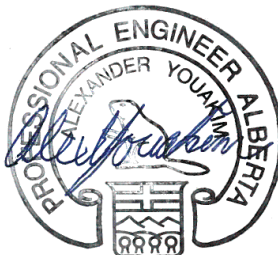


ATCO

Distribution Deficiency Report

ATCO Thornton 2091S Area Load New POD Transformer

 APEGA ID 150741 2026-08-19
PERMIT TO PRACTICE ATCO ELECTRIC LTD. RM SIGNATURE:  RM APEGA ID #: 95027 DATE: August 20 2026 PERMIT NUMBER: P000850 The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Approvals	Signature	Date
Alex Youakim, P.Eng Engineer, Distribution System Planning		August 19, 2026
Amanda Robertson, P.Eng Supervising Engineer, Distribution System Planning	 August 20 2026	August 19, 2026

Table of Contents

Table of Contents.....	2
1 Executive Summary	4
2 Introduction	5
2.1 Customer Requests.....	5
2.2 Existing System	7
2.2.1 Thornton 2091S.....	9
2.2.2 Dome Cutbank 810S.....	9
2.2.3 Bridge Creek 798S	10
2.2.4 Wapiti 823S	11
2.2.5 Simonette 733S	11
2.2.6 H.R. Milner 740S	12
2.2.7 Pakenham 2103S.....	13
2.2.8 ATCO's Load Forecast Methodology.....	13
2.2.9 Historical Performance Information	13
2.2.10 Restoration Times	13
3 Alternative Evaluation.....	14
3.1 Distribution-Only Alternatives.....	14
3.1.1 Distribution-Only Alternative 1: Serve Load from Thornton 2091S.....	14
3.1.2 Distribution-Only Alternative 2: Offload Thornton 2091S to Surrounding PODs	15
3.2 Alternatives Which Include Transmission	16
3.2.1 Transmission-Based Alternative 1: Add New Transformer to Thornton 2091S POD.....	16
3.2.2 Transmission-Based Alternative 2: Construct a new POD	17
3.3 Evaluation of Alternatives	18
4 Conclusion	18
5 Appendix A – POD Load Forecast Tables.....	19
5.1 Existing Forecasts	19
5.2 Distribution-Based Alternative 1	22
5.3 Distribution-Based Alternative 2	23
5.4 Transmission-Based Alternative 1	24
5.5 Transmission-Based Alternative 2	25
6 Appendix B – ATCO DFO Planning Criteria	26
7 Appendix C – Customer Letter of Support	26

Revision History:

R0	Original Submission	Alex Youakim	December 20, 2024
R1	Revised for Gate 3 Submission	Alex Youakim	July 10, 2026
R2	Revised as per AESO Comments	Alex Youakim	August 19, 2026

1 Executive Summary

ATCO Distribution Facility Owner (ATCO DFO) has received multiple large load requests in the Thornton 2091S area totaling 32.9 MW.

These requests are near distribution lines currently supplied by Thornton 2091S. Thornton 2091S is equipped with one 30/40/50 MVA, 144/25 kV transformer. Forecast loading for Thornton 2091S POD shows that the POD transformer will be overloaded by 2028. To address this deficiency, several alternatives were considered by ATCO DFO including:

Distribution Alternative 1: Serve load from Thornton 2091S

Distribution Alternative 2: Offload Thornton 2091S to nearby PODs

Transmission Alternative 1: Increase Capacity at Thornton 2091S

Transmission Alternative 2: Construct a new POD

A detailed analysis of each solution can be found in Section 3 of the report.

Based on the analysis performed in this report, ATCO DFO prefers Transmission Alternative 1. The scope of this alternative is to install a new transformer and new breakers at Thornton 2091S.

Because of the current lead time for large power transformers, some of the load transfers discussed in Distribution Alternative 2 may be required as an intermediate solution until Thornton 2091S can be expanded. These load transfers would be implemented by ATCO DFO on an as needed basis.

2 Introduction

2.1 Customer Requests

ATCO DFO has received multiple large load requests in the Thornton 2091S area totaling approximately 32.9 MW. Table 2.1-1 shows the new customer load requests.

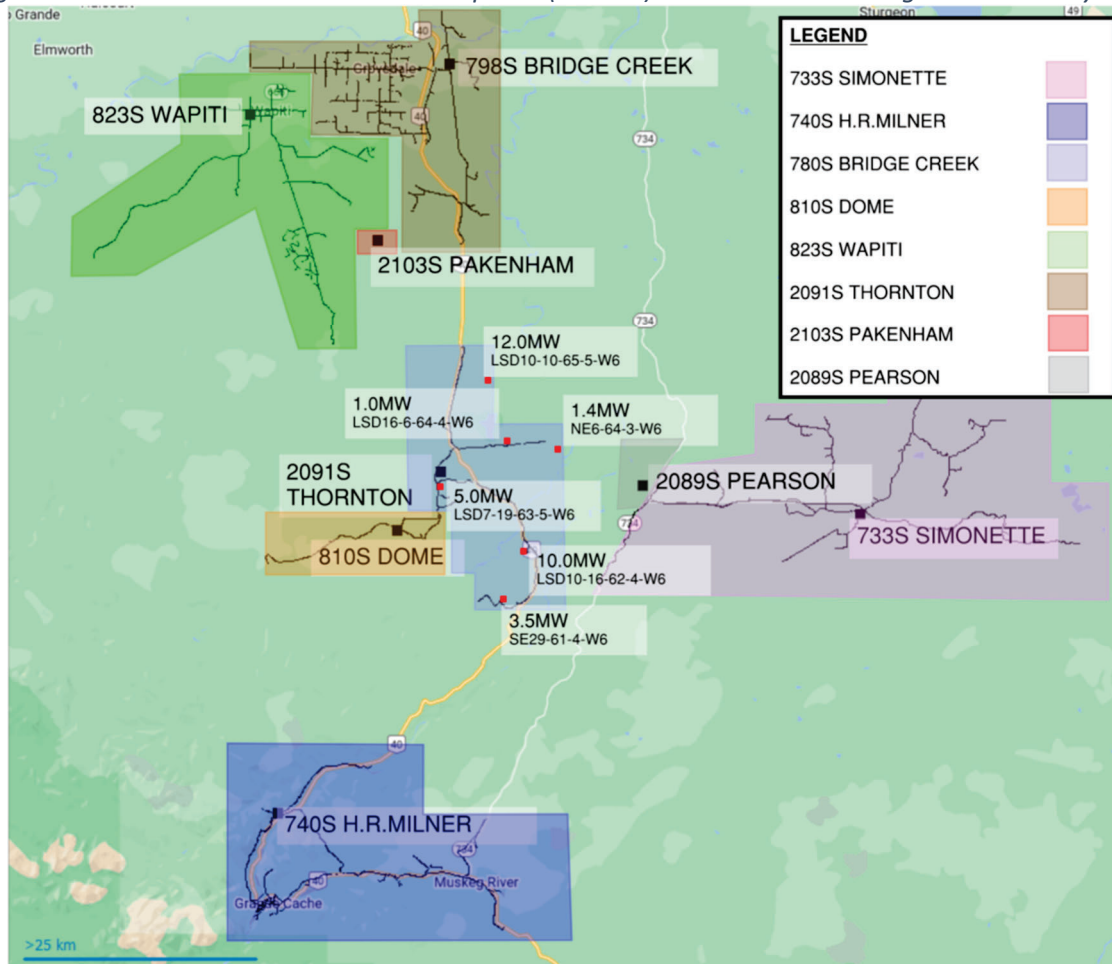
Table 2.1-1: Thornton 2091S Area New Customer Requests

Location	Load Type Characterization	Requested Operating Load (MW)	Requested ISD/Energization Date	Feeder	Status
7-19-63-5-W6	Industrial	5.0	Q2 2025	5L703 – 2091S	Constructed*
SE29-61-4-W6	Industrial	3.5	Q2 2026	5L720 – 2091S	Firm
10-16-62-4-W6	Industrial	10.0	Q2 2026	5L703 – 2091S	Firm
NE6-64-3-W6	Industrial	1.4	Q2 2026	5L775 – 2091S	Firm
16-6-64-4-W6	Industrial	1.0	Q2 2026	5L775 – 2091S	Firm
Subtotal (Firm Projects)		20.9			
10-10-65-5-W6	Industrial	12.0	Q2 2028	5L775 – 2091S	Initial Proposal
Subtotal (Initial Proposal Projects)		12.0			
Total Large Load Requests		32.9			

*NOTE: Project is connected to the grid but has not ramped up to full load.

Figure 2.1-1 shows the load requests identified in Table 2.1-1 in relation to the existing ATCO distribution system. All the loads are close to existing Thornton 2091S circuits.

Figure 2.1-1: Thornton Area New Load Requests (>1 MW) in Relation to Existing Distribution System



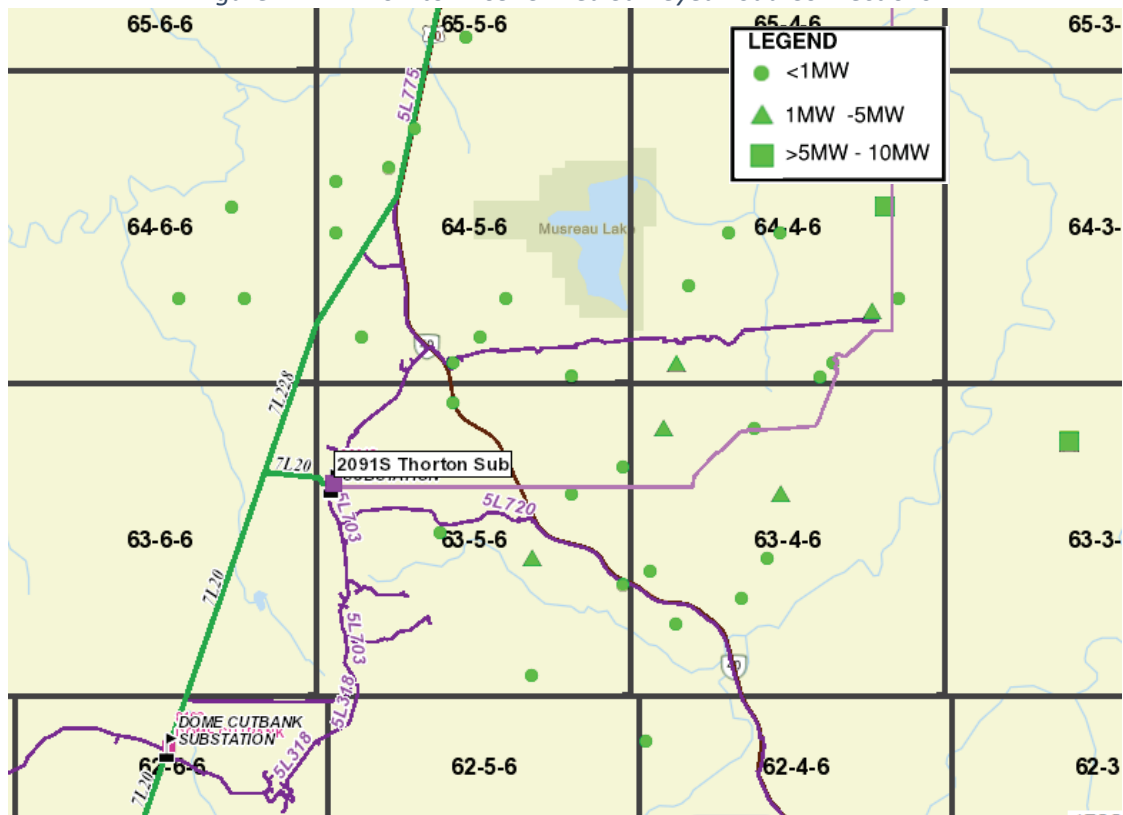
In addition to the customer requests that ATCO DFO has received, ATCO DFO approached and surveyed customers in the Thornton area to inquire about potential future loads. Table 2.1-2 shows the results of the customer future load survey for the loads within the Thornton. Figure 2.1-2 shows the approximate locations of all the surveyed load.

Table 2.1-2: Thornton 2091S Area Preliminary Load Inquiries

Location	Load Type Characterization	Requested Operating Load (MW)	Status
65-5-6	Industrial	0.5	Survey
64-6-6	Industrial	0.6	Survey
64-5-6	Industrial	3.2	Survey
64-4-6	Industrial	10.0	Survey
63-5-6	Industrial	3.5	Survey
63-4-6	Industrial	5.2	Survey
62-4-6	Industrial	0.2	Survey
Total Surveyed Load		23.2	

Figure 2.1-2 shows the approximate locations of all the surveyed load connections.

Figure 2.1-2: Thornton 2091S Area Surveyed Load Connections



In addition to these survey results received from a limited subset of the customers operating in the area, ATCO has received a letter directly from one area customer in support of the project. The letter, included herein as Appendix C, confirms the customer's firm load requests incorporated into this DDR, the timing requirements, and a description of more than 200 MW of existing self-supplied loads in the area of the proposed Greenview and existing Thornton PODs that the customer considers potential candidates for electrification as part of their decarbonization efforts.

The customer has identified that the ability to connect to the AIES in a timely fashion will dramatically reduce the CO₂ emissions of their operations, compared to self-generation at their sites. Historically, customers in the area have resorted to self-supply due to challenges obtaining grid power on a schedule that suits their operations.

2.2 Existing System

The Thornton 2091S area is located between Grande Cache and Grande Prairie. PODs with 25 kV service in the Thornton 2091S area are Thornton 2091S and Dome Cutbank 810S. The other PODs considered in this DDR are Wapiti 823S, Bridge Creek 798S, Simonette 733S and Pakenham 2103S. Pakenham POD is

currently in the AESO Connection Queue (Project P2716). Figure 2.2-1 shows the current distribution system configuration in the area.

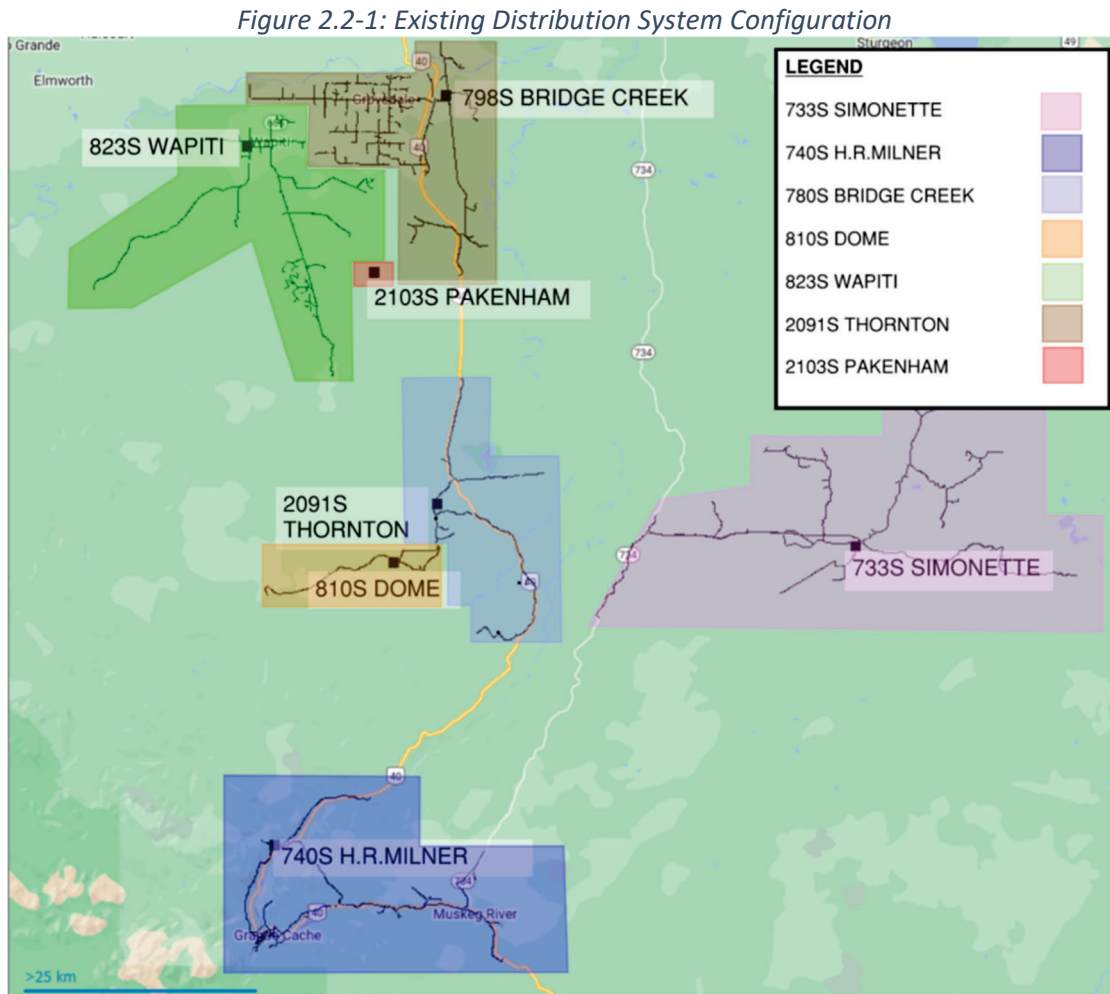


Table 2.2-1 shows the breakdown of existing load type for the area PODs.

Table 2.2-1: POD Existing Load Type

POD	Existing Load Type (%)				DTS (MW)	STS (MW)
	Industrial	Residential	Commercial	Total		
Thornton 2091S	79.3	1.7	19.0	100	25	N/A
Dome Cutbank 810S	85.1	0.4	14.5	100	16	N/A
Wapiti 823S	85.8	7.8	6.4	100	21	32.8
Bridge Creek 798S	85.8	6.0	8.2	100	22.5	N/A
Simonette 733S	86.3	1.2	12.5	100	44	N/A
H.R. Milner 740S	43.3	33.1	23.6	100	9.512	N/A

2.2.1 Thornton 2091S

Thornton 2091S is the POD closest to the load centre. It is located roughly 70 km Northeast of the Town of Grand Cache. The legal land description of Thornton 2091S is SW30-63-5-W6.

Thornton 2091S is equipped with one 30/40/50 MVA 144/25 kV transformer (701T) and three 25 kV feeder breakers. Figure 2.2-3 shows the SLD for Thornton 2091S.

Figure 2.2-2: Thornton 2091S SLD

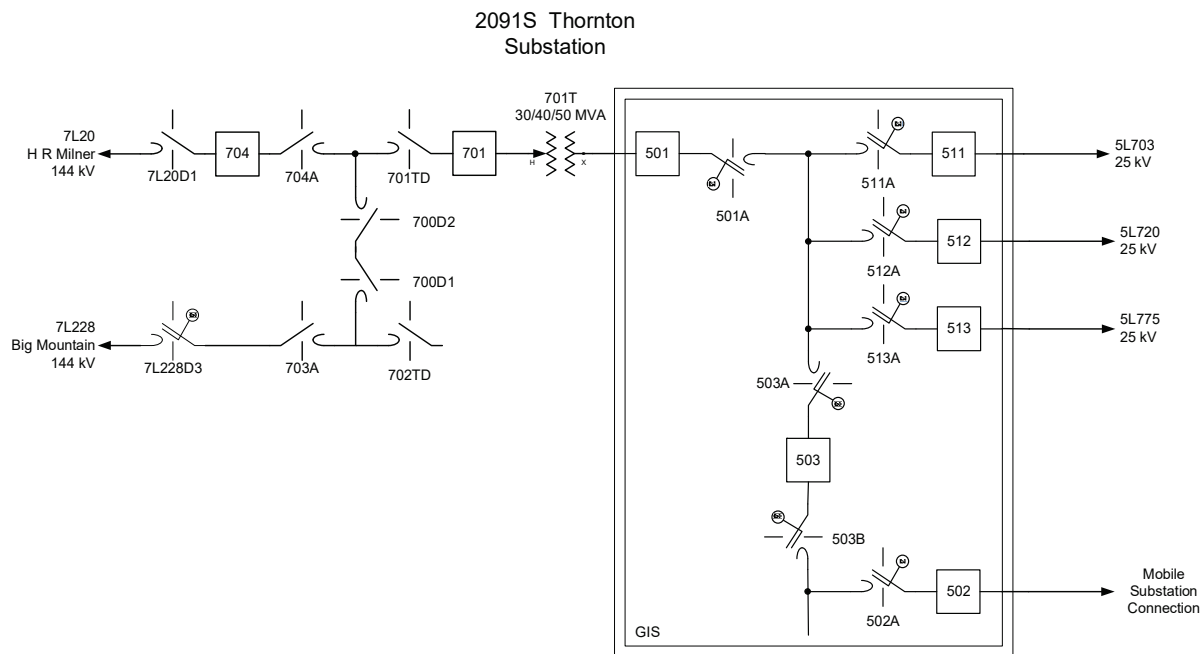


Table 5.1-1 in Appendix A shows the load forecast for Thornton 2091S with no load requests. The load composition for the POD is predominantly industrial.

There are no existing or planned distribution-connected generators connected to Thornton 2091S.

2.2.2 Dome Cutbank 810S

Dome Cutbank 810S is located roughly 10 km southwest of Thornton 2091S POD. The legal land description of Dome Cutbank 810S is NE28-62-6-W6.

Dome Cutbank 810S is a t-tapped substation equipped with two 10/13 MVA 144/25 kV transformers (701T and 702T) running parallel on a common bus and two 25 kV feeder breakers. Figure 2.2-4 shows the SLD for Bridge Creek 798S.

Figure 2.2-3: Dome Cutbank 810S SLD

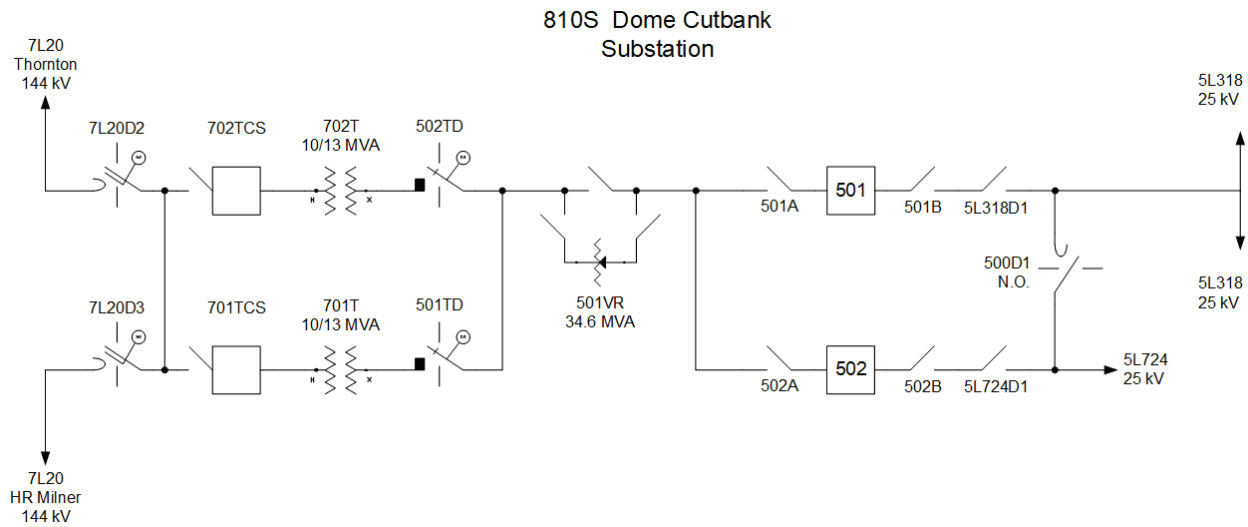


Table 5.1-2 in Appendix A shows the load forecast for Dome Cutbank 810S. Currently, the load composition for the POD is largely industrial.

There are no existing or planned distribution-connected generators connected to Dome Cutbank 810S.

2.2.3 Bridge Creek 798S

Bridge Creek 798S is approximately 30 km from the largest load request in LSD 10-10-65-5-W6M. The legal land description of Bridge Creek 798S is LSD 7-5-70-5-W6.

Bridge Creek 798S is equipped with a 25/33/42 MVA 144/25 kV transformer (701T) and two 25 kV feeder breakers. Figure 2.2-5 shows the SLD for Bridge Creek 798S.

Figure 2.2-4: Bridge Creek 798S SLD

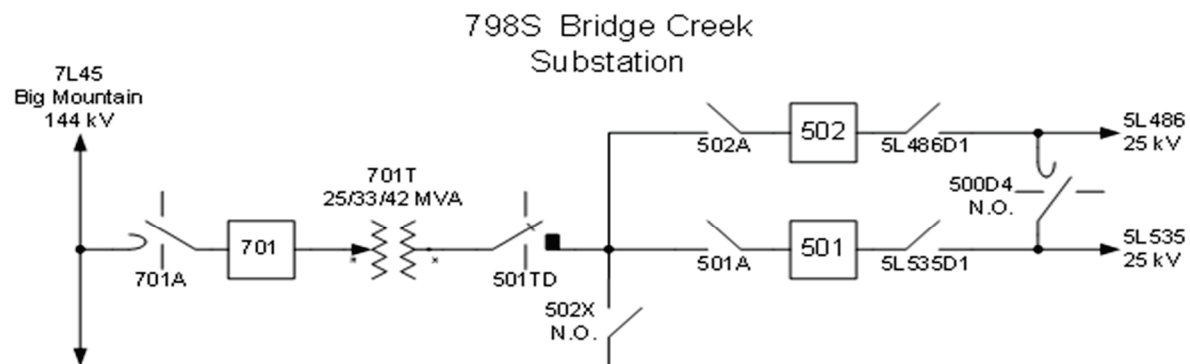


Table 5.1-3 in Appendix A shows the load forecast for Bridge Creek 798S. Currently, the load composition for the POD is largely industrial.

There are no existing or planned distribution-connected generators connected to Bridge Creek 798S.

2.2.4 Wapiti 823S

Wapiti 823S POD is located roughly 35 km southwest of the City of Grande Prairie. The legal land description of Wapiti 823S is LSD 5-8-69-8-W6.

Wapiti 823S is equipped with one 30/40/50 MVA 144/25 kV transformer (701T) and three 25 kV feeder breakers. Figure 2.2-5 shows the SLD for Wapiti 823S.

Figure 2.2-5: Wapiti 823S SLD

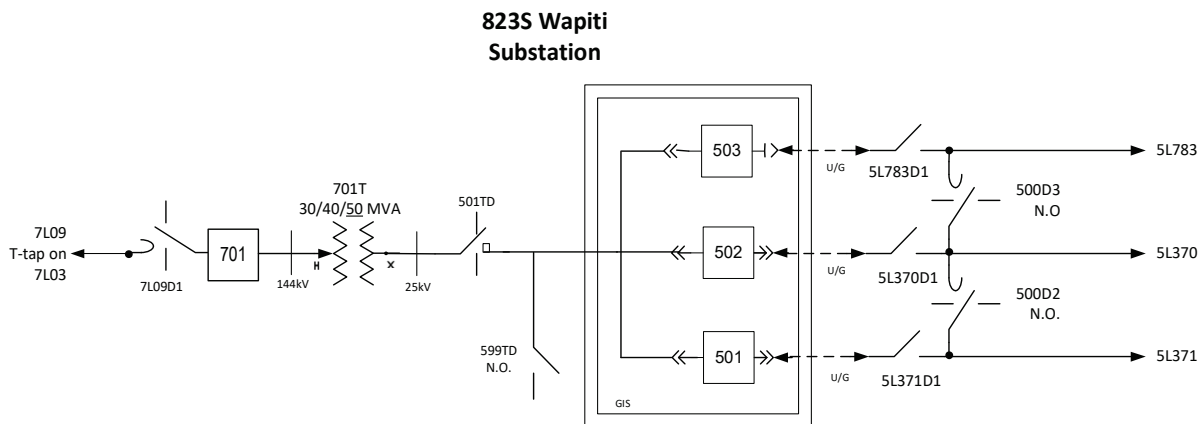


Table 5.1-4 in Appendix A shows the existing load forecast for Wapiti 823S. This POD serves primarily industrial loads.

There are two 20 MW distribution-connected BESS connected to Wapiti 823S. There are also two 14.986 MVA non-export synchronous generators connected to Wapiti 823S.

2.2.5 Simonette 733S

Simonette POD is located roughly 61 km west of the Town of Fox Creek. The legal land description of Simonette 733S is NE6-63-25-W5M.

Simonette 733S is equipped with one 30/40/50 MVA 144/25 kV transformer (702T) and three 25 kV feeder breakers. Figure 2.2-6 shows the single line diagram (SLD) for Simonette 733S.

Figure 2.2-6: Simonette 733S SLD

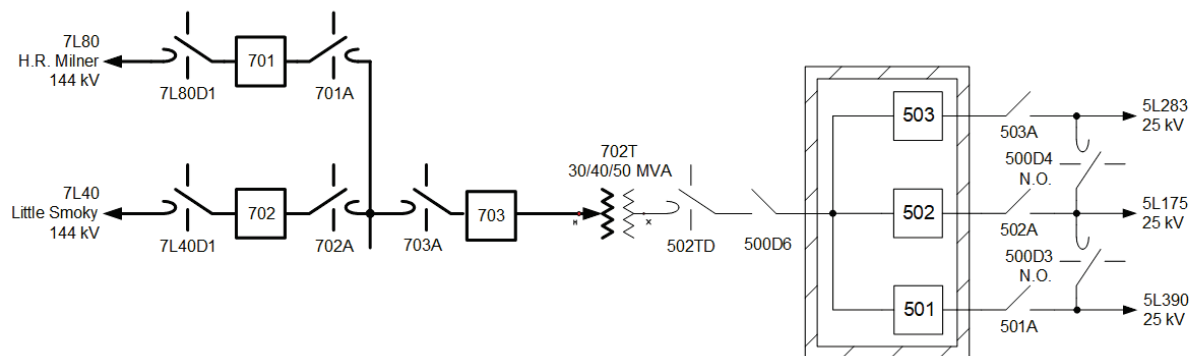


Table 5.1-5 in Appendix A shows the existing load forecast for Simonette 733S. This POD serves primarily industrial type loads

There are no existing or planned distribution-connected generators connected to Simonette 733S.

2.2.6 H.R. Milner 740S

H.R. Milner 740S POD is located roughly 13 km North of the Town of Grande Cache. The legal land description of H.R. Milner 740S is SE15-58-8-W6M.

H.R. Milner is equipped with two 25/33.3/41.7 MVA 144/25 kV transformers (702T and 703T) and three 25 kV feeder breakers. Figure 2.2-7 shows the single line diagram (SLD) for H.R. Milner 740S.

Figure 2.2-7: H.R. Milner 740S SLD

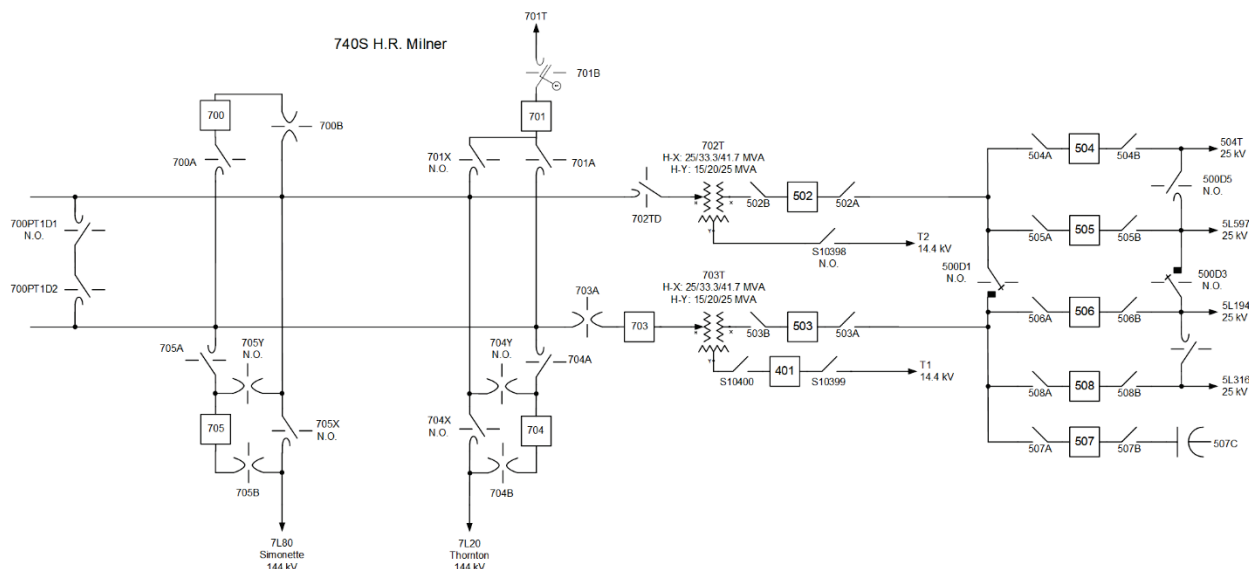


Table 5.1-6 in Appendix A shows the existing load forecast for H.R. Milner 740S. This POD serves the Town of Grande Cache, a large generation facility and several large industrial customers in the area.

2.2.7 Pakenham 2103S

Pakenham 2103S is a new POD currently being studied by the AESO Project P2716 and will be located roughly 30 km South of the hamlet of Grovedale. The legal land description of Pakenham 2103S is expected to be SW8-67-6-W6M.

Pakenham 2103S will be equipped with one 50 MVA 144/25 kV transformer and two 25 kV feeder breakers. There is currently no SLD for this site.

Table 5.1-7 in Appendix A shows the load forecast for Pakenham 2103S. This POD will serve large industrial clients in the area.

There are no planned distribution-connected generators connections to Pakenham 2103S.

2.2.8 ATCO's Load Forecast Methodology

ATCO DFO's load forecasting methodology considers several factors:

- Historical Trend Load Growth
 - Historical load growth for the area (in %) is reviewed and conservative load growth is applied to future years. ATCO typically applies an annual growth rate, except for dedicated industrial feeders which have zero load growth rate applied as load is expected to be steady until discrete loads are added by the customer.
- Distributed Energy Resources (DERs)
 - ATCO's load forecasts have the DERs effects removed from the historical data, so DER contributions are not considered in the net load.

2.2.9 Historical Performance Information

As this DDR is driven by load growth, the SAIDI and SAIFI information was not considered to be a driver and will not be considered further.

2.2.10 Restoration Times

As this DDR is driven by load growth, restoration time information was not considered to be a driver and will not be considered further.

3 Alternative Evaluation

3.1 Distribution-Only Alternatives

3.1.1 Distribution-Only Alternative 1: Serve Load from Thornton 2091S

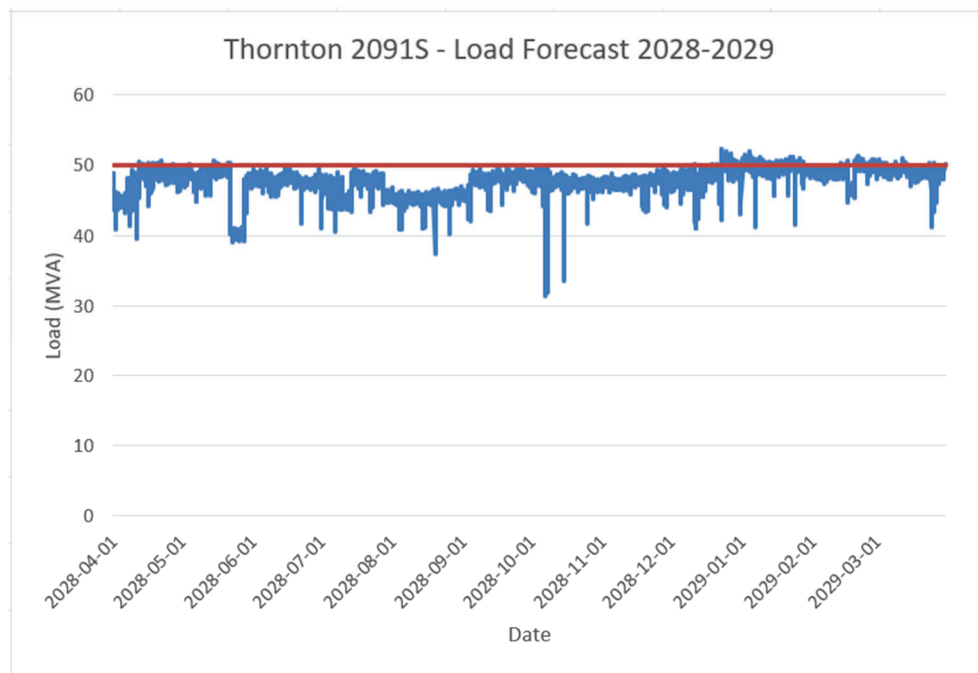
As identified in Figure 2.1-1, Thornton 2091S distribution system is the closest distribution system to the customer load requests. Table 5.2-1 in Appendix A shows the Thornton 2091S load forecast with all the load requests identified in Table 2.1-1.

The following deficiencies are identified:

- In 2026:
 - Loading of feeder 5L720 will exceed ATCO DFO Planning Criteria for rural feeder capacity (Appendix B)
 - Loading of feeder 5L703 will exceed ATCO DFO Planning Criteria for rural feeder capacity (Appendix B)
- In 2028:
 - Loading of feeder 5L775 will exceed ATCO DFO Planning Criteria for rural feeder capacity (Appendix B)
 - Loading of Thornton transformer 701T will exceed its rated capacity.

Figure 3.1-1 shows the load forecast for hourly load forecast 2028/2029 time period when ATCO DFO predicts the POD transformer will be overloaded.

Figure 3.1-1: Thornton 2091S hourly Load Forecast 2028-2029



This analysis does not account for any of the surveyed load in section 2.1.

3.1.2 Distribution-Only Alternative 2: Offload Thornton 2091S to Surrounding PODs

Alleviating capacity constraints from Thornton 2091S would require offloading Thornton 2091S to adjacent PODs. The following adjacent PODs are considered in the analysis: Dome Cutbank 810S, Wapiti 823S, Bridge Creek 798S, Simonette 733S, and Pakenham 2103S.

There is potential to offload approximately 2.7 MVA of load from Thornton 2091S feeder 5L703 to Dome Cutbank 810S feeder 5L318. This would involve installing a new gang switch and some switching activities to isolate and transfer the load between the two feeders. See Table 5.3-1 and Table 5.3-2 for additional details.

Bridge Creek 798S has two feeders, both feeders are already exceed (5L535) or is projected to exceed (5L486 in 2028) ATCO's design criteria of 15MVA. Increasing feeder capacity at 798S Bridge Creek via a POD breaker addition would not be a viable solution as the POD transformer is projected to reach capacity in 2027.

Wapiti 823S feeder 5L783 is the closest feeder to the Thornton 2091S Area and has 9.7 MVA of spare capacity. However this spare capacity cannot be utilized because no load from Thornton 2091S is close enough to maintain acceptable voltage levels. Studies indicated the site voltages would be below the 0.97 Vpu requirement for industrial loads greater than 1 MW despite the use of regulators and capacitors to boost voltage.

Simonette 733S is facing feeder and transformer capacity constraints due to high customer demand in the area. There is no remaining capacity available to serve the Thornton 2091S area loads from Simonette 733S prior to 2028.

H.R.Milner 740S is too far from the Thornton Area and feeders would exceed ATCO feeder length guidelines.

The requested new load nearest to Pakenham 2103S is 12 MVA, which cannot be connected because acceptable voltage levels cannot be achieved.

As summarized in Table 3.1-1, only 2.7 MVA of load can be offloaded from Thornton 2091S. This offload is not sufficient to prevent the transformer from exceeding 95% capacity. See Table 5.3-1 and Table 5.3-2 in Appendix A for load forecast details.

Although the existing transformer capacity is not exceeded as of the need by date, ATCO Electric's customers have identified additional loads at the preliminary stage as identified in Table 2.1-2. These loads have likely energization dates between 2028 and 2035. These loads have not been included the load forecast tables in Appendix A.

Table 3.1-1: Surrounding POD Offloading Capability

POD	Offload from Thornton 2091S (MVA)	Constraint
Dome Cutbank 810S	2.7	POD Capacity
Wapiti 823S	0	25 kV Voltage Level
Bridge Creek 798S	0	Feeder Capacity
Simonette 733S	0	25 kV Voltage Level and POD Capacity
H.R. Milner 740S	0	Distance
Pakenham 2103S	0	25kV Voltage Level
Total	2.7	

3.2 Alternatives Which Include Transmission

3.2.1 Transmission-Based Alternative 1: Add New Transformer to Thornton 2091S POD

Transmission-Based Alternative 1 involves the following at Thornton 2091S:

- Add an additional transformer;
- Install three new 25 kV breakers for three new 25 kV feeders
- Build 44 km of 3 x 477 ACSR to offload existing feeder.

Transmission scope and quantities will be subject to change based on AESO and TFO review. A 50 MVA transformer has been included to aid the high level cost comparison between Alternatives.

Table 3.2-1 shows the estimated cost for proposed Transmission Alternative 1.

Table 3.2-1: Transmission Alternative 1 Cost Estimate +50/-30% in 2026\$

Scope Item	Cost (\$M +50/-30% 2026)
One (1) 50 MVA transformer & Three (3) 25 kV Breakers	10
Distribution feeders	13
Total	23

Thornton 2091S POD was designed to be expanded in the future. The feeders at Thornton 2091S are already set up to be run as double circuits and can be used to extend new feeder mainlines out of the substation and to nearby loads. This is a significant benefit as the area is heavily congested with oil and gas infrastructure, and this double circuit provision will reduce the amount of new right-of-ways required.

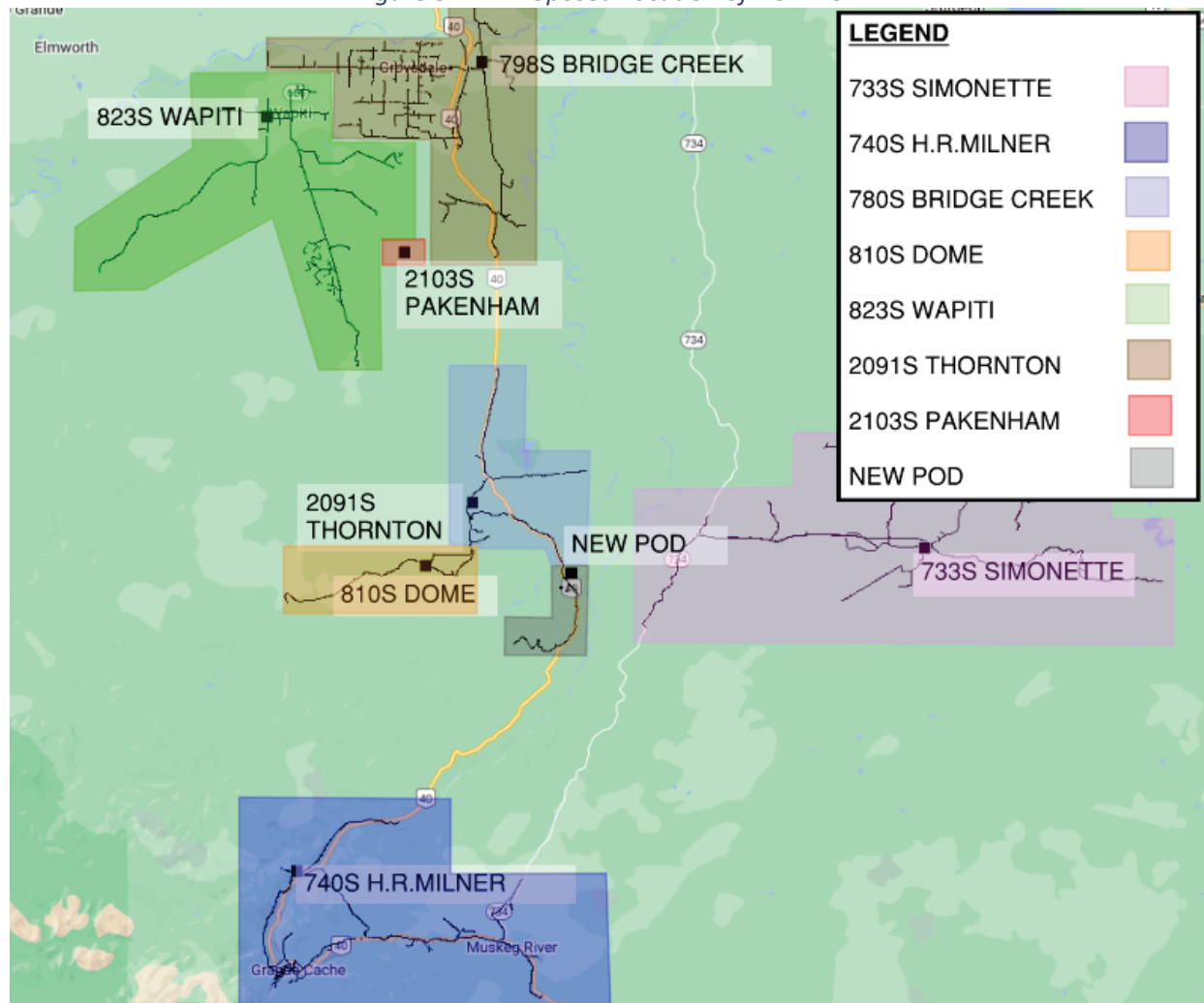
The majority projected future load growth (see Figure 2.1-2: Thornton 2091S Area Surveyed Load Connections Figure 2.1-2) is projected to be in close proximity to existing Thornton 2091S distribution feeders. This means leveraging existing infrastructure in the area will reduce the need for new line build and make distribution connections for customers in the area less costly and faster after the mainline circuits are extended.

The requested in-service date (ISD) for this alternative is Q3 2027.

3.2.2 Transmission-Based Alternative 2: Construct a new POD

The assumed transmission development for this alternative involves constructing a new transmission connection and a new POD with a minimum capacity of 50 MVA. ATCO DFO suggests LSD NE21 64-4-6 as a potential location for the new POD because it is within 2 km of the major load centre on feeders 5L720 and 5L703 , supplying two gas plants with combined load of 18 MVA as well as some other small loads. Figure 3.2-1 shows the proposed location of the new POD.

Figure 3.2-1: Proposed Location of New POD



Transmission scope and quantities will be subject to change based on AESO and TFO review. The following scope of work is assumed for cost estimating purposes only:

- Construct approximately 24 km of 144 kV transmission line, T-Tapping existing line 7L20 to new POD. This is the closest straight shot distance to nearest Transmission Line, final routing and connection plans to be determined during AESO process.
- One 50 MVA transformer
- Three 25 kV breakers and feeders.
- Construct 2 km of double circuit 3 x 477 ACSR feeder from POD to serve surrounding load.

Table 3.2-2 provides a cost estimate for Transmission Alternative 2.

Table 3.2-2: Transmission Alternative 2 Cost Estimate +50/-30% in 2026\$

Scope Item	Cost (\$M 2026)
144 kV Transmission Line	24
New POD including one 50 MVA transformer & three 25 kV Breakers	16
Distribution feeders	0.75
Total	40.75

Table 5.5-1 and Table 5.5-2 in Appendix A show the load forecast for Thornton 2091S and the new POD for this alternative. The requested ISD for the new POD is Q3 2027.

3.3 Evaluation of Alternatives

Distribution Alternative 1 and 2 were not included in the evaluation because they are not viable solutions.

Transmission Alternative 1 is ATCO DFO's preferred solution to add required capacity in the Thornton 2091S area. The POD was designed with future expansion in mind, which will allow ATCO DFO to leverage existing assets in the area to keep costs down while providing value to the customer base in the area. This includes provisions for double circuiting on the mainline feeders out of the POD and space to accommodate a second transformer in the existing POD location. This option is more cost effective than Transmission Alternative 2 and can be deployed in a more timely manner.

Transmission Alternative 2 would add capacity in a constrained area and expand the reach of ATCO's Distribution service area. However, Transmission Alternative 2 does not leverage existing infrastructure and would take longer to deploy, and at a higher cost. Furthermore, a new POD in the area would be better utilized in an underserved area east of Thornton rather than the Thornton area.

4 Conclusion

ATCO DFO prefers Transmission-Based Alternative 1 as it provides the required capacity for the requested load and offers the most value. It also provides the necessary capacity to serve anticipated additional loads that are currently under discussion with customers at the preliminary inquiry stage.

It is anticipated that much of the future load growth in the Thornton 2091S Area will be close to existing Thornton 2091S POD distribution infrastructure. Expanding Thornton 2091S will allow ATCO DFO to most efficiently serve loads in the Thornton 2091S Area load centre.

ATCO DFO requests an ISD of Q3 2027 for this development.

5 Appendix A – POD Load Forecast Tables

5.1 Existing Forecasts

Table 5.1-1: Thornton 2091S Load Forecast with No Load Requests

Thornton 2091S										MVA LOADING - RECORDED						PREDICTED - REQUIRED CAPACITY									
SUB		CAPACITY		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035						
No	Feeder	T/R	MVA	Peak	MVA	Peak	MVA	Peak	MVA	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak						
2091S	5L703	701T	50	9.9	2.9	2.7	2.7	3.3	97.6%	3.3	3.3	3.3	3.4	3.4	3.4	3.5	3.5	3.6	3.6						
	9.9			12.5	12.4	14.5	13.4	91.8%	13.6	13.7	13.8	14.0	14.1	14.2	14.4	14.5	14.7	14.8							
	6.2			5.9	6.1	5.4	6.1	98.2%	6.2	6.3	6.3	6.4	6.5	6.5	6.6	6.7	6.7	6.8							
701T Total				18.0	20.2	19.7	21.7	21.2	21.4	21.6	21.9	22.1	22.3	22.5	22.7	23.0	23.2	23.4	23.4						
2091S Total				18.0	20.2	19.7	21.7	21.2	21.4	21.6	21.9	22.1	22.3	22.5	22.7	23.0	23.2	23.4	23.4	23.4					

Notes:
A feeder coincidence factor of 0.93 was applied to 2091S 701T
Values shown are annual peaks.
Load growth is estimated to be at 1% annually

Table 5.1-2: Dome Cutbank 810S Load Forecast

Dome 810S																
SUB		MVA LOADING - RECORDED					PREDICTED - REQUIRED CAPACITY									
		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
No	Feeder	CAPACITY		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
		T/R	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
810S	5L318	701T/	26	3.0	2.7	2.9	4.4	5.6	96.9%	5.7	5.8	5.8	5.9	6.0	6.0	6.2
	5L724	702T		14.9	14.2	15.0	14.5	14.5	89.5%	14.5	14.5	14.5	14.5	14.5	14.5	14.5
701T Total			17.2	16.8	17.1	16.7	19.4	19.5	19.5	19.6	19.7	19.7	19.8	19.8	19.9	20.0
810S Total			17.2	16.8	17.1	16.7	19.4	19.5	19.5	19.6	19.7	19.7	19.8	19.8	19.9	20.0

Notes:
A feeder coincidence factor of 0.963 was applied to 810S 701T feeders
Load growth on 5L318 assumed to be 1%. Load growth on 5L724 assumed to be 0% as it serves mostly one large industrial client.
Values shown are annual peaks.

Table 5.1-5: Simonette 733S Load Forecast

Simonette 733S				MVA LOADING - RECORDED								PREDICTED - Required Capacity											
SUB	CAPACITY		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035					
	No	Feeder	MVA	MVA	MVA	MVA	MVA	PF	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak					
733S	5L390	702T	5.4	7.1	4.9	5.8	5.1	97.5%	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA					
	5L175		7.8	7.8	8.2	8.9	8.3	94.9%	15.4	15.4	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5					
	5L283		11.0	10.5	11.7	12.0	16.6	98.4%	10.9	14.3	14.9	14.9	14.9	14.9	14.9	14.9	14.9	14.9					
702T Total			21.8	21.3	22.2	23.3	27.5		47.1	49.7	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6					
733S Total			21.8	21.3	22.2	23.3	27.5		47.1	49.7	36.6	36.6	36.6	36.6	36.6	36.6	36.6	36.6					

Notes:
A feeder coincidence factor of 0.917 was applied to 733S 702T feeders
New Pearson 2089S will be used to offload Simonette



Distribution Planning Criteria Violation
Transformer Exceeds 95% of Nameplate
Substation Capacity Exceeded

Load Transfer			Year
MVA	From	To	
2.9	5L175	5L390	
0.6	5L283	5L390	
11.0	5L175	2089S	
7.4	5L175	2089S	
4.9	5L390	5L175	2028
10.0	5L283	5L175	2028

Table 5.1-6: H.R. Milner 740S Load Forecast

H.R. Milner 740S				MVA LOADING - RECORDED								PREDICTED - REQUIRED CAPACITY									
SUB	Feeder	CAPACITY		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035		
		No	T/R	MVA	Peak MVA	MVA	Peak MVA	MVA	PF	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA		
740S	5L597	702T	41.7	1.1	3.9	2.6	2.1	1.1	63.4%	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2		
	MP SS			6.2	2.3	7.1	7.1	6.4	80.5%	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4		
702T Total				6.4	4.3	8.5	8.2	7.3		7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.4		
				MVA LOADING - RECORDED								PREDICTED - REQUIRED CAPACITY									
SUB	Feeder	CAPACITY		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035		
		No	T/R	MVA	Peak MVA	MVA	Peak MVA	MVA	PF	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA	Peak MVA		
740S	5L194	703T	41.7	4.4	4.1	4.3	5.2	4.2	97.1%	4.2	4.3	4.4	4.4	4.5	4.5	4.5	4.6	4.6	4.7		
	5L316			7.2	7.0	6.6	8.4	7.6	94.2%	7.6	7.8	7.9	8.0	8.1	8.1	8.2	8.3	8.3	8.4		
703T Total				10.3	10.3	10.4	10.1	10.4		10.4	10.6	10.7	10.8	11.0	11.1	11.2	11.3	11.4	11.5		
740S Total				15.1	13.0	17.6	16.8	16.2		16.1	16.4	16.5	16.6	16.7	16.8	16.9	17.0	17.1	17.2		

Notes:
A feeder coincidence factor of 0.979 was applied to 740S 702T
A feeder coincidence factor of 0.877 was applied to 740S 703T
A transformer coincidence factor of 0.913 was applied to the POD total
Values shown are annual peaks.

Table 5.1-7: Pakenham 2103S Load Forecast

Proposed Pakenham 2103S				MVA LOADING - RECORDED					PREDICTED - Required Capacity										
SUB		CAPACITY		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
		No	Feeder	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
2103S	5LX1	Proposed	50																
	5LX2	701T																	
			701T Total																

Notes:

A feeder coincidence factor of 1 was applied to the proposed 701T feeders

The two new feeders out of the proposed new Pakenham 2103S POD will be express industrial feeders serving a single load centre. Under N-1 contingency, the total load supplying the site will be limited to 24.5 MVA. Values shown are annual peaks.

5.2 Distribution-Based Alternative 1

Table 5.2-1: Thornton 2091S Load Forecast for Distribution Alternative 1

Thornton 2091S				MVA LOADING - RECORDED								PREDICTED - REQUIRED CAPACITY											
SUB	CAPACITY		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035					
	No	T/R	MVA	MVA	MVA	MVA	MVA	PF	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak					
2091S	Feeder	MVA	MVA	MVA	MVA	MVA	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA					
	5L703		3.0	2.9	2.7	2.7	3.3	97.6%	17.4	17.5	17.5	17.5	17.6	17.6	17.6	17.7	17.7	17.7					
	5L720	50	9.9	12.5	12.4	14.5	13.4	91.8%	17.0	17.2	17.3	17.3	17.6	17.7	17.9	18.0	18.1	18.3					
	5L775		6.2	5.9	6.1	5.4	6.1	98.2%	8.3	8.4	19.6	19.6	19.7	19.8	19.8	19.9	19.9	20.0					
701T Total			18.0	20.2	19.7	21.7	21.2		39.7	40.1	50.6	50.8	51.0	51.2	51.4	51.6	51.8	52.1					
2091S Total			18.0	20.2	19.7	21.7	21.2		39.7	40.1	50.6	50.8	51.0	51.2	51.4	51.6	51.8	52.1					

Notes:

A feeder coincidence factor of 0.93 was applied to 2091S 701T

Values shown are annual peaks.

Load growth is estimated to be at 1% annually



Distribution Planning Criteria Violation
Transformer Exceeds 95% of Nameplate
Substation Capacity Exceeded

5.3 Distribution-Based Alternative 2

Table 5.3-1: Thornton 2091S Load Forecast for Distribution Alternative 2

Thornton 2091S			MVA LOADING - RECORDED										PREDICTED - REQUIRED CAPACITY																	
			2021/2022		2022/2023		2023/2024		2024/2025		2025/2026		2026		2027		2028		2029		2030		2031		2032		2033		2034	
SUB	CAPACITY		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
No	Feeder	T/R	MVA	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	MVA
2091S	5L703	701T	3.0	2.9	2.7	2.7	3.3	97.6%		17.4	17.4	14.8	14.8	14.8	14.9	14.9	14.9	14.9	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
	5L720		9.9	12.5	12.4	14.5	13.4	91.8%		17.0	17.0	17.2	17.3	17.5	17.6	17.7	17.9	18.0	18.1	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3
	5L775		6.2	5.9	6.1	5.4	6.1	98.2%		8.3	8.3	8.4	19.6	19.6	19.7	19.7	19.8	19.8	19.9	19.9	19.9	19.9	19.9	19.9	19.9	20.0	20.0	20.0	20.0	20.0
701T Total			18.0	20.2	19.7	21.7	21.2			39.7	37.6	48.1	48.3	48.5	48.7	48.9	49.1	49.3	49.3	49.3	49.3	49.3	49.3	49.3	49.3	49.5	49.5	49.5	49.5	49.5
2091S Total			18.0	20.2	19.7	21.7	21.2			39.7	37.6	48.1	48.3	48.5	48.7	48.9	49.1	49.3	49.3	49.3	49.3	49.3	49.3	49.3	49.3	49.5	49.5	49.5	49.5	49.5

Notes:
A feeder coincidence factor of 0.93 was applied to 2091S 701T
Values shown are annual peaks.
Load growth is estimated to be at 1% annually

Distribution Planning Criteria Violation
Transformer Exceeds 95% of Nameplate
Substation Capacity Exceeded

Load Transfers		
MVA	From	To
2.7	5L703	5L318

Table 5.3-2: Dome Cutbank 810S Load Forecast for Distribution Alternative 2

Dome 810S										MVA LOADING - RECORDED										PREDICTED - REQUIRED CAPACITY													
SUB No		CAPACITY		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	Peak	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035														
		T/R	MVA	Peak	Peak	Peak	Peak	Peak		Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak												
810S	Feeder			MVA	MVA	MVA	MVA	PF		MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA														
	5L318	701T/	3.0	2.7	2.9	4.4	5.6	96.9%		5.7	8.5	8.5	8.6	8.6	8.7	8.7	8.8	8.9	8.9														
	5L724	702T	14.9	14.2	15.0	14.5	14.5	89.5%		14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5														
701T Total			17.2	16.8	17.1	16.7	19.4		19.5	22.1	22.2	22.3	22.3	22.4	22.4	22.4	22.5	22.5	22.6														
810S Total			17.2	16.8	17.1	16.7	19.4		19.5	22.1	22.2	22.3	22.3	22.4	22.4	22.4	22.5	22.5	22.6														

Notes:
A feeder coincidence factor of 0.963 was applied to 810S 701T feeders
Load growth on 5L318 assumed to be 1%. Load growth on 5L724 assumed to be 0% as it serves mostly one large industrial client.
Values shown are annual peaks.

Distribution Planning Criteria Violation
Transformer Capacity Exceeded
Substation Capacity Exceeded

Load Transfers		
MVA	From	To
2.7	5L703	5L318

5.4 Transmission-Based Alternative 1

Table 5.4-1: Thornton 2091S Forecast for Transmission-Based Alternative 1

Thornton 2091S				MVA LOADING - RECORDED								PREDICTED - REQUIRED CAPACITY							
SUB No	Feeder	CAPACITY		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	
		T/R	MVA	Peak	MVA	Peak	MVA	PF	Peak	MVA	Peak	MVA	Peak	MVA	Peak	MVA	Peak	MVA	
2091S	5L703	701T	50	3.0	2.9	2.7	2.7	3.3	97.6%	17.4	17.5	7.5	7.6	7.6	7.6	7.7	7.7	7.7	
	5L720			9.9	12.5	12.4	14.5	13.4	91.8%	17.0	17.2	17.3	17.5	17.7	17.9	18.0	18.1	18.3	
	5L775			6.2	5.9	6.1	5.4	6.1	98.2%	8.3	8.4	7.6	7.7	7.8	7.8	7.9	7.9	8.0	
701T Total				18.0	20.2	19.7	21.7	21.2	39.7	40.1	30.1	30.3	30.5	30.8	31.0	31.2	31.4	31.6	

Thornton 2091S				MVA LOADING - RECORDED								PREDICTED - REQUIRED CAPACITY							
SUB No	Feeder	CAPACITY		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	
		T/R	MVA	Peak	MVA	Peak	MVA	PF	Peak	MVA	Peak	MVA	Peak	MVA	Peak	MVA	Peak	MVA	
2091S	5LNew4	702T (NEW)	50	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	12.1	12.2	12.4	12.5	12.6	12.7	12.9	
	5LNew5			0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7
	5LNew6			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
702T Total				0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.5	20.7	20.9	21.1	21.3	21.5	21.7	21.9	
2091S Total				18.0	20.2	19.7	21.7	21.2	39.7	40.1	50.6	51.0	51.4	51.8	52.3	52.7	53.1	53.5	

Notes:

- Assume new Transformer is in service in 2028
- A feeder coincidence factor of 0.930 was applied to 2091S 701T and 702T
- POD total coincidence factor assumed to be 1.0
- Values shown are annual peaks.
- Load growth is estimated to be at 1% annually
- Feeder 5L720 is still show as exceeding planning criteria. Because of the size and location of the loads, offloading is not possible.
- Feeder 5L720 still allows for N-1 contingency for other feeders on transformer 701T.

Distribution Planning Criteria Violation

Load Transfers		
MVA	From	To
12.0	5L775	5LNew4
10.0	5L703	5LNew6
		2028
		2028

5.5 Transmission-Based Alternative 2

Table 5.5-1: Thornton 2091S Forecast for Transmission-Based Alternative 2

Thornton 2091S			MVA LOADING - RECORDED						PREDICTED - REQUIRED CAPACITY									
			2021/2022	2022/2023	2023/2024	2024/2025	2025/2026		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
SUB No	CAPACITY		Peak	Peak	Peak	Peak	MVA	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	
	Feeder	T/R	MVA	MVA	MVA	MVA												
2091S	5L703	701T	3.0	2.9	2.7	2.7	3.3	97.6%	17.4	17.5	7.5	7.5	7.6	7.6	7.7	7.7	7.7	
	5L720		9.9	12.5	12.4	14.5	13.4	91.8%	17.0	17.2	12.1	12.3	12.4	12.5	12.7	12.8	12.9	
	5L775		6.2	5.9	6.1	5.4	6.1	98.2%	8.3	8.4	13.3	13.3	13.4	13.5	13.5	13.6	13.7	
701T Total			18.0	20.2	19.7	21.7	21.2		39.7	40.1	30.6	30.8	31.0	31.2	31.4	31.6	31.9	
2091S Total			18.0	20.2	19.7	21.7	21.2		39.7	40.1	30.6	30.8	31.0	31.2	31.4	31.6	31.9	

Notes:

Assume new POD is in service in 2028

A feeder coincidence factor of 0.93 was applied to 2091S 701T

Values shown are annual peaks.

Load growth is estimated to be at 1% annually

Distribution Planning Criteria Violation

Load Transfers		
MVA	From	To
10.0	5L703	5LNew4 2028
11.5	5L720	5LNew5 2028
6.3	5L775	5L720 2028

Table 5.5-2: New POD Forecast for Transmission-Based Alternative 2

NEW POD			MVA LOADING - RECORDED						PREDICTED - REQUIRED CAPACITY									
SUB		CAPACITY		2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
No	Feeder	T/R	MVA	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak	Peak
XXS	5LNew4	701T (NEW)	MVA	0.0	0.0	0.0	0.0	PF	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA	MVA
	5LNew5		0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	
	5LNew6		0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	11.5	11.6	11.7	11.8	12.0	12.1	12.2	12.3
70XT Total			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	0.0
New POD Total			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.2	20.4	20.6	20.8	21.0	21.2	21.4

Notes:

Assume new Transformer is in service in 2027/2028

A feeder coincidence factor of 0.930 was applied to new POD

POD total coincidence factor assumed to be 1.0

Values shown are annual peaks.

Load growth is estimated to be at 1% annually

Load Transfers		
MVA	From	To
10.0	5L703	5LNew4 2028
11.5	5L720	5LNew5 2028

6 Appendix B – ATCO DFO Planning Criteria

ATCO DFO has established planning criteria to ensure the safe and reliable connection and operation of loads to the distribution system. Criteria applicable in this report are highlighted below:

POD Capacity Planning – System Normal: Under system normal conditions, AE DFO must ensure sufficient substation transformer and voltage regulator capacity exists to carry all peak loads. In high growth areas, loading on substation transformers must remain below 95% of the total nameplate rating of the POD transformers.

25 kV Voltage Levels: the voltage threshold on ATCO DFO's 25 kV systems, under normal conditions for urban residential transformers with multiple customer secondaries, and for loads greater than 1 MVA, must remain above **0.97 Vpu** and below **1.04 Vpu**. For rural customers, the voltage must remain above 0.95 Vpu and below 1.04 Vpu. No more than three (3) voltage regulators will be connected in series to regulate voltage levels along a feeder.

Rural Feeder Loading: the maximum normal loading of 25 kV distribution feeders in a rural area is **15.0 MVA**.

Feeder Length: the maximum recommended 25 kV distribution feeder length is **60 km**.

7 Appendix C – Customer Letter of Support

See attached on following pages.

Main Office

1500, 308-4th Avenue SW
Calgary, Alberta, Canada
T2P 0H7
Tel: 403-503-8600
Fax: 403-509-6427
www.arcresources.com

December 10, 2024

Jonathan Tse
Key Account Manager
ATCO
5302 Forand St. SW
Calgary, AB T3E 8B4
(via email: jonathan.tse@atco.com)

Dear Mr. Tse,

RE: Greenview Substation Load Customer Letter of Interest

1. **Legal Name:** ARC Resources Ltd.

2. **Point of Contact:**

Tina Osiowy
Facilities Engineering Manager
ARC Resources
Suite 1500, 308 4 Ave SW
Calgary, AB T2P 0H7
e: tosowy@arcresources.com
d: 403-776-5064
c: 403-477-2551

3. **Project Area:** ARC's Kakwa River Project is located approximately 60 kilometres south of Grande Prairie, Alberta.

ARC Resources Ltd. (ARC) is Canada's third largest natural gas producer with operations focused in the Montney region in northern Alberta and northeast British Columbia (BC). ARC is committed to producing reliable and affordable energy in a manner that seeks to align with our values and the interests of our stakeholders and Indigenous partners.

ARC was an early mover in the sector as it relates to electrification. For over a decade, we have worked closely with the Government of BC and BC Hydro to electrify our operations in northeast BC. Today, all our major natural gas processing facilities in BC are powered by electricity from BC's provincial power grid. In total, the electrification of our northeast BC assets has reduced our greenhouse gas emissions by approximately 420,000 tCO₂e annually.

This letter serves as an indication of ARC's interest in receiving service as a load customer from a proposed new substation in the Greenview area of the Alberta Electric System Operator's (AESO) Northwest

Planning Region. The proposed Greenview substation is required for the electrification of two forthcoming ARC sites that will collectively require approximately 17 MW of power. ARC estimates that electrification of these two sites has the potential to avoid approximately 105,000 tCO₂e annually. Importantly, ATCO has informed ARC that the nearby Thornton 2091S and Simonette 733S substations are currently operating at or near maximum capacity and are unable to supply the requested power. Furthermore, ARC has submitted applications for additional load at the Thornton 2091S substation:

- LSD 10-16-062-04-W6M: Expansion of existing load from 8 MW to 18 MW (In-Service Date: Q2 2026)
- LSD 10-10-065-05-W6M: Connection of new load of 10.2 MW (In-Service Date: Q2 2026)

ARC is advancing work to have sites near the proposed Greenview substation onstream for Q1 2028. Accordingly, ARC requires line power to these sites by early 2028. If the AESO is unable to provide initial/preliminary systems project approval for the proposed Greenview substation by Q1 2025, it is anticipated that ATCO will not be able to confirm the necessary Q1 2028 in-service date. In the absence of timely line power, ARC would be required to install turbine generators to power these facilities. Given the high cost of installing turbine generators, transitioning to line power at a later stage would be uneconomic.

We appreciate the opportunity to provide input on development of transmission and distribution infrastructure in the Northwest Planning Region. We commit to notifying ATCO, as soon as is reasonably possible, about any decisions to delay or discontinue the advancement of any ARC projects that would be anticipated to receive power from the proposed Greenview substation. Additionally, ARC would welcome the opportunity to meet with ATCO and the AESO to discuss the broad potential for electrification within our Kakwa field to increase load consumption. For example, ARC's Kakwa field has approximately 27 sites that are currently powered by a combined 280,000 HP of natural gas driven power generation and compression.

Please contact me with any questions or concerns you may have about this letter.

Kind regards,



Tina Osiowy
Facilities Engineering Manager

Cc: Tejay Haugen – Vice President, Operations Planning, ARC Resources
Stephanie Neilson – Manager, Environmental Sustainability, ARC Resources
Quincy Chiang – Senior Facilities Engineer, ARC Resources
Justin Gregoire – Senior Emissions Reduction Engineer, ARC Resources