

August 9, 2018

Jerry Mossing
Vice President, Transmission
Alberta Electric System Operator
2500, 330-5th Avenue SW
Calgary, Alberta T2P 0L4

Dear Mr. Mossing: *Jerry*

Re: P2023 – FortisAlberta Kananaskis Area Reliability Project

AltaLink Management Ltd. (AML), in its capacity as General Partner of AltaLink, L.P., is pleased to submit a Service Proposal (SP) for the FortisAlberta Kananaskis Area Reliability Project. AltaLink understands that the AESO will direct assign this project to AltaLink if it proceeds.

The project scope of work is to engineer, procure, construct, and commission the following:

Substation:

- Salvage and scrap the existing 138/25 kV 6MVA Transformer.
- Install one (1) new 138/25kV 10MVA LTC Transformer.
- Install two (2) 138 kV Live Tank Breakers on the high side of the transformers.
- Install three (3) 138kV Potential Transformers.
- Install two (2) 25 kV Motorized Switches on the low side of the transformers.
- Install one (1) new 25 kV Feeder Breaker.
- Install one (1) new 25 kV Tie Breaker.
- Install a new control building.

Transmission Line:

- There is no transmission line scope of work for this project.

Telecommunication:

- There is no telecommunication scope of work for this project.

The Service Proposal estimate for the project is \$5.06 million. The project cost estimates and cash-flow estimate are stated in the attached Service Proposal (Appendix B).

The cost estimates have an accuracy of +20%/–10%. As agreed, the cost estimates are only for informational and tracking purposes pursuant to Schedule F of AltaLink's Transmission Terms and Conditions, approved by the AUC. Therefore, the cost estimates are not binding. Should the project proceed, AltaLink will capitalize the actual cost of the final project. AltaLink requests that it be involved in any third-party discussions regarding the project estimates or schedule.



The in-service date (ISD) for the project is 1st November, 2019. Meeting any ISD is contingent upon a number of factors, including, but not limited to, regulatory approvals, material procurement, and construction conditions.

If you have any questions or if you require further information, please contact Andrew Smith at 403-387-3518. The confirmation of Direct Assignment should be sent to Keith Turriff, Director, Project Development.

Thank you for your consideration of this proposal. We look forward to receiving the AESO's endorsement.

Yours truly,

Scott Thon
President and Chief Executive Officer
AltaLink Management Ltd.



Service Proposal (SP)

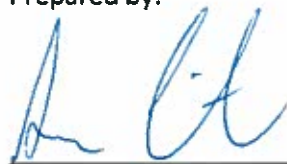
FortisAlberta Kananaskis Area Reliability

AML D.0711/AESO P2023

Rev. 0

August 14, 2018

Prepared by:



Andrew Smith, P.Eng, Project Manager

REVISIONS HISTORY

Rev.	Date (MM-DD-YYYY)	Sections Changed	Changes
0	08-14-2018	N/A	Initial version.

GLOSSARY

A	Amp
AC	Alternating Current
AESO	Alberta Electric System Operator
AIES	Alberta Interconnected Electric System
AFUDC	Allowance for Funds Used During Construction
AML	AltaLink Management Ltd.
AUC	Alberta Utilities Commission
BIL	Basic Insulation Levels
CSS	Connection Study Scope
CT	Current Transformer
DC	Direct Current
DER	Distributed Energy Resource
DFO	Distribution Facilities Operator
EPC	Engineering, Procurement and Construction
EZE	Easement
FA	Facility Application
IED	Intelligent Electronic Device
ISD	In-Service Date
ION	Integrated On-demand Network
IPP	Independent Power Producer
IR	Information Request
ISO	Independent System Operator, now AESO
kV	Kilovolt
kVA	Kilovolt Ampere
LTC	Load Tap Changing
Mb	Megabyte
MOD	Motor Operated Disconnect
MPLS	Multiprotocol Layer Switching
MSL	Mining Surface Lease
MVA	Megavolt Ampere
NID	Needs Identification Document
NGR	Neutral Grounding Reactor
P&C	Protection and Control

P&L	Permit and Licence
PT	Potential Transformer
RAS	Remedial Action Scheme
ROW	Right-of-Way
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
SP	Service Proposal
SLD	Single Line Diagram
SMU	Synchrophasor Measurement Unit
SONETSST	Synchronous Optical Networking Station Service Transformer

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1.0 PROJECT OVERVIEW

In accordance with the Terms and Conditions of Service, AltaLink Management Ltd. (AML) has prepared this Service Proposal (SP) for the FortisAlberta Kananaskis Area Reliability Project (referred to as “the Project”), in support of the Alberta Electric System Operator’s (AESO’s) development.

The scope of work for the Project includes, but is not limited to, the following major components at Mount Allan 115S substation:

- Installation of one (1) 138/25 kV 10 MVA LTC transformer;
- Salvage and scrap of the existing 138/25 kV 6 MVA transformer;
- Installation of two (1) 138 kV live tank circuit breakers with associated disconnect switches;
- Installation of three (3) 138 kV potential transformers;
- Installation of one (1) 25 kV feeder breaker;
- Installation of one (1) 25 kV tie breaker; and
- Installation of one (1) control building.

The project development is illustrated in the single-line diagram(s) (SLDs) and preliminary layout drawings in [Appendix A](#).

The estimated cost for the proposed development is \$5,056,070. The SP cost estimate is provided in [Appendix B](#). Costs are attributable to the customer.

The cash flow is shown in the attached cash flow estimate in [Appendix B](#).

The customer-requested in-service date (ISD) for the Project is November 1st, 2019. The project schedule is shown in [Appendix C](#).

This SP meets the requirements outlined in the AESO’s direction letter, dated June 4, 2018, as well as the P2023 Functional Specification Version 1, dated May 31, 2018. This Service Proposal complies with all applicable AESO Authoritative Documents and technical standards in effect as of June 4, 2018.

2.0 SCOPE OF WORK

AML is accountable for all project management, land or land-use acquisition, siting, and applicable regulatory approvals and permits, material procurement, construction, commissioning, acceptance, energization, and closeout documentation requirements for its facilities to interconnect to the Alberta Interconnected Electric System (AIES).

2.1 Transmission Lines

No transmission line scope is required for the Mount Allan 115S substation.

2.2 Substations

2.2.1 Mount Allan Substation 115S

The components of the Project related to Mount Allan 115S are shown in the attached SLDs and preliminary layout drawings in [Appendix A](#), and consist of the following:

- The Mount Allan 115S substation location is SW 13-23-9-W5;
- Engineering studies conducted on the TFO's behalf, as required by the AESO. The TFO will also be conducting an AC Study, DC Study, Lightning Study and updating the Grounding Study and Geotechnical Studies for the substation;
- AltaLink completed the short circuit study as requested by the AESO in the CSS and no issues have been identified;
- Modify the existing Mount Allan 115S substation as indicated in the single line diagrams included in Appendix B;
- Install all equipment shown in Table 9-2, including all required foundations and structures. The preferred foundation type is concrete, based on the available Geotech study report;
- Install a new 30% oil containment system for the new transformer;
- Install a new 25 kV high bay structure for the new 25 kV bus;
- Install overhead flexible bus to connect the existing 25 kV bus to the new 25 kV bus;
- Install the new feeder to the new high bay structure;
- Install AMI injection points on new and existing 25 kV bus. Fortis will salvage the existing AMI annex;
- Install two (2) neutral junction boxes and 4/0 neutral from transformers to neutral junction boxes. There is no existing neutral interconnection;
- Install wildlife cover-up on all new 25 kV equipment;
- Install lightning masts for transformer lightning protection as required based on the results of the lightning study. Height of the masts will be decided based on the detailed design;
- Install one (1) 25 kV MOD to replace the VR 3- way switch;
- Install one (1) MOD on the new high bay for the existing transformer secondary isolation; and
- Major new equipment is shown in Table 2-2-1 below:

Table 2-2-1 – Major New Equipment List at Mount Allan 115S

Quantity	Equipment
1	138/25 kV 10MVA LTC transformer

Quantity	Equipment
1	Neutral grounding reactor 1 ohm
2	150 kV 3000A 650 kV BIL Live tank Circuit Breaker
3	145 kV 650 kV BIL capacitive Voltage transformers, 700-1200:1 ratio, 2 windings
2	27.5 kV 1200A 150 kV BIL Dead Tank Breakers
6	25 kV Hook type 1200A 150 kV BIL switch
6	25 kV Hook type 600A 150 kV BIL switch
2	25 kV 150 kV BIL hook stick type fused disconnect
2	25 kV 1200A 150 kV BIL motor operated vertical break disconnect switches
2	25 kV 75 kVA 150 kV BIL 120/240 V single phase SST
3	25 kV 150 kV BIL 1200:1 Single phase Voltage transformers
3	6 kV distribution class arrestors
3	21 kV station class surge arrestors
1	ION7650

The standalone CTs /PTs are shown in the SLD.

- The following are the proposed protection schemes and control schemes:
 - New 25 kV bus protection;
 - New redundant T1 transformer protection;
 - New breaker fail protections for the new 138 kV breakers;
 - New breaker protection for the new 25 kV tie breaker;
 - New feeder protections for the replacement feeder protection relay for 404L and the new feeder to be connected to the new 25 kV bus;
 - New Air break control modules; and
 - No new RAS or control schemes are required.
- One (1) new AltaLink approved Ethernet switch for all new IEDs;

- One (1) AltaLink approved Port server as required;
- One (1) AltaLink approved Human Machine Interface (HMI);
- One (1) AltaLink standard DC-AC Inverter;
- One (1) SEL-2440 remote I/O control module unit;
- Upgrade D25 port to ACC baud rate to 9600 Bauds;
- Engineering and design standards utilized in the project are AltaLink standards and ISO Rules;
- Mobilization and de-mobilization areas will be located on private land close to Mount Allan 115S substation;
- No camp requirements;
- Laydown / storage yards will be located on AltaLink property, near Mount Allan 115S substation; and
- Existing feeder meter at Mount Allan 115S will be replaced by an ION7650. AltaLink maintenance will complete this replacement.

2.3 Telecommunication Facilities

No telecommunication facilities are required for the Project.

2.4 Salvaged Equipment

AML will salvage the following equipment:

- Existing 138/25 kV, 6MVA spare transformer;
- Salvage transformer high side grounding switches and 25 kV transformer secondary switches;
- Salvage and scrap existing 25 kV bypass bus;
- Salvage all foundations which will not be re used in this project;
- Salvage existing VR bypass switch;
- Salvage existing 25 kVA SST; and
- The customer will pay for the cost to salvage this equipment.

2.5 Spatial and Technical Diagrams

The following spatial and technical diagrams are provided in [Appendix A:](#)

- **Project Area;**
- **SLD;**
- **Substation Layout;**
- **Substation Site Plan;**
- **The Protection and Control and Metering drawings will be available after the detailed design is complete and these drawings will be included in the PDUP stage 5; and**

- **No Telecom drawings are included as there is no telecom scope of work.**

3.0 COST ESTIMATES

3.1 AESO Cost Template

The estimated cost for the proposed development is \$5,056,070 (2019 CAD\$), and it has an accuracy of +20%/–10% and a base year of 2018. The cost estimate is valid for 90 days.

The SP spreadsheets are in [Appendix B](#), and the cash flow is shown in [Appendix B](#).

AML requests involvement in any third-party discussions regarding the project estimate or schedule. As agreed, the price estimates are only for informational and tracking purposes, pursuant to Section 9 of the ISO Rules, approved by the Alberta Utilities Commission (AUC). The cost estimate is not binding; however, if the Project proceeds, AML will capitalize the actual costs of the final project as part of the AESO's Direct Assignment letter.

AFUDC is estimated at \$32,783.

3.2 Additional Work

There is no additional work required to support the maintenance and the operations work for the project scope of work.

4.0 PROJECT SCHEDULE

The scheduled ISD for the Project is November 1st, 2019. The schedule is attached in [Appendix C](#); the schedule shows the project milestones for the major components of the Project. Meeting the schedule is contingent upon, but not limited to, receiving timely AESO direction to file, obtaining regulatory approval, construction conditions, environmental restrictions, and other factors that are outside AML's control.

4.1 Transmission Line

- No Transmission Line work is included in the project scope of work.

4.2 Substation Mount Allan 115S

Table 4-2-1: Substation Schedule Overview for Mount Allan 115S

	Start date	Finish Date
Engineering	28-Nov-18	18-Apr-19
Procurement long lead	3-July-18	9-May-19
Construction	20-June-19	1-Nov-19

Commissioning	21-Oct-19	01-Nov-19
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4.3 Telecommunication Facilities

- No Telecom included in the project scope of work.

4.4 Scheduled ISD

The scheduled ISD for the Project is November 1st, 2019.

4.5 Construction Limitations and Constraints

- Construction at Mount Allan 115S is scheduled to occur during migratory bird season. The impact of a migratory bird on the project depends on the bird species and the location with respect to the project. There could be construction constraints introduced which interrupt or delay construction occurring within the project area. Wildlife studies are planned to start and conclude in May 2019 which will identify any present wildlife risks that could constrain construction.
- At Mount Allan 115S, the 138 kV bus outage is also a construction constraint and as stated in section 8.0, avoidance of outages in July and August are recommended.

5.0 ASSUMPTIONS

5.1 Scope

- One round of consultation is required;
- No AUC hearing is required;
- Temporary workspace has been included;
- All approvals, access, permits, funding and P&L are available when required;
- The estimate does not include cost for permits or agreements such as Environmental Permits (including Water Act), Road Use Agreements, Permitting requirement with Transportation Canada, etc. as these are not anticipated to be required for the project;
- No RAS is required for the project;
- Provision for Mobile substation cost is included;
- Outages are available and do not delay the project schedule;
- No funding delays;
- Detailed engineering to proceed post P&L;
- Project construction proceeds in an uninterrupted fashion;
- Normal construction period (no accelerated schedules);
- Storage costs for material not included (material is delivered directly to site);
- No unusual considerations for substation access (normal setback for roads);
- Roads accessible during construction (especially for moving heavy equipment);
- Existing access roads are suitable with construction matting for construction activities;
- Assume normal drainage systems are adequate;

- No traffic accommodation costs for any roads impacted by construction;
- Change in the scope of work, foundations or substation locations may affect the cost of the work;
- Assume typical fill requirements to bring Mount Allan 115S Substation expansion to grade including Altalink standard gravel structure for site development (300mm pit run, 200mm road crush and 100mm insulating gravel);
- Existing grounding grids are assumed adequate;
- Detail design has not been completed for specific foundation types based on existing ground conditions;
- Concrete slab on grade foundation to be reused for the T1 transformer. All other equipment and structure foundations are assumed to utilize concrete pile foundations; and
- Fortis will supply 25 kV breaker cables, feeder cables, neutral cables, and marshalling rack.

5.2 Weather and Environmental

- Normal weather assumed for the time of year in which construction is scheduled (no unusual factors such as periods of severe heat or cold, heavy rain, heavy snow, etc.);
- No Water Act Approval; and
- The contingency and risk register includes delays due to a migratory bird impacting the construction schedule and causing a delay but mitigation costs have not been included for an extraordinary environmental or wildlife consideration.

5.3 Operational Outages

The outage windows on 138 kV transmission lines and 138 kV buses have potential impacts to TransAlta Hydro generation in the area and should avoid the increased runoff of July and August. Mobile substation is to be used to provide service to the existing feeders during the time of 138 kV bus outage at Mount Allan 115S. Outage to 777L will require coordination with BC Hydro.

5.4 Escalation

Includes current standard estimating Escalation rate of 2.4% per annum; based on a projected cash flow (24 month project duration from initiation to In Service Date). Applied to AML supplied equipment and EPC cost only.

6.0 DEVIATIONS FROM THE FUNCTIONAL SPECIFICATION

There are no deviations from the AESO P2023 Functional Specifications Version 1 dated May 31, 2018.

7.0 RISK MANAGEMENT

AML will work with the AESO, as well as internal departments and vendors, to mitigate generic risks through continual communication and observance of timelines.

Table 7-1 refers to the project-specific risks associated with the Project.

Table 7-1 – Risk Identification and Mitigation Strategy

	Risk	Mitigation
1	Mount Allan 115S is an existing brownfield substation and unexpected conditions may be encountered which introduce additional scope of work to mitigate (e.g. buried cables).	This risk will be accepted.
2	Outage availability due to system/customer constraints resulting in schedule delays	Provide notice to customer early and coordinate with their planned outages.
3	Inclement weather conditions may delay or impact construction	This risk will be accepted.
4	Delay in delivery/installation of major equipment (Transformer, Breakers, etc.)	Work Closely with vendor and Eng Services to minimize/eliminate the delay
5	Construction delay due to migratory birds/ species at risk	Proceed with Env. Mitigation plan.
6	Safety incidents / Stand-down / Additional Safety Requirements	This risk will be accepted.
7	Interface management among AML, Customer, EPC and major equipment vendors may require additional coordination efforts	Early coordination with EPC and customers.
8	Additional cost is required to reconnect the mobile substation to one of the 138 kV transmission lines	Engage EPC on planning the mobile substation connection.
9	P&L is delayed which may lead to a delay in procuring long lead equipment and the construction schedule.	This risk will be accepted.
10	ISD delay causes extra AFUDC charges against the project	This risk will be accepted.
11	Concurrent engineering required with other projects.	Commence detailed engineering shortly after Permit and License is issued.
12	Customer construction scope of work delays	Engage the customer earlier in the project; construction not planned until 2019.

8.0 OPERATION AND OUTAGES

Outages will be required at Mount Allan 115S substation to install new equipment. This preliminary high-level construction and outage plan is provided in Table 8-1 for reference purposes. A detailed outage plan will be developed well in advance with proper coordination with all the stakeholders. All outages listed below will occur in Fall 2019.

Table 8-1 – Preliminary Outage Plan at Mount Allan 115S

Outage Element	Approximate Duration	Work to be Performed	Impact on Other Operational Facilities
76L and 90L	Short outage	New breakers connection and commissioning	Potential impacts to TransAlta Hydro generation
Short outages on 138 kV bus	1-3 days	Bus PT installation	Potential impacts to TransAlta Hydro generation
777L	1day (if required)	During installation of transformer for safety clearance	Coordination with BC Hydro is required for 777L outages.
76L	1 day	To connect mobile substation	Potential impacts to TransAlta Hydro generation

9.0 APPROVAL

The signature on the title page of this Service Proposal represents the Approval.

Appendix A:
FIGURES

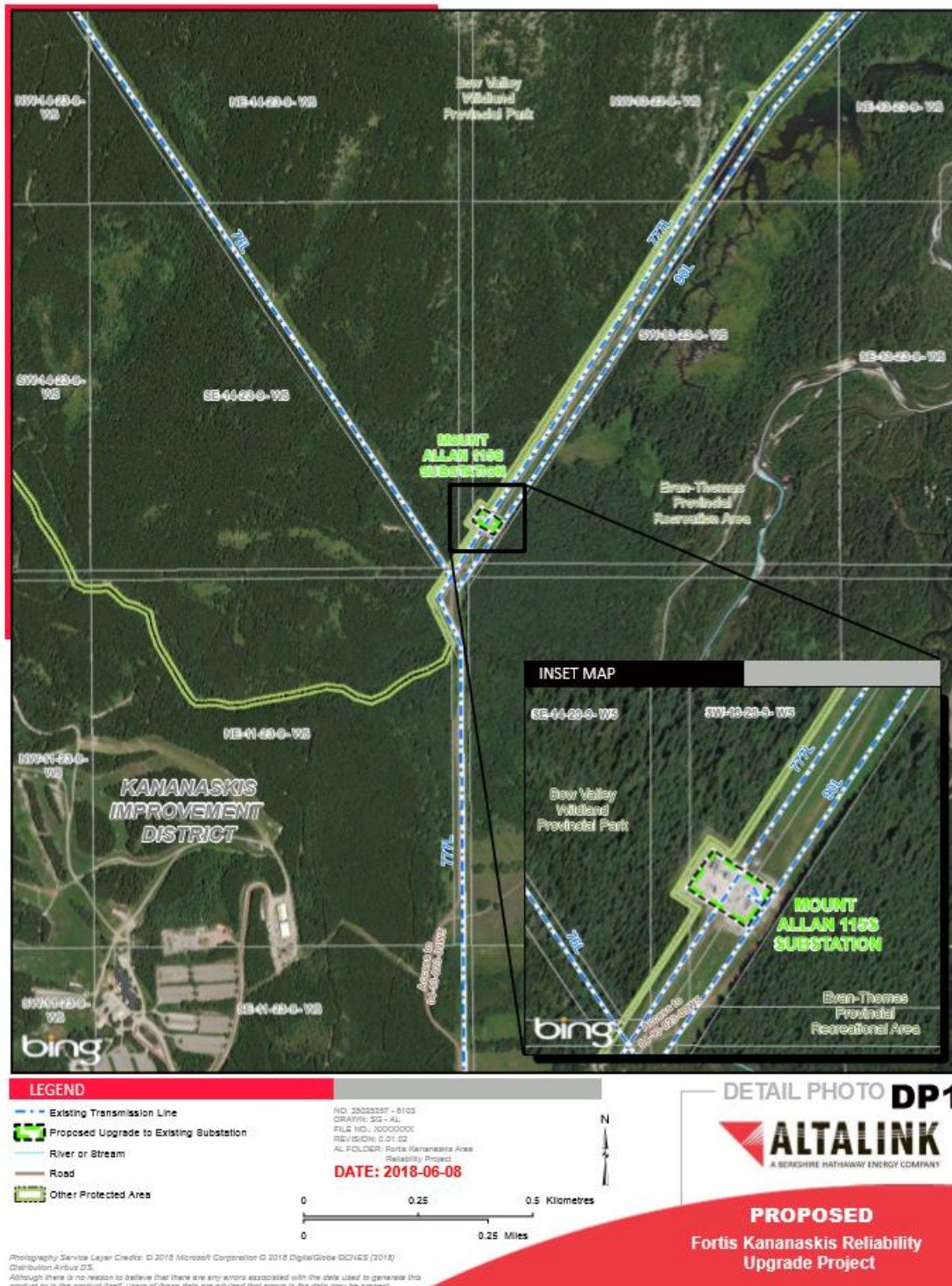
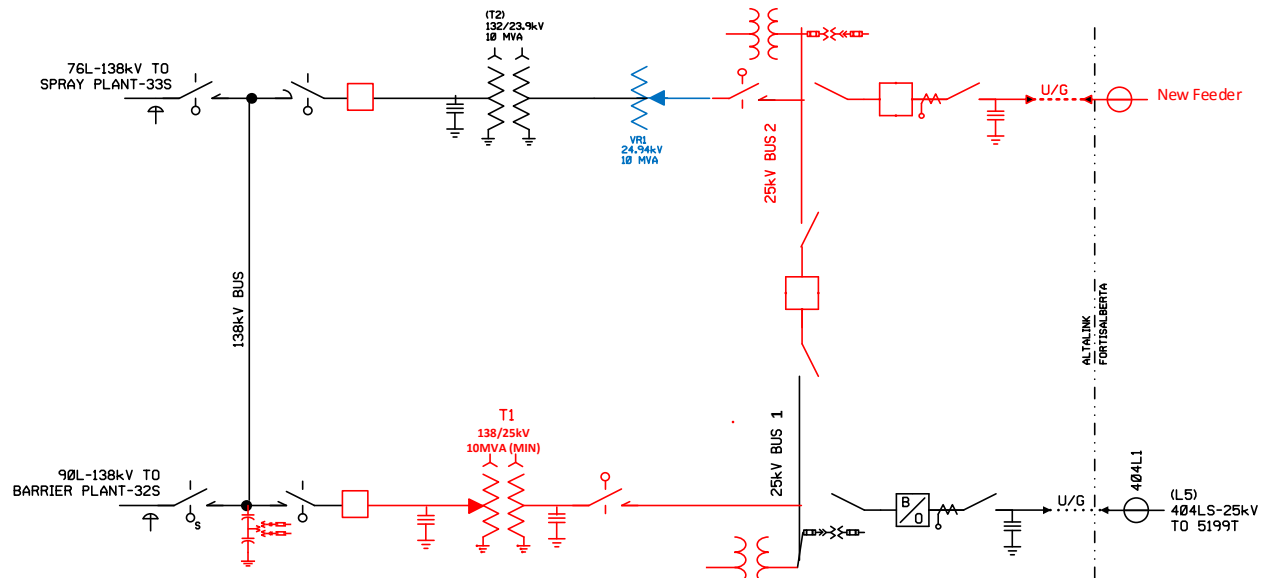


Fig A-1 Project Area – Mount Allan 115S



Legend

—	Existing
—	New
—	Modified

Figure A-2 – Conceptual Substation Diagram – Mount Allan 115S



Please note: The Protection and Control and Metering drawings will be available after the detailed design is complete and these drawings will be included in the PDUP stage 5.

APPENDIX B:
COST ESTIMATE

AESO Project Name & No.	Fortis Alberta Kananaskis Area Reliability Project		P2023/D.0711	TRANSMISSION PROJECT ESTIMATE SUMMARY
Prepared by:	Altalink Management Ltd.			
AACE Class:	3	Estimate Basis	Service Proposal	
High Range	20%	Low Range	-10%	
Date of Estimate:	8-Aug-18	Base Year Used	2018	
In Service Date	1-Nov-19			
	SYSTEM	PARTICIPANT	TOTAL	ASSUMPTIONS
TRANSMISSION LINE				
Material	\$ -	\$ -	\$ -	
Labour	\$ -	\$ -	\$ -	
Supply & Install	\$ -	\$ -	\$ -	
TOTAL TRANSMISSION LINE	\$ -	\$ -	\$ -	
SUBSTATION				
Material	\$ -	\$ 1,568,280	\$ 1,568,280	
Labour	\$ -	\$ 1,476,493	\$ 1,476,493	
Supply & Install	\$ -	\$ -	\$ -	
TOTAL SUBSTATION	\$ -	\$ 3,044,773	\$ 3,044,773	
TELECOMMUNICATION				
Material	\$ -	\$ -	\$ -	
Labour	\$ -	\$ -	\$ -	
Supply & Install	\$ -	\$ -	\$ -	
TOTAL TELECOMMUNICATIONS	\$ -	\$ -	\$ -	
OWNERS				
Pre-SP Cost	\$ -	\$ 109,314	\$ 109,314	
Service Proposal	\$ -	\$ 41,825	\$ 41,825	
Facility Applications	\$ -	\$ 149,018	\$ 149,018	
Regulatory & Compliance	\$ -	\$ -	\$ -	
Land Rights - Easements	\$ -	\$ 3,541	\$ 3,541	
Land - Damage Claims	\$ -	\$ -	\$ -	
Land - Acquisitions	\$ -	\$ -	\$ -	
Land - Other	\$ -	\$ -	\$ -	
TOTAL OWNERS COST	\$ -	\$ 303,698	\$ 303,698	
DISTRIBUTED				
Procurement Management	\$ -	\$ 33,148	\$ 33,148	
Project Management	\$ -	\$ 458,742	\$ 458,742	
Construction Management	\$ -	\$ 172,015	\$ 172,015	
Contingency	\$ -	\$ 272,500	\$ 272,500	
Escalation	\$ -	\$ 73,391	\$ 73,391	
TOTAL DISTRIBUTED	\$ -	\$ 1,009,796	\$ 1,009,796	
SALVAGE				
Transmission Line Labour	\$ -	\$ -	\$ -	
Substation Labour	\$ -	\$ 209,500	\$ 209,500	
Telecom Labour	\$ -	\$ -	\$ -	
Land Remediation and Reclamation	\$ -	\$ 7,500	\$ 7,500	
TOTAL SALVAGE	\$ -	\$ 217,000	\$ 217,000	
OTHER COSTS				
AFUDC	\$ -	\$ 32,783	\$ 32,783	
E&S/Overhead	\$ -	\$ 448,019	\$ 448,019	
TOTAL OTHER	\$ -	\$ 480,802	\$ 480,802	
TOTAL PROJECT	\$ -	\$ 5,056,070	\$ 5,056,070	

Figure B-1 Mount Allan 115S Estimate Summary

SUBSTATION SUMMARY					
		SYSTEM	PARTICIPANT	TOTAL	CONTRACT
Substation < Mount Allan, 115s >					
MATERIALS					
Major Equipment		\$ -	\$ 930,567	\$ 930,567	\$ -
Transformer	One (1) - 138/25KV 10MVA LTC		\$ 715,130	\$ 715,130	
Transformer	quantity, voltage, rating		\$ -	\$ -	
Circuit Breaker	Two (2) - 25KV Outdoor Dead Tank Breaker		\$ 70,778	\$ 70,778	
Circuit Breaker	Two (2) - 138KV Outdoor Live Tank Breaker		\$ 105,964	\$ 105,964	
Circuit Breaker	*quantity, voltage, type <AIS, GIS, Metal Clad>		\$ -	\$ -	
Capacitor Bank	quantity, voltage, rating		\$ -	\$ -	
Reactor bank	quantity, voltage, rating		\$ -	\$ -	
SVS (Static VAR System)	quantity, voltage, rating, type		\$ -	\$ -	
Current Transformer	quantity, voltage		\$ -	\$ -	
Current Transformer	quantity, voltage		\$ -	\$ -	
Potential Transformer	Three (3) - 25KV Single Phase		\$ 7,137	\$ 7,137	
Potential Transformer	Three (3) - 138KV Single Phase CVT		\$ 21,507	\$ 21,507	
Surge Arrestor	Three (3) - 25KV Surge Arrestor		\$ 3,061	\$ 3,061	
Surge Arrestor	Three (3) - 6KV Surge Arrestor		\$ 6,990	\$ 6,990	
Neutral Grounding Reactor	One (1) NGR		\$ -	\$ -	
Other major equipment	quantity, voltage, rating		\$ -	\$ -	
Switchyard		\$ -	\$ 345,022	\$ 345,022	\$ -
Foundations	Twenty Four (24) - Cassion Piles One (1) - Transformer Foundation One (1) - Voltage Regulator Foundation Two (2) - Dead Tank Breaker Foundation		\$ 112,224	\$ 112,224	
Bus Structure and Network			\$ 127,881	\$ 127,881	
Disconnect Switch	Two (2) - Three Phase 25KV MOD Fourteen (14) - Single Phase 25KV Hook Switch		\$ 85,787	\$ 85,787	
Disconnect Switch	quantity, voltage, type		\$ -	\$ -	
Disconnect Switch	quantity, voltage, type		\$ -	\$ -	
Cabling			\$ 12,882	\$ 12,882	
Station Service			\$ 6,248	\$ 6,248	
Control Building		\$ -	\$ 292,691	\$ 292,691	\$ -
Structure	8 6x4x4 6m		\$ 175,709	\$ 175,709	
Protection, Control, Metering	Thirteen (13)		\$ 90,243	\$ 90,243	
SCADA			\$ 26,739	\$ 26,739	
Other	quality, type, description		\$ -	\$ -	
SUBTOTAL MATERIALS		\$ -	\$ 1,568,280	\$ 1,568,280	\$ -
LABOUR					
Detailed Engineering		\$ -	\$ 290,813	\$ 290,813	\$ -
Civil			\$ 4,695	\$ 4,695	
Electric			\$ 286,118	\$ 286,118	
Geotechnical			\$ -	\$ -	
P&C			\$ -	\$ -	
SCADA			\$ -	\$ -	
Construction		\$ -	\$ 567,595	\$ 567,595	\$ -
Survey			\$ 21,000	\$ 21,000	
Site Preparation			\$ 64,198	\$ 64,198	
Clearing			\$ -	\$ -	
Access Road			\$ -	\$ -	
Access Matting Rental	Five (5) - 30 days		\$ 15,000	\$ 15,000	
Access Matting Lay/Removal	hours		\$ -	\$ -	
Mobilization / demobilization	One (1)		\$ 30,000	\$ 30,000	
AC Mitigation			\$ -	\$ -	
Regulatory Approvals / Permits			\$ -	\$ -	
Environment Management			\$ -	\$ -	
Major Equipment Rental	One (1) Mobile Substation One (1) Hydrovac		\$ 195,000	\$ 195,000	
Yards			\$ 25,000	\$ 25,000	
Shelter Facility			\$ -	\$ -	
Camp Services & Catering			\$ -	\$ -	
Field Supervision			\$ 117,972	\$ 117,972	
Indirects			\$ 99,425	\$ 99,425	
Foundations		\$ -	\$ 235,221	\$ 235,221	\$ -
Concrete Slab on Grade			\$ 110,841	\$ 110,841	
Oil Containment			\$ 96,324	\$ 96,324	
Cassion Piles & bolt cage			\$ 28,056	\$ 28,056	
Electric		\$ -	\$ 114,183	\$ 114,183	\$ -
Structure & Bus Work Installation			\$ 36,246	\$ 36,246	
Installation of equipment			\$ 77,937	\$ 77,937	
P&C and SCADA		\$ -	\$ 93,681	\$ 93,681	\$ -
P&C and SCADA			\$ 93,681	\$ 93,681	
Commissioning		\$ -	\$ 175,000	\$ 175,000	\$ -
Commissioning			\$ 175,000	\$ 175,000	
SUBTOTAL LABOUR		\$ -	\$ 1,476,493	\$ 1,476,493	\$ -
SUPPLY & INSTALL					
Supply & Install 1	type / quality		\$ -	\$ -	
Supply & Install 2	type / quality		\$ -	\$ -	
Supply & Install 3	type / quality		\$ -	\$ -	
SUBTOTAL SUPPLY & INSTALL		\$ -	\$ -	\$ -	\$ -
TOTAL SUBSTATION (1)		\$ -	\$ 3,044,773	\$ 3,044,773	\$ -
TOTAL SUBSTATION MATERIAL		\$ -	\$ 1,568,280	\$ 1,568,280	\$ -
TOTAL SUBSTATION LABOUR		\$ -	\$ 1,476,493	\$ 1,476,493	\$ -
TOTAL SUBSTATION SUPPLY & INSTALL		\$ -	\$ -	\$ -	\$ -
TOTAL SUBSTATION		\$ -	\$ 3,044,773	\$ 3,044,773	\$ -

Figure B-2 Mount Allan 115S Substation Summary

DISTRIBUTED LABOUR SUMMARY					
	SYSTEM	PARTICIPANT	TOTAL	CONTRACT	ASSUMPTIONS
PROCUREMENT					
Procurement Management		\$ 33,148	\$ 33,148		
<Other resource>			\$ -		
<Other resource>			\$ -		
<Other costs>			\$ -		
<Other costs>			\$ -		
TOTAL PROCUREMENT	\$ -	\$ 33,148	\$ 33,148	\$ -	<i>Total used in Summary-Tab 1</i>
PROJECT MANAGEMENT					
Project Management		\$ 364,646	\$ 364,646		
Project Management Office		\$ 51,013	\$ 51,013		
Projects and Controls		\$ 43,083	\$ 43,083		
<Other resource>			\$ -		
<Other resource>			\$ -		
<Other resource>			\$ -		
<Other resource>			\$ -		
<Other resource>			\$ -		
<Other resource>			\$ -		
TOTAL PROJECT MANAGEMEN	\$ -	\$ 458,742	\$ 458,742	\$ -	<i>Total used in Summary-Tab 1</i>
CONSTRUCTION					
Construction Management		\$ 172,015	\$ 172,015		
Environment Management			\$ -		
Indirects			\$ -		
<Other resource>			\$ -		
<Other resource>			\$ -		
<Other resource>			\$ -		
<Other resource>			\$ -		
TOTAL CONSTRUCTION	\$ -	\$ 172,015	\$ 172,015	\$ -	<i>Total used in Summary-Tab 1</i>
TOTAL	\$ -	\$ 663,905	\$ 663,905	\$ -	<i>Total of Procurement, Project and Construction management</i>

Figure B-3 Mount Allan 115S Distributed Labour Summary

CONTINGENCY / RISK REGISTER SUMMARY							
	RISK	DESCRIPTION	IMPACT	PROB	COST IMPACT	CONTINGENCY	RESPONSE STRATEGY
KNOWN	1	Mount Allan 115S is an existing brownfield substation and unexpected conditions may be encountered which introduce additional scope of work to mitigate (e.g. buried cables).	Medium	30%	\$ 150,000	\$ 45,000	Accept
	2	Outage availability due to system/customer constraints resulting in schedule delays	Medium	25%	\$ 150,000	\$ 37,500	Mitigate Provide notice to customer early and coordinate with their planned outages.
	3	Inclement weather conditions may delay or impact construction	Medium	30%	\$ 120,000	\$ 36,000	Accept
	4	Delay in delivery/installation of major equipment (Transformer, Breakers, etc.)	Medium	20%	\$ 150,000	\$ 30,000	Mitigate Work Closely with vendor and Eng Services to minimize/eliminate the delay
	5	Construction delay due to migratory birds/ species at risk	Low	20%	\$ 120,000	\$ 24,000	Mitigate Proceed with Env. Mitigation plan.
	6	Safety incidents / Stand-down / Additional Safety Requirements	Low	10%	\$ 200,000	\$ 20,000	Mitigate
	7	Interface management among AML, Customer, EPC and major equipment vendors may require additional coordination efforts	Medium	20%	\$ 100,000	\$ 20,000	Mitigate Early coordination with EPC and customers.
	8	Additional cost is required to reconnect the mobile substation to one of the 138 kV transmission lines	Medium	10%	\$ 150,000	\$ 15,000	Mitigate Engage EPC on planning the mobile substation connection.
	9	P&L is delayed which may lead to a delay in procuring long lead equipment and the construction schedule.	Medium	10%	\$ 150,000	\$ 15,000	Accept
	10	ISD delay causes extra AFUDC charges against the project	Medium	10%	\$ 150,000	\$ 15,000	Accept
	11	Concurrent engineering required with other projects.	Low	20%	\$ 50,000	\$ 10,000	Accept Commence detailed engineering shortly after Permit and License is issued.
	12	Customer construction scope of work delays	Low	10%	\$ 50,000	\$ 5,000	Mitigate Engage the customer earlier in the project; construction not planned until 2019.
UNKNOWN						\$ -	
						\$ -	
						\$ -	
						\$ -	
						\$ -	
						\$ -	
						\$ -	
						\$ -	
CONTINGENCY					\$	272,500	Total used in Summary-Tab 1
Risk Simulation Use Only (below)							
CONTINGENCY P50							Total used in Summary-Tab 1
CONTINGENCY P70							Total used in Summary-Tab 1
					\$	272,500	

Figure B-4 Mount Allan 115S Contingency Summary

ESCALATION SUMMARY						
	PERCENTAGE	YEARS	SYSTEM	PARTICIPANT	ESCALATION	ASSUMPTIONS
TRANSMISSION LINE						
Material					\$ -	
Labour					\$ -	
Supply and Install					\$ -	
TOTAL TRANSMISSION			\$ -	\$ -	\$ -	
SUBSTATION						
Material	2.4%	1.2		\$ 32,350	\$ 32,350	
Labour	2.4%	1.2		\$ 37,162	\$ 37,162	
Supply and Install					\$ -	
TOTAL SUBSTATION			\$ -	\$ 69,512	\$ 69,512	
TELECOMMUNICATIONS						
Material					\$ -	
Labour					\$ -	
Supply and Install					\$ -	
TOTAL TELECOMMUNICATIONS			\$ -	\$ -	\$ -	
OWNERS						
Pre-SP Cost					\$ -	
Proposal to Provide Service					\$ -	
Facility Applications					\$ -	
Regulatory & Compliance					\$ -	
Land Rights - Easements					\$ -	
Land - Damage Claims					\$ -	
Land - Acquisitions					\$ -	
Land - Other					\$ -	
TOTAL OWNERS			\$ -	\$ -	\$ -	
DISTRIBUTED						
Procurement	2.4%	1.2		\$ 364	\$ 364	
Project Management	2.4%	1.2		\$ 1,488	\$ 1,488	
Construction Management	2.4%	1.2		\$ 2,027	\$ 2,027	
TOTAL DISTRIBUTED			\$ -	\$ 3,879	\$ 3,879	
SALVAGE						
Transmission Line Labour					\$ -	
Substation Labour					\$ -	
Land Remediation and Reclamation					\$ -	
TOTAL SALVAGE			\$ -	\$ -	\$ -	
OTHER						
AFUDC					\$ -	
E&S					\$ -	
TOTAL OTHER			\$ -	\$ -	\$ -	
TOTAL ESCALATION			\$ -	\$ 73,391	\$ 73,391	Totals used in Summary-Tab 1

Figure B-5 Mount Allan 115S Escalation Summary

SALVAGE SUMMARY				
	SYSTEM	PARTICIPANT	SALVAGE	ASSUMPTIONS
SUBSTATION <Mount Allan,115S >				
Transformer Salvage		\$ 100,000	\$ 100,000	
Other Major Equipment Salvage		\$ 109,500	\$ 109,500	
Hazardous Removal			\$ -	
TOTAL SUBSTATION (1)	\$ -	\$ 209,500	\$ 209,500	
TOTAL SUBSTATION SALVAGE	\$ -	\$ 209,500	\$ 209,500	
TOTAL TRANSMISSION LINE SALVAGE	\$ -	\$ -	\$ -	
TOTAL SUBSTATION SALVAGE	\$ -	\$ 209,500	\$ 209,500	
TOTAL TELECOMMUNICATIONS SALVAGE	\$ -	\$ -	\$ -	
TOTAL SALVAGE	\$ -	\$ 209,500	\$ 209,500	<i>Totals used in Summary-Tab 1</i>

Figure B-6 Mount Allan 115S Salvage Summary

Fortis Kananaskis
 Cumulative Cost Flow

2018	ATD	Jul-18 Month 1	Aug-18 Month 2	Sep-18 Month 3	Oct-18 Month 4	Nov-18 Month 5	Dec-18 Month 6	Jan-19 Month 7	Feb-19 Month 8	Mar-19 Month 9	Apr-19 Month 10	May-19 Month 11	Jun-19 Month 12
Cost Flow	142,010	47,403	45,444	50,702	72,031	352,299	111,895	400,004	145,024	595,021	65,105	30,003	493,190
AFUDC	0	0	0	0	0	0	16,165	16,618	0	0	0	0	0
Cumul. \$Flow	142,010	189,413	234,857	285,559	357,590	709,889	837,749	1,254,370	1,399,394	1,994,415	2,059,520	2,089,524	2,582,713

	Jul-19 Month 13	Aug-19 Month 14	Sep-19 Month 15	Oct-19 Month 16	Nov-19 Month 17	Dec-19 Month 18	Jan-20 Month 19	Feb-20 Month 20	Mar-20 Month 21	Apr-20 Month 22	May-20 Month 23	Jun-20 Month 24
Cost Flow	450,899	538,838	489,507	674,297	191,575	13,499	43,709	11,932	11,137	10,997	9,167	0
AFUDC	0	0	0	0	0	0	0	0	0	0	0	0
Cumul. \$Flow	3,063,412	3,600,250	4,089,758	4,764,054	4,955,630	4,969,129	5,012,838	5,024,769	5,035,906	5,046,903	5,056,070	5,056,070

Figure B-7 Complete Project Cash Flow Estimate

APPENDIX C:
PROJECT SCHEDULE

Table C-1 Project Schedule

Activity/Milestone	Start	Finish
Connection Plan finalized	2018-01-03	2018-02-12
Conn. Study Scope finalized (AESO)	2018-01-03	2018-02-07
Conn. Proposal to AESO	2018-02-23	2018-04-10
Conn. Proposal accepted by AESO	2018-04-10	2018-05-09
Issue Functional Specification	2018-04-26	2018-06-01
AESO PIP Direction to TFO		2018-06-04
AESO S35 FA Direction to TFO		2018-06-04
AESO S39 SP Direction to TFO		2018-06-04
Submit SP to AESO	2018-06-04	2018-08-14
ANAP Submission (AESO)		2018-09-26
ANAP Approval (AESO)		2018-10-10
Facilities Application	2018-07-19	2018-10-11
AUC Facilities Approval (P&L)		2018-11-20
AUC Connection Order		NA
Transmission Lines		
Engineering	NA	NA
Procurement	NA	NA
Construction	NA	NA
Commissioning	NA	NA
Substation		
Engineering	2018-11-28	2019-04-18
Procurement	2018-07-03	2019-05-09

CONFIDENTIAL

Construction	2019-06-20	2019-11-01
Commissioning	2019-10-21	2019-11-01
Telecommunications		
Engineering	NA	NA
Procurement	NA	NA
Construction	NA	NA
Commissioning	NA	NA
Energization Checklist		2019-10-17
In-Service Date		2019-11-01
Project Close Out		2020-10-08