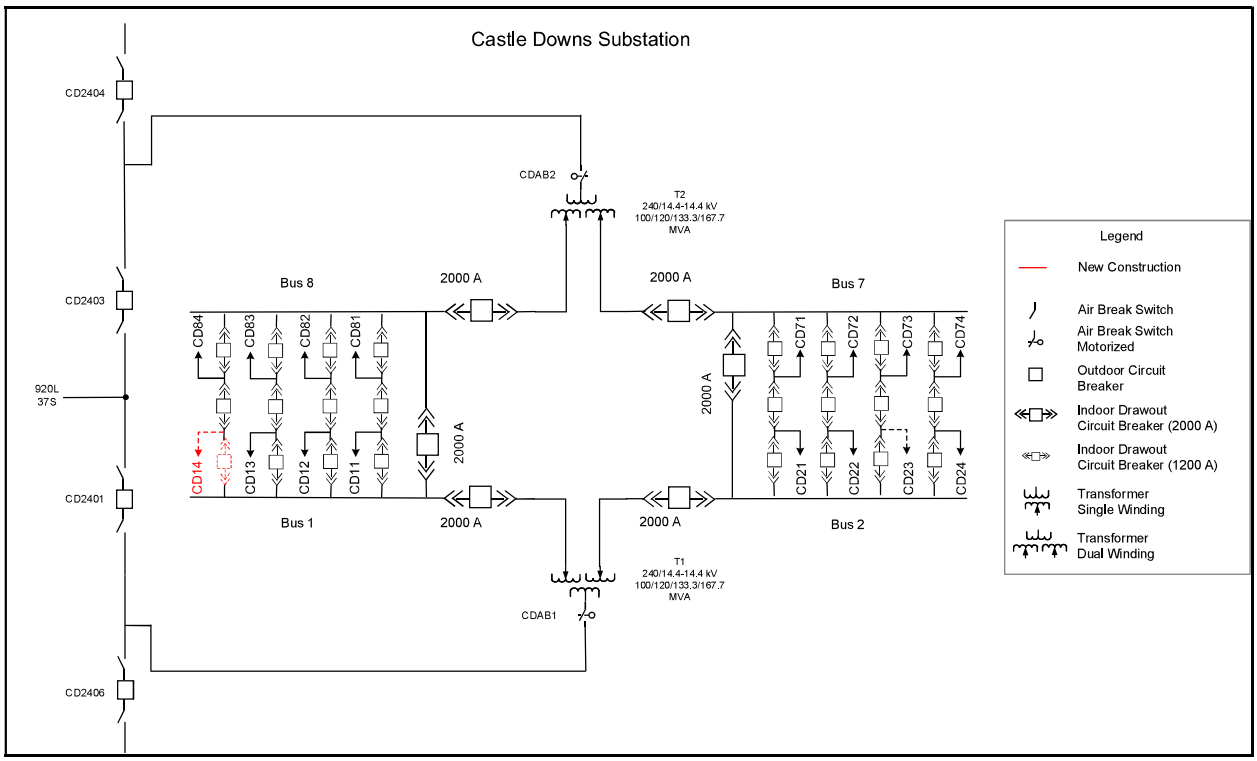
Firm Substation Capacity (N-1)	100 MVA * Due to the secondary breaker limitation at Castle Downs, the transformer during N-1 should operate at a maximum capacity of 100MVA i.e. approximately 50MVA each on the secondary windings

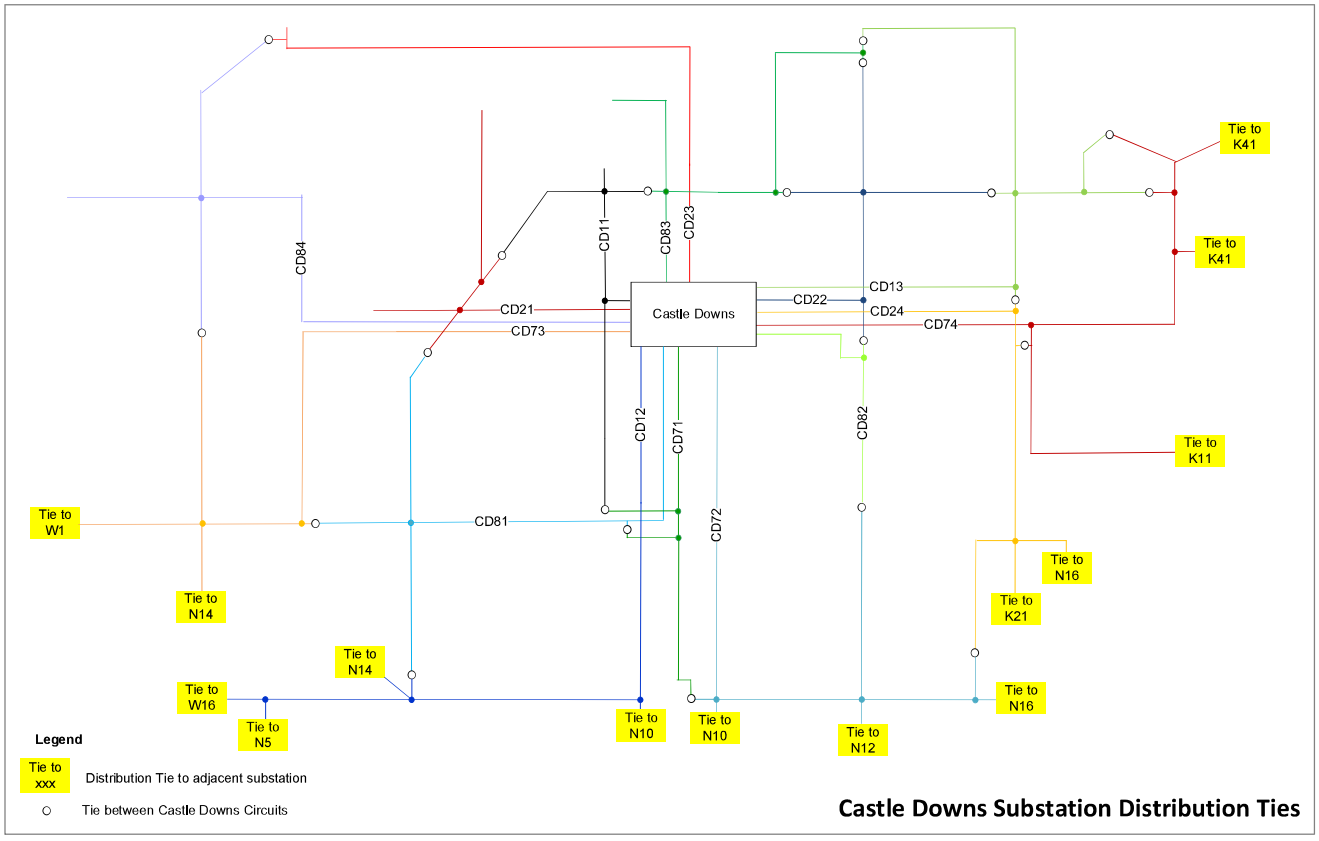
Figure 2.1
Existing Castle Downs Substation Configuration



2.2 CASTLE DOWNS DISTRIBUTION TIES

Figure 2.2 below shows a schematic diagram of the circuits supplied by Castle Downs POD and the distribution circuit ties to adjacent PODs. Ties to circuits supplied by adjacent PODs are highlighted in yellow.

Figure 2.2
Castle Downs POD Distribution Circuit Ties (Post-2023 Planned Work)



2.3 CASTLE DOWNS POD HISTORICAL PERFORMANCE

2.3.1 SAIFI and SAIDI

See Table 2.3.1 below for EDTI's 10-year overall System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI).

Table 2.3.1 EDTI SAIFI and SAIDI

Index	EDTI 2012-2021 Average
SAIFI	1.04
SAIDI	0.82

2.3.2 Castle Downs POD Outage History

Historically, EDTI has not kept full records of scheduled or forced transmission element outages where no customer load was lost. EDTI began recording such transmission outages in 2019. The 2019-2022 historical scheduled transformer outage data for the development area of Castle Downs is presented below in Table 2.3.2-1. This data is reflective of the contingency of concern to be addressed by the proposed development – loss of a Castle Downs POD transformer. EDTI plans its system such that all load interrupted due to transmission outages can be fully restored via transmission switching within the POD. This is required due to the design of EDTI's distribution system, which is unable to provide full contingency support for a transmission outage due to their typical durations and the magnitude of unsupplied load involved. Refer to Response 5 for further information on EDTI planning criteria. See Table 2.3.2-2 below for a 10-year list (i.e. 2012-2022) of historical customer outages occurring at Castle Downs due to loss of transmission supply. Note, EDTI does not keep record of the magnitude of load lost. The data only reflects operation in compliance with EDTI's N-1 firm POD loading planning criteria where load was restored via transmission switching.

Table 2.3.2-1 EDTI Castle Downs Scheduled Transformer Outages

PLANNED OUTAGES					
OUTAGE NUMBER	OUTAGE TITLE	START	END	DURATION	REASON
OE100920	CDDS7 @ Castle Downs E557S	Apr-11-2022 07:00	Apr-11-2022 17:00	10 HRS	Castle Downs CDDS7 Disconnect Maintenance
OE102156	240kV BUS and TX 2 (920LE) @ Castle Downs E557S	Feb-01-2022 15:15	Feb-01-2022 19:00	4 HRS	Emergency Outage: Remove plastic stuck in 240kV Bus at Castle Downs
OE101253	TX2 Zone @ Castle Downs E557S	Jun-19-2021 07:00	Jun-20-2021 17:00	34 HRS	TX2 Tap Changer Maintenance and CD2404 Bay CT Doble
OE100899	TX1 and CD2406 @ Castle Downs E557S	Apr-26-2021 07:00	Apr-30-2021 17:00	106 HRS	TX1 Doble, TX1 Tap Changer Maintenance, CD2406 maintenance
OE100898	TX2, CD2404 Bay @ Castle Downs E557S	Apr-12-2021 07:00	Apr-23-2021 17:00	274 HRS	TX2 Doble, CD2404 Maintenance, CDDS7/CDDS6/CDAB2 switch maintenance

PLANNED OUTAGES					
OUTAGE NUMBER	**OUTAGE TITLE**	**START**	**END**	**DURATION**	**REASON**
OE100683	Castle Downs TX1	Jul-06-2020 07:00	Jul-06-2020 17:00	10 HRS	Maintenance / Doble
OE100154	TX1 @ Castle Downs	Apr-15-2019 07:00	Apr-18-2019 17:00	82 HRS	Doble / SFRA
OE100152	Tx2 Outage @ Castle Downs S/S	Feb-25-2019 07:00	Mar-01-2019 17:00	106 HRS	Relay Maintenance

Table 2.3.2-2 2012 -2022 Historical Loss of Transmission Supply Outages

Incident number	Substation	Year	Month	Date	Time	Customers Impacted	Customer Hours of Interruption	Duration (hours)
14756	Castle Downs	2012	July	7/9/2012	4:25:00 PM	2935	2495	0.85
15564	Castle Downs	2013	July	7/31/2013	1:31:00 PM	2182	11565	5.30
17238	Castle Downs	2016	January	1/7/2016	2:22:00 PM	3265	272	0.08
17237	Castle Downs	2016	January	1/7/2016	2:22:00 PM	4558	380	0.08
17236	Castle Downs	2016	January	1/7/2016	2:22:00 PM	4318	360	0.08
INC 15013071	Castle Downs	2020	October	10/21/2020	7:19:32 AM	5015	1042	0.21
INC 15013069	Castle Downs	2020	October	10/21/2020	7:19:32 AM	4359	890	0.20
INC 15013072	Castle Downs	2020	October	10/21/2020	7:19:32 AM	3487	733	0.21
INC 15013070	Castle Downs	2020	October	10/21/2020	7:19:32 AM	3173	638	0.20
INC 15014542	Castle Downs	2021	February	2/7/2021	5:51:52 PM	4358	4799	1.10
INC 15015557	Castle Downs	2021	April	4/26/2021	9:03:07 AM	5776	2546	0.44

2.4 KENNEDALE/EAST TERMINAL SUBSTATION CONFIGURATION

2.4.1 Kennedale Substation Configuration before P7078

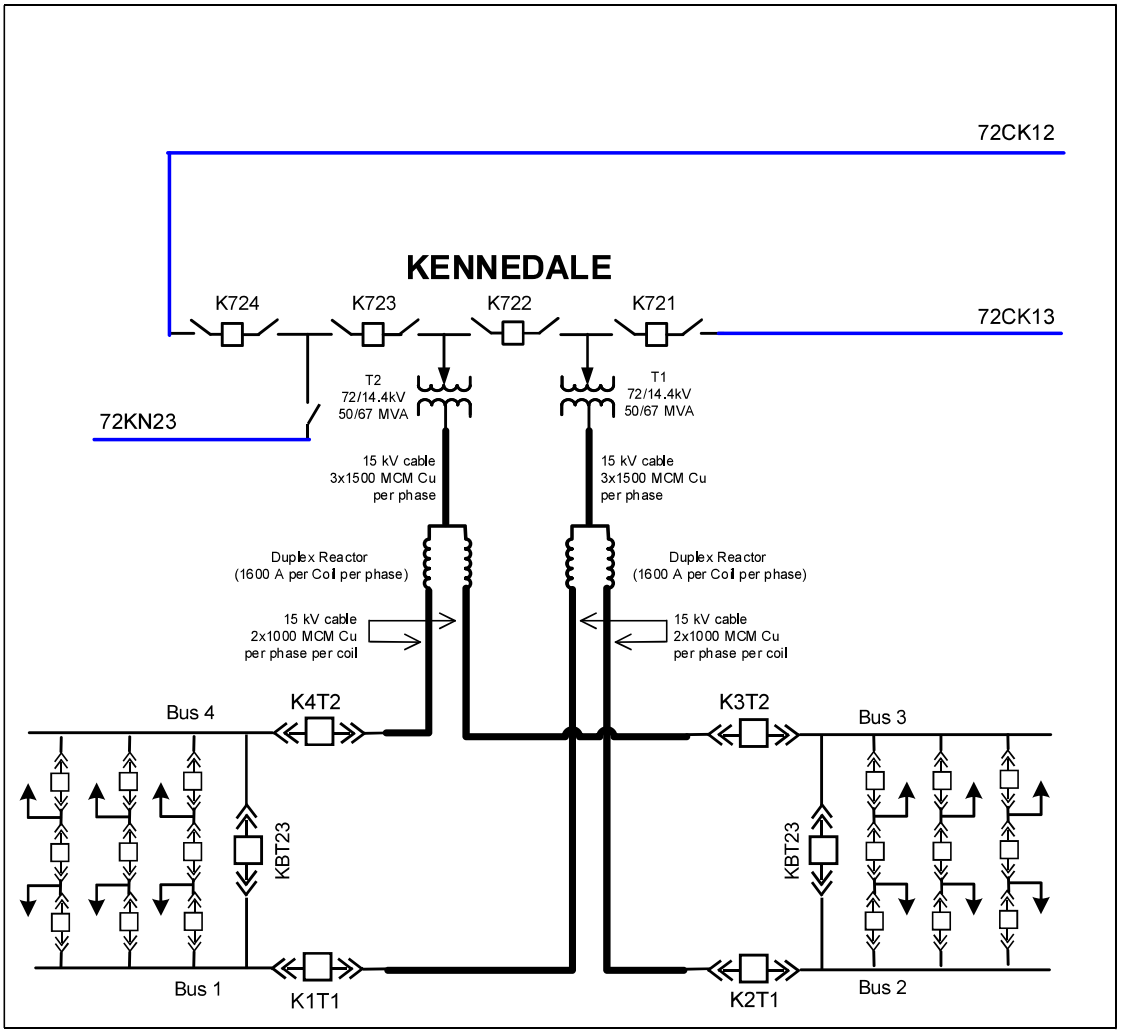
Kennedale POD substation has two (2) x 72 kV / 14.4 kV power transformers. Before P7078 – City of Edmonton Transmission Reinforcement, a transmission constraint of 58.6 MVA exists as the N-1 POD Capacity Limit as shown in Table 2.4.1.

The peak station load at Kennedale POD has exceeded its N-1 POD Capacity Limit in 2021 summer and there are no available breakers to offload adjacent PODs in the current substation. This deficiency will be addressed by P7078 in Q4 2026.

Table 2.4.1 Existing Kennedale Substation Capacities

Substation	Kennedale
Transformation Installed Capacity	T1, T2: 72/14.4 kV, 50/66.7-74.7 MVA
72kV Substation Capacity	72CK12: 48 MVA (summer) / 56 MVA (winter) 72CK13: 48 MVA (summer) / 56 MVA (winter) 72KN23: 60 MVA (summer) / 60 MVA (winter)
Peak Station Load (15kV)	65.9 MVA (2021 summer) 57.4 MVA (2020 winter)
15 kV Switchgear (N-1)	76.8 MVA
Firm Transformation (N-1)	74.7 MVA
Firm Substation (N-1)	58.6 MVA[1]

Figure 2.4.1
Existing Kennedale Substation Configuration



[1] The Firm Substation Capacity for Kennedale reflects the highest capacity during a transmission outage, and cannot be directly derived from the other capacities.

2.4.2 East Terminal Substation Configuration After P7078

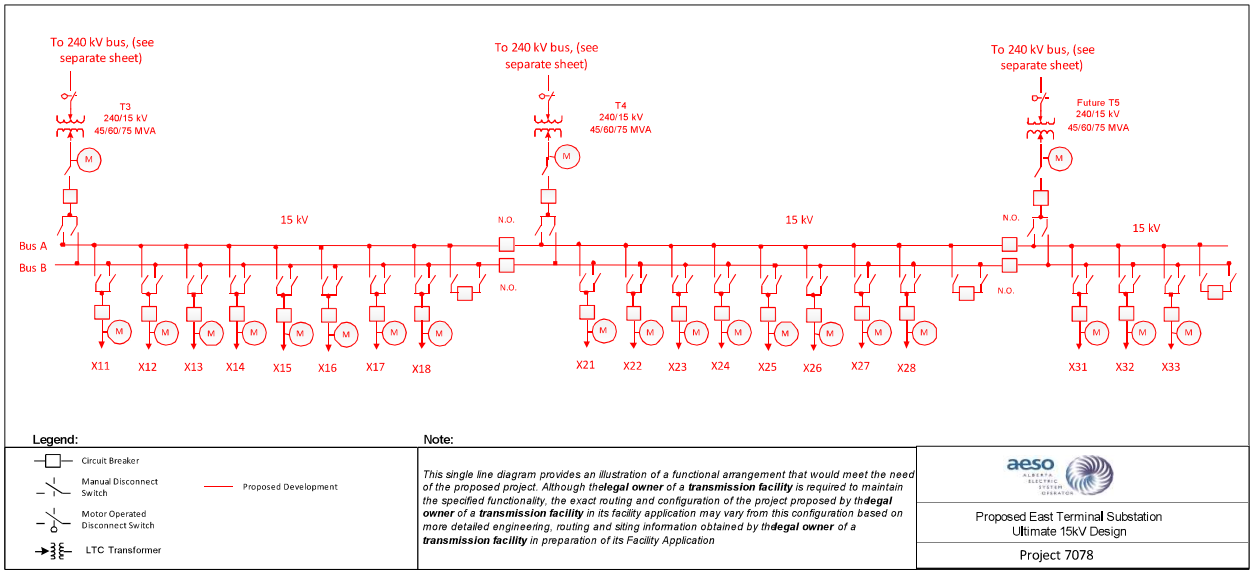
A new 240 kV / 14.4 kV POD designated as East Terminal POD will be constructed as part of P7078 – City of Edmonton Transmission Reinforcement. The N-1 Substation Capacity is assumed to be equivalent to Kennedale POD at 75 MVA.

Figure 2.4.2 shows the proposed substation configuration after P7078.

Table 2.4.2 East Terminal Substation Capacities after P7078

Substation	East Terminal
Transformation Installed Capacity	T1, T2: 240/14.4 kV, 45/60/75 MVA
240kV Substation Capacity	980L: 492 MVA (summer) / 606 MVA (winter) 915L: 492 MVA (summer) / 606 MVA (winter)
Firm Transformation (N-1)	75.0 MVA
Firm Substation (N-1)	75.0 MVA

Figure 2.4.2
East Terminal Substation Configuration after P7078



2.5 NAMAO SUBSTATION CONFIGURATION

2.5.1 Namao Substation Configuration before P7078

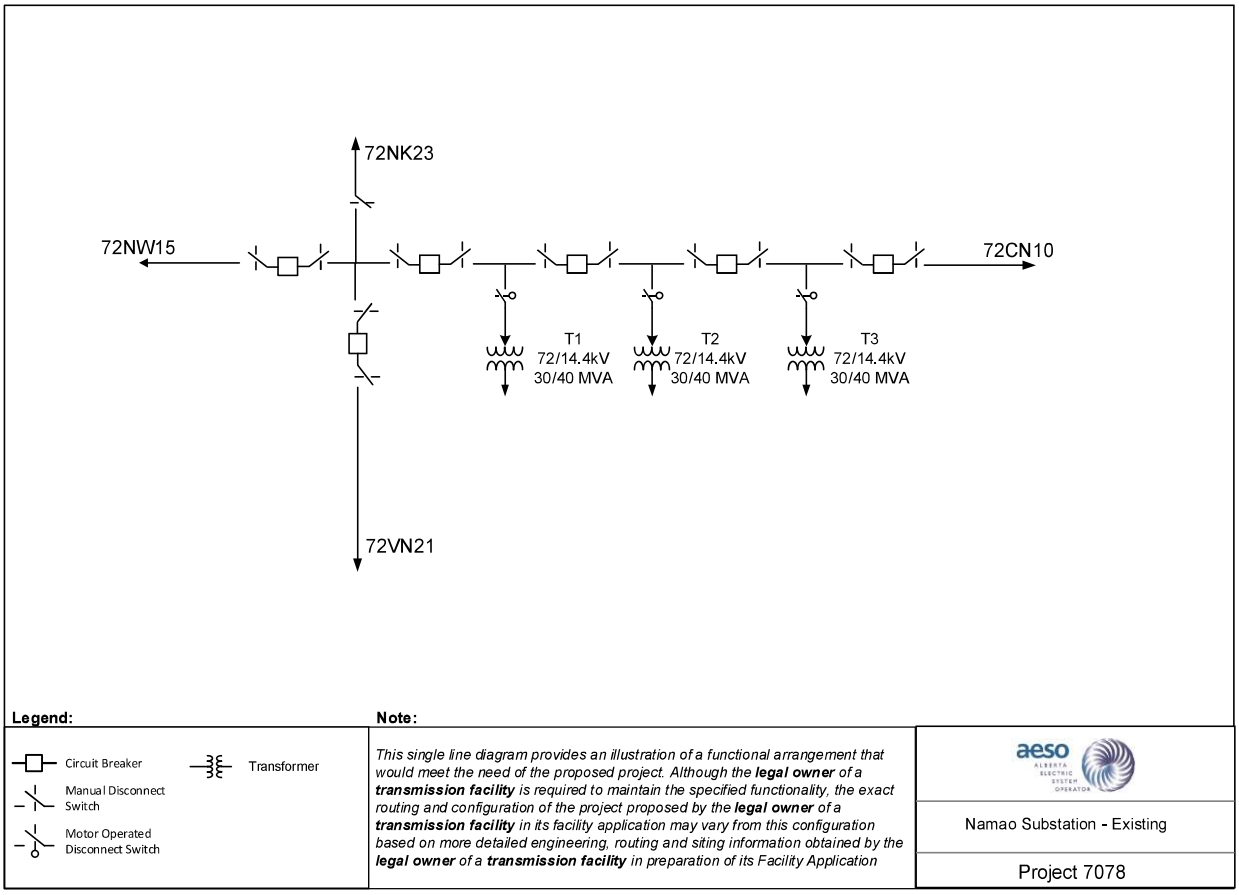
Namao POD substation has three (3) x 72 kV / 14.4 kV power transformers. Before P7078 – City of Edmonton Transmission Reinforcement, a transmission constraint of 64.5 MVA exists as the N-1 POD Capacity Limit, as shown in Table 2.5.1.

Figure 2.5.1 shows the substation configuration before P7078.

Table 2.5.1 Existing Namao Substation Capacities

Substation	Namao
Transformation Installed Capacity	T1, T2, T3: 72/14.4 kV, 30/40 MVA
72kV Substation Capacity	72CN10: 60 MVA (summer) / 60 MVA (winter) 72KN23: 60 MVA (summer) / 60 MVA (winter) 72NW15: 64 MVA (summer) / 89 MVA (winter) 72VN21: 60 MVA (summer) / 65 MVA (winter)
Peak Station Load (15kV)	57.4 MVA (2021 summer) 57.7 MVA (2020 winter)
15 kV Switchgear (N-1)	76.8 MVA
Firm Transformation (N-1)	80.0 MVA
Firm Substation (N-1)	64.5 MVA[2]

Figure 2.5.1
Existing Namao Substation Configuration



2.5.2 Namao Substation Configuration after P7078

[2] The Firm Substation Capacity for Namao reflects the highest capacity during a transmission outage, and cannot be directly derived from the other capacities.

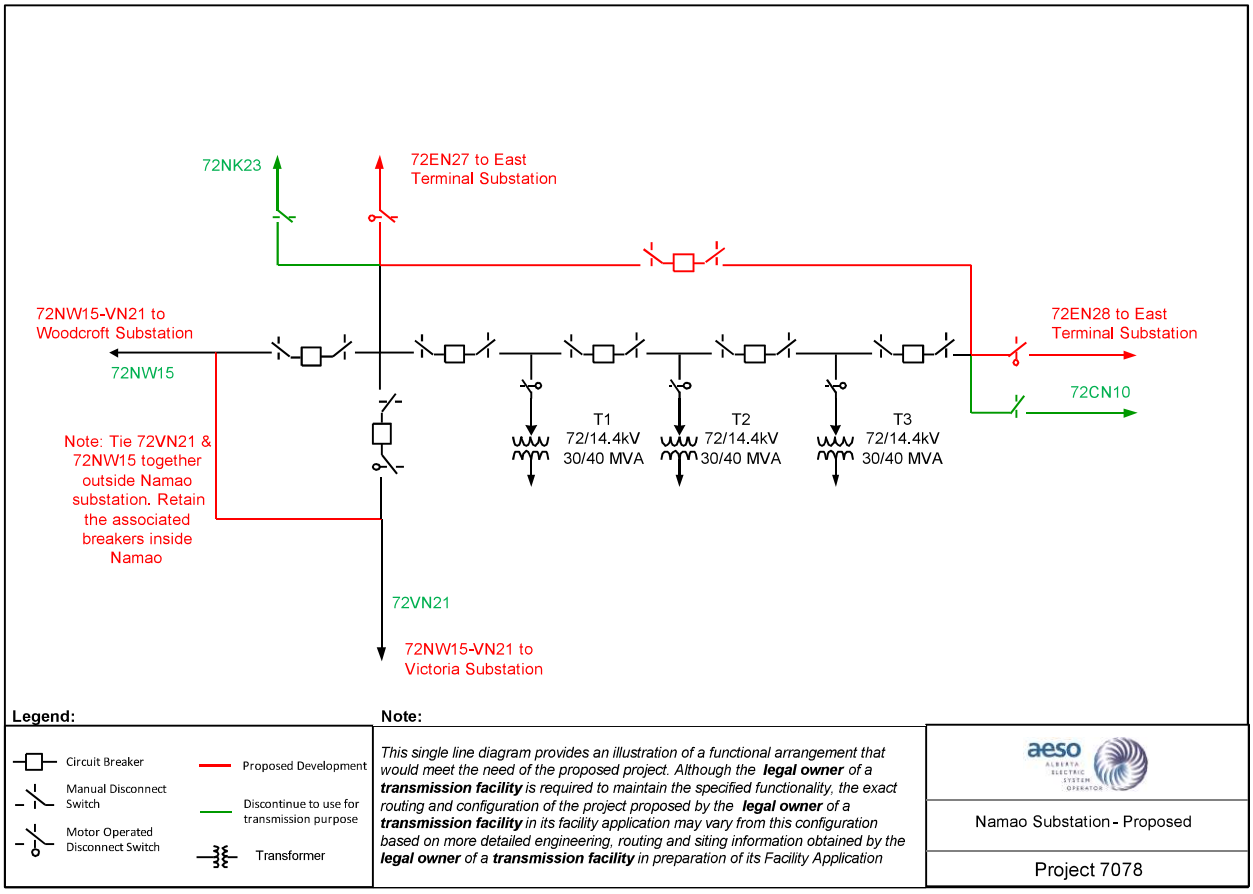
After P7078, the transmission constraint on the Namao POD will be removed and the N-1 Substation Capacity will equal the N-1 Transformation Capacity of 80.0 MVA.

Figure 2.5.2 shows the proposed substation configuration after P7078.

Table 2.5.2 Namao Substation Capacities after P7078

Substation	Namao
Transformation Installed Capacity	T1, T2, T3: 72/14.4 kV, 30/40 MVA
72kV Substation Capacity	72EN27: 80 MVA (summer) / 80 MVA (winter) 72EN28: 80 MVA (summer) / 80 MVA (winter)
Firm Transformation (N-1)	80.0 MVA
Firm Substation (N-1)	80.0 MVA

Figure 2.5.2
Namao Substation Configuration after P7078



3.0 EDTI DISTRIBUTION PLANNING CRITERIA

3.1 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. EDTI shall increase the N-1 Firm Capacity of a POD in a timely manner if the connected coincident peak load is forecasted to exceed its N-1 Firm Capacity within the 10-year forecast period.

3.2 CIRCUIT LOADING POLICY

Design Rating and Emergency 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 Normal Load Rating, which corresponds to 2/3 of the circuit's Emergency Rating. For 15 kV 500 mcm distribution feeders, EDTI's Design Rating is 6.5 MVA in summer and 7.5 MVA in winter. For 15 kV 750 mcm distribution feeders, EDTI's Design Rating is 8.5 MVA in summer and 8.7 MVA in winter.
- During emergency operating condition (N-1), the loading on an EDTI distribution circuit shall not exceed the circuit's Normal Rating for duration of more than three days.
- At no time shall the loading on an EDTI distribution circuit exceed the circuit's Emergency Rating. For 15 kV 500 mcm distribution feeders, EDTI's Emergency Rating is 10 MVA in summer and 11.2 MVA in winter. For 15 kV 750 mcm distribution feeders, EDTI's Emergency Rating is 12.8 MVA in summer and 13.2 MVA in winter.

3.2.1 Design Rating

The Design Rating is the maximum acceptable distribution circuit load under normal operating conditions. Loaded to Design Rating, each circuit has the reserve capacity to pick up 50% of the load on any adjacent circuit during contingency situations. In practice, it may not be possible to transfer the entire load from a faulted circuit to two adjacent circuits, due to circuit configurations, infrastructure limitations and load distributions.

3.2.2 Normal Rating

The Normal 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 may experience thermal degradation and accelerated cable failure. If loaded to a level between the Design Rating and the Normal Rating, it will not be possible to take full advantage of the circuit's load transfer capability to support N-1 contingency conditions.

3.2.3 Emergency Rating

The Emergency Rating is the maximum load that EDTI is capable of operating a circuit under a contingency situation, when load is transferred from an adjacent circuit that has experienced an outage. 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."[3] If the cable loading exceeds the Emergency Rating, it is expected that the feeder will experience acute thermal degradation resulting in an accelerated cable failure, reducing the asset life of the cable.

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

4.0 LOAD FORECAST

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 DFO has determined that load demand in the Edmonton area is highly sensitive to weather conditions. Furthermore, the DFO found that the majority of load growth can be explained by three parameters: 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, 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 twenty years of daily temperature during system peak, EDTI DFO has determined the 90th percentile temperature, provided in the table below. The DFO produces a 90th percentile summer and winter peak forecast at the system and POD levels.

Table 4.1 90th percentile temperatures

	Summer	Winter
90^{th} percentile	33.9°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 DFO 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.

- The winter/summer power factor recorded at each of the PODs in 2021 is used as the winter/summer forecast for years 2022 to 2031.

4.2 LOAD FORECASTING RESULTS

Non-coincident peak load demand for the past five years and forecast peak load values for the next 10 years is provided in Table 4.2-1 and Table 4.2-2 for the summer and winter season, respectively. As can be observed, Castle Downs winter peak values are historically higher than summer peak values, however, EDTI observed higher than normal summer loading in 2021 due to an extended heat wave that increased POD loading. EDTI forecasts loading levels at 90th percentile temperatures observed over the past 20 years. Per Table 4.2-2, Castle Downs exceeded firm capacity in the winters of 2019 and 2020, and in the summer of 2021. EDTI has performed distribution switching to offload Castle Downs as identified in Section 4.3 to resolve loading concerns in the short term, however, the POD is forecast to again exceed its N-1 Firm Capacity in the winter of 2023.

The coincidence factor of the circuits from adjacent substations with ties connected to Castle Downs circuits is effectively 1.0. This is due to the adjacent circuits supplying predominantly residential load that peak at the same time as Castle Downs (which also predominantly supplies residential load).

EDTI historical loading records are inclusive of any DCG that was generating at the time of record and are therefore reflective of net loads. EDTI forecasts are created using trends observed through historical loading records inclusive of any DCG that was generating at the time of record. Therefore, EDTI forecasts implicitly include the net load impacts of DCG.

Table 4.2-1
Castle Downs Substation Historical & Projected Summer Loads in MVA

							Historic and Forecast Load - Summer Peak												
					LOADING - RECORDED					FORECAST LOAD									
			W	[2017]	[2018]	[2019]	[2020]	[2021]		[2022]	[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]
SUB		CAPACITY[4]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
Castle Downs	POD	100.0	S	83.7	97.9	91.7	99.2	114.9	96.6%	98.1	99.3	100.7	101.7	102.9	104.3	110.6	112.1	113.4	113.4
	T1	100.0[5]	S	35.1	39.7	38.1	98.6	81.4	-	EDTI does not forecast at the POD transformer level.									
	CD11	8.5	S	5.9	6.5	6.4	6.6	9.4	-	8.3	8.4	8.5	8.5	8.5	8.6	8.6	8.7	8.7	8.7
	CD12	8.5	S	5.3	5.6	5.9	6.2	5.7	-	3.7	3.9	4.0	4.2	4.3	4.4	5.6	5.8	5.8	5.8
	CD13	8.5	S	2.5	3.8	3.2	3.0	3.2	-	6.3	6.7	6.9	7.1	7.4	7.6	7.8	8.0	8.2	8.2
	CD14	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CD21	8.5	S	5.6	6.5	7.6	9.0	10.4	-	9.0	7.5	7.5	7.5	7.6	7.6	7.7	7.7	7.8	7.8
	CD22	8.5	S	7.6	10.3	9.9	11.3	10.1	-	6.1	8.2	8.3	8.4	8.5	8.6	8.8	8.9	9.0	9.0
	CD23	8.5	S	0.0	0.0	0.0	0.0	0.0	-	3.3	6.2	6.2	6.3	6.3	6.3	6.3	6.3	6.4	6.4
	CD24	8.5	S	6.6	6.9	6.4	6.1	7.7	-	6.5	5.4	5.4	5.4	5.5	5.6	5.7	5.8	6.0	6.0
	T2	100.0[5]	S	54.6	65.3	58.4	96.0	66.9	-	EDTI does not forecast at the POD transformer level.									
	CD71	8.5	S	7.8	8.0	7.4	7.8	8.8	-	7.8	7.8	7.9	7.9	8.0	8.0	8.1	8.1	8.2	8.2
	CD72	8.5	S	4.8	4.7	4.9	4.5	4.9	-	8.3	8.3	8.4	8.4	8.4	8.4	8.5	8.5	8.6	8.6
	CD73	8.5	S	11.2	9.5	8.1	8.2	7.5	-	6.0	6.0	6.0	6.1	6.1	6.1	8.1	8.2	8.4	8.4
	CD74	8.5	S	6.9	7.5	7.7	8.8	9.4	-	8.4	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.2	8.2
	CD81	8.5	S	6.8	7.5	7.2	7.3	9.0	-	8.3	8.3	8.4	8.4	8.5	8.5	10.4	10.4	10.4	10.4
	CD82	8.5	S	7.9	8.4	7.8	9.3	10.1	-	5.6	4.7	4.7	4.7	4.7	4.9	4.9	5.1	5.2	5.2
	CD83	9.0	S	7.0	9.1	6.6	7.7	10.6	-	7.7	6.4	6.5	6.5	6.6	6.6	6.6	6.7	6.7	6.7
	CD84	9.0	S	n/a	6.4	5.7	6.7	8.8	-	7.3	8.0	8.2	8.5	8.6	8.8	8.8	8.9	9.0	9.0
Kennedale	POD	58.6	S	56.5	56.6	54.5	55.3	65.9	94.5%	54.2	54.9	55.8	56.4	57.1	58.0	58.8	59.8	60.5	60.5
	T1	66.7	S	42.0	29.3	43.4	35.7	37.4	-	EDTI does not forecast at the POD transformer level.									

[4] N-1 Firm Capacity for PODs, Transformer Capacity (seasonally dependent), and Design Capacity for Circuits
[5] Transformer Capacity of Castle Downs Transformers limited by Medium Voltage Switchgear

							Historic and Forecast Load - Summer Peak											
					LOADING - RECORDED					FORECAST LOAD								
			W	[2017]	[2018]	[2019]	[2020]	[2021]		[2022]	[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]
SUB		CAPACITY[4]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	K11	8.5	S	9.5	8.7	8.6	9.2	7.3	-	6.1	5.2	5.7	5.8	6.1	6.4	6.7	7.0	7.3	7.4
	K12	7.7	S	9.1	2.7	1.8	1.7	2.1	-	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
	K13	6.5	S	4.3	4.6	4.3	4.6	6	-	4.6	4.7	4.7	4.7	4.8	4.8	4.8	4.8	4.8	4.8
	K21	6.5	S	5.6	5.5	5.3	5.3	5.8	-	5.6	5.6	5.6	5.6	5.7	5.7	5.7	5.7	5.7	5.7
	K22	6.5	S	2.9	3.1	2.9	3.1	3.5	-	3.2	3.2	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.3
	K23	7.7	S	3.4	2.2	2.3	1.2	1.6	-	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	T2	66.7	S	49.5	42.5	41.1	29.3	36.9	-	EDTI does not forecast at the POD transformer level.									
	K31	8.5	S	7.4	7.6	7.6	7.9	9.8	-	9.2	7.7	7.8	7.8	7.8	7.9	7.9	8.0	8.1	8.1
	K32	7.7	S	0.1	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	K33	8.5	S	5.6	5.3	5.1	5.5	9.5	-	8.9	7.6	7.7	7.8	7.8	7.9	8.1	8.3	8.2	8.2
	K41	8.5	S	4.1	4.5	4.3	4.5	4.6	-	0.1	6.7	6.9	7.1	7.3	7.4	7.7	7.8	8.1	8.1
	K42	8.5	S	7.8	8.0	7.8	7.8	9.8	-	9.0	6.7	6.7	6.8	6.8	6.8	6.9	6.9	6.9	6.9
	K43	6.5	S	4.9	4.8	4.6	4.5	4.9	-	4.5	4.6	4.6	4.6	4.6	4.6	4.7	4.8	4.9	4.9
Namao	POD	64.5	S	52.0	54.3	52.3	56.3	57.4	93.7%	58.8	59.0	58.5	59.1	60.3	61.5	63.6	64.6	65.7	67.0
	T1	40.0	S	n/a[6]	n/a[6]	n/a[6]	26.3	30.4	-	EDTI does not forecast at the POD transformer level.									
	N13	6.5	S	6.7	6.8	6.7	6.9	6.0	-	5.9	6.0	6.0	6.0	6.1	6.1	6.2	6.2	6.2	6.3
	N14	8.5	S	7.7	8.2	7.5	7.5	7.8	-	7.6	8.4	8.5	8.5	8.6	8.6	8.7	8.8	8.8	8.8
	N15	7.7	S	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
	N16	8.5	S	0.0	0.0	0.0	0.0	0.0	-	6.7	6.7	6.7	6.7	6.8	6.8	6.9	6.9	6.9	7.0
	N17	6.5	S	2.8	2.8	2.7	3.0	3.6	-	3.0	3.1	3.1	3.1	3.1	3.2	4.2	4.2	4.2	4.3
	N18	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T2	40.0	S	n/a[6]	n/a[6]	n/a[6]	29.6	23.8	-	EDTI does not forecast at the POD transformer level.									
	N1	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	N2	8.5	S	4.2	4.2	4.5	4.9	5.0	-	5.0	5.0	5.0	5.1	5.1	5.1	5.2	5.2	5.2	5.2

[6] Data point unavailable due to recording system issue.

							Historic and Forecast Load - Summer Peak												
					LOADING - RECORDED					FORECAST LOAD									
			W	[2017]	[2018]	[2019]	[2020]	[2021]		[2022]	[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]
SUB		CAPACITY[4]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	N3	6.5	S	5.4	5.5	5.5	5.7	6.4	-	5.8	5.9	5.9	6.9	7.0	7.0	7.1	7.1	7.1	7.2
	N4	6.5	S	3.8	3.9	3.4	4.3	8.9	-	4.4	4.4	4.4	4.5	4.5	4.6	4.6	4.7	4.7	4.7
	N5	6.5	S	4.5	4.7	4.9	4.9	5.3	-	5.2	5.2	5.3	5.3	5.4	5.4	5.4	5.4	5.5	5.5
	N6	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T3	40.0	S	n/a[6]	n/a[6]	n/a[6]	36.6	20.1	-	EDTI does not forecast at the POD transformer level.									
	N7	6.5	S	3.1	3.4	3.2	3.3	4.0	-	3.2	3.2	3.3	3.3	3.3	3.3	3.4	3.4	3.4	3.5
	N8	6.5	S	5.2	5.4	5.2	4.7	5.3	-	4.7	4.8	4.8	4.9	4.9	4.9	5.0	5.0	5.1	5.1
	N9	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	N10	6.5	S	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
	N11	8.5	S	6.4	6.7	7.2	5.9	6.8	-	7.0	7.1	7.1	7.2	7.2	7.3	7.4	7.6	7.9	8.0
	N12	6.5	S	4.1	4.5	5.3	5.6	6.2	-	5.5	5.6	5.6	5.7	5.7	5.7	5.8	5.8	5.9	5.9
Woodcroft	POD	80.0	S	65.5	68.2	58.0	58.1	73.6	92.1%	71.4	73.8	74.7	75.3	77.4	78.2	79.1	80.1	80.9	80.8
	T1	40.0	S	25.7	24.6	n/a[6]	22.2	33.5	-	EDTI does not forecast at the POD transformer level.									
	W1	8.5	S	7.3	6.5	5.7	5.4	8.5	-	8.2	8.5	8.5	8.6	8.6	8.7	8.7	8.8	8.8	8.9
	W2	6.5	S	7.0	5.9	4.3	3.7	3.9	-	4.3	4.3	4.4	4.4	4.5	4.5	4.6	4.6	4.7	4.7
	W3	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	6.5	S	6.3	6.0	5.6	6.4	7.4	-	6.4	6.5	6.5	6.5	6.5	6.6	6.6	6.6	6.6	6.6
	W5	6.5	S	4.0	5.3	5.2	5.6	7.5	-	4.8	4.8	4.8	4.9	5.5	5.5	5.6	5.7	5.8	5.8
	W6	6.5	S	0.9	0.9	0.8	0.8	6.6	-	5.9	6.0	6.2	6.4	6.5	6.5	6.6	6.6	6.7	6.7
	T2	40.0	S	22.6	35.5	n/a[6]	36.4	38.3	-	EDTI does not forecast at the POD transformer level.									
	W7	6.5	S	.	1.9	1.8	1.7	2.7	-	2.6	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	W8	8.5	S	6.4	6.4	6.1	5.6	5.6	-	6.1	6.3	6.4	6.4	6.4	6.5	6.5	6.6	6.6	6.6
	W9	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W10	8.5	S	6.6	6.3	7.2	6.1	6.0	-	6.9	7.1	7.1	7.2	7.2	7.3	7.3	7.4	7.4	7.5
	W11	8.5	S	5.1	5.1	6.2	5.7	6.0	-	5.7	5.7	5.8	6.0	6.2	6.2	6.2	6.3	6.4	6.4

							Historic and Forecast Load - Summer Peak											
					LOADING - RECORDED					FORECAST LOAD								
			W	[2017]	[2018]	[2019]	[2020]	[2021]		[2022]	[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]
SUB		CAPACITY[4]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	W12	8.5	S	3.6	4.1	3.8	3.2	2.3	-	3.9	3.9	3.9	3.9	4.6	4.6	4.8	4.8	4.8	4.8
	T3	40.0	S	20.0	21.0	n/a[6]	34.2	29.9	-	EDTI does not forecast at the POD transformer level.									
	W13	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W14	6.5	S	7.3	7.5	5.6	5.4	4.2	-	3.9	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7
	W15	8.5	S	4.1	4.0	5.0	4.8	4.6	-	4.8	4.8	4.9	4.9	5.0	5.0	5.1	5.1	5.2	5.2
	W16	6.5	S	3.4	3.6	3.4	3.4	6.9	-	6.5	6.5	6.5	6.6	6.6	6.7	6.7	6.8	6.8	6.9
	W17	6.5	S	5.8	5.8	3.8	3.7	3.6	-	3.7	3.7	3.8	3.8	3.8	3.9	3.9	4.0	4.1	4.1
	W18	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4.2-2
Castle Downs Substation Historical & Projected Winter Loads in MVA

							Historic and Forecast Load - Winter Peak											
					LOADING - RECORDED					FORECAST LOAD								
			W	[2017]	[2018]	[2019]	[2020]	[2021]		[2022]	[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]
SUB		CAPACITY[7]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
Castle Downs	POD	100.0	W	95.2	97.0	102.2	100.4	99.5	96.6%	100.0	101.2	102.6	103.6	104.8	106.2	112.6	114.2	115.5	115.5
	T1	100.0[8]	W	72.8	92.3	41.5	88.5	79.1	-	EDTI does not forecast at the POD transformer level.									
	CD11	8.7	W	6.4	6.3	6.9	6.5	7.8	-	7.8	7.8	7.8	7.9	7.9	7.9	7.9	8.0	8.1	8.2
	CD12	8.7	W	5.3	5.2	5.7	6.1	4.1	-	4.0	4.2	4.3	4.4	4.5	4.7	5.9	5.9	6.0	6.1
	CD13	8.7	W	1.6	2.0	2.0	2.0	6.6	-	4.9	5.2	5.4	5.6	5.9	6.1	6.3	6.6	6.7	6.8
	CD14	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CD21	8.7	W	7.3	7.1	10.3	10.3	9.5	-	10.3	8.9	8.9	9.0	9.0	9.0	9.0	9.1	9.1	9.1
	CD22	8.7	W	8.8	11.0	11.2	11.0	6.2	-	5.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0
	CD23	8.7	W	0.0	0.0	0.0	0.0	2.2	-	3.3	6.2	6.2	6.3	6.3	6.3	6.3	6.4	6.4	6.4
	CD24	8.7	W	7.7	6.1	6.5	6.2	7.1	-	6.3	5.2	5.2	5.2	5.3	5.4	5.5	5.6	5.8	5.8
	T2	100.0[8]	W	89.1	96.4	64.4	66.5	60.0	-	EDTI does not forecast at the POD transformer level.									
	CD71	8.7	W	8.5	8.0	7.4	7.4	7.4	-	7.5	7.5	7.6	7.6	7.7	7.7	7.8	7.8	7.9	7.9
	CD72	8.7	W	3.4	3.7	3.4	3.6	7.6	-	5.5	5.5	5.6	5.6	5.6	5.6	5.7	5.7	5.8	5.8
	CD73	8.7	W	11.3	9.4	9.9	9.0	5.9	-	7.0	7.1	7.1	7.1	7.1	7.2	9.2	9.2	9.3	9.3
	CD74	8.7	W	7.6	7.4	8.7	8.7	7.9	-	8.8	8.4	8.4	8.5	8.6	8.6	8.7	8.8	8.8	8.8
	CD81	8.7	W	7.8	7.6	9.7	7.6	7.8	-	7.7	7.7	7.8	7.8	7.8	7.8	9.9	9.9	9.9	10.0
	CD82	8.7	W	10.0	9.4	9.8	9.6	4.3	-	7.7	6.9	6.9	6.9	6.9	7.0	7.0	7.2	7.2	7.2
	CD83	9.5	W	8.1	9.5	8.0	10.5	8.2	-	10.6	9.4	9.4	9.4	9.5	9.5	9.5	9.6	9.6	9.6
	CD84	9.5	W	-	6.1	6.3	6.4	7.1	-	7.0	7.2	7.4	7.6	7.9	8.1	8.4	8.6	8.8	8.9
Kennedale	POD	67.3	W	55.7	56.1	56.8	57.4	50.3	94.5%	50.3	51.0	51.8	52.3	53.0	53.8	54.6	55.5	56.2	56.2
	T1	88.7	W	33.2	43.4	48.3	45.6	36.2	-	EDTI does not forecast at the POD transformer level.									

[7] N-1 Firm Capacity for PODs, Transformer Capacity (seasonally dependent), and Design Capacity for Circuits
[8] Transformer Capacity of Castle Downs Transformers limited by Medium Voltage Switchgear

							Historic and Forecast Load - Winter Peak											
					LOADING - RECORDED					FORECAST LOAD								
			W	[2017]	[2018]	[2019]	[2020]	[2021]		[2022]	[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]
SUB		CAPACITY[7]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	K11	8.7	W	10.1	8.4	8.4	8.9	5.9	-	6.1	5.2	5.7	5.8	6.1	6.4	6.7	7.0	7.3	7.4
	K12	9.0	W	2.9	2.0	1.7	1.2	1.7	-	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	K13	7.5	W	5.0	5.1	5.1	4.9	5.8	-	5.1	5.1	5.2	5.2	5.3	5.3	5.4	5.4	5.5	5.5
	K21	7.5	W	6.2	5.9	5.6	5.2	5.7	-	5.6	5.6	5.6	5.7	5.7	5.7	5.7	5.8	5.8	5.8
	K22	7.5	W	3.2	3.1	3.1	3.1	3.3	-	3.3	3.3	3.3	3.4	3.4	3.5	3.5	3.6	3.6	3.7
	K23	9.0	W	1.8	1.6	1.2	1.0	1.3	-	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	T2	88.7	W	42.5	43.8	39.2	40.3	35.7	-	EDTI does not forecast at the POD transformer level.									
	K31	8.7	W	8.1	8.3	8.3	7.8	9.2	-	8.8	7.2	7.3	7.3	7.4	7.4	7.4	7.5	7.5	7.6
	K32	9.0	W	0.1	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	K33	8.7	W	3.9	6.0	5.8	6.0	8.8	-	8.9	7.6	7.7	7.8	7.8	7.9	8.1	8.2	8.2	8.2
	K41	8.7	W	5.4	5.2	5.4	5.2	0.0	-	0.1	6.7	6.9	7.1	7.3	7.4	7.7	7.8	8.1	8.1
	K42	8.7	W	7.5	7.6	7.7	7.2	7.8	-	7.9	5.6	5.6	5.7	5.7	5.7	5.8	5.9	5.9	5.9
	K43	7.5	W	4.0	4.1	4.2	3.9	4.0	-	4.0	4.0	4.0	4.0	4.1	4.1	4.1	4.2	4.2	4.2
Namao	POD	71.1	W	55.7	55.4	56.7	57.7	56.2	93.7%	57.9	58.1	57.6	58.2	59.4	60.6	62.6	63.7	64.7	66.1
	T1	47.5	W	n/a[9]	n/a[9]	n/a[9]	23.0	25.8	-	EDTI does not forecast at the POD transformer level.									
	N13	7.5	W	7.3	6.8	7.5	7.0	6.0	-	6.0	6.0	6.1	6.1	6.2	6.3	6.3	6.3	6.4	6.4
	N14	8.7	W	7.3	7.0	6.9	7.0	6.4	-	7.1	7.6	7.7	7.7	7.9	8.0	8.0	8.1	8.2	8.2
	N15	9.0	W	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
	N16	8.7	W	0.0	0.0	0.0	0.0	7.5	-	6.5	6.5	6.5	6.5	6.6	6.6	7.0	7.0	7.0	7.1
	N17	7.5	W	3.6	3.8	4.2	3.7	4.2	-	4.2	4.3	4.3	4.3	4.3	4.4	5.4	5.4	5.4	5.4
	N18	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T2	47.5	W	n/a[9]	n/a[9]	n/a[9]	43.0	20.6	-	EDTI does not forecast at the POD transformer level.									
	N1	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	N2	8.7	W	3.9	4.2	4.4	4.6	4.9	-	4.7	4.7	4.7	4.8	4.8	4.8	4.9	4.9	5.0	5.0

[9] Data point unavailable due to recording system issue.

							Historic and Forecast Load - Winter Peak											
					LOADING - RECORDED					FORECAST LOAD								
			W	[2017]	[2018]	[2019]	[2020]	[2021]		[2022]	[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]
SUB		CAPACITY[7]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	N3	7.5	W	6.2	6.2	6.5	6.5	6.1	-	6.6	6.7	6.7	7.4	7.5	7.6	7.7	7.8	7.8	7.8
	N4	7.5	W	4.5	4.5	4.0	5.1	4.3	-	4.4	4.4	4.4	4.5	4.5	4.6	4.6	4.7	4.7	4.7
	N5	7.5	W	4.9	4.8	5.6	4.7	5.2	-	5.2	5.2	5.3	5.3	5.4	5.4	5.4	5.4	5.5	5.5
	N6	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T3	47.5	W	n/a[9]	n/a[9]	n/a[9]	17.1	17.6	-	EDTI does not forecast at the POD transformer level.									
	N7	7.5	W	3.2	3.3	3.5	3.4	3.5	-	3.5	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	N8	7.5	W	5.1	4.9	4.7	4.9	4.6	-	4.7	4.8	4.8	4.8	4.9	4.9	5.0	5.0	5.1	5.1
	N9	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	N10	7.5	W	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
	N11	8.7	W	5.7	6.0	6.4	4.9	5.2	-	6.8	6.9	6.9	6.9	7.0	7.1	7.2	7.6	7.8	7.9
	N12	7.5	W	5.0	5.2	5.3	5.1	5.9	-	6.2	6.3	6.3	6.3	6.4	6.4	6.5	6.5	6.6	6.6
Woodcroft	POD	85.8	W	62.5	59.0	59.5	60.1	63.4	92.1%	64.4	66.8	67.5	68.1	70.1	70.9	71.6	72.5	73.2	73.2
	T1	47.5	W	25.7	40.0	n/a[9]	29.8	31.5	-	EDTI does not forecast at the POD transformer level.									
	W1	8.7	W	7.0	5.3	5.2	5.0	6.9	-	7.0	7.3	7.3	7.4	7.4	7.5	7.5	7.6	7.6	7.6
	W2	7.5	W	6.7	6.4	3.8	3.6	4.1	-	3.9	3.9	4.0	4.0	4.1	4.1	4.2	4.2	4.3	4.3
	W3	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	7.5	W	6.1	5.9	6.3	7.1	7.3	-	7.2	7.3	7.3	7.3	7.3	7.4	7.4	7.4	7.4	7.4
	W5	7.5	W	6.0	5.2	5.5	5.6	7.5	-	5.0	5.0	5.0	5.1	5.6	5.6	5.7	5.8	5.9	5.9
	W6	7.5	W	0.7	0.7	0.7	0.7	5.4	-	5.6	5.7	5.9	6.1	6.2	6.2	6.3	6.3	6.4	6.4
	T2	47.5	W	27.5	35.5	n/a[9]	37.7	43.1	-	EDTI does not forecast at the POD transformer level.									
	W7	7.5	W	1.5	1.4	1.4	2.0	3.0	-	2.1	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
	W8	8.7	W	5.8	5.6	5.5	5.2	4.9	-	5.2	5.5	5.6	5.6	5.6	5.7	5.7	5.8	5.8	5.8
	W9	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W10	8.7	W	6.3	6.2	6.1	5.9	5.9	-	5.9	6.1	6.1	6.2	6.2	6.3	6.3	6.4	6.4	6.5
	W11	8.7	W	4.4	4.7	6.0	5.3	5.3	-	5.3	5.3	5.4	5.6	5.8	5.8	5.8	5.9	6.0	6.0

							Historic and Forecast Load - Winter Peak											
					LOADING - RECORDED					FORECAST LOAD								
			W	[2017]	[2018]	[2019]	[2020]	[2021]		[2022]	[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]
SUB		CAPACITY[7]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	W12	8.7	W	5.2	5.2	4.6	3.0	4.2	-	4.2	4.2	4.2	4.2	4.9	4.9	5.0	5.0	5.0	5.0
	T3	47.5	W	22.8	15.8	n/a[9]	17.2	34.6	-	EDTI does not forecast at the POD transformer level.									
	W13	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W14	7.5	W	7.0	5.6	5.8	5.7	3.7	-	3.9	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7
	W15	8.7	W	4.1	4.2	4.9	4.9	4.3	-	4.9	4.9	5.0	5.0	5.1	5.1	5.2	5.2	5.3	5.3
	W16	7.5	W	4.3	4.2	4.2	3.9	6.3	-	7.1	7.1	7.1	7.2	7.2	7.3	7.3	7.4	7.4	7.4
	W17	7.5	W	5.1	3.7	3.7	3.7	3.6	-	3.7	3.7	3.8	3.8	3.8	3.9	3.9	4.0	4.1	4.1
	W18	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The Castle Downs load trend graph for total POD load is shown in Figure 4.2-1 from which it can be seen that the POD exceeded its POD N-1 firm capacity in June 2021. The 2021 observed load profile for Castle Downs has been linearly scaled to the forecast 2031 peak to provide insight into what future loading could look like in 2031. Load trend graphs for Castle Downs T1 and Castle Downs T2 are shown in Figure 4.2-2 and Figure 4.2-3 respectively. Unsupplied load may occur during peak conditions with a POD transformer contingency. The load trend graphs have been created using EDTI's AMI dataset and network model. In effect, the load trend graph is a bottom-up aggregation of customer load normally supplied by Castle Downs and its transformers, irrespective of outages on the system that may have occurred. This data normalizes loading based on normal design state and removes "noise" due to abnormal operating conditions observed with top-level measurements such as SCADA (e.g. temporary load transfers, POD transformer outages).

Figure 4.2-1 – Castle Downs Load Trend Graph – POD Total

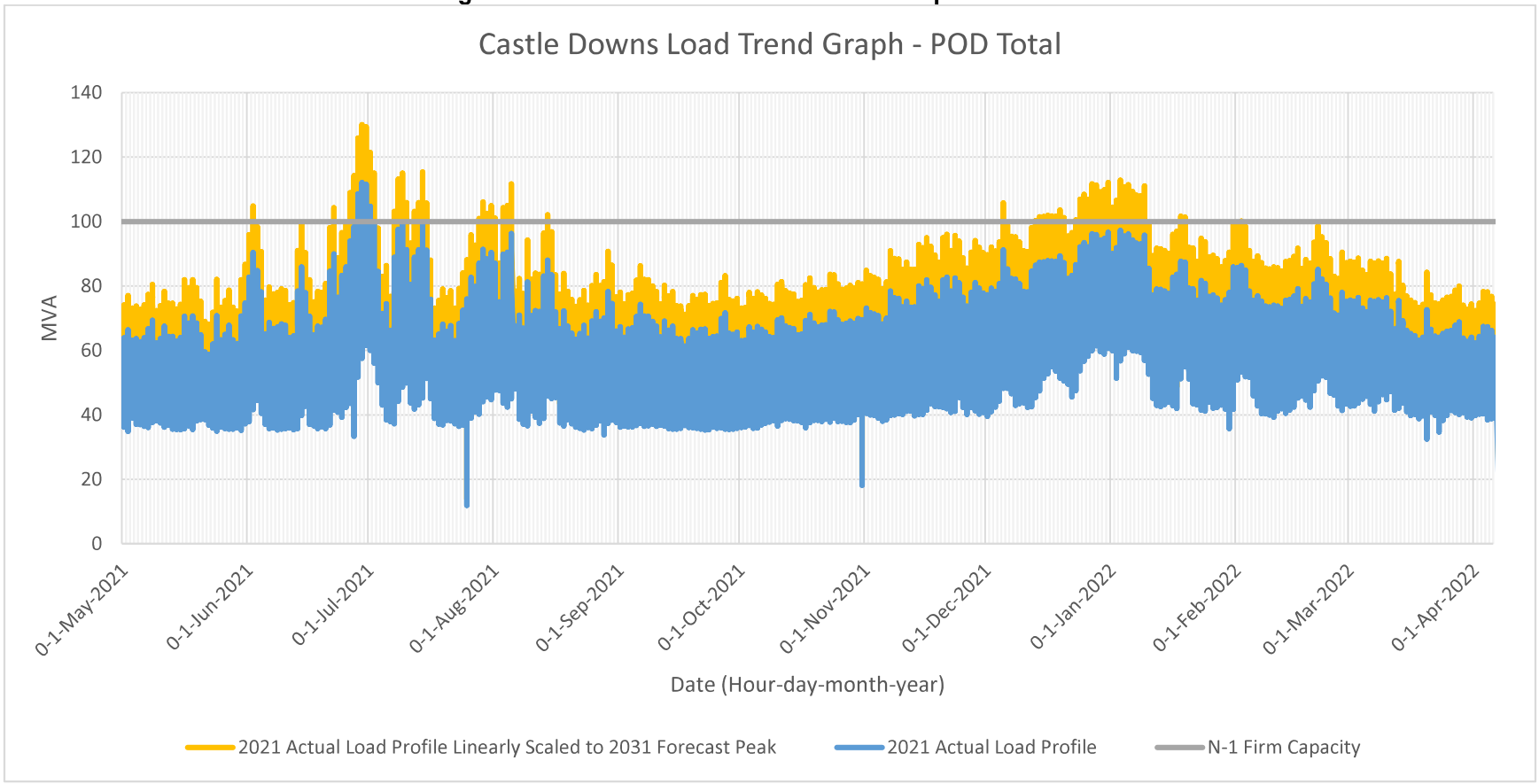


Figure 4.2-2 – Castle Downs T1 Load Curve

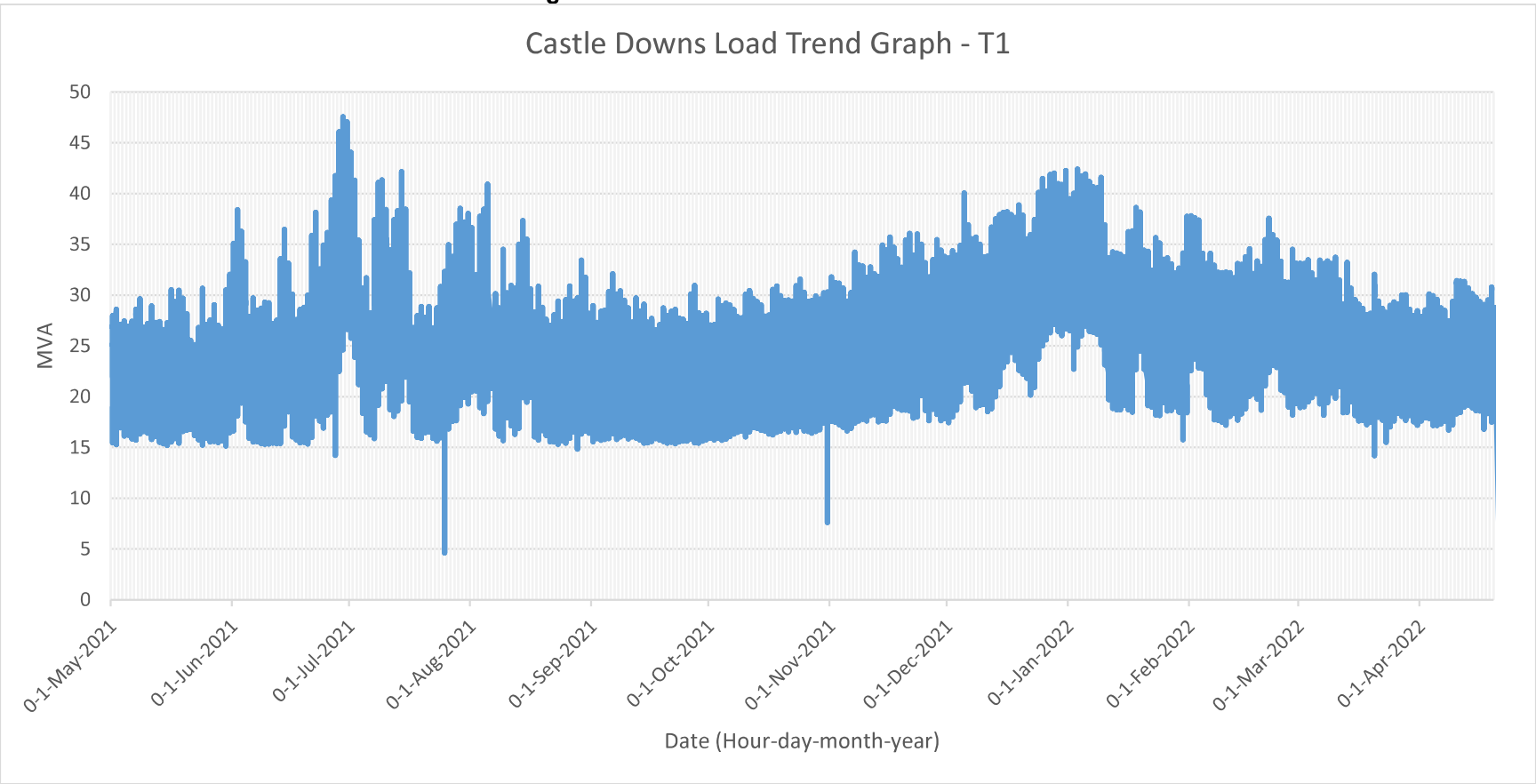
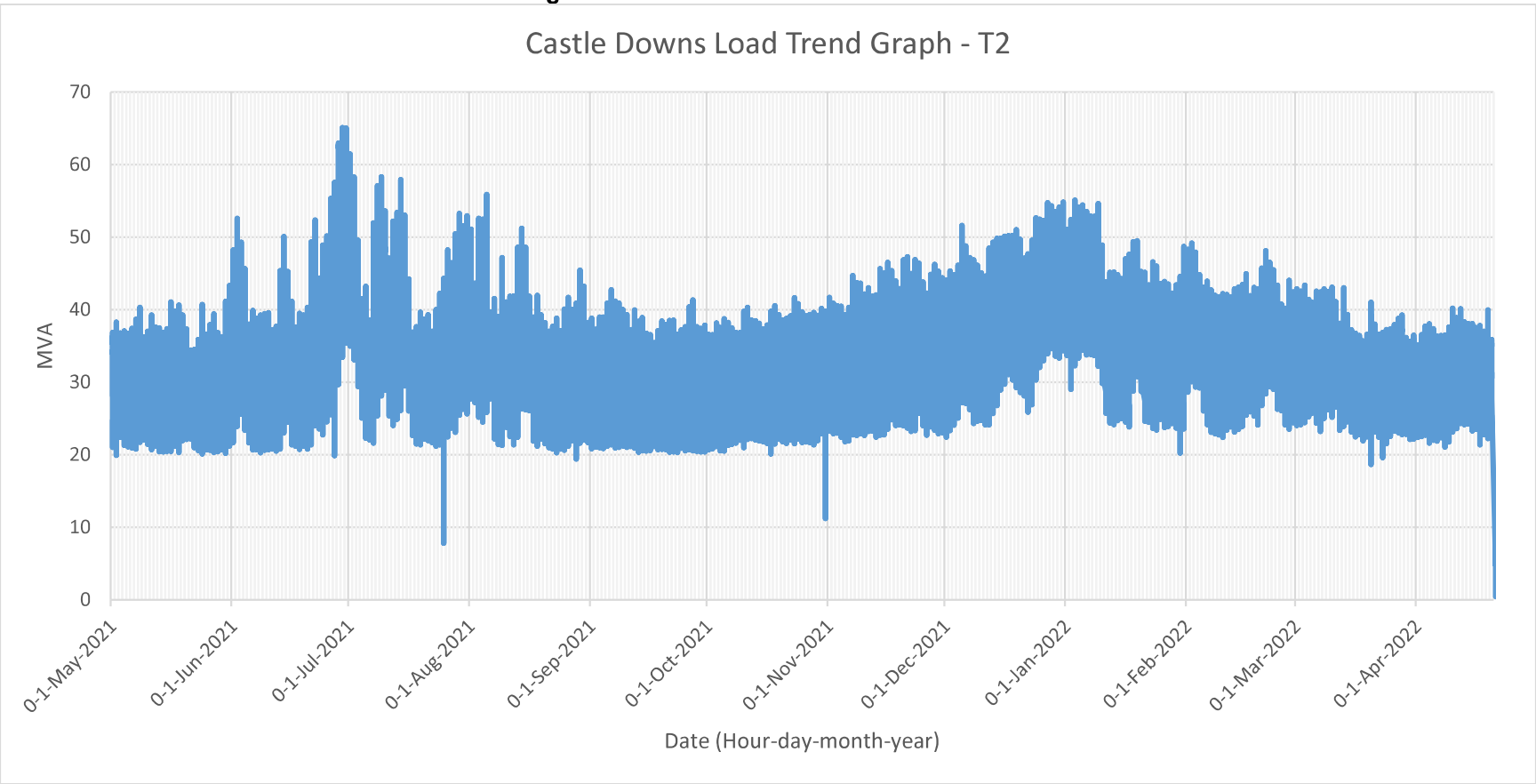


Figure 4.2-3 – Castle Downs T2 Load Curve



4.3 LOAD TRANSFERS

EDTI has previously evaluated distribution switching options to reduce loading on Castle Downs POD. As a result of that analysis, EDTI transferred 5.5 MVA of load from Castle Downs POD to Woodcroft POD in the summer of 2021, prior to the recorded summer peak. The following load transfers were performed:

- 2.8 MVA of load transferred from circuit CD12 to circuit W16
- 2.7 MVA of load transferred from circuit CD73 to circuit W1

The planned load transfers between Castle Downs and adjacent substations are shown in Table 4.3 below. There are no planned load transfers involving a transfer of a rate DTS contract. These load transfers are planned to address distribution circuit level loading issues and are required independent of this project proceeding.

Table 4.3
Planned Load Transfers in Castle Downs Development Area

	Load Transfer	
MVA	From To	Planned Year
1.6	CD21 – CD23	2023
1.3	CD83 – CD23	2023
0.9	CD82 – CD22	2023
1.1	CD24 – CD22	2023
1.3	CD74 – K41	2023
0.9	K11 – CD74	2023
3.8	K11 – K41	2023
1.6	K33 – K41	2023
3.6	K33 – K11	2023
3.8	K31 – K33	2023
2.3	K42 – K31	2023

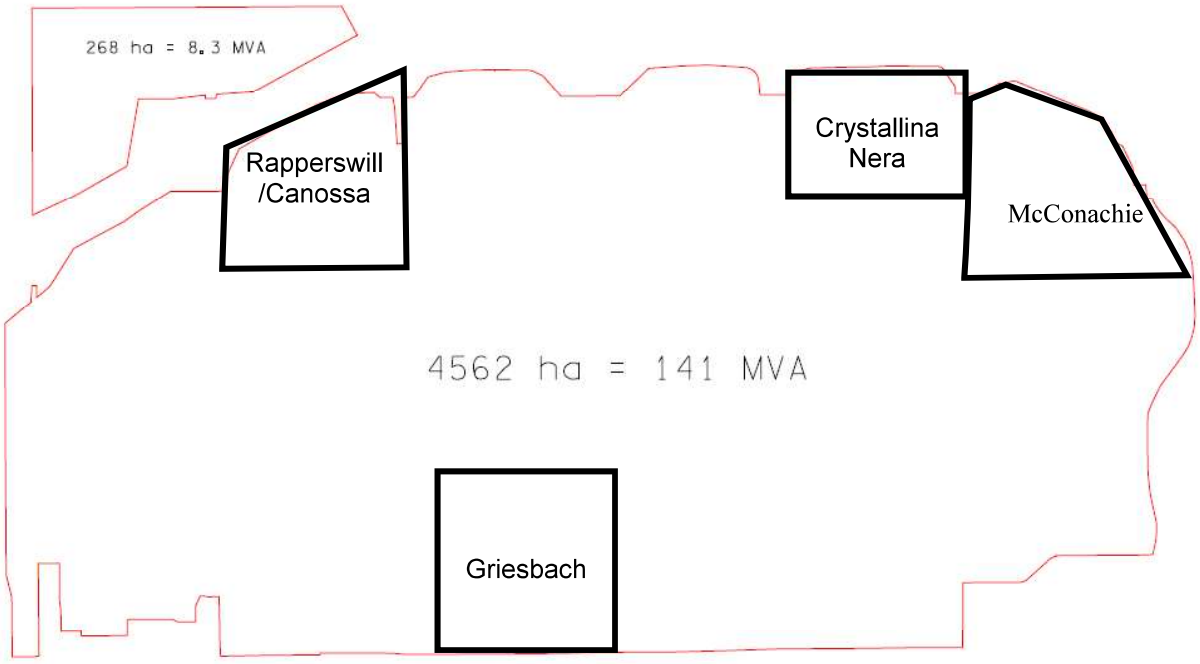
4.4 AREAS OF GROWTH IN CASTLE DOWNS POD

Load growth has been observed in several neighbourhood within the Castle Downs Service Area. In particular, the Griesbach, Rapperswill/Canossa, Crystallina Nera and McConachie neighbourhoods represent potential growth within the study period.

Table 4.4
Neighbourhoods and Potential Load within Castle Downs Service Area

Neighbourhood	Potential Load (MVA)
Griesbach	3.0
Rapperswill	0.5
Canossa	1.7
Crystallina Nera West	0.6
Crystallina Nera East	2.6
McConachie	2.3

Figure 4.4
Neighbourhoods and Potential Load within Castle Downs Service Area



4.5 CONSIDERATIONS IN LOAD FORECASTING

There are several uncertainties in load forecasting:

- Temperature Sensitivity– Edmonton experienced record temperatures during the 2021 heat wave and summer peak load exceeded previous forecasts. This indicates a high amount of temperature-sensitive loads in the Castle Downs and Kennedale PODs that was previously unaccounted for.
- Extreme Weather – There is increased risk of extreme weather events similar to the heat wave due to climate change. Projected Summer & Winter Loads in Table 4.2-1 and Table 4.2-2 are for 90th percentile temperatures and a repeat of events like the 2021 heat wave could increase the projected load at risk.
- Electric Vehicles (EVs) – EV adoption is projected to increase due to Federal mandates as well as pledges from vehicle manufacturers to electrify their portfolios. This increased demand for EVs will increase the load at risk in areas with high EV penetration. Due to the demographics and large number of single family homes, the Castle Downs POD has been identified as a POD with high EV adoption under high growth scenarios.

5.0 DEFICIENCY ASSESSMENT

This section focuses on evaluating the deficiencies in supply of distribution load for the Castle Downs service areas.

5.1 POD LOADING DEFICIENCY ASSESSMENT

As per EDTI's POD loading policy (Section 3.1), the transmission N-1 firm capacity is defined as the maximum load that the POD can supply without overloading any transmission equipment under an N-1 emergency operating condition.

The term "Load at Risk" in section 5.1.1 refers to any distribution load that is predicted to be unserved under POD N-1 emergency conditions, due to the distribution load exceeding the remaining available transmission capacity.

5.1.1 Castle Downs POD Contingency Load Table

Table 5.1.1-1 and Table 5.1.1-2 shows the forecasted annual peak loading over the 2022-2031 period at Castle Downs POD and the corresponding load at risk for the summer and winter season, respectively. Violations of EDTI DFO's POD loading policy are highlighted in red.

Table 5.1.1-1
Castle Downs Projected Summer Load at Risk in MVA

							Contingency Load Table									
				Current Year	S		10-Year Forecast									
				2021	or		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
				Peak	W		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
				MVA			MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
T1 or T2 Contingency at Castle Downs sub		Castle Downs Total Load	114.9	S		98.1	99.3	100.7	101.7	102.9	104.3	110.6	112.1	113.4	113.4
		N-1 Capacity	100.0	S		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		Back up from Kennedale[10]	1.7	S		2.9	3.2	3.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		Back up from Namao[10]	0.0	S		0.0	0.0	0.0	0.0	0.0	4.4	5.6	5.8	5.8	5.8
		Back up from Woodcroft	0.0	S		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Total Unsupplied Load	13.2	S		0.0	0.0	0.0	0.1	1.3	0.0	3.4	4.7	6.0	6.0

Table 5.1.1-2
Castle Downs Projected Winter Load at Risk in MVA

							Contingency Load Table									
				Current Year	S		10-Year Forecast									
				2021	or		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
				Peak	W		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
				MVA			MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
T1 or T2 Contingency at Castle Downs sub		Castle Downs Total Load	99.5	W		100.0	101.2	102.6	103.6	104.8	106.2	112.6	114.2	115.5	115.4
		N-1 Capacity	100.0	W		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		Back up from Kennedale[10]	3.5	W		3.4	4.9	5.0	3.3	3.3	3.3	2.1	2.1	2.1	2.1
		Back up from Namao[10]	0.0	W		0.0	0.0	0.0	0.0	0.0	4.4	5.6	5.8	5.8	5.8
		Back up from Woodcroft	0.0	W		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Total Unsupplied Load	13.2	W		0.0	0.0	0.0	0.3	1.5	0.0	4.9	6.3	7.6	7.6

[10] Namao and Kennedale back up capacity assume P7078 completion by 2026 year end.

5.1.2 Castle Downs Backup Capability

EDTI has calculated the back-up capacity available using the following methodology:

Adjacent POD N-0 Capacity

EDTI has considered the maximum backup available from adjacent PODs to be limited to the remaining N-0 capacity at the respective POD.

Adjacent Circuit Capacity

EDTI has considered the maximum backup available from an adjacent PODs circuit with a tie to a Castle Downs circuit to be limited to the lesser of:

1. The margin remaining between circuit design rating and actual or forecast circuit loading, or;

2. The maximum amount of load from the Castle Downs circuit that can be transferred to the adjacent PODs circuit without exceeding the adjacent circuit's design rating. This is required to properly consider limitations due to circuit topography and tie locations.

5.1.3 Requested Timing to Mitigate Castle Downs Distribution Deficiency

As stated in Section 0, EDTI performed load transfers from Castle Downs POD to Woodcroft POD in 2021. Despite these load transfers, EDTI observed the deficiency identified by the DDR during the 2021 summer peak period. The 2021 summer peak period was hotter than typical and EDTI saw a correspondingly high peak load at Castle Downs POD. EDTI forecasts are weather corrected and based on 90th percentile temperatures. EDTI forecasts load growth to cause the issue to emerge again in the winter 2023 under 90th percentile winter temperatures. EDTI has requested an ISD of June 1, 2024 to allow the deficiency to be resolved prior to the summer peak in 2024 where Castle Downs POD is forecast to exceed N-1 capacity during 90th percentile summer temperatures. Based on information from the TFO, EDTI does not believe an ISD date before summer of 2024 to be achievable.

5.1.4 Castle Downs Customer Types

Castle Downs POD services a mixture or commercial, residential, and industrial customers. Table 5.1.4 below provides a summary of the customer counts by rate class supplied by Castle Downs POD.

Table 5.1.4: EDTI Castle Downs Customer Types

Types of Loads		
	Castle Downs	
Customer Type	**Number of Customers**	**Approximate MVA[11]**
Residential	47,658	78.6
Industrial / Commercial	1,403	35.2
Total	**49,061**	**113.8**

[11] Based on 2021 summer peak. Note, the total is based on EDTI's AMI data and network model and does not include line losses, transmission losses, or unmetered loads.

5.1.5 Castle Downs Distributed Connected Generation

Castle Downs POD service area presently has a small amount of Distribution Connected Generation (DCG) connected within. A summary of the DCG connected at Castle Downs POD is shown in Table 5.1.5 below. EDTI is not aware of any significant DG additions planned for the Castle Downs service area that would significantly impact the deficiencies described within this report. EDTI presently does not have any plans to construct DCG within the service area.

Table 5.1.5: DCG connected to Castle Downs POD

Type	Size [kW]	Number of Sites	Aggregate Nameplate [MW]
Photovoltaic	**0 – 4.9**	92	0.2
	5.0 – 9.9	61	0.4
	10.0 – 49.9	22	0.3
	50.0 – 150.0	0	0.0
	150.0 – 249.9	1	0.2
	250.0 – 999	1	0.6
Total		177	1.8

As shown in the table, all DCG within the Castle Downs service area are < 1 MW; in addition, all DCG are of the solar photovoltaic generation type. Due to the nature of the DCG (numerous distinct microgeneration sites), small aggregate size overall, and intermittency of the DCG connected, EDTI has not communicated with DCG operators as an option to mitigate the distribution deficiency.

5.2 CASTLE DOWNS RESTORATION TIMES

In the immediate aftermath of a transformer contingency, the remaining transformer would take on the demand of the substation and system operators would monitor the remaining transformer's loading and more specifically, the loading of the two medium voltage switchgears supplied by the remaining transformer (in aggregate, these are currently rated for less than the transformer capacity). If either of the two medium voltage switchgear exceeded 50 MVA in loading, operators would transfer load away off the switchgear to the extent possible available using distribution circuit ties, and if necessary shed load. For contingencies lasting longer than 36 hours, EDTI is unable to utilize its distribution circuit ties during peak operating conditions without damaging cable assets or otherwise compromising distribution system reliability. In the event of the transformer contingency identified as the contingency of concern, replacement of the Castle Downs transformer with a spare transformer stored at East Industrial could take up to 8 weeks. For a Transmission outage of this length, EDTI will only load Distribution circuits to their design rating, which is the normal operating condition of the Distribution system. If loaded to a level between the Design Load Rating and the Normal Peak Load Rating, it will not be possible to rely on the planned circuit load transfer capability to support N-1 Distribution contingency conditions that are expected to occur, whether planned or unplanned. Distribution infrastructure is significantly more exposed to outside factors that could cause outages as compared to transmission infrastructure. For example, vehicles striking transformers, animal contacts, struck poles, etc. are all relatively common events on the distribution system of an urban utility as compared to the transmission system.

5.2.1 Mobile Substation

EDTI TFO does not utilize or own a mobile substation. Restoration of a failed transformer would depend on the nature of the failure and parts availability – the repair timeline could extend from hours to days or weeks. Replacement of a failed transformer with an on-hand spare transformer would take approximately four to eight weeks.

5.2.2 Consequences of Unsupplied Load

EDTI is unable to forecast the transformer failure that would be required to cause unsupplied load. However, using the Castle Downs Total POD load trend from 2021 provided in Figure 4.2-1 as a baseline, EDTI has already observed loading that would have resulted in unsupplied load had there been a transformer contingency. During the summer 2021 period Castle Downs was loaded above its N-1 firm rating during peak periods on 5 different days. Despite EDTI forecasting based on 90th percentile weather conditions, the circumstances required to cause this loading occurred in 2021 and could occur in any given forecast year. Forecast load growth at Castle Downs will increase the magnitude of loading events of this nature and increase the number of days where peak loading exceeds Castle Downs N-1 firm capacity. There are also weather trends that EDTI has yet to quantify which will likely increase the frequency of such events.

Loss of load during peak loading periods also corresponds with the highest impact for the type of customers supplied by Castle Downs. As shown in Table 5.1.4, customers supplied by Castle Downs are predominantly residential. During peak periods the largest loads used by customers are related to heating, ventilation, and cooling systems. In the summer, unsupplied customers would lose their cooling systems, during winter, unsupplied customers would lose their heating systems. As a result, the weather

conditions that create these loading circumstances are also the periods where these customers most rely on their electrical service. Consequences of loss of electrical service can include property damage such as frozen pipes, or even personal harm to customers due to weather exposure.

5.3 LIMITATIONS ON MAINTENANCE OR PLANNED OUTAGES

As shown in Figure 4.2-1, Castle Downs Total POD load exceeded its N-1 capacity of 100 MVA in June 2021. Castle Downs Total POD load also reached close to its N-1 capacity during winter peak months as observed in December 2021 and January 2022. EDTI system operators monitor system loading and evaluate each planned outage on an outage-by-outage basis (as required for maintenance). Given recent Castle Downs Total POD loading compared to its N-1 capacity and Castle Downs POD load growth forecast, EDTI will be unable to reliably schedule planned outages during the months of December through February during the winter period, and June through August during the summer period, without putting customer load at risk moving forward.

6.0 ALTERNATIVES

EDTI first considered the possibility of a purely distribution alternative to address the deficiency identified above. EDTI has reviewed the capacities of the existing distribution system and substations in the vicinity of the Castle Downs POD and determined that there is not enough capacity on adjacent PODs to resolve the shortfall, or enough capacity available on distribution circuits supplied by adjacent PODs.

To address the Castle Downs capacity shortfall, EDTI's Distribution function identified two alternatives with transmission components.

6.1 ALTERNATIVE I – DISTRIBUTION LOAD TRANSFERS

In June 2021, distribution load transfers were performed to transfer a total of 5.5 MVA from Castle Downs POD to Woodcroft POD as detailed in section 4.3. This was identified as the last feasible distribution load transfer possible to lower Castle Downs loading without transmission investment. This load transfer is reflected in the forecast in Table 4.2-1 above, and as can be observed, Woodcroft POD is forecast to exceed its N-1 Firm Capacity in 2029.

EDTI rejects this alternative, as there are no available load transfers that will resolve the shortfall in the forecast period.

Alternative I is not technically viable.

6.2 ALTERNATIVE II - CAPACITY INCREASE OF CASTLE DOWNS POD

This alternative consists of increasing the N-1 Firm Capacity at Castle Downs POD in 2024 by installing a new 15 kV switchgear, reconfiguring the existing 240 kV /14.4 kV windings to feed the new switchgear, and rebalancing distribution circuits to utilize the new switchgear. This alternative optimizes use of existing transmission capacity that is currently stranded due to the existing 15 kV switchgear capacity limitation.

EDTI DFO estimates that Alternative II will add 67.7 MVA of N-1 POD firm capacity to the North Edmonton area. This available capacity would provide significant buffer given forecast uncertainties. The magnitude of loading observed on Castle Downs in 2021, demonstrates the sensitivity of the PODs load to higher temperatures. Alternative II will add sufficient POD capacity to handle loading due to temperature sensitivity without any load at risk.

If Alternative II is pursued, the AESO may direct TFO to prepare a facility application for the requested transmission upgrades.

Figure 6.2 shows the proposed configuration of Castle Downs Substation after Alternative II, removing the existing capacity constraint. Table 6.2 shows that Castle Downs will no longer have violations of EDTI DFO's POD loading policy (Section 3.1) within a 20-year forecast period.

Alternative II is technically viable.

Figure 6.2
Proposed Castle Downs System Configuration after Alternative II

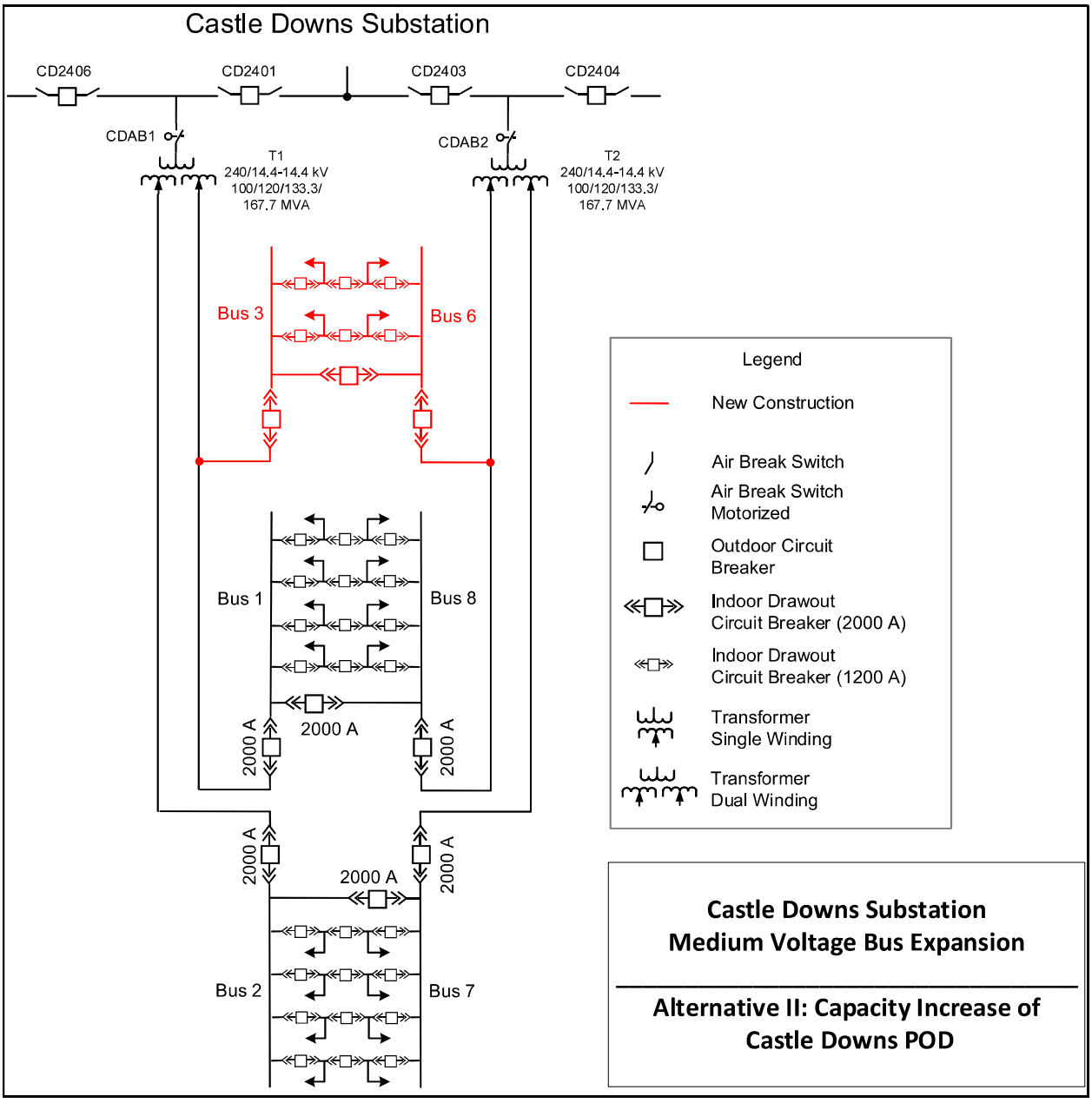


Table 6.2

Historical and Forecast Load for Castle Downs POD after P7078 and Castle Downs POD Capacity Increase

								Historic and Forecast Load																							
					LOADING - RECORDED								FORECAST LOAD																		
				W	2017	2018	2019	2020	2021		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
SUB		CAPACITY		or	Pre-Project								Post-Project																	
NO	N-1 Substation	MVA		S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
E557S Castle Downs		167.7		S	83.7	97.9	91.7	99.2	114.9	96.6%	98.1	99.3	100.7	101.7	102.9	104.3	110.6	112.1	113.4	113.4	114.3	115.3	116.2	117.2	118.1	119.1	120.0	121.0	121.9	122.9
E557S Castle Downs		167.7		W	95.2	97.0	102.2	100.4	99.5	95.5%	100.0	101.2	102.6	103.6	104.8	106.2	112.6	114.2	115.5	115.4	116.4	117.4	118.3	119.3	120.3	121.2	122.2	123.2	124.1	125.1
East Terminal		75.0		S	56.5	56.6	54.5	55.3	65.9	94.5%	54.2	54.9	55.8	56.4	57.1	58.0	58.8	59.8	60.5	60.5	61.1	61.7	62.3	62.9	63.4	64.0	64.6	65.2	65.8	66.4
East Terminal		75.0		W	55.7	56.1	56.8	57.4	50.3	97.7%	50.3	51.0	51.8	52.3	53.0	53.8	54.6	55.5	56.2	56.2	56.7	57.3	57.8	58.4	58.9	59.4	60.0	60.5	61.1	61.6
Namao		80.0		S	52.0	54.3	52.3	56.3	57.4	93.7%	58.8	59.0	58.5	59.1	60.3	61.5	63.6	64.6	65.7	67.0	68.4	69.8	71.1	72.5	74.0	75.5	77.0	78.5	80.0	81.7
Namao		80.0		W	55.7	55.4	56.7	57.7	56.2	95.8%	57.9	58.1	57.6	58.2	59.4	60.6	62.6	63.7	64.7	66.1	67.4	68.7	70.1	71.4	72.9	74.4	75.8	77.3	78.8	80.5
Woodcroft		80.0		S	65.5	68.2	58.0	58.1	73.6	92.1%	71.4	73.8	74.7	75.3	77.4	78.2	79.1	80.1	80.9	80.8	81.4	82.0	82.6	83.2	83.8	84.5	85.1	85.7	86.3	86.9
Woodcroft		85.8		W	52.5	59.0	59.5	60.1	61.2	94.4%	64.4	66.8	67.5	68.1	70.1	70.9	71.6	72.5	73.2	73.2	73.8	74.3	74.8	75.4	75.9	76.5	77.0	77.6	78.1	78.6

6.3 ALTERNATIVE III - NEW CIRCUITS FROM EAST TERMINAL POD AND NAMAO POD

This alternative is only possible following completion of Project P7078 – City of Edmonton Transmission Reinforcement in 2026, which installs a new POD currently designated as East Terminal to replace existing Kennedale POD, and increases the N-1 Capacity of Namao POD.

EDTI and the AESO would coordinate with the planned Project P7078 – City of Edmonton Transmission Reinforcement, which increases the N-1 Capacity of Namao to 80 MVA, and a new East Terminal POD with a new N-1 Capacity of 75 MVA. Two new feeder positions would be required from the East Terminal POD following completion of P7078.

EDTI DFO estimates that Alternative III will use approximately 7.9 MVA of distribution feeder capacity from Namao POD and 8.6 MVA of distribution feeder capacity from East Terminal POD to offload Castle Downs POD. In addition, since a large portion of the future growth in North Edmonton is forecasted to come from the Crytallina Nera and McConachie ASPs (refer to Figure 0), approximately 6 km from the Kennedale POD, future expansion in North Edmonton will require relatively long and higher capital cost distribution feeders that would be more economically supplied from Castle Downs POD.

Alternative III will use 1 feeder position as well as an existing distribution circuit from the Namao POD and 2 feeder positions from the new East Terminal POD, reducing their ability to accommodate load growth within their respective service areas.

Additional distribution construction and cost is required to redistribute circuit loading and address load growth in the North of the Castle Downs service area.

Construction of three new feeders and the upgrades to the existing distribution feeder depends on the completion of P7078. Delays in the ISD of P7078 will result in increased risk of unsupplied load during the study period.

Figure 6.3 shows two new proposed circuits from East Terminal POD and one new proposed circuit one and upgrading one existing circuit from Namao POD to offload Castle Downs POD. Additional capital is required to utilize the existing distribution circuit from the Namao POD.

Alternative III is technically viable.

Figure 6.3
Proposed New Circuits after Alternative III

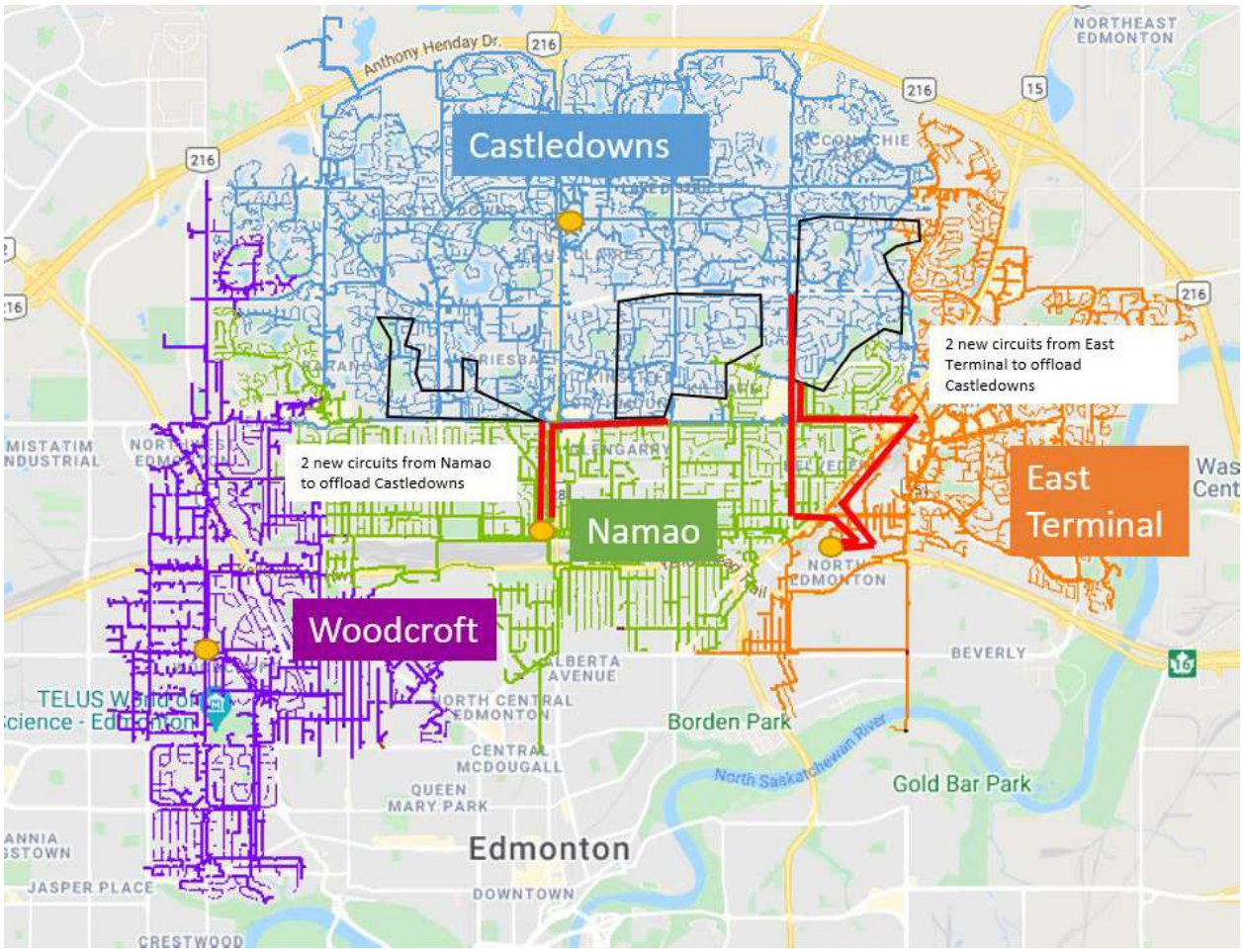


Table 6.3
Historical and Forecast Load for Castle Downs POD after P7078 and Load Transfers

								Historic and Forecast Load																							
					LOADING - RECORDED						FORECAST LOAD																				
				W	2017	2018	2019	2020	2021		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
SUB		CAPACITY		or	Pre-Project											Post-Project														
NO	N-1 Substation	MVA		S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
E557S Castle Downs		100.0		S	83.7	97.9	91.7	99.2	114.9	96.6%	98.1	98.9	100.3	101.3	102.5	95.8	93.7	95.2	96.5	96.5	97.4	98.4	99.3	100.3	101.2	102.2	103.1	104.1	105.0	106.0
E557S Castle Downs		100.0		W	95.2	97.0	102.2	100.4	99.5	95.5%	100.0	100.8	102.2	103.2	104.4	97.7	95.7	97.3	98.6	98.5	99.5	100.5	101.4	102.4	103.4	104.3	105.3	106.3	107.2	108.2
East Terminal		75.0		S	56.5	56.6	54.5	55.3	65.9	94.5%	54.2	55.3	56.2	56.8	57.5	62.4	67.8	68.8	69.5	69.5	70.1	70.7	71.3	71.9	72.4	73.0	73.6	74.2	74.8	75.4
East Terminal		75.0		W	55.7	56.1	56.8	57.4	50.3	97.7%	50.3	51.4	52.2	52.7	53.4	58.2	63.6	64.5	65.2	65.2	65.7	66.3	66.8	67.4	67.9	68.4	69.0	69.5	70.1	70.6
Namao		80.0		S	52.0	54.3	52.3	56.3	57.4	93.7%	58.8	59.0	58.5	59.1	60.3	65.6	71.5	72.5	73.6	74.9	76.3	77.7	79.0	80.4	81.9	83.4	84.9	86.4	87.9	89.6
Namao		80.0		W	55.7	55.4	56.7	57.7	56.2	95.8%	57.9	58.1	57.6	58.2	59.4	64.7	70.5	71.6	72.6	74.0	75.3	76.6	78.0	79.3	80.8	82.3	83.7	85.2	86.7	88.4
Woodcroft		80.0		S	65.5	68.2	58.0	58.1	73.6	92.1%	71.4	73.8	74.7	75.3	77.4	78.2	79.1	80.1	80.9	80.8	81.4	82.0	82.6	83.2	83.8	84.5	85.1	85.7	86.3	86.9
Woodcroft		85.8		W	52.5	59.0	59.5	60.1	61.2	94.4%	64.4	66.8	67.5	68.1	70.1	70.9	71.6	72.5	73.2	73.2	73.8	74.3	74.8	75.4	75.9	76.5	77.0	77.6	78.1	78.6

7.0 COST COMPARISON

Table 7.0: Distribution Cost Comparison

Alternative	Description	Estimated Costs (+/- 50%, $MM, $2022)
II	**Capacity Increase of Castle Downs POD**	
	Distribution Costs	**0.3**
	Transmission Costs	**TBD**
	Total Costs for Alternative II	**TBD**
III	**New Circuits from East Terminal POD and Namao POD**	
	Distribution Costs	**10.3**
	East Terminal Feeders	**5.5**
	Namao Feeders	**4.8**
	Transmission Costs	**TBD**
	Total Costs for Alternative III	**TBD**

8.0 PREFERRED ALTERNATIVE

EDTI prefers Alternative II – Capacity Increase of Castle Downs POD. EDTI prefers this alternative for the following reasons:

1. Alternative II allows for increased utilization of existing transformation and transmission capacity at Castle Downs POD (currently limited by 15 kV switchgear).
2. Alternative II resolves capacity constraints over the longest time horizon, leaving capacity at adjacent PODs for them to accommodate loads as required. POD capacity is not exceeded for the Namao or East Terminal PODs until 2041.
3. Castle Downs POD is located at the center of North Edmonton, which is a shorter distance to potential load growth in the Rapperswill/Canossa area and along the northern edge of its service area than the Namao or East Terminal POD locations, resulting in shorter and more cost-effective future distribution circuits. Alternative III will require additional distribution construction and cost in order to balance distribution circuits after offloading the Castle Downs POD.
4. Castle Downs POD was originally designed to house 24 cells/breakers and is able to support the installation of the new switchgear lineup. Alternative II will make the full transformation capacity at the Castle Downs POD available for use.
5. Castle Downs POD capacity increase also provides support for other PODs in the area to resolve capacity constraints through distribution means as required in the future.

8.1 CASTLE DOWNS POD N-1 FIRM CAPACITY

Upon completion of the capacity increase of the Castle Downs POD, the POD N-1 firm capacity constraint at the Castle Downs POD will be eliminated. The Castle Downs POD will have sufficient capacity to supply forecasted load growth in North Edmonton for the next 20 years and beyond.

9.0 CONCLUSION

EDTI DFO has determined that resolving the deficiencies through distribution means only is not technically viable.

Pending the completion of transmission-related assessment and associated costs, EDTI DFO presently suggests Alternative II as the preferred alternative to address the identified deficiencies and considerations outlined in this document. EDTI DFO believes that Alternative II is a more efficient solution that provides additional flexibility to accommodate growth and resolve capacity constraints required in the future. Alternative II also ensures that any future growth in the Castle Downs POD will require shorter and more cost effective distribution feeders (that utilize existing distribution ducts) due to the closer proximity of the Castle Downs POD to the developing Rapperswill/Canossa and accommodate growth along the northern edge of its service area. In addition, Alternative II is best suited to meet the needs of future customer connections and potential load growth due to A/C installation or Electric Vehicle adoption.

EDTI DFO believes that Alternative III is technically viable and addresses the distribution and transmission deficiencies identified in Section 5.0. However, Alternative III solves capacity issues until 2033, at which additional load transfers are required to reduce Castle Downs loading below POD capacity. The Namao POD will also begin to exceed POD capacity in 2035 and the East Terminal POD in 2041. While Alternative III addresses the capacity issues in the short term, additional transmission upgrades are required within a 20-year forecast period.

Should EDTI's preferred alternative be selected, EDTI will be requesting a DTS contract increase from 84.67 MW to 99.25 MW at the Castle Downs POD.

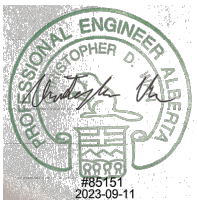
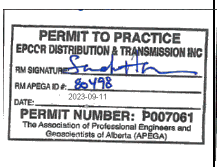
The requested in-service date for the proposed development is June 01, 2024.

EPCOR DISTRIBUTION & TRANSMISSION INC.

Distribution Deficiency Report (DDR) for Castle Downs

Technical Supplement 1

September 11, 2023

Company	Role	Name	Date	Signature
EDTI	Prepared	Chris Wan, P. Eng	September 11, 2023	
EDTI	Approved	Sarah Hanson, P. Eng	September 11, 2023	

Contents

1.0 INTRODUCTION

This Distribution Deficiency Report (DDR) Technical Supplement 1 provides EDTI's most up-to-date load information for the Castle Downs, Kennedale, Namao, and Woodcroft POD service areas. The updated data reflects 2023 forecasted results and includes 2022 feeder load actuals for both the summer and winter seasons for all affiliated sites. The results shown in Section 2.0 of this technical supplement support the original need and motive of the P2543 Castle Downs DDR.

2.0 2023 UPDATED LOAD FORECAST RESULTS

Table 1 and Table 2 below provide an update to the forecasted load data showcased in the P2543 DDR. The tables contain updated forecast data for the Castle Downs, Kennedale, Namao, and Woodcroft PODs based on the 2023 forecast year. Furthermore, actual 2022 loading data was added to provide an accurate view of each POD's current loading status. Based on the latest forecast data, the Castle Downs POD peak load is still expected to exceed N-1 capacity in 2023.

EDTI notes the following regarding the updated tables:

- Column 2022 represents actual loading for each affiliated POD from 2022.
- The forecasted data between 2023 through to 2032 are updated as per the latest forecast.
- Actual and forecasted loading data are shifted one year into the future compared to the P2543 DDR.
- Feeder capacities have been updated based on the latest ampacity ratings and cable information.

Table 1 : Castle Downs Substation Historical & Projected Summer Loads in MVA (Updated from the P2543 DDR).

							Historic and Forecast Load - Summer Peak											
				LOADING - RECORDED						FORECAST LOAD								
			W	[2018]	[2019]	[2020]	[2021]	[2022]		[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]	[2032]
SUB		CAPACITY[1]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
Castle Downs	POD	100.0	S	97.9	91.7	99.2	114.9	101.1	97.1%	105	106.8	108.0	108.8	109.6	115.5	116.4	117.2	118.1	118.9
	T1	100.0[2]	S	39.7	38.1	98.6	81.4	42.7	-	EDTI does not forecast at the POD transformer level.									
	CD11	8.5	S	6.5	6.4	6.6	9.4	8.0	-	8.1	8.1	8.2	8.3	8.3	8.4	8.4	8.5	8.5	8.6
	CD12	8.5	S	5.6	5.9	6.2	5.7	3.7	-	6.2	6.2	6.3	6.3	6.4	7.4	7.5	7.5	7.6	7.6
	CD13	9.0	S	3.8	3.2	3.0	3.2	6.7	-	6.8	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6
	CD14	NIS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CD21	8.5	S	6.5	7.6	9.0	10.4	8.5	-	6.6	6.7	6.8	7.0	7.1	7.2	7.4	7.5	7.6	7.8
	CD22	8.5	S	10.3	9.9	11.3	10.1	6.7	-	8.3	8.4	8.4	8.4	8.5	8.5	8.6	8.6	8.6	8.7
	CD23	9.0	S	0.0	0.0	0.0	0.0	3.3	-	6.6	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.8	6.8
	CD24	8.5	S	6.9	6.4	6.1	7.7	6.8	-	6.0	6.1	6.1	6.1	6.2	6.2	6.2	6.3	6.3	6.3
	T2	100.0[2]	S	65.3	58.4	96.0	66.9	58.6	-	EDTI does not forecast at the POD transformer level.									
	CD71	8.5	S	8.0	7.4	7.8	8.8	7.8	-	9.2	9.2	9.3	9.3	9.4	9.4	9.5	9.6	9.6	9.7
	CD72	8.5	S	4.7	4.9	4.5	4.9	8.4	-	8.4	8.5	8.5	8.5	8.6	8.6	8.6	8.7	8.7	8.7
	CD73	8.5	S	9.5	8.1	8.2	7.5	5.9	-	6.2	6.3	6.3	6.3	6.4	8.4	8.5	8.5	8.6	8.6
	CD74	8.5	S	7.5	7.7	8.8	9.4	8.0	-	6.9	7.0	7.0	7.1	7.2	7.3	7.4	7.4	7.5	7.6
	CD81	8.5	S	7.5	7.2	7.3	9.0	8.4	-	9.2	9.2	9.2	9.3	9.3	11.4	11.4	11.5	11.5	11.6
	CD82	8.5	S	8.4	7.8	9.3	10.1	4.6	-	3.9	4.0	4.0	4.0	4.1	4.1	4.2	4.2	4.3	4.3
	CD83	9.0	S	9.1	6.6	7.7	10.6	7.9	-	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6
	CD84	9.0	S	6.4	5.7	6.7	8.8	8.0	-	8.0	9.0	9.4	9.4	9.4	9.5	9.5	9.5	9.6	9.6
Kennedale	POD	58.6	S	56.6	54.5	55.3	65.9	53.4	99.0%	58.7	58.8	58.9	59.1	59.2	59.4	59.5	59.6	59.8	59.9
	T1	66.7	S	29.3	43.4	35.7	37.4	27.0	-	EDTI does not forecast at the POD transformer level.									

[1] N-1 Firm Capacity for PODs, Transformer Capacity (seasonally dependent), and Design Capacity for Circuits

[2] Transformer Capacity of Castle Downs Transformers limited by Medium Voltage Switchgear

							Historic and Forecast Load - Summer Peak											
				LOADING - RECORDED						FORECAST LOAD								
			W	[2018]	[2019]	[2020]	[2021]	[2022]		[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]	[2032]
SUB		CAPACITY[1]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	K11	9.0	S	8.7	8.6	9.2	7.3	8.4	-	6.2	6.2	6.2	6.3	6.3	6.3	6.4	6.4	6.4	6.5
	K12	7.7	S	2.7	1.8	1.7	2.1	2.4	-	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	K13	6.5	S	4.6	4.3	4.6	6	6.5	-	6.6	6.6	6.6	6.6	6.7	6.7	6.7	6.7	6.7	6.8
	K21	6.5	S	5.5	5.3	5.3	5.8	5.6	-	5.6	5.7	5.7	5.7	5.7	5.7	5.7	5.8	5.8	5.8
	K22	6.5	S	3.1	2.9	3.1	3.5	2.8	-	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	K23	7.7	S	2.2	2.3	1.2	1.6	2.3	-	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	T2	66.7	S	42.5	41.1	29.3	36.9	24.7	-	EDTI does not forecast at the POD transformer level.									
	K31	9.0	S	7.6	7.6	7.9	9.8	8.4	-	8.8	8.8	8.9	8.9	9.0	9.0	9.1	9.1	9.2	9.2
	K32	7.7	S	0.1	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	K33	9.0	S	5.3	5.1	5.5	9.5	7.2	-	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
	K41	9.0	S	4.5	4.3	4.5	4.6	0.0	-	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
	K42	9.0	S	8.0	7.8	7.8	9.8	8.0	-	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7
	K43	6.5	S	4.8	4.6	4.5	4.9	4.3	-	4.3	4.3	4.3	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Namao	POD	64.5	S	54.3	52.3	56.3	57.4	58.4	98.4%	59.9	60.1	61.7	62.0	62.3	63.4	63.5	63.6	63.7	63.7
	T1	40.0	S	n/a[3]	n/a[3]	26.3	30.4	23.3	-	EDTI does not forecast at the POD transformer level.									
	N13	6.5	S	6.8	6.7	6.9	6.0	5.5	-	5.8	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	6.0
	N14	9.0	S	8.2	7.5	7.5	7.8	7.7	-	8.6	8.6	8.6	8.6	8.6	8.6	8.7	8.7	8.7	8.7
	N15	7.7	S	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
	N16	9.0	S	0.0	0.0	0.0	0.0	7.1	-	7.1	7.1	7.1	7.2	7.2	7.2	7.2	7.3	7.3	7.3
	N17	6.5	S	2.8	2.7	3.0	3.6	3.3	-	3.3	3.3	3.3	3.3	3.3	4.3	4.3	4.3	4.3	4.3
	N18	NIS	S	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-
	T2	40.0	S	n/a[3]	n/a[3]	29.6	23.8	15.9	-	EDTI does not forecast at the POD transformer level.									
	N1	NIS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	N2	9.0	S	4.2	4.5	4.9	5.0	4.8	-	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8

[3] Data point unavailable due to recording system issue.

							Historic and Forecast Load - Summer Peak											
				LOADING - RECORDED						FORECAST LOAD								
			W	[2018]	[2019]	[2020]	[2021]	[2022]		[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]	[2032]
SUB		CAPACITY[1]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	N3	6.5	S	5.5	5.5	5.7	6.4	5.7	-	5.7	5.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
	N4	6.5	S	3.9	3.4	4.3	8.9	5.9	-	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	4.5
	N5	6.5	S	4.7	4.9	4.9	5.3	4.8	-	4.8	4.8	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.3
	N6	NIS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T3	40.0	S	n/a[3]	n/a[3]	36.6	20.1	30.7	-	EDTI does not forecast at the POD transformer level.									
	N7	6.5	S	3.4	3.2	3.3	4.0	3.6	-	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	N8	6.5	S	5.4	5.2	4.7	5.3	4.8	-	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	N9	NIS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	N10	6.5	S	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
	N11	8.5	S	6.7	7.2	5.9	6.8	6.6	-	6.9	7.0	7.2	7.4	7.5	7.5	7.5	7.5	7.5	7.5
	N12	6.5	S	4.5	5.3	5.6	6.2	6.0	-	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Woodcroft	POD	80.0	S	68.2	58.0	58.1	73.6	66.6	99.5%	73.5	74.4	75.9	76.8	77.1	77.3	77.6	77.8	78.1	78.3
	T1	40.0	S	24.6	n/a[3]	22.2	33.5	28.2	-	EDTI does not forecast at the POD transformer level.									
	W1	9.0	S	6.5	5.7	5.4	8.5	8.0	-	7.6	7.6	7.7	7.7	7.7	7.7	7.8	7.8	7.8	7.8
	W2	6.5	S	5.9	4.3	3.7	3.9	3.8	-	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	W3	NIS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	6.5	S	6.0	5.6	6.4	7.4	6.8	-	7.8	8.5	8.5	8.5	8.5	8.6	8.6	8.6	8.6	8.6
	W5	6.5	S	5.3	5.2	5.6	7.5	4.3	-	4.4	4.4	5.1	5.2	5.2	5.3	5.3	5.3	5.3	5.4
	W6	6.5	S	0.9	0.8	0.8	6.6	6.2	-	6.3	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1
	T2	40.0	S	35.5	n/a[3]	36.4	38.3	32.0	-	EDTI does not forecast at the POD transformer level.									
	W7	6.5	S	1.9	1.8	1.7	2.7	2.6	-	2.6	2.6	2.6	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	W8	9.0	S	6.4	6.1	5.6	5.6	5.2	-	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
	W9	NIS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W10	9.0	S	6.3	7.2	6.1	6.0	5.8	-	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
	W11	9.0	S	5.1	6.2	5.7	6.0	5.9	-	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9

							Historic and Forecast Load - Summer Peak											
				LOADING - RECORDED						FORECAST LOAD								
			W	[2018]	[2019]	[2020]	[2021]	[2022]		[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]	[2032]
SUB		CAPACITY[1]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	W12	9.0	S	4.1	3.8	3.2	2.3	4.1	-	4.1	4.1	4.7	4.7	4.7	4.7	4.8	4.8	4.8	4.8
	T3	40.0	S	21.0	n/a[3]	34.2	29.9	19.4	-	EDTI does not forecast at the POD transformer level.									
	W13	NIS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W14	6.5	S	7.5	5.6	5.4	4.2	3.8	-	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
	W15	9.0	S	4.0	5.0	4.8	4.6	4.6	-	4.6	4.6	4.6	4.6	4.6	4.7	4.7	4.7	4.7	4.7
	W16	6.5	S	3.6	3.4	3.4	6.9	7.1	-	6.4	6.5	6.5	6.5	6.6	6.6	6.7	6.7	6.7	6.8
	W17	6.5	S	5.8	3.8	3.7	3.6	3.8	-	3.8	3.8	3.8	3.8	3.9	3.9	3.9	3.9	3.9	3.9
	W18	NIS	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2 : Castle Downs Substation Historical & Projected Winter Loads in MVA (Updated from the P2543 DDR).

							Historic and Forecast Load - Winter Peak												
				LOADING - RECORDED						FORECAST LOAD									
			W	[2018]	[2019]	[2020]	[2021]	[2022]		[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]	[2032]
SUB		CAPACITY[4]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
Castle Downs	POD	100.0	W	97.0	102.2	100.4	99.5	97.4	97.6%	102.4	104.2	105.3	106.2	107.0	112.8	113.7	114.5	115.3	116.1
	T1	100.0[5]	W	92.3	41.5	88.5	79.1	81.3	-	EDTI does not forecast at the POD transformer level.									
	CD11	8.7	W	6.3	6.9	6.5	7.8	7.8	-	7.8	7.9	7.9	8.0	8.0	8.1	8.1	8.2	8.2	8.3
	CD12	8.7	W	5.2	5.7	6.1	4.1	4.2	-	6.7	6.7	6.8	6.8	6.9	7.9	8.0	8.0	8.1	8.1
	CD13	9.5	W	2.0	2.0	2.0	6.6	7.1	-	7.2	7.3	7.4	7.5	7.5	7.6	7.7	7.8	7.9	8.1
	CD14	NIS	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CD21	8.7	W	7.1	10.3	10.3	9.5	9.4	-	7.4	7.6	7.7	7.8	8.0	8.1	8.2	8.3	8.5	8.6
	CD22	8.7	W	11.0	11.2	11.0	6.2	6.3	-	7.9	7.9	8.0	8.0	8.1	8.1	8.1	8.2	8.2	8.2
	CD23	9.5	W	0.0	0.0	0.0	2.2	2.1	-	5.5	5.5	5.5	5.5	5.6	5.6	5.6	5.6	5.6	5.6
	CD24	8.7	W	6.1	6.5	6.2	7.1	7.0	-	6.2	6.2	6.3	6.3	6.3	6.4	6.4	6.4	6.5	6.5
	T2	100.0[5]	W	96.4	64.4	66.5	60.0	85.5	-	EDTI does not forecast at the POD transformer level.									
	CD71	8.7	W	8.0	7.4	7.4	7.4	7.6	-	8.9	9.0	9.0	9.1	9.2	9.2	9.3	9.3	9.4	9.4
	CD72	8.7	W	3.7	3.4	3.6	7.6	7.3	-	7.3	7.4	7.4	7.4	7.5	7.5	7.5	7.6	7.6	7.6
	CD73	8.7	W	9.4	9.9	9.0	5.9	5.5	-	5.9	5.9	6.0	6.0	6.1	8.1	8.1	8.2	8.2	8.3
	CD74	8.7	W	7.4	8.7	8.7	7.9	7.7	-	6.5	6.6	6.7	6.8	6.8	6.9	7.0	7.1	7.1	7.2
	CD81	8.7	W	7.6	9.7	7.6	7.8	7.6	-	8.3	8.4	8.4	8.5	8.5	10.6	10.6	10.7	10.7	10.7
	CD82	8.7	W	9.4	9.8	9.6	4.3	4.0	-	3.3	3.4	3.4	3.4	3.5	3.5	3.6	3.6	3.6	3.7
	CD83	9.5	W	9.5	8.0	10.5	8.2	7.9	-	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6
	CD84	9.5	W	6.1	6.3	6.4	7.1	6.9	-	6.9	8.0	8.3	8.3	8.4	8.4	8.4	8.5	8.5	8.5
Kennedale	POD	67.3	W	56.1	56.8	57.4	50.3	51.9	95.9%	56.3	56.4	56.6	56.7	56.9	57	57.1	57.3	57.4	57.5
	T1	88.7	W	43.4	48.3	45.6	36.2	22.1	-	EDTI does not forecast at the POD transformer level.									

[4] N-1 Firm Capacity for PODs, Transformer Capacity (seasonally dependent), and Design Capacity for Circuits

[5] Transformer Capacity of Castle Downs Transformers limited by Medium Voltage Switchgear

							Historic and Forecast Load - Winter Peak											
				LOADING - RECORDED						FORECAST LOAD								
			W	[2018]	[2019]	[2020]	[2021]	[2022]		[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]	[2032]
SUB		CAPACITY[4]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	K11	9.5	W	8.4	8.4	8.9	5.9	7.8	-	5.5	5.6	5.6	5.6	5.7	5.7	5.7	5.8	5.8	5.8
	K12	9.0	W	2.0	1.7	1.2	1.7	1.8	-	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	K13	7.5	W	5.1	5.1	4.9	5.8	6.9	-	6.9	7.0	7.0	7.0	7.0	7.0	7.1	7.1	7.1	7.1
	K21	7.5	W	5.9	5.6	5.2	5.7	6.7	-	6.8	6.8	6.8	6.8	6.8	6.8	6.9	6.9	6.9	6.9
	K22	7.5	W	3.1	3.1	3.1	3.3	3.1	-	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
	K23	9.0	W	1.6	1.2	1.0	1.3	1.7	-	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	T2	88.7	W	43.8	39.2	40.3	35.7	29.0	-	EDTI does not forecast at the POD transformer level.									
	K31	9.5	W	8.3	8.3	7.8	9.2	8.7	-	9.0	9.0	9.1	9.1	9.2	9.2	9.3	9.3	9.4	9.4
	K32	9.0	W	0.1	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	K33	9.5	W	6.0	5.8	6.0	8.8	5.3	-	6.1	6.1	6.1	6.2	6.2	6.2	6.2	6.2	6.2	6.2
	K41	9.5	W	5.2	5.4	5.2	0.0	0.0	-	7.0	7.0	7.1	7.1	7.2	7.2	7.3	7.3	7.4	7.0
	K42	9.5	W	7.6	7.7	7.2	7.8	7.0	-	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	K43	7.5	W	4.1	4.2	3.9	4.0	4.0	-	4.0	4.0	4.0	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Namao	POD	71.1	W	55.4	56.7	57.7	56.2	59.0	99.9%	61.9	62.1	63.8	64.0	64.3	65.4	65.5	65.6	65.7	65.8
	T1	47.5	W	n/a[6]	n/a[6]	23.0	25.8	24.5	-	EDTI does not forecast at the POD transformer level.									
	N13	7.5	W	6.8	7.5	7.0	6.0	6.3	-	6.6	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.8
	N14	9.5	W	7.0	6.9	7.0	6.4	7.2	-	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1
	N15	9.0	W	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
	N16	9.5	W	0.0	0.0	0.0	7.5	7.9	-	7.9	7.9	7.9	8.0	8.0	8.0	8.1	8.1	8.1	8.1
	N17	7.5	W	3.8	4.2	3.7	4.2	5.2	-	5.2	5.2	5.2	5.2	5.2	6.2	6.2	6.2	6.2	6.2
	N18	NIS	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T2	47.5	W	n/a[6]	n/a[6]	43.0	20.6	20.9	-	EDTI does not forecast at the POD transformer level.									
	N1	NIS	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	N2	9.5	W	4.2	4.4	4.6	4.9	5.8	-	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8

[6] Data point unavailable due to recording system issue.

							Historic and Forecast Load - Winter Peak											
				LOADING - RECORDED						FORECAST LOAD								
			W	[2018]	[2019]	[2020]	[2021]	[2022]		[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]	[2032]
SUB		CAPACITY[4]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	N3	7.5	W	6.2	6.5	6.5	6.1	6.5	-	6.5	6.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	N4	7.5	W	4.5	4.0	5.1	4.3	7.5	-	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	N5	7.5	W	4.8	5.6	4.7	5.2	5.8	-	5.8	5.8	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.3
	N6	NIS	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T3	47.5	W	n/a[6]	n/a[6]	17.1	17.6	18.0	-	EDTI does not forecast at the POD transformer level.									
	N7	7.5	W	3.3	3.5	3.4	3.5	4.1	-	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.2	4.2	4.2
	N8	7.5	W	4.9	4.7	4.9	4.6	5.3	-	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
	N9	NIS	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	N10	7.5	W	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
	N11	8.7	W	6.0	6.4	4.9	5.2	5.9	-	6.2	6.3	6.5	6.7	6.8	6.8	6.8	6.8	6.8	6.8
	N12	7.5	W	5.2	5.3	5.1	5.9	6.3	-	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Woodcroft	POD	85.8	W	59.0	59.5	60.1	63.4	62.2	99.9%	62.7	63.6	65.1	66.0	66.2	66.4	66.6	66.8	67.0	67.2
	T1	47.5	W	40.0	n/a[6]	29.8	31.5	30.2	-	EDTI does not forecast at the POD transformer level.									
	W1	9.5	W	5.3	5.2	5.0	6.9	6.7	-	6.7	6.7	6.7	6.8	6.8	6.8	6.8	6.9	6.9	6.9
	W2	7.5	W	6.4	3.8	3.6	4.1	3.5	-	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	W3	NIS	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	7.5	W	5.9	6.3	7.1	7.3	6.5	-	7.5	8.2	8.2	8.2	8.2	8.2	8.3	8.3	8.3	8.3
	W5	7.5	W	5.2	5.5	5.6	7.5	5.0	-	5.0	5.0	5.8	5.8	5.8	5.9	5.9	5.9	6.0	6.0
	W6	7.5	W	0.7	0.7	0.7	5.4	5.5	-	5.5	5.6	5.7	5.7	5.8	5.9	6.0	6.1	6.1	6.2
	T2	47.5	W	35.5	n/a[6]	37.7	43.1	25.4	-	EDTI does not forecast at the POD transformer level.									
	W7	7.5	W	1.4	1.4	2.0	3.0	2.0	-	2.0	2.0	2.0	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	W8	9.5	W	5.6	5.5	5.2	4.9	5.9	-	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
	W9	NIS	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W10	9.5	W	6.2	6.1	5.9	5.9	6.2	-	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
	W11	9.5	W	4.7	6.0	5.3	5.3	5.3	-	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3

							Historic and Forecast Load - Winter Peak											
				LOADING - RECORDED						FORECAST LOAD								
			W	[2018]	[2019]	[2020]	[2021]	[2022]		[2023]	[2024]	[2025]	[2026]	[2027]	[2028]	[2029]	[2030]	[2031]	[2032]
SUB		CAPACITY[4]	or	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	POD/Tx/Feeder	MVA	S	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	W12	9.5	W	5.2	4.6	3.0	4.2	4.5	-	4.5	4.5	5.0	5.1	5.1	5.1	5.1	5.1	5.1	5.2
	T3	47.5	W	15.8	n/a[6]	17.2	34.6	19.4	-	EDTI does not forecast at the POD transformer level.									
	W13	NIS	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W14	7.5	W	5.6	5.8	5.7	3.7	3.9	-	4.1	4.1	4.1	4.1	4.2	4.2	4.2	4.2	4.2	4.2
	W15	9.5	W	4.2	4.9	4.9	4.3	4.5	-	4.5	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
	W16	7.5	W	4.2	4.2	3.9	6.3	6.4	-	6.4	6.4	6.4	6.5	6.5	6.5	6.6	6.6	6.6	6.7
	W17	7.5	W	3.7	3.7	3.7	3.6	3.4	-	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.6
	W18	NIS	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-