APPENDIX F LAND IMPACT ASSESSMENT

ALTALINK

Land Impact Assessment for the Southern Alberta Transmission Development (SATD)

Presented to the
Alberta Electric System Operator ("AESO")
in Support of the AESO Needs Identification Document

Date: November 25, 2008

Table of Contents

1 EXECUTIVE SUMMARY 4
1.1 LIA FINDINGS 4
1.2 DOCUMENT STRUCTURE 7
2 LIA ASSESSMENT PROCESS 9
2.1 SUBSTATIONS 11
2.2 STUDY AREA 11
2.3 REPRESENTATIVE ROUTES 19
2.3.1 Paralleling Roads with 500kV Transmission lines *20*
2.4 RIGHT OF WAY WIDTH AND TOWER FOOTPRINT 20
2.5 PARALLELING EXISTING TRANSMISSION LINES 20
3 MAJOR ASPECTS AND MEASURABLE INDICATORS 22
3.1 AGRICULTURAL IMPACT 22
3.1.1 Specific Agricultural Concerns *22*
3.1.2 Measurable Indicators for Agricultural Concerns *24*
3.2 RESIDENTIAL IMPACT 25
3.2.1 Specific Residential Concerns *25*
3.2.2 Measurable Indicators for Residential Concerns *27*
3.3 ENVIRONMENTAL IMPACTS 27
3.3.1 Specific Environmental Concerns *28*
3.3.2 Measurable Indicators for Environmental Concerns *29*
3.4 COST 30
3.5 ELECTRICAL CONSIDERATIONS 30
3.5.1 Specific Electrical Considerations *30*
3.5.2 Measurable Indicators *30*
3.6 VISUAL IMPACT 31
3.6.1 Specific Visual Concerns *32*
3.6.2 Measurable Indicators for Visual Concerns *32*
3.7 SPECIAL CONSTRAINTS 32
3.7.1 Specific Special Constraints *33*
3.7.2 Measurable Indicators for Special Constraints *34*
4 INFORMATION SOURCES 35
5 ACRONYMS 37
6 GLOSSARY 38
7 APPENDICES 39

List of Tables, Diagrams and Maps

Maps

Transmission Project Study Area……. 14
Alternative 1A Map……. 13
Alternative 1B Map……. 14
Alternative 1C Map……. 15
Alternative 2 Map……. 16
Alternative 3 Map……. 17
Alternative 4 Map……. 18

List of Appendices

Appendix A – Discussion of Using Roads For High Voltage Power Transmission Line Routes

1 EXECUTIVE SUMMARY

The intent of the Land Impact Assessment (LIA) is for transmission facility owner (TFO) AltaLink Management Ltd. (AltaLink) to provide the AESO with the land-impact information it requires for the Needs Identification Document (NID).

This was achieved by conducting a comparative assessment of the AESO's Southern Alberta Transmission Development (SATD) system development plans, using measurable indicators (e.g., amount of native grassland) to quantify the various concerns associated with the major aspects of the NID (Section 6.1 NID12 of the AUC Rule 007), with the exclusion of cost and electrical aspects from a power system perspective, as a focus for collecting measurable land-impact data.

To further facilitate a comparative assessment at this stage of the Project development, representative routing scenarios based on, among other items, the location of individual components proposed for the project were used for each alternative in order to establish a baseline of information. However, no specific routing scenarios are being recommended at this time.

In addition, AltaLink conducted and developed the LIA using the following direction from the AESO:

- The LIA is to focus exclusively on land impact
- Cost is out of scope and not included
- All Six system development plans are to be assessed
- Electrical consideration assessments are to be limited to land-related impacts

1.1 LIA Findings

All of the Alternatives start with Stage 1 components A&J. The potential impacts for Stage 1 will occur for all Alternatives. Only stages 2 through 4 were used in a comparison of the Alternatives.

All of the Alternatives are viable from a land impact perspective, and none have potential impacts that would cause any to be rejected.

Comparisons between metrics were done in relation to alternative 1B, which was about the middle of the three 240kV looped Alternatives (1A, 1B & 1C). Metrics that were at least 20% lower potential impact are colored green, and metrics that are at least 20% higher potential impact are colored red.

When comparing the Alternatives considered for the Southern Alberta Transmission Development (SATD) what is most apparent is that the length of the line is the largest

driver for most of the impacts. The HVDC Alternative 4 has the shortest overall length. Alternative 4 has the most metrics that are 20% lower potential impact. Similarly, the 500kV Alternative 3 has the longest line length, and the most number of metrics that are 20% higher potential impact, except notably for some of the more significant metrics, such as residences within 150m, potential to parallel transmission lines, and amount of irrigated parcels crossed.

The potential to construct paralleling lines does provide the opportunity to reduce the minimum impacts. The incremental difference can not be estimated until more detailed routing and consultation is completed. For example the environmental impacts within 800m of two lines together would be lower than the impacts within 800m of lines that are separated. This report does not incorporate any reductions that could be realized due to paralleling.

The 240kV Alternatives, Alternatives 1A, 1B, 1C and 2 are all relatively similar.

Agricultural
- Alternative 2 has the least potential impact
- Alternative 3 has the highest potential impact
- Alternatives 3, and 4 have the least potential impact to irrigated parcels

Residential
- Alternatives 3, and 4 have the least potential impact to residences within 150m
- Alternative 4 has the least potential impact to residences within 800m
- Alternative 1C has the highest potential impact to residences within 800m

Environment
- Alternative 1C has the least potential impact
- Alternative 3 has the highest potential impact

Electrical Considerations
- Alternative 3 has the highest potential for paralleling new facilities

Visual Impacts
- Alternatives 3, and 4 have the least potential impact to residences within 150m
- Alternative 3 potentially impacts the most Protected or Designated Areas.

Special Constraints
- Alternative 4 has the least potential impact
- Alternative 3 has the highest potential impact on Historical resources

The table of comparative metrics can be found on the next page.

Major Aspects and Considerations November 19, 2008 South Alberta Transmission Development SATD LIA		Alternatives						
		Common	240 kV Looped			240kV Radial	500kV	HVDC
			IA	1B	1C	II	III	IV
		Phase 1	Phase 2 - 4	Phase 2 - 4	Phase 2 - 4	Phase 2 - 4	Phase 2 - 4	Phase 2 - 4
		A,J	G,F,C1,E,D,H	G,F,C2,E,D,H	G,F,C1,E,D,K	G,B,D,H	Y,F,C1,E,X,Z	F,C1,E,HVDC
		Min. - Max.						
Line Parameters								
R-O-W Length (km)		190 - 291	768-795	793-841	808-852	774-819	1113-1206	748-778
Agricultural Impact								
Amount of Agricultural Land Crossed (km)	Cultivated	39 - 98	258 - 319	265 - 330	294 - 369	142 - 176	443 - 571	279 - 366
	Forage land	7 - 14	40 - 89	40 - 89	25 - 71	34 - 65	30 - 104	16 - 65
	Total	51 - 110	322 - 382	334 - 389	344 - 415	182 - 235	529 - 619	327 - 399
Dominant Land Suitability Class Distribution - Distance Crossed (km)	1	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
	2	11 - 52	33 - 40	51 - 59	46 - 69	46 - 53	39 - 60	31 - 56
Classes 1 - 3 are good agricultural land	3	79 - 115	243 - 289	253 - 316	265 - 316	154 - 214	421 - 489	229 - 285
Classes 4 - 7 require more and more work to be productive	4	31 - 89	249 - 300	248 - 300	257 - 300	238 - 285	384 - 520	257 - 349
	5	9 - 56	86 - 118	84 - 118	93 - 122	127 - 166	114 - 148	78 - 106
	6	0 - 0	30 - 37	30 - 37	37 - 39	48 - 54	30 - 34	28 - 35
	7	0 - 0	66 - 70	66 - 70	52 - 56	104 - 104	35 - 42	31 - 40
Irrigated Parcels Crossed (km)		0 - 12	74 - 127	74 - 127	60 - 110	69 - 98	43 - 123	29 - 85
Residential Impacts								
Total Residences within 150 m of centreline (#)		20 - 40	40-90	40-90	40-80	40-90	30-70	20 - 50
Total Residences within 0 - 800 m of R-O-W edge (#)		180 - 400	270 - 420	290-430	370-550	280- 400	310-450	200-330
Environmental Impacts								
Surface Water (ha) in or within 800m of R-O-W edge		214 - 468	1543 - 2091	1597 - 2147	1522 - 2344	1690 - 2353	2102 - 2838	1186 - 2000
Native Grassland Crossed (km)		24 - 85	258 - 280	272 - 303	257 - 277	402 - 434	323 - 378	231 - 265
Sensitive Wetland Areas (ha) in or within 800 m of R-O-W		36 - 1081	1597 - 1986	1607 - 1996	455 - 797	1637 - 2051	693 - 1973	317 - 1723
Proximity to Protected or Designated Areas in or within 800 m of R-O-W edge (ha)		8 - 20	14 - 15	14 - 15	16 - 18	16 - 16	25 - 33	14 - 16
Cost – Cost information and comparisons are provided in other sections of the Need application								
Electrical Considerations								
Paralleling Existing Transmission Lines greater than or equal to 240 kv (km)		76 - 148	7 - 7	7 - 7	4 - 13	7 - 7	59 - 78	7 - 82
Crossing Existing Transmission Lines greater than or equal to 240 kv (#)		0 - 1	1 - 2	1 - 2	3 - 6	1 - 2	1 - 2	1 - 5
Potential to Parallel Future Transmission Lines greater than or equal to 240 kv (Km)		0 - 59	3 - 3	0 - 0	8 - 31	251 - 256	368 - 397	3 - 3
Visual Impacts								
Total Residences within 150 m of centreline (#)		20 - 40	40 - 90	40 - 90	40 - 80	40 - 90	30 - 70	20 - 50
Proximity to Protected or Designated Areas in or within 800 m of R-O-W edge (#)		8 - 20	14 - 15	14 - 15	16 - 18	16 - 16	25 - 33	14 - 16
Special Constraints								
Proximity to Historical Resources in or within 800 m of R-O-W (#)		113 - 335	365 - 473	408 - 522	388 - 507	434 - 559	650 - 837	379 - 458
Major River Crossings (#)		7 - 11	7 - 12	7 - 12	11 - 22	8 - 12	16 - 27	10 - 22
Minor Airports in or within 1.6/3.2 km of R-O-W (#)		0 - 3	0 - 0	0 - 0	1 - 1	0 - 0	0 - 1	0 - 0

Notes: Phase 1 is common to all alternatives, and not included in the metrics used for comparison

Colored comparisons in relation of Alternative 1B, which was about the middle of the looped 240kV alternatives

Green represents at least 20% LESS potential impact

Red represents at least 20% MORE potential impact

Agricultural suitability class 4 through 7 were not compared because they are poor soils

Treed areas not on table as they were all zero

No major airports within 6km of any of the representative routes

The Alberta Electric System Operator (AESO) requested AltaLink to provide a Land Impact Assessment (LIA) for a proposed Southern Alberta Transmission Development (SATD) to be used by the AESO for a future Needs Identification Document (NID).

The LIA is a comparative assessment of the AESO's six potential system development Alternatives.
Each system development alternative is comprised of several components (such as a new transmission line, substation, or modification to an existing facility) which are listed in the following section.

The LIA uses the major aspects (with the exception of cost and certain electrical factors) identified in AUC Rule 007 (Section 6.1 NID12) for direction in identifying potential impacts. These include:

1. Agricultural Impact
2. Residential Impact
3. Environmental Impact
4. Electrical Considerations
5. Visual Impact
6. Special Constraints

Typical representative routes were determined for each of the six system development alternatives to assess the potential impacts. The representative routes were used for high-level assessments only, with no determination made on the specific route location, such as which side of a paralleled transmission line a new line could be sited.

The LIA was created using the best available information including, but not limited to: land-use and land-base classification data; hydrology, wildlife, parks and protected areas data, aerial-photo and satellite imagery analysis; reconnaissance flights and field visits; knowledge and experience of AltaLink siting transmission lines in the areas traversed, and knowledge of the existing and proposed 240kV and 500 kV lines transmission lines currently being planned in Alberta.

Public and agency consultation, environmental fieldwork, visual assessments, historical and archaeological-impact assessments, a land-titles search, and other activities will help determine specific routing scenarios during the Facilities Application processes that would occur in the future.

1.2 Document Structure

This document is organized to provide the AESO and other readers with an understanding of:

- The plans being considered;
- The limitations of assessing the plans;

- The assumptions, criteria, information;
- The factors that influence proponents' and stakeholders' decisions; and;
- The rationale for how the findings were reached.

The LIA findings and an executive summary are provided in Section 1. Specific details and maps for each of the Six alternatives are found in section 2. The development of representative routes for each alternative and the considerations behind using an existing road or transmission line for routing are also discussed in this section.

Section 3 provides insight into the major aspects of transmission line impacts and how measurable indicators are used to gauge these concerns for each alternative. The measurable indicators are used to conduct a broad comparison and establish potential differences between each proposed system-development alternative. Other considerations such as limitations of the assessment are also discussed.

Sections 4 through 8 describe additional details regarding data sources, abbreviations used in the report and a general glossary. The appendix contains a listing of formally designated environmentally sensitive areas within the study area.

2 LIA ASSESSMENT PROCESS

The NID Land Impact Assessment (LIA) process allows the AESO to do a comparative assessment of the potential impacts for a variety of potential transmission system development alternatives.

To ensure consistent data for all alternatives, the assessment process was driven by common criteria. The AUC's major aspects for land assessments, with the appropriate measurable indicators and concerns were regarded for all alternatives. All alternatives required representative routing to generate the measurable indicators, as well as consistent technical assumptions (such as using a 65m R/W)

This section offers a detailed look at the criteria used in the LIA process, providing an understanding of how the LIA was conducted and developed, and how findings were reached.

The LIA evaluated the relative Land Impacts of six potential SATD system alternatives.

The six system development alternatives include the components as listed below:

Stage	Alt 1A 240 kV Looped	Alt 1B 240 kV Looped	Alt 1C 240kV Looped	Alt 2 240 kV Radial	Alt 3 500 kV	Alt 4 HVDC
I	Peigan to DeWinton (Path J), Milo (new station) Crowsnest to Goose Lake (Path A)	Peigan to DeWinton (Path J), Milo (new station) Crowsnest to Goose Lake (Path A)	Peigan to DeWinton (Path J), Milo (new station) Crowsnest to Goose Lake (Path A)	Peigan to DeWinton (Path J), Milo (new station) Crowsnest to Goose Lake (Path A)	Peigan to DeWinton (Path J), Milo (new station) Crowsnest to Goose Lake (Path A)	Peigan to DeWinton (Path J) Milo (new station) Crowsnest to Goose Lake (Path A)
II	Sub D – W. Brooks (Path G)	Sub D – W. Brooks (Paths G)	Sub D – W. Brooks (Path G)	Sub D – W. Brooks Three Circuits (Path Gx2)	Sub H - Milo (Path Y) Sub H - MH2 (Path F)	Sub H - MH2 (Path F)
III	G. Lake - Sub C (Path C1) Sub C – Sub D (Path E) Sub C - MATL (Path D)	Peigan - Sub C (Path C2) Sub C – Sub D (Path E) Sub C - MATL (Path D)	G. Lake - Sub C (Path C1) Sub C - Sub D (Path E) Sub C - MATL (Path D)	Sub A – Peigan (Path B) Sub C - MATL (Path D)	G. Lake - Sub C (Path C1) Sub C – Sub H (Path E)	Sub H - Langdon (HVDC Option) G. Lake - Sub C (Path C1) Sub C – Sub H (Path E)

Stage	Alt 1A 240 kV Looped	Alt 1B 240 kV Looped	Alt 1C 240kV Looped	Alt 2 240 kV Radial	Alt 3 500 kV	Alt 4 HVDC
IV	Ware Jn - Langdon (Path H)	Ware Jn - Langdon (Path H)	W. Brooks - Sub I - DeWin (Path K)	Ware Jn - Langdon (Path H)	Sub H - Crows (Path X) Milo – Langdon (Path Z)	

Description of Each Component:

Component/ Path	Description	Start Location	Finish Location	Approximate Length (km)	Comments
A	240 kV Goose Lake 103S to Crowsnest	Existing 103S Goose Lake Sub	Sec 4-8-3W5M	43-59	Connection to 1201 Line
B	240 kV Peigan 59S to Sub A	Existing Peigan 59S Sub	Sec 1-3-28-W4M	77-102	Radial Option
C1	240 kV Goose Lake 103S to Sub C	Existing 103S Goose Lake Sub	Sec 38 -8-16-W4	247-251	
C2	240 kV Peigan 59S to Sub C	Existing Peigan 59S Sub	Sec 38-8-16-W4M	272-297	
D	240 kV Sub E (MATL) to Sub C	Sec 14-10-21-W4M	Sec 38-8-16-W4M	63-69	
E	240 kV Sub C to Sub D (H/HVDC A)	Sec 35-8-16-W4M	Sec 6-9-8-W4M	75-84	Assumed Sub D is same location as Sub H/HVDC A
F	240 kV Sub D to Medicine Hat (MH2)	Sec 6-9-8-W4M	Sec 29-13-5-W4M	106-111	
G	240 kV West Brooks 28S to Sub D	Existing West Brooks 28S (LSD13-28-18-15W4M)	Sec 6-9-8-W4M	251-256	Must pass east of Medicine Hat
H	240 kV Ware Junction 132S to Langdon 102S	Existing Ware Junction 132S (12-17-22-14W4)	Existing Langdon 102S (NW16-23-27W4)	132-135	
J	240 kV Peigan 59S to DeWinton	Existing Peigan 59S Sub	SW31-21-29W4	147-232	Potential to parallel existing 911L or 1201L line

Component/ Path	Description	Start Location	Finish Location	Approximate Length (km)	Comments
K	240 kV West Brooks to Sub I to DeWinton	Existing West Brooks 28S (LSD13-28-18-15W4M)	SW31-21-29W4	172-192	Potential to Parallel Existing Line. Must pass through Sub I at Sec 14-19-17-W4M
X	500 kV Crowsnest to Sub H (D/HVDC A)	Sec 4-8-3W5M	Sec 6-9-8W4M	203-210	Assumed Sub H is same location as Sub D/HVDC A
Y	500 kV Milo Jct to Sub H	NW-13-18-21W4M	Sec6-9-8W4M	117-155	
Z	500 kV Milo Jct to Langdon 102S	NW-13-18-21W4M	Existing Langdon 102S (NW16-23-27W4)	99	
HVDC	HVDC Langdon 102S to HVDC A (D/H)	Existing Langdon 102S (NW16-23-27W4)		320-332	Assumed HVDC A is same location as Sub D/H

2.1 Substations

The LIA does not include metrics for the substations. We offer the following comments for the AESO's consideration. At existing substation sites there would need to be expansion. For this LIA it is assumed that the expansions have little effect in the context of the entire system alternative developments.

The site for new substations were arbitrarily chosen for the sake of this LIA. The substations could all move by several miles along transmission line routes to be located in the best location based on consultation, environmental and technical considerations, cost, and availability of land. The substations would be located along the final line routes, and so some of the metrics already encompass new substation sites. The additional incremental impact will have little effect in the context of the entire system alternative developments.

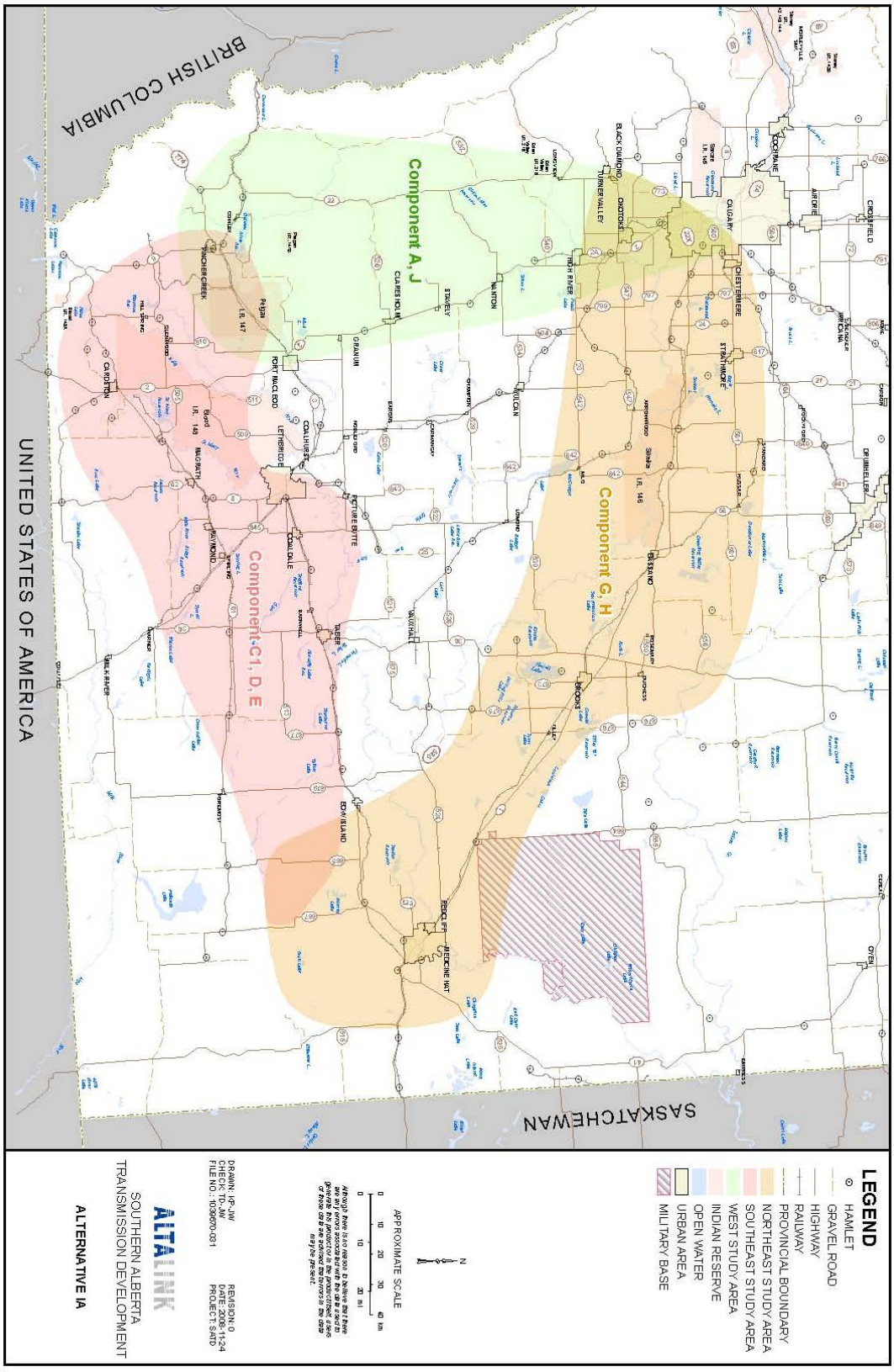
2.2 Study Area

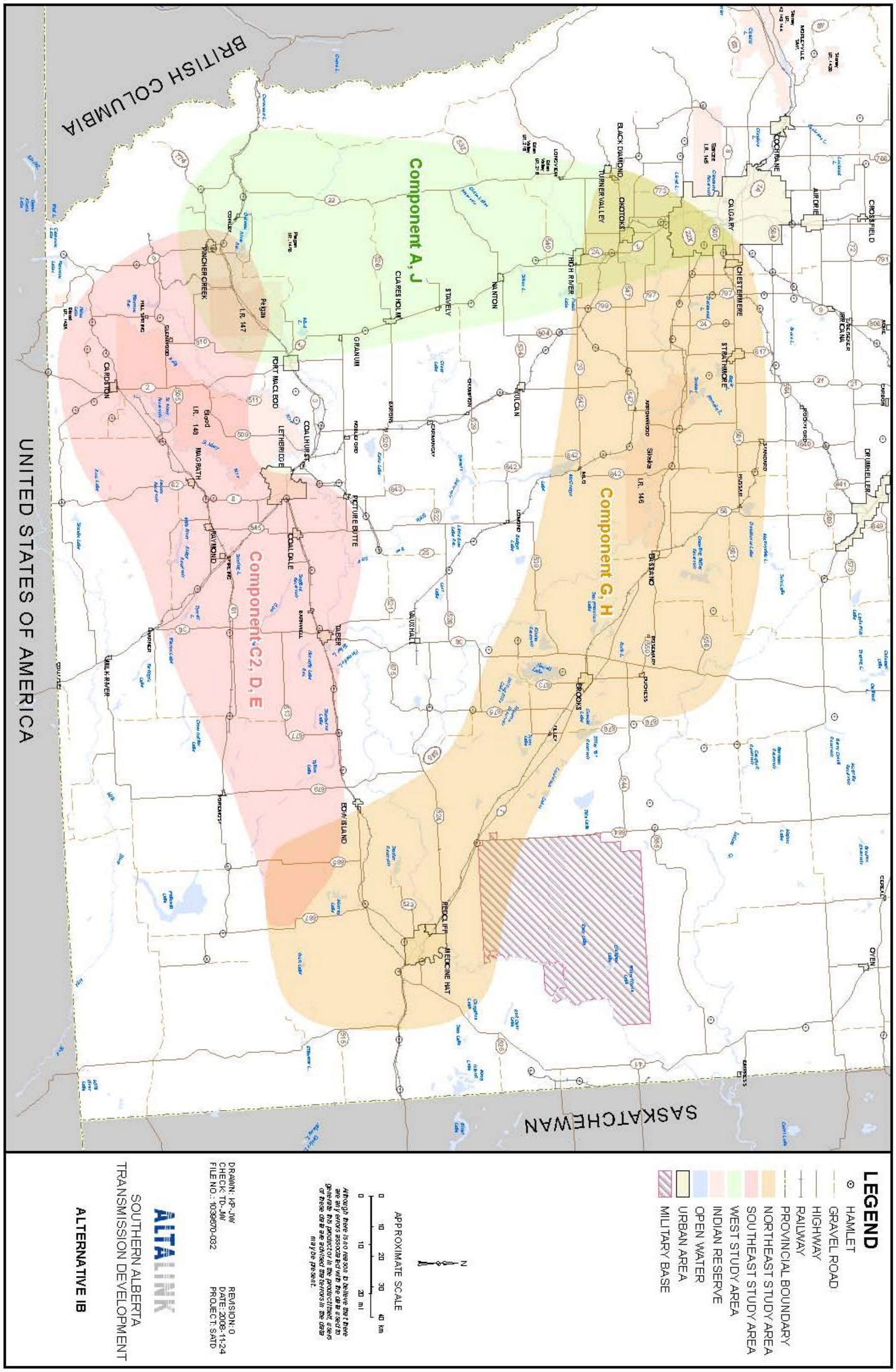
The study area was defined in relation to the system development components identified by AESO.

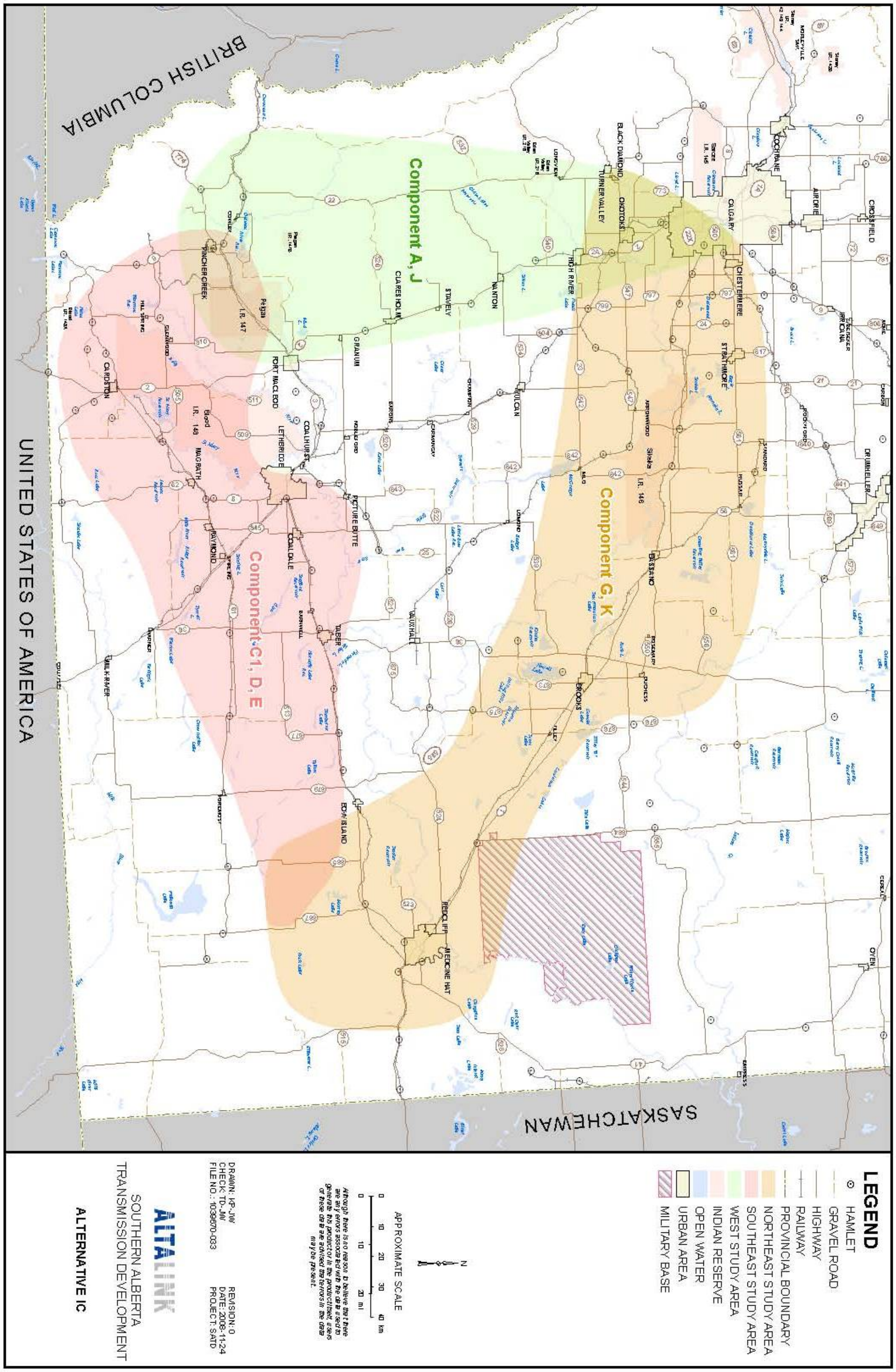
The geographical location of system components generally encompass the southern region of Alberta

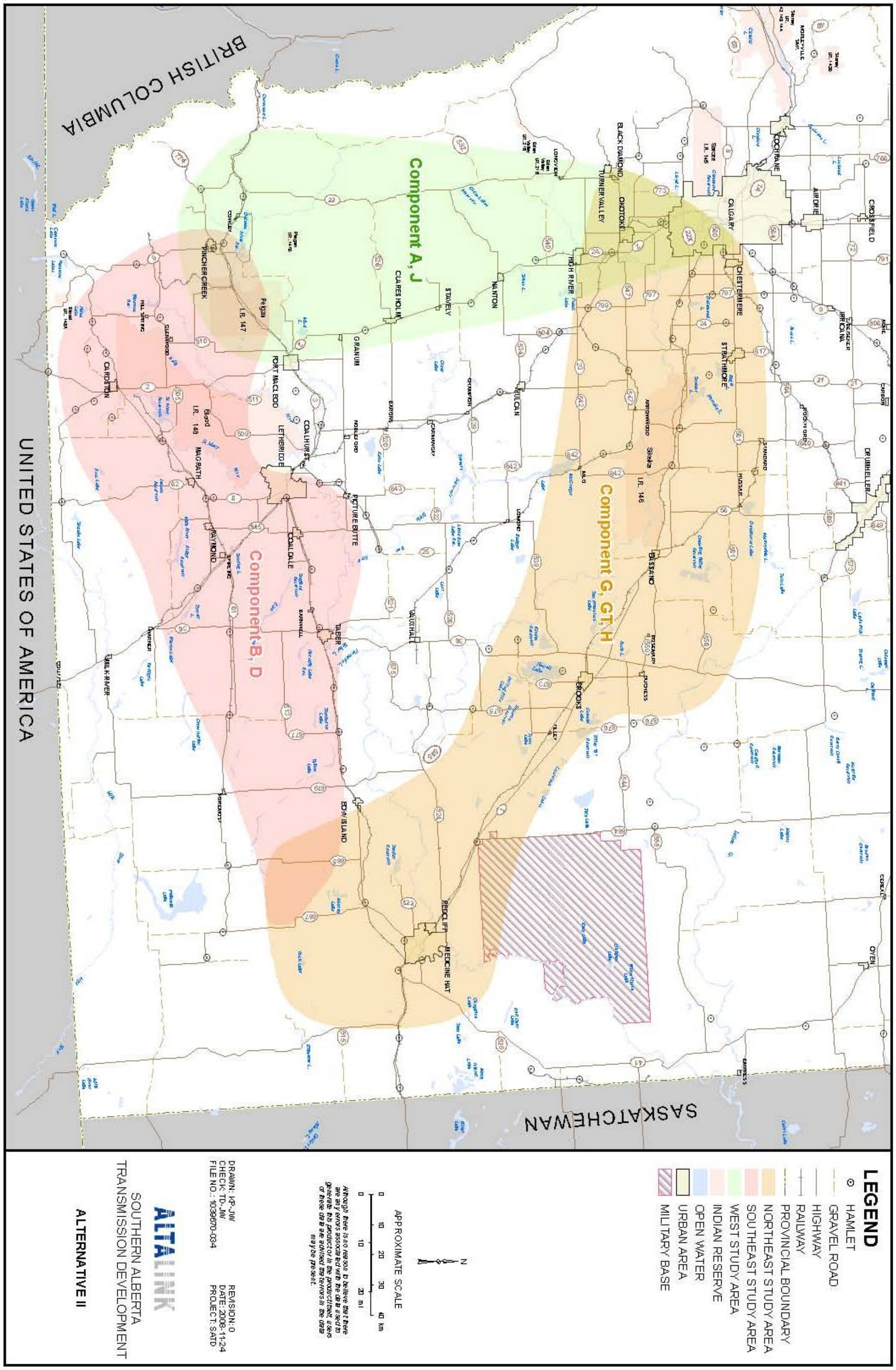
- A reasonable northern limit was formed by Calgary east to the Saskatchewan border.
- The eastern boundary of the study area is the Saskatchewan border
- The western limit of the study area are the foothills
- The southern boundary is the Montana border
- Excluded, or “no-go areas” are the many populated areas within the study area such as Lethbridge, Medicine Hat and Suffield Armed Forces Base.
- Excluded, or “no-go areas” are environmental features such as major lakes like Lake Newell Recreation Area, and historical resource areas like Head Smashed In buffalo jump.

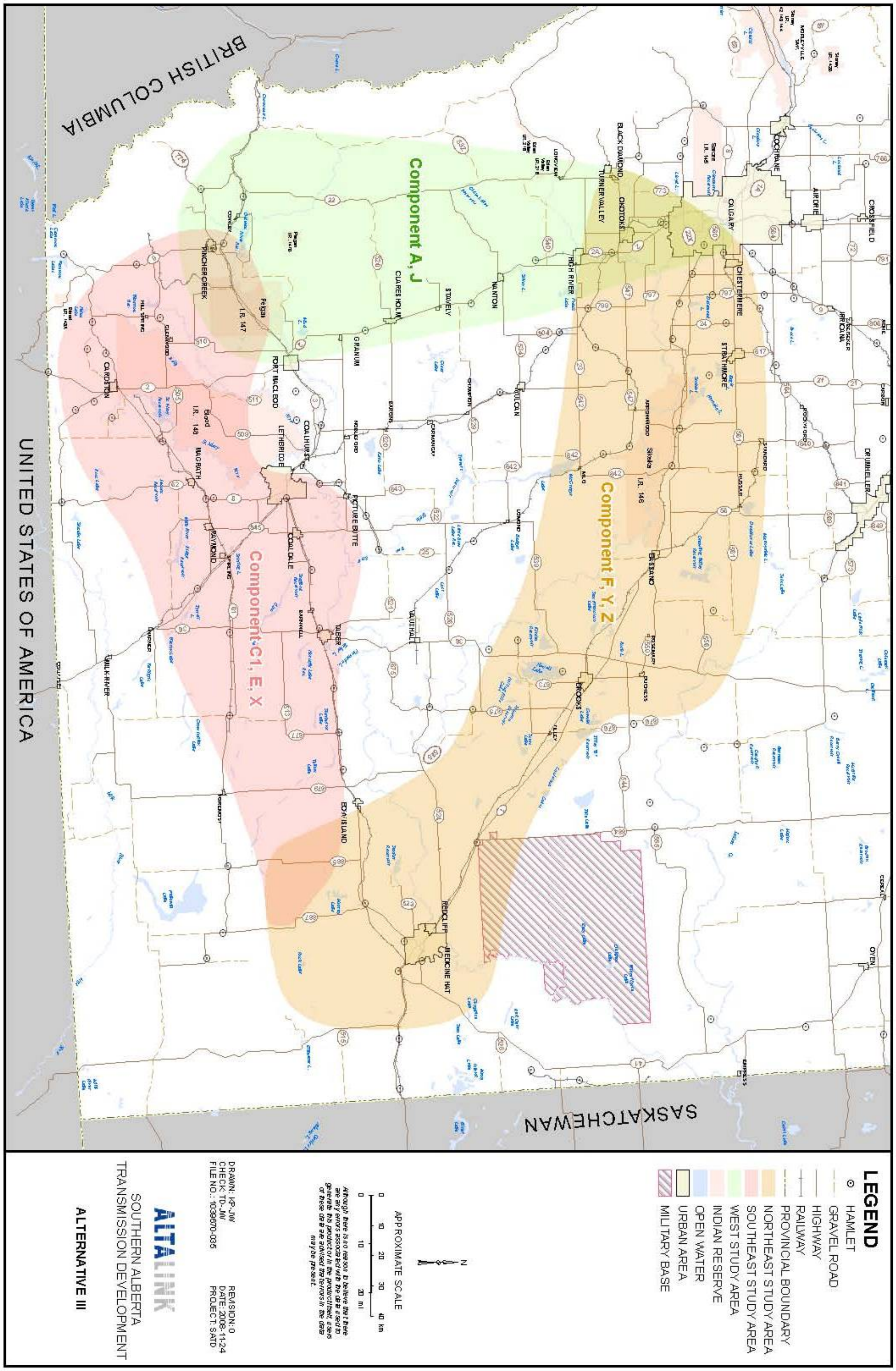
Representative routes were then developed, as described in Section 2.3. Representative Routes Maps of the overall study area, and individual SATD development alternatives are included on the following six pages. (Representative routes were determined within each individual study area depending on which potential system development alternative was being considered).

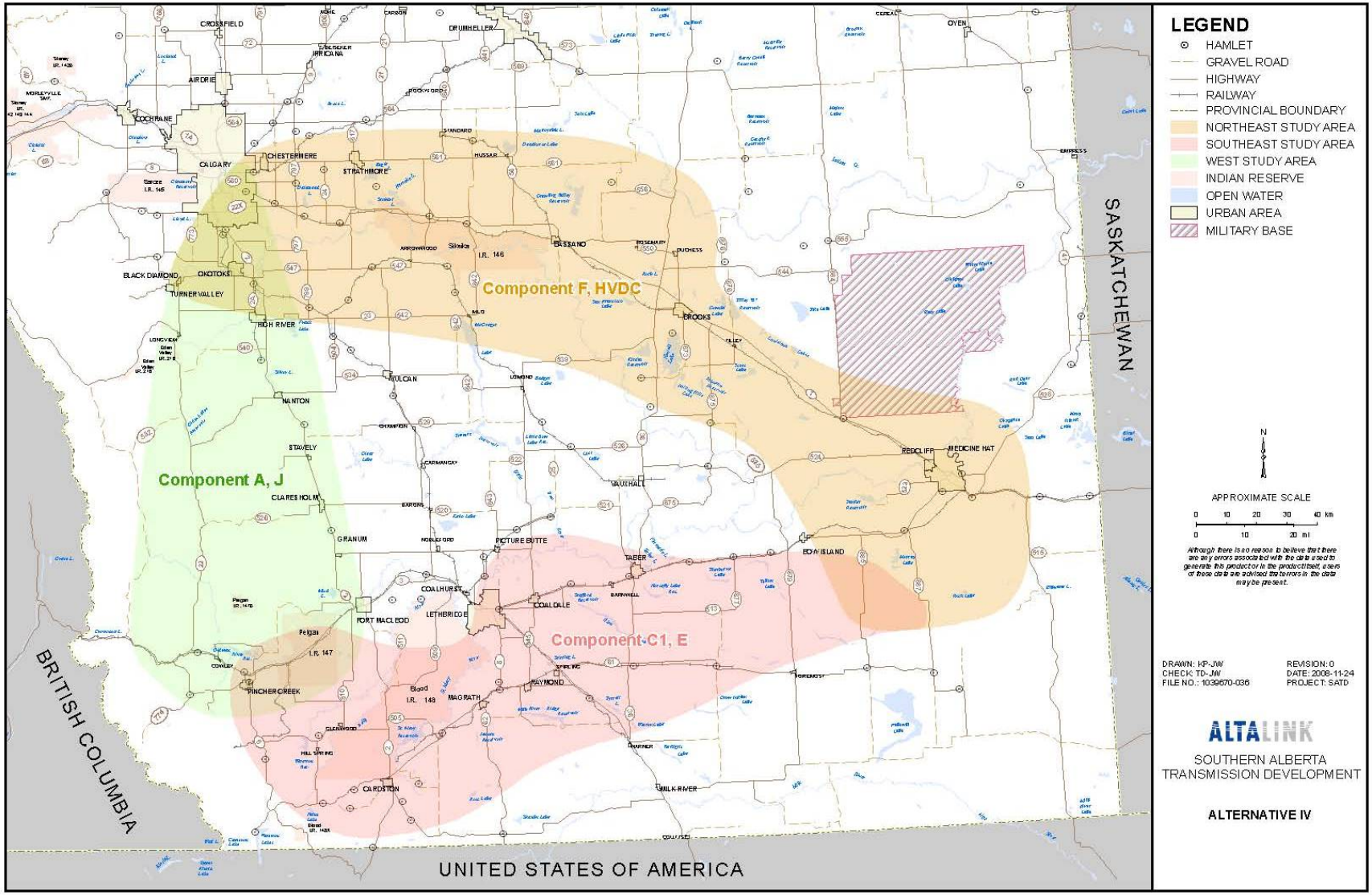

BRITISH COLUMBIA
SASKATCHEWAN
UNITED STATES OF AMERICA
Component A, J
Component G, H
Component C1, D, E
LEGEND
HAMLET
GRAVEL ROAD
HIGHWAY
RAILWAY
PROVINCIAL BOUNDARY
NORTHEAST STUDY AREA
SOUTHEAST STUDY AREA
WEST STUDY AREA
INDIAN RESERVE
OPEN WATER
URBAN AREA
MILITARY BASE
APPROXIMATE SCALE
N
DRAWN: KP-JW
CHECK TD-JW
FILE NO: 103670-001
REVISION: 0
DATE: 2008-11-24
PROJECT SATD
ALTALINK
SOUTHERN ALBERTA
TRANSMISSION DEVELOPMENT
ALTERNATIVE IA


BRITISH COLUMBIA
UNITED STATES OF AMERICA
SASKATCHEWAN
Component A, J
Component C2, D, E
Component G, H
CALGARY
MEDICINE HAT
BROOKS
LEGEND
HAMLET
GRAVEL ROAD
HIGHWAY
RAILWAY
PROVINCIAL BOUNDARY
NORTHEAST STUDY AREA
SOUTHEAST STUDY AREA
WEST STUDY AREA
INDIAN RESERVE
OPEN WATER
URBAN AREA
MILITARY BASE
APPROXIMATE SCALE
ALTALINK
SOUTHERN ALBERTA
TRANSMISSION DEVELOPMENT
ALTERNATIVE IB


BRITISH COLUMBIA
UNITED STATES OF AMERICA
SASKATCHEWAN
Component A, J
Component G, K
Component C1, D, E
CALGARY
AIRDRIE
COCHRANE
CROSSFIELD
CHESTERMERE
STRATHMORE
OKOTOKS
TURNER VALLEY
BLACK DIAMOND
HIGH RIVER
NANTON
STAVELY
CLARESHOLM
GRANUM
FORT MACLEOD
PINCHER CREEK
CARDSTON
MAGRATH
RAYMOND
LETHBRIDGE
COALHURST
COALDALE
PICTURE BUTTE
TABER
VAUXHALL
BROOKS
BASSANO
VULCAN
DRUMHELLER
MILK RIVER
BOW ISLAND
REDCLIFF
MEDICINE HAT
LEGEND
HAMLET
GRAVEL ROAD
HIGHWAY
RAILWAY
PROVINCIAL BOUNDARY
NORTHEAST STUDY AREA
SOUTHEAST STUDY AREA
WEST STUDY AREA
INDIAN RESERVE
OPEN WATER
URBAN AREA
MILITARY BASE
APPROXIMATE SCALE
DRAWN: KP-JW
CHECK: TD-JW
FILE NO.: 1039070-033
REVISION: 0
DATE: 2008-11-24
PROJECT: SATD
ALTALINK
SOUTHERN ALBERTA
TRANSMISSION DEVELOPMENT
ALTERNATIVE IC


BRITISH COLUMBIA
UNITED STATES OF AMERICA
SASKATCHEWAN
Component A, J
Component B, D
Component G, GT, H
CALGARY
MEDICINE HAT
LEGEND
HAMLET
GRAVEL ROAD
HIGHWAY
RAILWAY
PROVINCIAL BOUNDARY
NORTHEAST STUDY AREA
SOUTHEAST STUDY AREA
WEST STUDY AREA
INDIAN RESERVE
OPEN WATER
URBAN AREA
MILITARY BASE
APPROXIMATE SCALE
ALTALINK
SOUTHERN ALBERTA
TRANSMISSION DEVELOPMENT
ALTERNATIVE II
DRAWN: KP-JW
CHECK: TD-JW
FILE NO.: 1036070-034
REVISION: 0
DATE: 2008-11-24
PROJECT: SATD


BRITISH COLUMBIA
UNITED STATES OF AMERICA
SASKATCHEWAN
Component A, J
Component C1, E, X
Component F, Y, Z
LEGEND
HAMLET
GRAVEL ROAD
HIGHWAY
RAILWAY
PROVINCIAL BOUNDARY
NORTHEAST STUDY AREA
SOUTHEAST STUDY AREA
WEST STUDY AREA
INDIAN RESERVE
OPEN WATER
URBAN AREA
MILITARY BASE
APPROXIMATE SCALE
DRAWN: KP-JW
CHECK: TD-JW
FILE NO.: 1039670-035
REVISION: 0
DATE: 2008-11-24
PROJECT: SATD
ALTALINK
SOUTHERN ALBERTA
TRANSMISSION DEVELOPMENT
ALTERNATIVE III


Component A, J
Component F, HVDC
Component C1, E
SASKATCHEWAN
BRITISH COLUMBIA
UNITED STATES OF AMERICA
CROSSFIELD
DRUMHELLER
OYEN
AIRDRIE
COCHRANE
CALGARY
CHESTERMERE
STRATHMORE
STANDARD
HUSSAR
EMPRESS
BLACK DIAMOND
OKOTOKS
TURNER VALLEY
HIGH RIVER
BASSANO
ROSEMARY
DUCHESS
BROOKS
ARROWWOOD
I.R. 146
VULCAN
LOMOND
NANTON
STAVELY
CHAMPION
CARMANGAY
CLARESHOLM
VAUXHALL
REDCLIFF
MEDICINE HAT
GRANUM
PICTURE BUTTE
TABER
EDWISLAND
COALHURST
COALDALE
FORT MACLEOD
LETHBRIDGE
Peigan
I.R. 147
PINCHER CREEK
Blood
I.R. 148
MAGRATH
RAYMOND
STIRLING
FORESTBURG
GLENWOOD
HILL SPRING
CARDSTON
MILK RIVER
COUTTS
LEGEND
HAMLET
GRAVEL ROAD
HIGHWAY
RAILWAY
PROVINCIAL BOUNDARY
NORTHEAST STUDY AREA
SOUTHEAST STUDY AREA
WEST STUDY AREA
INDIAN RESERVE
OPEN WATER
URBAN AREA
MILITARY BASE
N
APPROXIMATE SCALE
0 10 20 30 40 km
0 10 20 mi
Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.
DRAWN: KP-JW
CHECK: TD-JW
FILE NO.: 1039670-036
REVISION: 0
DATE: 2008-11-24
PROJECT: SATD
ALTALINK
SOUTHERN ALBERTA
TRANSMISSION DEVELOPMENT
ALTERNATIVE IV

2.3 Representative Routes

Representative routes were required in order to provide for the collection of land-impact data. However, no specific routing is being recommended at this time.

To identify representative routes, potentially viable transmission line route segments were delineated by right-of-way planners using siting techniques consistent with those employed in other transmission line projects. Representative routes were developed, with consideration for environmental features, populated areas, and paths which impacted lower numbers of individual residences.

In siting representative routes with the intent to minimize potential impacts, several factors are considered. These factors include, but are not limited to:

1. Minimize impact on residences
2. Minimize number of landowners directly impacted
3. Minimize impact on existing, approved, and planned developments
4. Parallel existing transmission lines (*Alberta Environment's Guide for Transmission Lines*, Nov., 1994, and *Alberta Transmission Regulations Section 15, AR255/2007 s7*)
5. Follow ¼ lines where there is less development
6. Address the seven aspects in AUC Rule 007
7. Follow the considerations in *Alberta Environment's Guide for Transmission Lines*, Nov., 1994
8. Follow the considerations in the Alberta Transmission Regulations (Section 15, AR255/2007 s7)

Using the above factors, representative routes were identified for each of the Six system-development alternatives.

The level of assessment presented in this document only focuses on the landscape and general criteria as they can be applied to the representative routing concepts associated with the six system-development alternatives being considered. More site-specific work will be done in the context of preparing Facility Applications that may occur in the future. At that time it is possible to make a detailed assessment of the route and site-specific impacts associated with transmission line routing in order to determine specific, preferred routes, alternate routes or rejected routes. This more detailed work would include the following:

- Route specific public and agency notification and consultation;
- A historical, archaeological and cultural overview;
- Environmental field work;
- Field reconnaissance by helicopter and on the ground;
- A determination of access to private lands; and
- A determination on technical solutions.

2.3.1 Paralleling Roads with 500kV Transmission lines

A report to the AESO was provided to address the use of roads for 500kV transmission lines for the Calgary to Edmonton 500kV. This report was done to address the suggestion provided to the AESO in their Open Houses that the route should follow Highway 2 or other road allowances.

In general, roads are not a good location for a new 240 kV or 500 kV transmission line to be developed for the following reasons:
- the number of residences impacted is typically higher beside roads,
- impacts to the number of facilities and commercial buildings and businesses is higher,
- traffic safety concerns, and the impacts to road use are increased and,
- the risk of having to re-locate the transmission line due to future road widening is considerable.

The report, without the specific analysis of the Highway 2 route possibility for the NS500kV, is in Appendix A.

2.4 Right of Way width and tower footprint

It should be noted that the right-of-way width used and the proposed transmission towers are general assumptions at this preliminary planning stage. The numbers used may change during the more detailed Facility Application stage, when additional information specific to local areas is determined. This may include things such as topography, local weather history, major crossings, and other factors.

Because the purpose of the LIA report is to provide information that can be used by the AESO to compare the Six system development alternatives, and the exact size of the right-of-way and tower footprint will have very little impact on the metrics at this stage, a right-of-way width and tower footprint size was chosen that will cover all the tower types and right-of-way widths being considered for the system development alternatives.

The right-of-way width used for the metrics in this report is 65 m, and the tower footprint used is 10 m x 10 m.

2.5 Paralleling Existing Transmission Lines

The Transmission regulation outlines the requirement for siting transmission lines as follows:

15.1**(1)** In preparing plans and making arrangements for new transmission facilities or for enhancements or upgrades to existing transmission facilities, the ISO must take into consideration geographic separation for the purposes of ensuring reliability of the transmission system.

(2) When considering the location of new transmission facilities or of enhancements or upgrades to existing transmission facilities, the ISO must consider

(a) wires solutions that reduce or mitigate the right of way, corridor or other route required, and

(b) maximizing the efficient use of rights of way, corridors or other routes that already contain or provide for utility or energy infrastructure.

(3) The ISO must consider the measures described in subsections (1) and (2) notwithstanding that those measures may result in additional costs.

(4) In subsection (2)(a), "wires solutions" includes, without limitation,

(a) providing new, higher capacity transmission facilities in combination with the salvage of lower capacity transmission facilities, or

(b) providing staged transmission capacity increases that reduce the need to access rights of way for subsequent capacity increases.

In developing representative routes the TFO's included route segments that paralleled existing 240kV transmission lines where possible. During the detailed route selection stage in preparation for a Facilities Application, opportunities to parallel, or replace existing transmission lines would be explored. Discussion with the AESO would occur to explore the ability to salvage transmission lines either before or after construction of new transmission lines. For example, a common component to all the system alternatives is the Peigan to DeWinton line, which could replace existing single circuit 911L. In any of these scenarios the final result is little to no incremental impact on the landscape.

3 MAJOR ASPECTS AND MEASURABLE INDICATORS

All of the major aspects, with the exception of cost, identified in the AUC Rule 007 – section 6.1 (AESO Needs Identification Document Applications) were considered for each of the representative routes and system-development alternatives. In addition, all of the major aspects have associated measurable indicators and specific concerns that were evaluated based on experience routing transmission lines in Alberta.

The following provides a definition of the measurable indicators and concerns related to the major aspects identified in AUC Rule 007, and how these can be used to provide land-impact information, as well as the overall impact on the project and suggestions on how they can be mitigated.

The major aspects under Rule 007 are Agricultural Impact, Residential impact, Environmental Impact, Cost, Electrical Considerations, Visual Impact, and Special Constraints. Under each aspect in Rule 007 are a list of concerns; a), b) etc., which are discussed in the following sections.

3.1 Agricultural Impact

Agricultural impacts generally refer to agricultural activities associated with rural lands, which may include cultivation of crops, livestock, and other commercial operations associated with individual landowners.

Agricultural impacts will likely be a factor in this project, as the study area is located in what is known as the "White Area[1]" of the province. The White Area contains most of the land suitable for cultivating. Although much of this land is privately owned, the provincial government has retained a few parcels for environmental reasons or natural resources management. A wide range of uses is allowed on this land (e.g., agriculture, oil/gas/coalbed methane exploration and development, surface materials development, commercial ventures such as hotels and trail riding operations, and recreation).

3.1.1 Specific Agricultural Concerns

AltaLink has considered several specific concerns outlined in Rule 007 which are listed below and are associated with agricultural impacts. We have provided commentary on each of these concerns and how they may relate to the project.

a.) Loss of Crops - This includes short-term loss caused by construction; longer-term losses possible from soil erosion, rutting, drainage, disturbance, and soil mixing; and permanent loss of crop under or adjacent to the tower base

Short-term crop loss during construction is kept to a minimum with appropriate mitigation and construction practices. Such short-term losses are compensated through

[1] The White Area and Green Area are defined in the *Public Lands Operational Handbook December 2004*, published by Alberta Sustainable Resource Development.

damage payments to landowners. Permanent loss of crop under or adjacent to the tower base is mitigated through working with specific landowners during the Facility Application consultation, routing of the centerline relative to legal boundaries such as ¼ lines, and compensated for by annual tower payments. The vast majority of the right-of-way can still be used by the landowner for crop production. Potential impacts may be further reduced by landowner input on tower placement. Quantifying the amount of cropland and forage lands can be used as an indicator of the potential level of impact, with cropland being the most significant indicator.

b.) Short-term disruption of farming and livestock grazing resulting from construction
These potential impacts are mitigated through appropriate construction practices and working with specific landowners to minimize any disruption. Quantifying the amount of cropland and forage lands can be used as an indicator of the potential level of impact.

c.) Reduced efficiency of field operations
This potential impact is mitigated by determining tower placement that minimizes impact. Long-term impacts are considered when determining annual structure payments for towers. Quantifying the amount of cropland and forage lands can be used as an indicator of the potential level of impact, with cropland being the most significant indicator.

d.) Restrictions on use of aircraft and high-pressure irrigation systems
The presence of a transmission line can potentially impact use of aircraft for agricultural operations, such as crop spraying. This is very landowner and route specific, and aerial spraying is being used less often as high-wheel crop sprayers are becoming more common. The impact on the operation of irrigation equipment can usually be minimized through consultation with affected landowners around the placement of towers and centerlines. Any unavoidable impacts are considered when determining compensation payments for mitigations (changes to irrigation systems) or impacts.

e.) Risk of collision with tower; damage to equipment, lost time, liability for damage to tower and secondary liabilities
A landowner will not be held liable for tower damage unless it was deliberately caused by the landowner or his agents. If the transmission line is taken out of service by the damage, it is typically restored to service within 24 to 48 hours, so any disruption to farming activities due to repairs of the line and tower is short in duration. The potential of collision with a transmission tower is considered very low.

f.) Reduction in yield adjacent to towers due to overlapping farming operations and added soil compaction
Permanent loss of crop under or adjacent to the tower base is mitigated through working with specific stakeholders during the Facility Application consultation. The total area under the towers is always relatively small for overhead transmission lines. It is addressed and compensated for through annual tower payments. Potential impacts are further reduced by landowner input to tower placement. Quantifying the amount of cropland and forage lands can be used as an indicator of the potential level of impact with cropland being the most significant indicator.

g.) Added cost and inconvenience of weed control under towers
The added cost and inconvenience of weed control is compensated as part of the annual structure payments to landowners.

h.) Impact of height restrictions on equipment during field operations
All transmission lines in Alberta provide clearance for equipment 4.3 metres high on agricultural land. 500 kV power lines provide clearance for equipment 6.1 m high on agricultural land.

i.) Psychological impact of line
This is a subjective impact involving factors such as visual impact, electric and magnetic fields (EMF), land values and other issues, all of which are incorporated in the LIA and will be addressed in the Facility Application. Provision of unbiased information around EMF research from national and international health and scientific agencies often helps address some people's concerns.

j.) Loss of shelter belts
Impacts to shelter belts can be mitigated through routing offsets relative to legal boundaries such as ¼ lines along which shelter belts may exist. In some cases only trimming may be required. Compensation for re-establishment of a shelter belt is also a possibility. All of these are site specific and determined in consultation with the potentially affected landowner at the Facility Application stage.

k.) Shared use with other utilities and transmission lines
Utilization of existing linear disturbances is a factor in the final determination of routing during the Facility Application stage, as per the Alberta Environment's Transmission Planning Guidelines, and Alberta Transmission Regulations. At this conceptual planning stage, potential opportunities have been identified in the representative routings that could parallel existing transmission lines. Section 2.5 **Paralleling Existing Transmission Lines** discusses this further.

l.) Interference with citizen band radios
This is becoming less of an issue as Citizen Band (CB) radios are being replaced with newer technologies. However, CB radios operate at frequencies close to that of AM radios, neither of which are designed to be immune to power-line interference. The interference produced by power lines diminishes with distance from the power lines, making interference highly localized. All facilities will comply with federal guidelines related to radio interference.

3.1.2 Measurable Indicators for Agricultural Concerns

There are several high-level indicators that can be assessed at the Need Identification stage that can be measured for each of the representative routes in each of the six system alternatives. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the alternatives. These measurable indicators may

relate to one or more of the specific concerns identified in the AUC Rule 007 with respect to agricultural impact. The measurable indicators developed for agricultural impacts are:

1. Amount of Cultivated Land Crossed – Using existing land-cover type data, the approximate amount of affected agricultural land (cropland lands) can be determined. This can then be directly related to potential impacts on agricultural activities and associated concerns. **The most significant indicator for potential agricultural impact is amount of cultivated land crossed.**

2. Total Amount of Agricultural Land Crossed – This includes the cultivated land crossed plus forage lands which includes pasture. Using existing land-cover type data, the approximate amount of affected agricultural land (forage lands) can be determined. This can then be added to the cultivated lands and directly related to potential impacts on agricultural activities and associated concerns.

3. Agricultural Land Suitability Crossed – This measures the suitability of the lands from an agricultural perspective. Class 1 through 3 lands are good for cultivation, and classes 4 through 7 are lands that require increasingly intensive work for them to be productive.

4. Irrigated lands Crossed – This measures the potential impacts to irrigated lands from each of the alternatives

3.2 Residential Impact

Minimizing residential impact is an important consideration in the routing of transmission lines. There are sources of existing information such as County maps, air photographs and satellite images that can be used to provide an indication of the potential residential impacts associated with the proposed system-development plans.

Residential impact of new transmission lines is a significant factor for both rural and urban residents. Some portions of the LIA study area are highly settled when compared to other areas in the province. This includes areas near or in the cities of Lethbridge and Medicine Hat, as well as several surrounding cities, towns and smaller communities. As is typical with major urban centres, the majority of the population growth and residential development is occurring along the perimeter of Lethbridge, Medicine Hat and nearby communities where many residents commute to the city. In addition to the growth in urban areas, there is a considerable amount of country residential subdivisions present, under construction, and in the planning stages in the surrounding rural areas.

3.2.1 Specific Residential Concerns

AltaLink has considered several specific concerns outlined in Rule 007 which are listed below and are associated with residential impacts. We have provided commentary on each of these concerns and how they may relate to the project.

a.) Decrease of property values

This is a very site-specific impact. A preliminary determination of potential residences within 150m has been completed and applied to representative routes to provide an indication of potential number of residences that may be affected.

b.) Loss of developable lands and constraints on development

Development tends to happen in proximity to existing developed (urban) areas, i.e., residential density is a measure of potential impact. Therefore, minimizing routing in areas of existing residential density may help avoid areas with the highest development potential.

c.) Relocation or removal of residences

A preliminary determination of potential residences within 150 m of the representative routes can be used as a general indicator of the potential level of impact. However, it is difficult to assess the specific risk at this preliminary stage, as specific routes are not determined until the future Facility Application stage.

d.) Psychological impact of the line

This is a subjective impact involving factors such as visual impact, EMF, land values and other issues, all of which are incorporated in the LIA and will be addressed in the Facility Application. Provision of unbiased information around EMF research from national and international health and scientific agencies often helps address some people's concerns.

e.) Noise and TV interference

TV reception problems related to high-voltage transmission lines are unlikely. If interference does occur, it can often be resolved by relocating the TV or changing the antennae. The transmission lines are designed to meet allowable audible noise and TV interference. Where individual landowners are concerned, measurements will be taken before and after construction so signal interference beyond allowable levels can be identified and mitigated. There are sometimes increased levels of TV interference and audible noise immediately after construction until small imperfections on the conductors are naturally removed. As these types of concerns tend to be associated with residences, the number of residences within 150m can be used as an indicator of the potential level of impact.

f.) Windbreak and other vegetation removal

This is an issue where the removal or trimming of trees or other vegetation may be required when establishing a new right-of-way. It is also important to note that the overall impact is considered in making compensation payments for towers and land rights. This is site-specific and determined in consultation with the potentially affected landowner at the more detailed future Facility Application stage.

g.) Conflict with recreational use of land holdings

The proximity of known recreational areas, such as parks and natural areas can be determined in relation to representative routes. This can be used as a preliminary indicator of potential impacts.

h.) Public versus private land

The use of public land is generally viewed by landowners as a preferable alternative to using private lands. Existing data sources can provide a general indication of the amount of public ("Crown") versus private land, which can be used as an indicator of the potential level of impact. This project is in the White Area on almost exclusively private land. Large areas of public land (such as Federal or Provincial Parks) was identified in the mapping and avoided by the representative routes. Determination of small pieces of other public land would be done in the future during the more detailed route evaluations and land title searches in preparation for Facilities Applications.

3.2.2 Measurable Indicators for Residential Concerns

There are several high-level indicators that can be measured for each of the proposed plans and components and be assessed at this preliminary stage.
These measurable indicators can be used to conduct a broad comparison and establish potential differences between the plans. These measurable indicators may relate to one or more of the specific concerns identified in the AUC Rule 007 with respect to residential impact. The measurable indicators developed for residential impacts are:

1. Number of residences – It is assumed that the closer residences are to a transmission line and the higher the number of residences, the more residents will feel they are impacted. The categories are:

- Within 150 m of the centerline
- 0 – 800 m of the right-of-way, total residences

For the purpose of this assessment, it is assumed that there is a greater potential for residential impact on those residing within 150 m of the centerline. This is the distance established through landowner consultation during the route selection on the previous NS500kV facilities application. **The most significant indicator for potential residential impact is the total number of residences within 150 m**

3.3 Environmental Impacts

Existing environmental information was used to define areas in which potential representative routes may occur. Use of this data provided a general indication of environmental issues and relative impacts having potential to occur along representative routes associated with each of the system-development plans. These impacts will continue to be assessed as the project moves forward and additional information becomes available.

The potential environmental impacts from transmission lines are a concern for a variety of stakeholders and efforts to minimize such environmental impacts is a consideration when assessing the routing and the technologies associated with transmission lines. With respect to this project, portions of the study area are highly settled when compared to other areas in the province, resulting in existing levels of landscape fragmentation.

Several parks, natural areas, and other environmentally sensitive areas existing within the study area have been considered during evaluation of the plans.

One thing to note is that all of the proposed system-development plans can be built almost anywhere within the study area and pose some level of environmental impact. While some will have a lower or higher potential level when compared to others, almost all identified environmental impacts can be mitigated using various planning, routing and construction techniques to either eliminate or lower the potential impact.

3.3.1 Specific Environmental Concerns

AltaLink has considered several specific concerns outlined in Rule 007 which are listed below and are associated with environmental impacts. We have provided commentary on each of these concerns and how they may relate to the project.

a.) Increased public accessibility to wildlife areas

Typically this is an issue for treed/forested areas where there is currently little access. Access along the right-of-way on private land is managed in consultation with the landowner. One method of controlling access involves using locked gates. The proximity of representative routes to known wetlands and large treed areas can be determined using existing data sources, and can provide a general indication of the potential for an increase in the level of public access.

b.) Alteration of natural areas and interference with outdoor educational opportunities

The number of protected or designated areas that could be crossed by each alternative can be determined using existing data sources. This can provide a general indication of the potential level of this impact.

c.) Use of Restricted Development Area (TUC)

Currently none of the developed representative routing utilizes any part of an established TUC.

d.) Effect on erosion

AltaLink will attempt to avoid areas that pose potential erosion problems. If they cannot be avoided, then the intent is to work with associated regulatory agencies and landowners to develop appropriate mitigations and construction practices to minimize potential impacts. The amount of potential disturbance near water associated with each of the six system-development alternatives can provide a general indication of the potential level of impact.

e.) Unique ecological areas

There are some general indicators that can be used to identify unique ecological areas and the potential impact on these areas. Such indicators of unique ecological areas include the number of water crossings, the amount of designated sensitive areas that could be

crossed, and areas of native vegetation (including treed areas and grassland). Existing data sources can be used to understand and mitigate the level of impact associated with representative routes during construction, operation, and maintenance of the facilities.

f.) Impact to Waterfowl and Other Birds

One potential concern related to transmission lines is bird collisions with overhead wires crossing over or adjacent to wetlands and water bodies. Data layers representing the amount of wetland and open surface water areas can be used to determine which representative routes could have a higher magnitude of bird collisions.

3.3.2 Measurable Indicators for Environmental Concerns

There are several high-level indicators that can be assessed at this preliminary stage that can be measured for each of the six proposed alternatives. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the plans. These measurable indicators may relate to one or more of the specific concerns identified in the AUC Rule 007 with respect to environmental impact. The measurable indicators developed for environmental impacts include:

1. Surface Water Within 800 m of the Right-of-Way Edge – This includes measuring the amount of surface water within 800 m of the right-of-way. This measure is an indication of the proximity to nearby water sources such as drainages, lakes and other identified wetlands within a representative route of a proposed routing concept. Because this represents areas with potential for bird impacts, **this is one of the four most useful metrics for potential environmental impact.**

2. Amount of Native Grassland – Using existing data, which identifies existing land-cover types, the approximate amount of affected native grassland can be determined for representative routes. Because native grassland is a sensitive and diminishing resource, **this is one of the four most useful metrics for potential environmental impact.**

3. Sensitive Wetland Areas – Wetland data can be referenced to determine the presence of sensitive wetland areas in relation to potential routing. This metric represents areas that are known to be used by waterfowl. In this area of the province impacts to larger areas is typically avoided through route selection and to small areas by tower placement. Because this represents areas of highest potential for bird collisions**, this is one of the four most useful metrics for potential environmental impact.**

4. Crossing Treed Areas – Existing data can be referenced to determine the presence of relatively large, contiguous treed areas (>100 ha) that may be impacted by potential routing. Because contiguous treed areas are diminishing in central Alberta, **this is one of the four most useful metrics for potential environmental impact.**

5. Protected or Designated Areas Crossed – Using federal and provincial data-sets, the number of parks, natural areas, environmentally sensitive areas (ESAs) or other designated sensitive areas that may be crossed by the various system-development plans

and associated components. Environmentally Sensitive Areas (ESAs) are areas identified by municipal, provincial or federal governments that have a recognized significance (local, provincial, national) and have been subsequently designated as areas requiring additional consideration. In the study area, there have been several ESAs identified.

3.4 Cost

The information and findings in the LIA do not consider the influence of cost.

3.5 Electrical Considerations

Electrical considerations play an important role when assessing potential impacts associated with the proposed plans. While the technical considerations, such as transfer capability, system flexibility, system reliability and losses are considered by the AESO separately, some land impacts related to electrical considerations can be identified. Technical requirements and the other electrical considerations associated with the plans can affect the presence or level of impacts on the land. Existing sources of data can be used to estimate the potential impacts associated with the proposed plans.

3.5.1 Specific Electrical Considerations

AltaLink has considered several specific concerns, listed below, associated with electrical considerations, and have provided commentary on each of these concerns and how they may relate to the project.

a.) Ease of connections to future load areas

This relates to electrical capacity, location of the facilities and the type of technology used (overhead vs. underground). This specific concern does not have any direct land impact and will be considered by the AESO separately.

b.) Reliability and repairability of the line

The reliability and repairability of a line as it relates to the specific technology being considered does not have any impact from a land perspective. However, wet soil conditions can present difficulties for future maintenance and repair activities. Detailed identification of wet areas can be determined during the more detailed Facility Application processes that may occur in the future.

c.) Access for construction and maintenance of the line

. Paralleling major roads or existing transmission lines can reduce some of the potential access concerns associated with new facilities.

3.5.2 Measurable Indicators

There are several high-level indicators that can be measured for each of the components and their associated system-development plans being considered. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the components and their associated system-development plans. These

measurable indicators may relate to one or more of the specific concerns identified in the AUC Rule 007. The measurable indicators developed for electrical considerations are:

1. Right-of-way length – The length of the transmission line is a key cost driver and can be used by the AESO in loss calculations.

2. Paralleling Existing Transmission Lines– Paralleling existing transmission lines is an effective way to reduce the amount of new linear disturbance and fragmentation. Landowners and agencies commonly request this of TFOs when they are considering establishing a new transmission line in an area.

3. 240kV Circuits Crossed – Crossing 240kV circuits introduces points of vulnerability to the 240kV / 500kV transmission system. The crossings cost about $3M each, and have a significant footprint.

3.6 Visual Impact

Visual impacts are generally considered a social impact that depends on an individual stakeholder's opinions. . There are existing sources of data that can be used to estimate the potential impacts associated with the proposed plans. These impacts will continue to be assessed as the project moves forward and additional information becomes available.

Visual impacts are closely related to residential impacts as they are typically influenced by similar factors. However, additional impacts may be experienced by other groups, such as recreational users (hikers, fishermen, hunters, etc.), recreational installations, roads and others.

There are some general assumptions that can be made for all overhead transmission lines:

- The closer the line is to a residence, the more likely a visual impact will be perceived.
- The higher the residential density, the more likely a visual impact will be perceived.
- Paralleling similar, existing transmission facilities has a lower visual impact than a greenfield route where there is no existing line.
- Close proximity to parks, natural areas and other recreational areas can be viewed as creating a higher degree of visual impact than in other areas.
- Avoiding the tops of hills, ridges and other topographic heights of land reduces the potential level of visual impact.
- Significant clearing of mature-treed areas increases the potential level of visual impact by removing what is generally considered an aesthetically pleasing feature on the landscape and potential screening of the transmission line.

3.6.1 Specific Visual Concerns

AltaLink has considered several specific concerns outlined in Rule 007 which are listed below and are associated with visual impacts. We have provided commentary on each of these concerns and how they may relate to the project.

a.) Visual impact of tree removal as seen from roads and recreational installations

Many stakeholders view the removal of trees as a visual impact. While the study area is primarily cleared land, an approximate amount of treed lands can be determined for representative routes that can be related to the level of potential tree removal and subsequent impact levels.

b.) Visual impact on dispersed recreational users such as hikers, fishermen, hunters, scenic viewers, and cross-country skiers

Areas commonly used by recreational users can be identified using existing data sources. These can then be compared with the various routes associated with each of the plans to provide a general indication of the potential level of impact.

c.) Visual impact of towers and lines as seen from residences, farms, roads, and recreational installations

The number and type of residences and landowners near representative routes can provide an indication of the potential visual impact. The type of tower being proposed can also impact the potential level of visual impact.

3.6.2 Measurable Indicators for Visual Concerns

There are several high-level indicators that can be measured for each of the components and associated system-development plans being considered. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the system-development plans. These measurable indicators may relate to one or more of the specific concerns identified in AUC Rule 007. The measurable indicators developed for visual impacts are:

1. Number of residences within 150m – For routing assessment purposes, it is assumed that the closer residences are to a transmission line and the higher the number of residences within the line-of-sight, the more residents will feel they are impacted.

For the purpose of this assessment, it is assumed that there is a greater potential for visual impact on those residing within 150 m of the centerline. **The most significant indicator for potential visual impacts is the total residences within 150m,** because they are the most significant receptor.

2. Proximity to Protected and Designated Areas – Using data from Alberta Sustainable Resource Development (ASRD), the number of parks, natural areas, and environmentally sensitive areas within 800 m of representative routes can be determined.

3.7 Special Constraints

Special constraints are issues or factors that may impact potential routing options unique to the specific study area being assessed. Using existing sources of available data, there are several special constraints that have been identified and incorporated for the project study area.

3.7.1 Specific Special Constraints

AltaLink has considered the one specific concern in AUC Rule 007 that can be associated with special constraints, as well as identified several additional special constraints that may relate to the project.

a.) Electrical interference with radio transmitting stations, and other telecommunication equipment – (from AUC 007)

There is the potential for transmission facilities to impact radio and other telecommunication equipment, and several telecommunications facilities have been identified within the study area. The intent is to work with affected facility owners to ensure appropriate routing and mitigation methods are employed to minimize or eliminate any potential impact. Following the construction of the proposed facilities, radio frequency interference (RFI) measurements will be taken to ensure that federal guidelines are not exceeded. Any interference problems caused by the new facilities will be mitigated by AltaLink.

b.) Major River Crossings

Major river crossings can present potential constraints related to technical design, environmental implications, timing restrictions and associated cost implications. Potential impacts on major river crossings are minimized by crossing overhead and complying with setbacks to the normal high-water marks for the crossing structures. Riparian vegetation can be selectively removed to minimize impacts. While an accurate determination of major river crossings cannot be determined until the more detailed Facilities Application stage, representative routes can be used to determine the potential for major river crossings. This in turn can provide a general indication of the level of impact.

c.) Proximity to Historical Resources – Historical resources are specific sites that have been identified within the province that hold particular archaeological significance. The province maintains a registry of known locations and, depending on the significance of a particular site, there may be constraints placed on nearby planned development or disturbance. This is particularly true for subsurface disturbances.

d.) Proximity to Major and Minor Airports – The presence of Airports, airstrip, and aerodromes present a challenge to routing each with a specific setbacks. The potential conflicts range from collision hazards to interference with radio and navigational equipment. Transport Canada maintains a list of all registered Airports, airstrip, and aerodromes.

3.7.2 Measurable Indicators for Special Constraints

There are several high-level indicators that can be measured for each of the plans being considered. These measurable indicators can be used to conduct a broad comparison and establish potential differences between the plans. These measurable indicators may relate to one or more of the specific concerns identified in the AUC Rule 007. The measurable indicators developed for special constraints are:

1. Proximity to Historical Resources – This utilizes data provided by Alberta Culture and Community Spirit to determine the presence of any identified historical resources within 800 m of the representative routes for the system-development plans and components.

2. Major River Crossings – This is the number of major river crossings that a representative route within a proposed routing concept crosses. (e.g.., Red Deer River)

3. Proximity to Airports – The number of Airports, airstrip, and aerodromes utilizes the data provided by Transport Canada as well as a review of the aerial photography adjacent to the representative routing. Mitigation of conflicts will take place at the facility application stage.

4 INFORMATION SOURCES

The following information sources were reviewed as part of this Land Impact Assessment:

References

Agronomic Interpretations Working Group. 1995. Land Suitability Rating System For Agricultural Crops: 1. Spring Seeded Small Grains. Edited by W.W. Pettapiece. Tech. Bull. 1995-6E. Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada, Ottawa.

Alberta Agriculture and Food. 2007. Land Suitability Rating System Classes For the Agricultural Region of Alberta. September 2007. 2 pp.

Alberta Culture and Community Spirit. 2008. Listing of Historic Resources Septemher 2008 edition. Historic Resources Management Branch, Alberta Culture and Community Spirit. Edmonton, Alberta.

Pryde Schropp McComb Inc. 2003. Inventory of Alberta Regional and Local Airports Assessment of Facilities Final Report. Prepared for Aviation Strategy Action Group. Edmonton, AB. February 18, 2003.

Internet Sites

Alberta Sustainable Resource Development (ASRD). 2004. Native Prairie Vegetation Inventory. Available at: http://www.srd.gov.ab.ca/lands/geographicinformation/resourcedataproductcatalogue/nativeprairievegitationinventory.aspx. Accessed: January 2008.

Alberta Tourism Parks and Recreation (ATPRC). 2008. Protected Areas ArcView Shapefile. Updated to April 24, 2008. Available at: http://www.tpr.alberta.ca/parks/landreferencemanual/default.aspx

Alberta Tourism Parks and Recreation (ATPRC). 2007. Crown Reservation Areas ArcView Shapefile. Updated to April 24, 2008. Available at: http://www.tpr.alberta.ca/parks/landreferencemanual/default.aspx

Sweetgrass Consultants Ltd. 1997. Environmentally Significant Areas of Alberta ArcView Shapefile accompanying Environmentally Significant Areas of Alberta Volume 1,2,3. Report prepared for: Resource Data Division, Alberta Environmental Protection. Edmonton, Alberta. Available at: http://www.tprc.alberta.ca/parks/heritageinfocentre/environsigareas/default.aspx.

Treeline Ecological Research. 1998. Environmentally Significant Areas of the Rocky Mountain Natural Region of Alberta Arcview Shapefile accompanying , Environmentally Significant Areas Inventory of the Rocky Mountain Natural Region of Alberta Final Report. Prepared for Corporate Management Service, Alberta Environmental Protection. January 17,

1998. Available at:
http://www.tpr.alberta.ca/parks/heritageinfocentre/environsigareas/default.aspx

Data Sources & Maps

Imagery Source: Telus Geomatics. 2008. SPOT5 Panchromatic Satellite Imagery, 2.5m resolution, Digital Imagery. Imagery Acquired in 2006 - 2007. Edmonton, Alberta.

AltaLIS Ltd. Various Dates. 1:20,000 Base Features, Geographic Information System (GIS) Spatial Database, Scale 1:20,000. Calgary, Alberta.

Alberta Soil Information Centre (ASIC). 2001. AGRASID 3.0: Agricultural Region of Alberta Soil Inventory Database (Version 3.0). (ed.) J.A. Brierley, T.C. Martin, and D.J. Spiess. Agriculture and Agri-Food Canada, Research Branch; Alberta Agriculture, Food and Rural Development, Conservation and Development Branch.

Prairie Farm Rehabilitation Administration (PFRA). 2001. Western Grains Transition Payment Program (WGTPP) Generalized Landcover. Agriculture and Agri - Food Canada

Important Bird Areas (IBAs) from BirdLife International. IBAs were obtained in a shapefile from Birdlife International by AltaLink. Data is current to 2004 (Heck 2008).

Wetlands were obtained from Ducks Unlimited Canada by AltaLink (Heck 2008). The data is current to 2006 and includes key molting and staging areas identified through field surveys and conservation efforts.

Alberta Agriculture and Rural Development. 2008. Irrigation District Data Information Database. Water Resources Branch Lethbridge, Alberta. Provided by Bob Winter, Data Management Coordinator, Water Resources Branch Lethbridge, Alberta.E-mail August 12, 2008.

Personal Communication

Tony Brierly. Land Resource Scientist, Agriculture and Agri-Food Canada, Edmonton. E-mail Correspondence. Attached File: ALL_Alberta_AGASID LSRS Ratings.DBF. September 2, 2008.

Heck, N. 2008. Environmental Advisor, AltaLink Management Ltd. Calgary, Alberta. E-mail March 20, 2008.

5 ACRONYMS

AESO - Alberta Electric System Operator

AltaLink – AltaLink Management Ltd.

ASRD - Alberta Sustainable Resource Development

ATCO – ATCO Electric Ltd.

AUC - Alberta Utilities Commission

DC - Direct Current

DND - Department of National Defence

ESA - Environmentally Sensitive Area

ha – Hectare

m - Metre

NID - Need Identification Document

R-O-W – Right-of-Way

TFO - Transmission Facility Owner

TUC - Transportation and Utility Corridor (around Lethbridge), also sometimes known as a restricted development area (RDA)

6 GLOSSARY

Aspect	The seven major aspects that the AESO must have regard for in determining technical options.
Facility Application	The Facility Application is developed and submitted by the TFO to the AEUB once final route and site selections have been made. These final selections are based on the direction provided by the AESO. It also involves an extensive public consultation program, detailed field surveys and other work.
Right-Of-Way	The right-of-way refers to the land required to build a proposed transmission line. The width considers several factors to ensure the safe and reliable operation of the line, which includes adequate clearance distances, access for maintenance and other factors.
Study Area	The study area refers to the general area in which the proposed developments could be located. This is the area that is considered for potential routing scenarios and the subsequent land impact assessment.
Need Identification Document	The need identification document is developed and submitted by the AESO to the AEUB once a technical solution has been recommended.

7 APPENDICES

Appendix A

Discussion of Using Roads For High Voltage Power Transmission Line Routes

Discussion of Using Roads For High Voltage Power Transmission Line Routes

Introduction

The AESO has asked for a report examining the possibility of using or paralleling roads or highways for routing high voltage transmission lines. This was a question that was posed at several of the AESO Open Houses.

This short report comments on; the recent MATL decision on this topic, road widening, impacts of road routes vs. ¼ line alignments, and routing in the White Zone vs. the Green Zone.

Roads and other linear facilities are evaluated by TFO's when looking for routes, and typically roads are one of the higher impact alignments.

MATL Decision Report

On page 23/24 of the EUB MATL January 2008 Decision Report 2008-006 the topic of road allowances for 240 kV transmission lines was discussed as follows:

"…the Board … is not aware of any places in Alberta where a 230-kV transmission line is located on a rural road allowance. The general practice in rural Alberta for 230-kV transmission lines is to place them on private land well in from any road allowance due to the size of the structures and the ROW needed to contain the swing of conductors.

In addition to the impacts on residences … the Board sees a safety impact of putting the MATL line along a road allowance. The Board is aware that the movement of large machinery is very common on rural roads and also the transportation of houses, granaries, and other large structures is not an uncommon site. It appears to the Board that standard road allowances, being only 20 m wide, would basically be half the ROW of a 230-kV transmission line. The Board , therefore, foresees that were it to approve either alternative route that would essentially sterilize, or at the very least greatly reduce the usability of those road allowances for the movement of large equipment or the transportation of structures that extend well beyond the actual road surface.

The Board, noting the impacts on the residences along the road allowances … rejects Alternatives C and D for the routing of MATL's 230-kV transmission line."

Road Widening

Paralleling roads has the risk of having to relocate sections of the route when the road authority decides that the road will be widened. This is a common occurrence for 138 kV transmission lines on road allowances, and is an acceptable cost and inconvenience

when compared to locating 138 kV on private lands. For major transmission lines, such as 500 kV the inconvenience and cost and potential system impacts of relocating for a road widening are considerable.

Road Allowances/Highways or ¼ Lines

It is the experience of AltaLink that the least impact location for a cross country lattice steel transmission line is along ¼ lines. The towers can either straddle the ¼ line, so each landowner has ½ a tower or the towers can be placed on one side of the ¼ line thus being at the edge of the field. Both locations reduce agricultural impacts. There are far fewer residences along ¼ lines as residences are typically located beside road allowances for access. Municipalities have setback requirements for facilities located on private land adjacent to roads, resulting in the towers potentially being located well onto the landowner's land. Paralleling road allowances will typically result in impacts to more residences and businesses. Road allowances and highways are also the preferred locations for distribution and lower voltage transmission power lines, telephone lines, fibre optic lines and low pressure gas pipelines.

White Area or Green Area

The NS 500 kV would be located within the White Area[2] of Alberta. In the white area, there is typically considerable development along roads. Most of the discussion in this paper would not apply to the Green Area of Northern Alberta as there is typically less development. In the Green Area, paralleling roads can result in opportunities to follow existing linear disturbance which could result in less tree clearing and provide access for improved construction and operation.

---

[2] The White Area and Green Area are defined in the *Public Lands Operational Handbook December 2004*, published by Alberta Sustainable Resource Development:

GREEN AREA

Public land in Alberta is divided into two broad land use designations referred to as the Green Area and White Area. The Green Area contains forested lands that are not available for agricultural development other than grazing. Most of this area is located in northern Alberta, with the remainder in the mountains and foothills along the western boundary of the province. Public land in the Green Area is generally not available for sale or settlement.

Depending on the location, a number of uses may be permitted (e.g., timber production, oil and gas exploration and development, mineral and surface materials exploration and development, commercial ventures such as trail riding operations, and recreation). Natural gas in coal, which is also called coalbed methane (CBM) is treated in a similar fashion to conventional natural gas and development may be permitted in some areas. Specific land management guidelines have been developed for the Green Area to ensure proper use of the land and resources.

WHITE AREA

The White Area contains most of the land suitable for cultivating. Although much of this land is privately owned, the provincial government has retained a few parcels for environmental reasons or natural resources management. A wide range of uses is allowed on this land (e.g., agriculture, oil/gas/coalbed methane exploration and development, surface materials development, commercial ventures such as hotels and trail riding operations, and recreation). Specific land management guidelines have been developed for multiple use of this land base.

Summary

In general, roads are not a good location for a 240 kV or 500 kV transmission line because the number of residence impacts is typically higher, impacts to number of businesses is higher, impacts to facilities and commercial buildings adjacent to roads, safety, impacts to road use is increased, and the risk of future impacts from road widening are considerable.

APPENDIX G COST ESTIMATES

Facility Substations	Description	Revised Alternatives					
		1A (2008$M)	1B (2008$M)	1C (2008$M)	2 (2008$M)	3 (2008$M)	4 (2008$M)
A	Switching sub, South of Peigan 59S: Line B termination 2-240kV line terminals				9.8		
C	Switching sub, South of Taber 83S: Lines C1(C2), D & E termination 4-240kV line terminals, 50 MVAR reactor, 0 to -100MVAR SVC	59.3	59.3	59.3			
	Line D2 termination 2-240kV line terminals				11.2		
	Lines C1 & E termination 2-240kV line terminals					10.3	
	Lines C1, D & E termination 5-240kV line terminals 50 MVAR reactor, 0 to -100MVAR SVC						56.85
D	Switching sub, South of Bullshead 523S: Line E, F & G termination. 3-240kV line terminals. 25 MVAR reactor, 0 to -100MVAR SVC	58.4	58.4	58.4			
	Line G2 termination 2-240kV line terminals				10.1		

Facility	Description	Revised Alternatives					
Substation		1A (2008$M	1B (2008$M	1C (2008$M	2 (2008$M	3 (2008$M	4 (2008$M
Matl 120S Substation	Proposed MATL Sub 4x240kV line terminal,4-CB	7.3	7.3	7.3			
	4x240kV line terminal, 8-CB 50 MVAR reactor, 0 to -100MVAR SVC				64.4		
H	500/240kV, 2-3x400MVA sub, south of Bullshead 523S. Lines E &F1 Termination: 2-500kV line terminals Lines X & Y termination: 2-240kV line terminals					147.4	
DeWinton	New Calgary Area Plan 240/138kV sub south of Calgary Line J termination, 2-CBs	4.6	4.6		4.6	4.6	4.6
	Line j & K termination, 5-CBs			12.9			

Facility	Description	Revised Alternatives					
Substation		1A (2008$M	1B (2008$M	1C (2008$M	2 (2008$M	3 (2008$M	4 (2008$M
Peigan 59S	2x200MVA TX, line J termination, reactor + SVC 240kV Switchyard equipment Upgrading	81.6		81.6			81.6
	2x200MVA TX, line J & C2 terminations, reactor + SVC 240kV Switchyard equipment Upgrading		85.2				
	2x200MVA TX, Line J termination 240kV Switchyard equipment Upgrading					34.2	
	2x200MVA TX, line J & B terminations, reactor + SVC 240kV Switchyard equipment Upgrading				86.9		
Milo Jct	Switching sub west of West Brooks Line 923,924,927&935 terminations 6x240kV line terminals, 9-CBs	24.6	24.6	24.6	24.6		24.6
	500/240kV, 2x1200MVA sub west of W. Brooks Line 923, 924, 927, 935, Y, Z 6x240kV line terminals, 9-CBs 2x500kV line terminals, 3-CBs					161.1	

Facility / Substations	Description	Revised Alternatives					
		1A (2008$M)	1B (2008$M)	1C (2008$M)	2 (2008$M)	3 (2008$M)	4 (2008$M)
Crowsnest	500/240kV, 2x1200MVA sub Close to Coleman 799S Line A &1201L termination 2x500kV line terminals, 4-CBs 2x240kV line terminals, 4-CBs	132.7	132.7	132.7	132.7		132.7
	Lines A, X & 1201L termination 3x500kV line terminals,6-CBs 2x240kV line terminals, 4-CB					147.8	
Ware Jct	Includes upgrade of the ampacity of some existing 240 kV components. Line H & W. Brooks-Anderson termination 4x240kV line terminals, 6-CBs	24.6	24.6		24.6		24.6
	W. Brooks-Anderson termination 2x240kV line terminals,3-CBs			10.3		10.3	
Goose Lake	Includes upgrade of the ampacity of some existing 240 kV components. Lines C1 & A1 terminations 3x240kV Line terminals, 6-CBs	16.6		16.6		16.6	16.6
	Includes upgrade of the ampacity of some existing 240 kV components. Line A termination 2x240kV Line terminals, 5-CBs		15.9		15.9		

Facility	Description	Revised Alternatives					
Substations		1A (2008$M)	1B (2008$M)	1C (2008$M)	2 (2008$M)	3 (2008$M)	4 (2008$M)
W. Brooks	Includes upgrade of the ampacity of some existing 240 kV components. Line G4 Terminations 2-240kV Line terminal, 4-CBs	21.9	21.9				
	Lines G4, K, W. Brooks-Anderson 4-240kV Line terminal, 6-CBs			26.2			
	Line G4 terminations 2-240kV Line terminal, 6-CBs 50 MVAR reactor, 0 to -300MVAR SVC				87.7		
Langdon	Line H terminations 3-240kV Line terminal, 3-CBs 240kV Switchyard equipment Upgrading	18.2	18.2		18.2		
	Line Z termination 1-500kV Line terminal, 2-CBs 500/240kV, 1-3x400MVA					31.7	
Cypress	240kV CB addition, +25/-50MVAR SVC Addition	31.1	31.1	31.1	31.1		31.1

Facility Substations	Description	Revised Alternatives 1A (2008$M)	1B (2008$M)	1C (2008$M)	2 (2008$M)	3 (2008$M)	4 (2008$M)
Med. Hat 2	240/138kV, 400 MVA sub 2 x 200 MVA LTC transformers 240 kV and 138 kV Switchyard 4x240kV line terminal, 6-240 kV CBs 8x138kV line terminations Split 138 kV bus	40.3	40.3	40.3	40.3		
	240/138kV, 400 MVA sub 2 x 200 MVA LTC transformers 240 kV and 138 kV Switchyard 2x240kV line terminal, 4-240 kV CBs 8x138kV line terminations Split 138 kV bus					35.9	35.9
Coleman	138kV/138kV, 120 MVA Phase-shifting Transformer	13.3	13.3	13.3	13.3	13.3	13.3

Facility	Description	Revised Alternatives					
Lines		1A (2008$M)	1B (2008$M)	1C (2008$M)	2 (2008$M)	3 (2008$M)	4 (2008$M)
A1	240kV, 4 km, D/C, 2x1033, Goose Lake 103S to Highway 785 WF	9.0	9.0	9.0		9.0	9.0
	240kV, 4 km, D/C, 2x477 ACSS, Goose Lake 103S to Highway 785 WF				8.06		
A3	240kV, 43.2 km, D/C, 2x1033, Highway 785 WF to Crowsnest	60.0	60.0	60.0		60.0	60.0
	240kV, 43.2 km, D/C, 2x477 ACSS, Highway 785 WF to Crowsnest				49.9		
B	240kV, 71 km, D/C, 2x477 ACSS From Peigan 59S to Sub A				96.6		
C1	240kV, 220 km, D/C 1-strg, 2x795, Goose Lake to Sub C	186.5		186.5		186.5	186.5

Facility / Lines	Description	Revised Alternatives					
		1A (2008$M)	1B (2008$M)	1C (2008$M)	2 (2008$M)	3 (2008$M)	4 (2008$M)
C2	240kV, 240 km, D/C 1-strg, 2x795, Peigan to Sub C		220				
D	240kV, 64 km, D/C 1-strg, 2x795, Sub E (MATL) to Sub C	61.7	61.7	61.7			
	240kV, 64 km, D/C, 2x795, Sub E (MATL) to Sub C						
D2	240kV, 64 km, D/C 1-strg, 2x477 ACSS, Sub E (MATL) to Sub C				88.7		
E	240kV, 73 km, D/C, 2x795, Sub C to D	75.5	75.5	75.5			
	240kV, 73 km, D/C, 1-strg 2x795, Sub C to D					64.3	64.3
G3	240kV, 102 km, D/C, 2x1033, Sub D to Med. Hat 2	138.9	138.9	138.9			
	240kV, 102 km, D/C, 2x477 ACSS, Sub D to Med. Hat 2				116.5		
	240kV, 102 km, D/C, 2x795, Sub D to Med. Hat 2					100.3	100.3

Facility / Lines	Description	Revised Alternatives					
		1A (2008$M)	1B (2008$M)	1C (2008$M)	2 (2008$M)	3 (2008$M)	4 (2008$M)
G4	240kV, 117 km, D/C, 2x1033, Med. Hat 2 to W. Brooks	160.8	160.8	160.8			
	240kV, 117 km, D/C, 2x477 ACSS, Med. Hat 2 to W. Brooks				135.0		
G5	240kV, 203 km, D/C, 2x477 ACSS, Sub D to W. Brooks				129		
H	240kV, 137 km, D/C, 2x1033, 50% SC @ midpoint, Ware Jct 132S to Langdon 102S	246.5	246.5				
	240kV, 137 km, D/C, 2x477 ACSS, 50%@ SC midpoint, Ware Jct 132S to Langdon 102S				211.3		
J	240kV, 150 km, D/C, 2x1033, 50% SC @ midpoint, Peigan 59S to DeWinton	265.5	265.5	265.5		265.5	265.5
	240kV,150 km, D/C, 2x477 ACSS, 50% SC @ midpoint, Peigan to DeWinton				226.7		

Facility	Description	Revised Alternatives					
Lines		1A (2008$M)	1B (2008$M	1C (2008$M)	2 (2008$M)	3 (2008$M)	4 (2008$M)
K	240kV, 147 km, D/C, 2x1033, 50% SC @ midpoint, West Brooks 28S to DeWinton			260.0			
X	500kV, 275 km, S/C, 3x1590, Crownsnest to Sub H					415.6	
Y	500kV,221 km, S/C, 3x1590, Milo Jct to Sub H					330.2	
Z	500kV, 113 km, S/C, 3x1590, Milo Jct to Langdon 102S					174.9	

Facility / Lines	Description	Revised Alternatives					
		1A (2008$M)	1B (2008$M)	1C (2008$M)	2 (2008$M)	3 (2008$M)	4 (2008$M)
HVDV	+/-500kV, 335 km, S/C bipolar, 2000 MW, Langdon 102S to HVDC A sub.						1266.9
	HVDC "A" : Switching sub close to Burdett & connected to converter station A 2-240kV line terminals, 3-CB						
	Converter Station A: DC/AC converter station for HVDC Line & connected to HVDC A sub						
	Langdon: +/- 500kV HVDC converter station						
911L(Salvage)	Salvage existing 240kV 911L from Peigan to Janet, ~161km	18.8	18.8	18.8	18.8	18.8	18.8
Blackie Area 138kV Reconfiguration	Reconfiguration Lines in the Blackie-Queenstown area.	18.1	18.1	18.1	18.1	18.1	18.1
Med. Hat 138kV Reconfiguration	Reconfiguration Lines in the Medicine Hat area.	50.3	50.3	50.3	50.3	50.3	50.3
Total Estimated Cost 2008$ M, No Escalation nor AFUDC		1826.4	1862.7	1819.9	1724.6	2307	2461.6

ALTALINK

- Need Identification Documents and Interconnection Single Line Diagrams (Substations) -

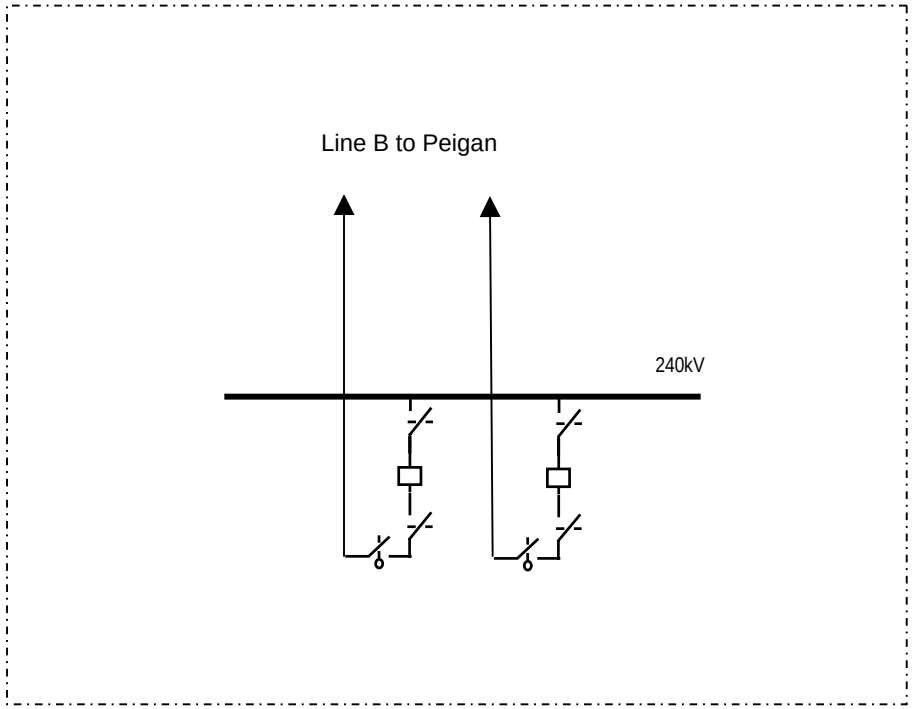
Estimate Summary for Need Identification Document (NID)

Project: SATD - New 240kV Substation A (Alt. 2)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 15, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 6,403,676	$ -	$ 6,403,676	$ -
Telecommunication	$ 324,032	$ -	$ 324,032	$ -
Total Facility Costs	**$ 6,727,707**	**$ -**	**$ 6,727,707**	**$ -**
Owners Costs	$ 135,000	$ -	$ 135,000	$ -
Distributed Costs	$ 2,250,137	$ -	$ 2,250,137	$ -
Total Owners and Dist. Costs	**$ 2,385,137**	**$ -**	**$ 2,385,137**	**$ -**
Total Direct Costs	**$ 9,112,844**	**$ -**	**$ 9,112,844**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 729,028	$ -	$ 729,028	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 729,028**	**$ -**	**$ 729,028**	**$ -**
TOTAL PROJECT COSTS	**$ 9,841,872**	**$ -**	**$ 9,841,872**	**$ -**

Assumptions and Risks

Site development for a typical 240/138kV source sub (150x110m) - Land available in the area
OPGW with MUX / LAN for a 240kV substation - SCADA system for a new 240kV Sub.
Standard "A" & "B" line protection
Typical control building for a 240/138kV source sub
Construction proceeds in a continuous fashion



LEGEND:

- Substation Fence
- Faulting Switch
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Provisions for Future development

ALTALINK

Substation A –Alt 2.

DATE	BY	SLD NO.
06-18 - 2008	RG	08-159

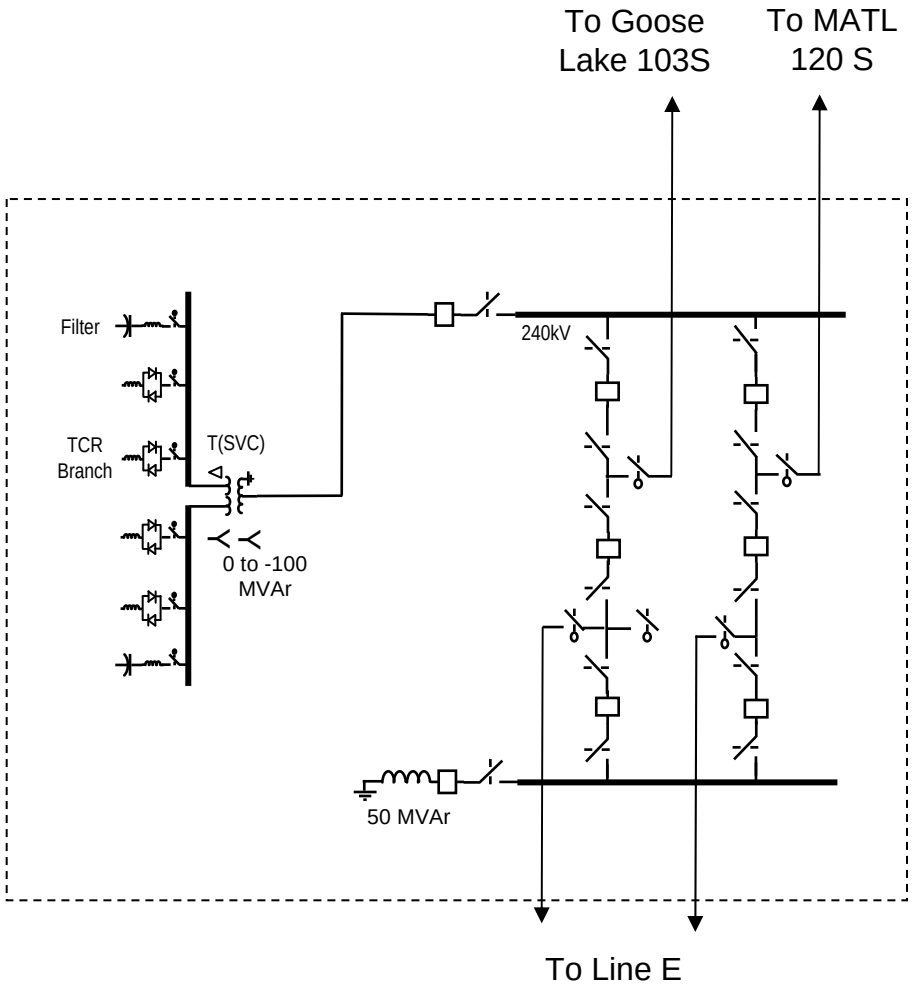
Estimate Summary for Need Identification Document (NID)

Project: SATD - New 240kV Sub C (Rev. Alts. 1A, 1B & 1C)
TFO: AltaLink
Prepared by: Rafael Guzmàn
Date: September 24, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 44,154,391	$ -	$ 44,154,391	$ -
Telecommunication	$ 424,832	$ -	$ 424,832	$ -
Total Facility Costs	**$ 44,579,223**	**$ -**	**$ 44,579,223**	**$ -**
Owners Costs	$ 160,000	$ -	$ 160,000	$ -
Distributed Costs	$ 10,194,981	$ -	$ 10,194,981	$ -
Total Owners and Dist. Costs	**$ 10,354,981**	**$ -**	**$ 10,354,981**	**$ -**
Total Direct Costs	**$ 54,934,204**	**$ -**	**$ 54,934,204**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 4,394,736	$ -	$ 4,394,736	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 4,394,736**	**$ -**	**$ 4,394,736**	**$ -**
TOTAL PROJECT COSTS	**$ 59,328,940**	**$ -**	**$ 59,328,940**	**$ -**

Assumptions and Risks

Land for site will be available in the area proposed.
Outages will be available when required and when scheduled.
Construction will proceed in a continuous fashion. Geo-technical studies will be required.
There are no unusual site development requirements.
The reactor and SVC prices are turn key.
Bus will be capable of 5 kA amperes. Breaker diamters will be capable of 3 kA.



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Fuse
- Disconnect Switch
- Proposed Development

ALTALINK

Sub C – Rev. Alts 1A, 1B & 1C

DATE	BY	SLD NO.
2008- 09 - 24	RG	08 - 307

Estimate Summary for Need Identification Document (NID)

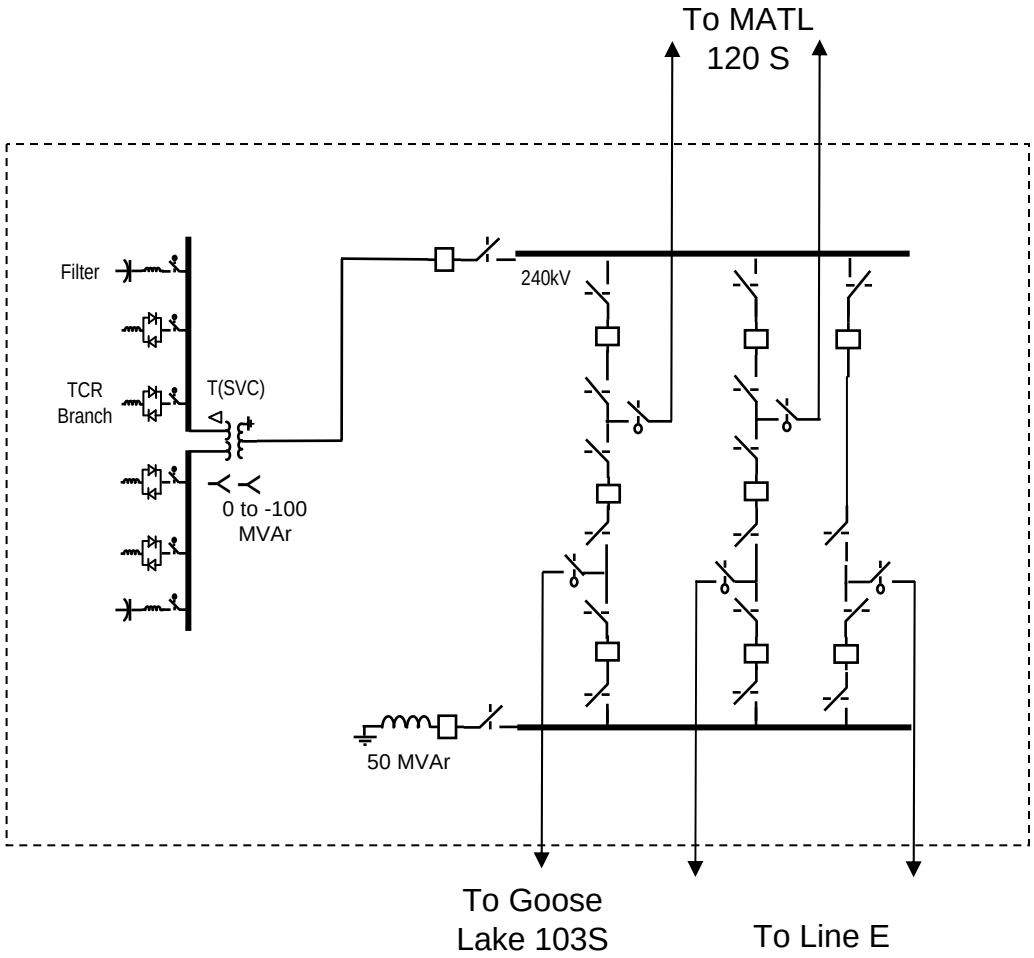
Project: SATD - New 240kV Sub C
(Alt. East Wind Scenario)

TFO: AltaLink
Prepared by: Rafael Guzmàn
Date: September 16, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 45,923,443	$ -	$ 45,923,443	$ -
Telecommunication	$ 424,832	$ -	$ 424,832	$ -
Total Facility Costs	**$ 46,348,275**	**$ -**	**$ 46,348,275**	**$ -**
Owners Costs	$ 160,000	$ -	$ 160,000	$ -
Distributed Costs	$ 10,755,311	$ -	$ 10,755,311	$ -
Total Owners and Dist. Costs	**$ 10,915,311**	**$ -**	**$ 10,915,311**	**$ -**
Total Direct Costs	**$ 57,263,586**	**$ -**	**$ 57,263,586**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 4,581,087	$ -	$ 4,581,087	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 4,581,087**	**$ -**	**$ 4,581,087**	**$ -**
TOTAL PROJECT COSTS	**$ 61,844,673**	**$ -**	**$ 61,844,673**	**$ -**

Assumptions and Risks

Land for site will be available in the area proposed.
Outages will be available when required and when scheduled.
Construction will proceed in a continuous fashion. Geo-technical studies will be required.
There are no unusual site development requirements.
The reactor and SVC prices are turn key.
Bus will be capable of 5 kA amperes. Breaker diameters will be capable of 3 kA.



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Fuse
- Disconnect Switch
- Proposed Development

ALTALINK

Sub C – East Wind Scenario

DATE	BY	SLD NO.
2008- 09 - 16	RG	08 - 272

Estimate Summary for Need Identification Document (NID)

Project: SATD - New 240kV Sub D
(Rev. Alts. 1A, 1B, and 1C)

TFO: AltaLink

Prepared by: A.Rothbauer + G.Rahimi

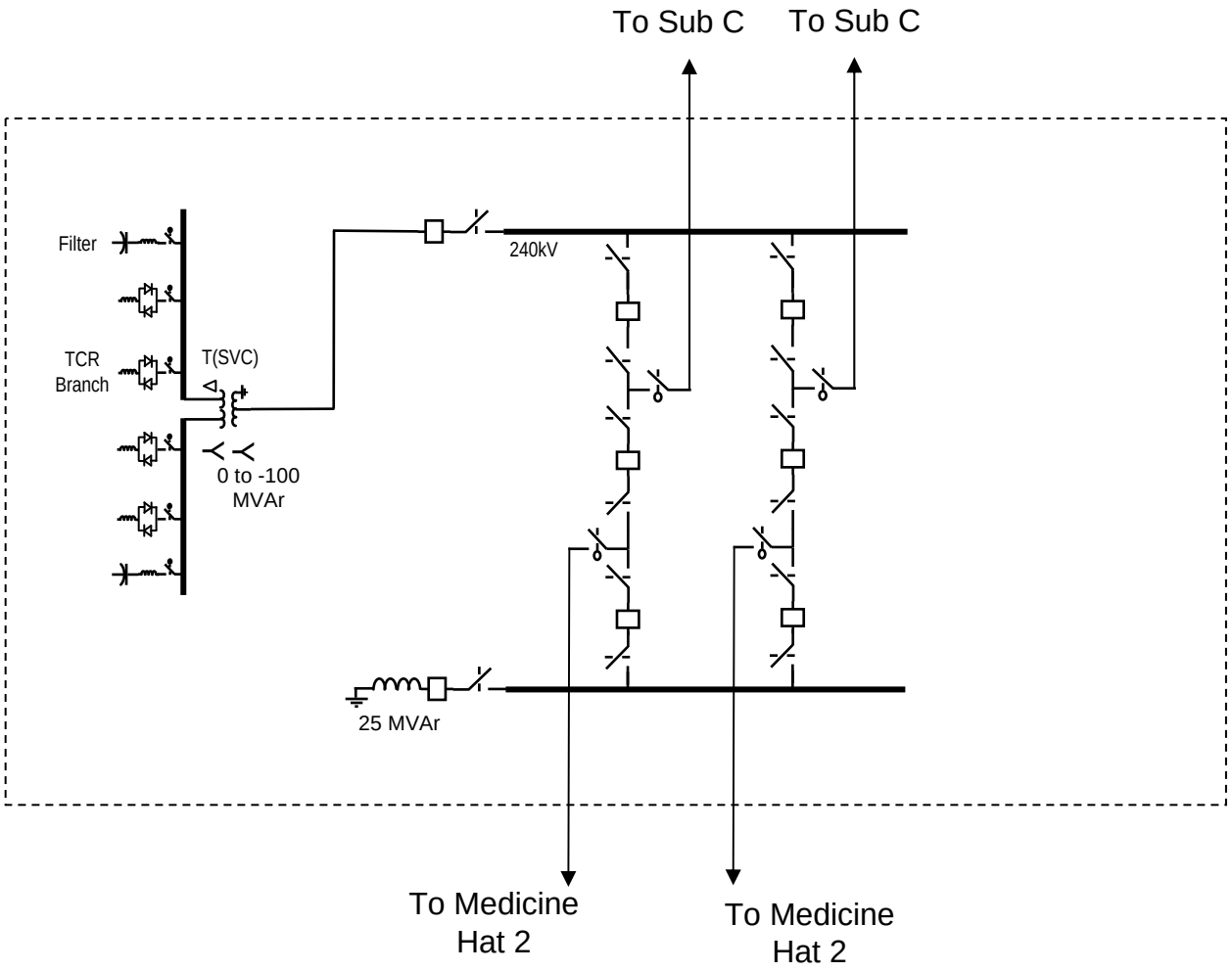
Date: September 25, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 43,567,030	$ -	$ 43,567,030	$ -
Telecommunication	$ 424,832	$ -	$ 424,832	$ -
Total Facility Costs	**$ 43,991,862**	**$ -**	**$ 43,991,862**	**$ -**
Owners Costs	$ 160,000	$ -	$ 160,000	$ -
Distributed Costs	$ 9,941,540	$ -	$ 9,941,540	$ -
Total Owners and Dist. Costs	**$ 10,101,540**	**$ -**	**$ 10,101,540**	**$ -**
Total Direct Costs	**$ 54,093,402**	**$ -**	**$ 54,093,402**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 4,327,472	$ -	$ 4,327,472	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 4,327,472**	**$ -**	**$ 4,327,472**	**$ -**
TOTAL PROJECT COSTS	**$ 58,420,875**	**$ -**	**$ 58,420,875**	**$ -**

Assumptions and Risks

Land for site will be available in the area proposed
Outages will be available when required and when scheduled. Construction will proceed in a continous fashion.
There are no unusual site development requirements. Geo-technical studies will be required.
The reactor and SVC prices are turn key.



LEGEND:

- Substation Fence
- Faulting Switch
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Proposed Development

ALTALINK

Sub D - Alternative 1A, 1B, 1C

DATE	BY	SLD NO.
2008- Sep - 25	GR	08 - 311

Estimate Summary for Need Identification Document (NID)

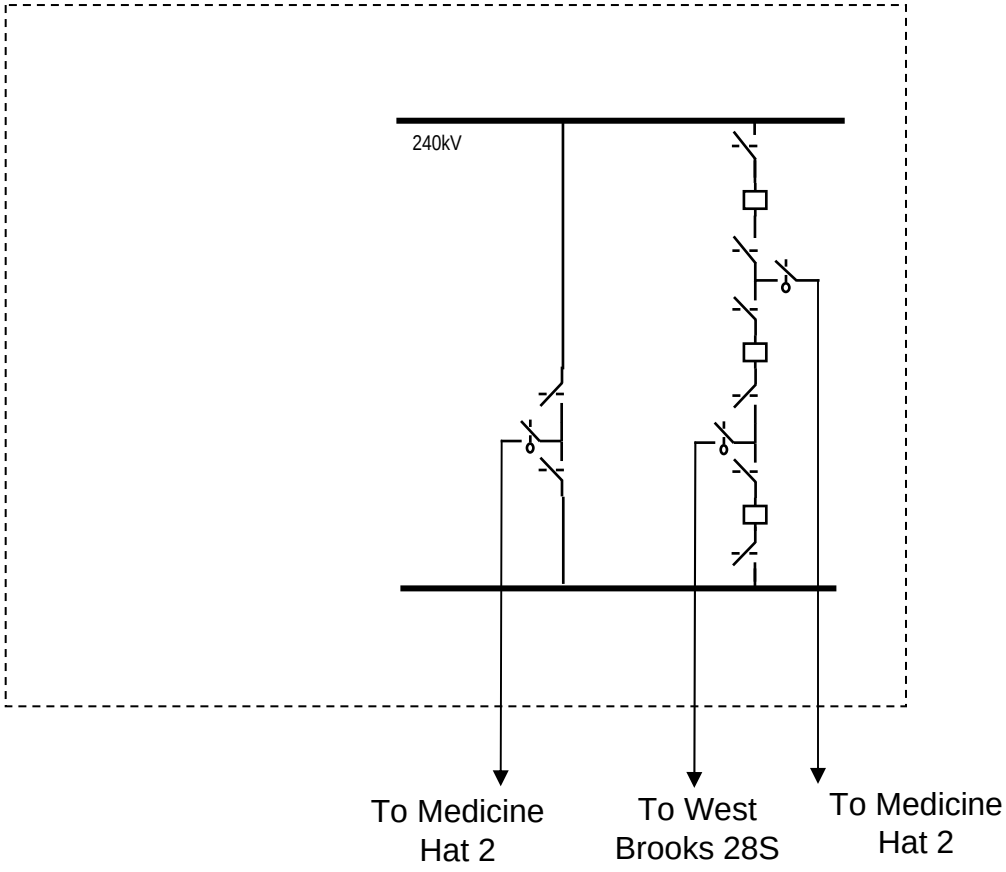
Project: SATD - New 240kV Sub D
Alt. 2

TFO: AltaLink
Prepared by: A.Rothbauer + G.Rahimi
Date: September 25, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 6,741,115	$ -	$ 6,741,115	$ -
Telecommunication	$ 424,832	$ -	$ 424,832	$ -
Total Facility Costs	**$ 7,165,947**	**$ -**	**$ 7,165,947**	**$ -**
Owners Costs	$ 160,000	$ -	$ 160,000	$ -
Distributed Costs	$ 2,054,987	$ -	$ 2,054,987	$ -
Total Owners and Dist. Costs	**$ 2,214,987**	**$ -**	**$ 2,214,987**	**$ -**
Total Direct Costs	**$ 9,380,934**	**$ -**	**$ 9,380,934**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 750,475	$ -	$ 750,475	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 750,475**	**$ -**	**$ 750,475**	**$ -**
TOTAL PROJECT COSTS	**$ 10,131,409**	**$ -**	**$ 10,131,409**	**$ -**

Assumptions and Risks

Land for site will be available in the area proposed
Outages will be available when required and when scheduled. Construction will proceed in a continous fashion.
There are no unusual site development requirements. Geo-technical studies will be required.



LEGEND:

- Substation Fence
- Faulting Switch
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Proposed Development

ALTALINK

Sub D - Alternative 2

DATE	BY	SLD NO.
2008- Sep - 25	GR	08 - 312

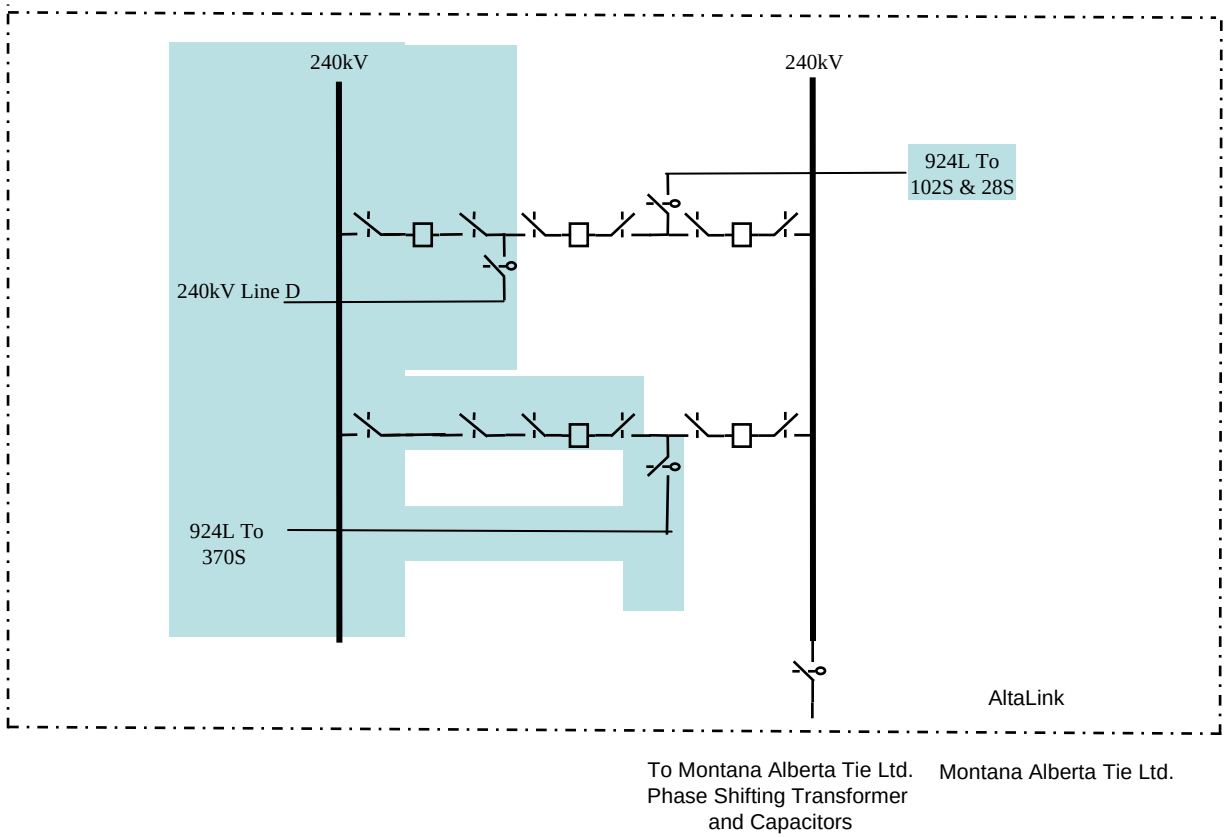
Estimate Summary for Need Identification Document (NID)

Project: SATD - MATL 120S Substation (Alts. 1A, 1B, and 1C)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: November 21, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 3,802,069	$ -	$ 3,802,069	$ -
Telecommunication	$ 324,032	$ -	$ 324,032	$ -
Total Facility Costs	**$ 4,126,101**	**$ -**	**$ 4,126,101**	**$ -**
Owners Costs	$ 225,000	$ -	$ 225,000	$ -
Distributed Costs	$ 2,449,167	$ -	$ 2,449,167	$ -
Total Owners and Dist. Costs	**$ 2,674,167**	**$ -**	**$ 2,674,167**	**$ -**
Total Direct Costs	**$ 6,800,269**	**$ -**	**$ 6,800,269**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 544,021	$ -	$ 544,021	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 544,021**	**$ -**	**$ 544,021**	**$ -**
TOTAL PROJECT COSTS	**$ 7,344,290**	**$ -**	**$ 7,344,290**	**$ -**

Assumptions and Risks

MATL 120S initial development is complete
Land will be available for purchase from MATL
Outages will be available when required and when scheduled
Only one circuit may be taken out at a time
Construction will proceed in a continuous fashion
Geotechnical studies will be required
There are no unusual site development requirements
Bus will be capable of 5000 amperes. Breaker diameters will be capable of 3000 A



LEGEND:

- Substation Fence
- Phase Shifting Transformer
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Proposed Development

ALTALINK

MATL 120S Alternatives 1A, 1B, & 1C
(one Line from Milo)

DATE	BY	SLD NO.
2008 – 11 - 21	RG	08 - 369

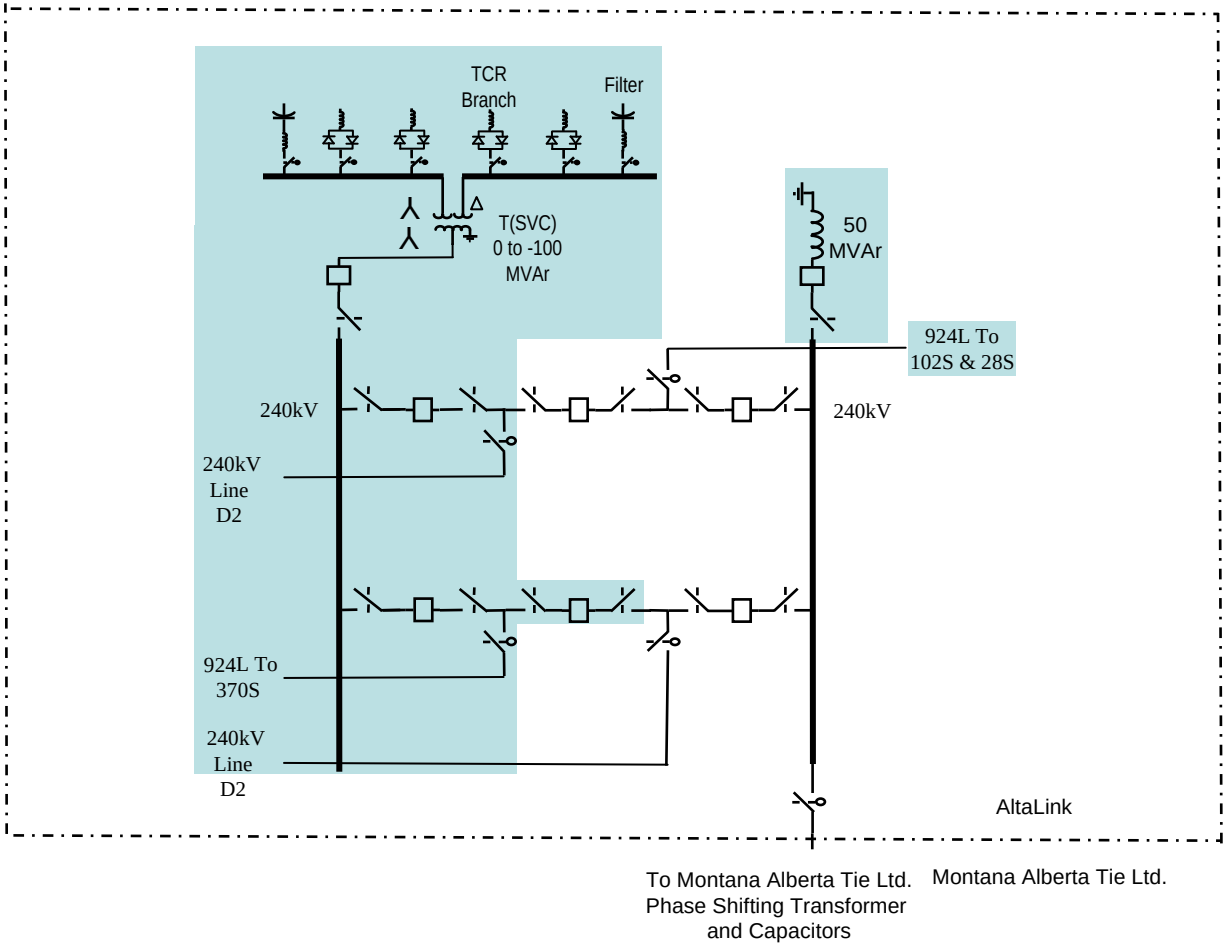
Estimate Summary for Need Identification Document (NID)

Project: SATD - MATL 120S (Alt. 2)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: November 21, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 42,471,102	$ -	$ 42,471,102	$ -
Telecommunication	$ 324,032	$ -	$ 324,032	$ -
Total Facility Costs	**$ 42,795,134**	**$ -**	**$ 42,795,134**	**$ -**
Owners Costs	$ 320,000	$ -	$ 320,000	$ -
Distributed Costs	$ 16,518,787	$ -	$ 16,518,787	$ -
Total Owners and Dist. Costs	**$ 16,838,787**	**$ -**	**$ 16,838,787**	**$ -**
Total Direct Costs	**$ 59,633,922**	**$ -**	**$ 59,633,922**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 4,770,714	$ -	$ 4,770,714	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 4,770,714**	**$ -**	**$ 4,770,714**	**$ -**
TOTAL PROJECT COSTS	**$ 64,404,635**	**$ -**	**$ 64,404,635**	**$ -**

Assumptions and Risks

MATL 120S initial development is complete
Land will be available for purchase from MATL
Outages will be available when required and when scheduled. Only one circuit may be taken out at a time
Construction will proceed in a continuous fashion
Geotechnical studies will be required
There are no unusual site development requirements
Bus will be capable of 5000 amperes.Breaker diamters will be capable of 3000A
The reactor and SVC prices are turn key



LEGEND:

- Substation Fence
- Phase Shifting Transformer
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Proposed Development

ALTALINK

MATL 120S Alternative 2
(One Line from Milo)

DATE	BY	SLD NO.
2008 –116 - 21	RG	08 - 370

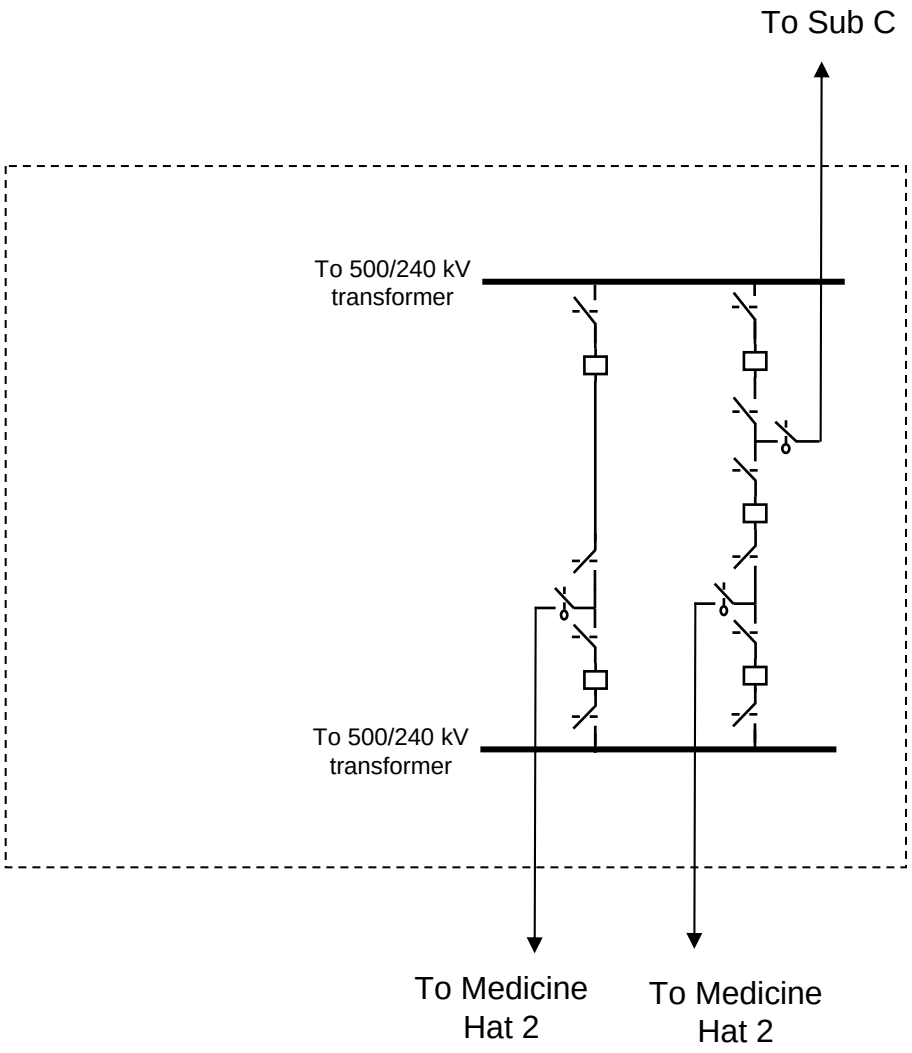
Estimate Summary for Need Identification Document (NID)

Project: SATD - New 500kV Sub H (rev Alt. 3)
TFO: AltaLink
Prepared by: Teshmont + G.Rahimi
Date: September 25, 2008
Accuracy: +30%/-30%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 113,277,031	$ -	$ 113,277,031	$ -
Telecommunication	$ 822,696	$ -	$ 822,696	$ -
Total Facility Costs	**$ 114,099,727**	**$ -**	**$ 114,099,727**	**$ -**
Owners Costs	$ 200,000	$ -	$ 200,000	$ -
Distributed Costs	$ 22,226,440	$ -	$ 22,226,440	$ -
Total Owners and Dist. Costs	**$ 22,426,440**	**$ -**	**$ 22,426,440**	**$ -**
Total Direct Costs	**$ 136,526,167**	**$ -**	**$ 136,526,167**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 10,922,093	$ -	$ 10,922,093	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 10,922,093**	**$ -**	**$ 10,922,093**	**$ -**
TOTAL PROJECT COSTS	**$ 147,448,260**	**$ -**	**$ 147,448,260**	**$ -**

Assumptions and Risks

Standard "A" and "B" protection for transformer, bus and lines.
Line tele-protection dual system with redundant channels. Channels sent by OPGW and microwave.
Pipeline and railroad induced voltage studies and mitigation plans not included
Geo-technical studies will be completed as required.
Construction will proceed in a continuous manner.
Land available.



LEGEND:

- Substation Fence
- Faulting Switch
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Proposed Development

ALTALINK

Sub H - Alternative 3 – 240kV section

DATE	BY	SLD NO.
2008- Sep - 25	GR	08 - 313

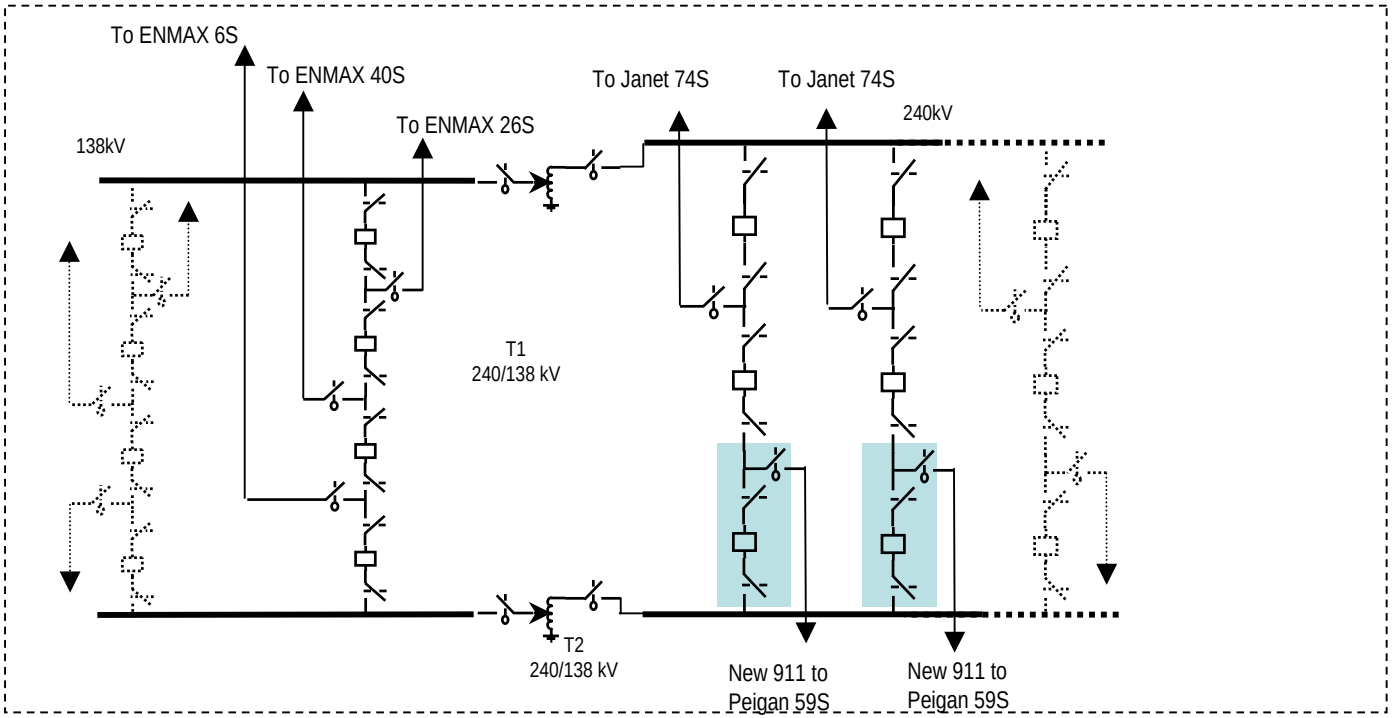
Estimate Summary for Need Identification Document (NID)

Project: SATD - New 240kV Line J Termination at DeWinton (Alts 1A, 1B, 2, 3, 4)
TFO: AltaLink
Prepared by: Rafael Guzmàn
Date: June 24, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 2,911,854	$ -	$ 2,911,854	$ -
Telecommunication	$ 50,400	$ -	$ 50,400	$ -
Total Facility Costs	**$ 2,962,254**	**$ -**	**$ 2,962,254**	**$ -**
Owners Costs	$ 95,000	$ -	$ 95,000	$ -
Distributed Costs	$ 1,196,774	$ -	$ 1,196,774	$ -
Total Owners and Dist. Costs	**$ 1,291,774**	**$ -**	**$ 1,291,774**	**$ -**
Total Direct Costs	**$ 4,254,028**	**$ -**	**$ 4,254,028**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 340,322	$ -	$ 340,322	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 340,322**	**$ -**	**$ 340,322**	**$ -**
TOTAL PROJECT COSTS	**$ 4,594,350**	**$ -**	**$ 4,594,350**	**$ -**

Assumptions and Risks

DeWinton is in service before line J is built
DeWinton is assumed to have an 1 1/2 breaker configuration with two 240kV diameters with 2-240kV CBs each
DeWinton will have a OPGW MUX / LAN equipment and SCADA System
No site development is required, no expansion nor land required. Strd Line / bus protection
Construction proceeds in a continuous manner. Outages available as required.



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Proposed Development
- Disconnect Switch
- Provisions for Future Development

ALTALINK

Sub DeWinton 224S – Alts 1A, 1B, 2, 3, 4

DATE	BY	SLD NO.
2008 - 06 - 23	RG	08-164

Estimate Summary for Need Identification Document (NID)

Project: SATD - New 240kV Lines J and K Termination at DeWinton (Alt. 1C)

TFO: AltaLink

Prepared by: Rafael Guzmàn

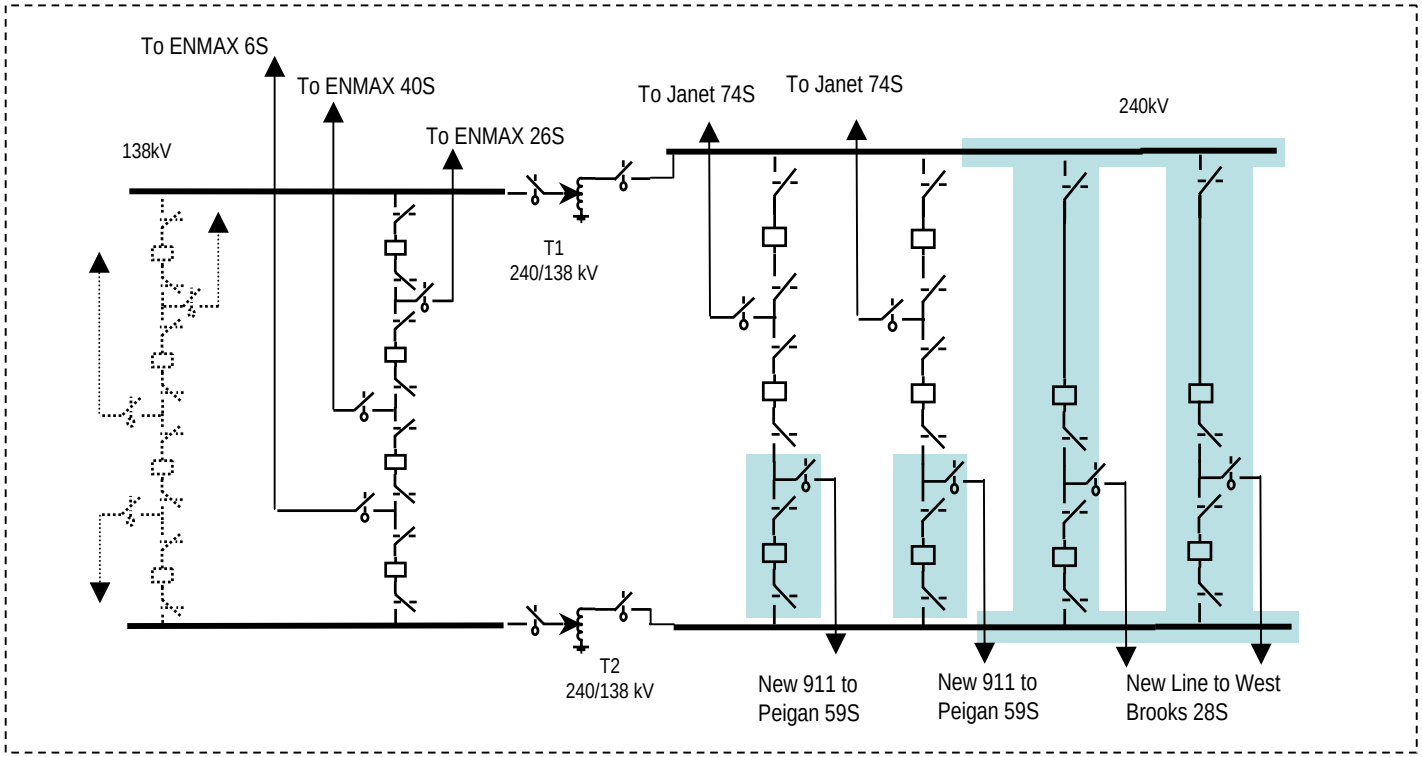
Date: June 23, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 8,261,995	$ -	$ 8,261,995	$ -
Telecommunication	$ 50,400	$ -	$ 50,400	$ -
Total Facility Costs	**$ 8,312,395**	**$ -**	**$ 8,312,395**	**$ -**
Owners Costs	$ 130,000	$ -	$ 130,000	$ -
Distributed Costs	$ 3,476,013	$ -	$ 3,476,013	$ -
Total Owners and Dist. Costs	**$ 3,606,013**	**$ -**	**$ 3,606,013**	**$ -**
Total Direct Costs	**$ 11,918,408**	**$ -**	**$ 11,918,408**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 953,473	$ -	$ 953,473	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 953,473**	**$ -**	**$ 953,473**	**$ -**
TOTAL PROJECT COSTS	**$ 12,871,881**	**$ -**	**$ 12,871,881**	**$ -**

Assumptions and Risks

DeWinton is in service before line J is built
DeWinton is assumed to have an 1 1/2 breaker configuration with two 240kV diameters with 2-240kV each
DeWinton will have a OPGW MUX / LAN equipment and SCADA System
Only termination of OPGW and addition of line SCADA points are required
No site development nor land is required. Sub Expansion is required (120x50m). Strd Line / bus protection
Construction proceeds in a continuous manner. Outages available as required



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Proposed Development
- Disconnect Switch
- Provisions for future development

ALTALINK

Sub DeWinton 224S – Alt 1C

DATE	BY	SLD NO.
2008 - 06 - 28	RG	08-165

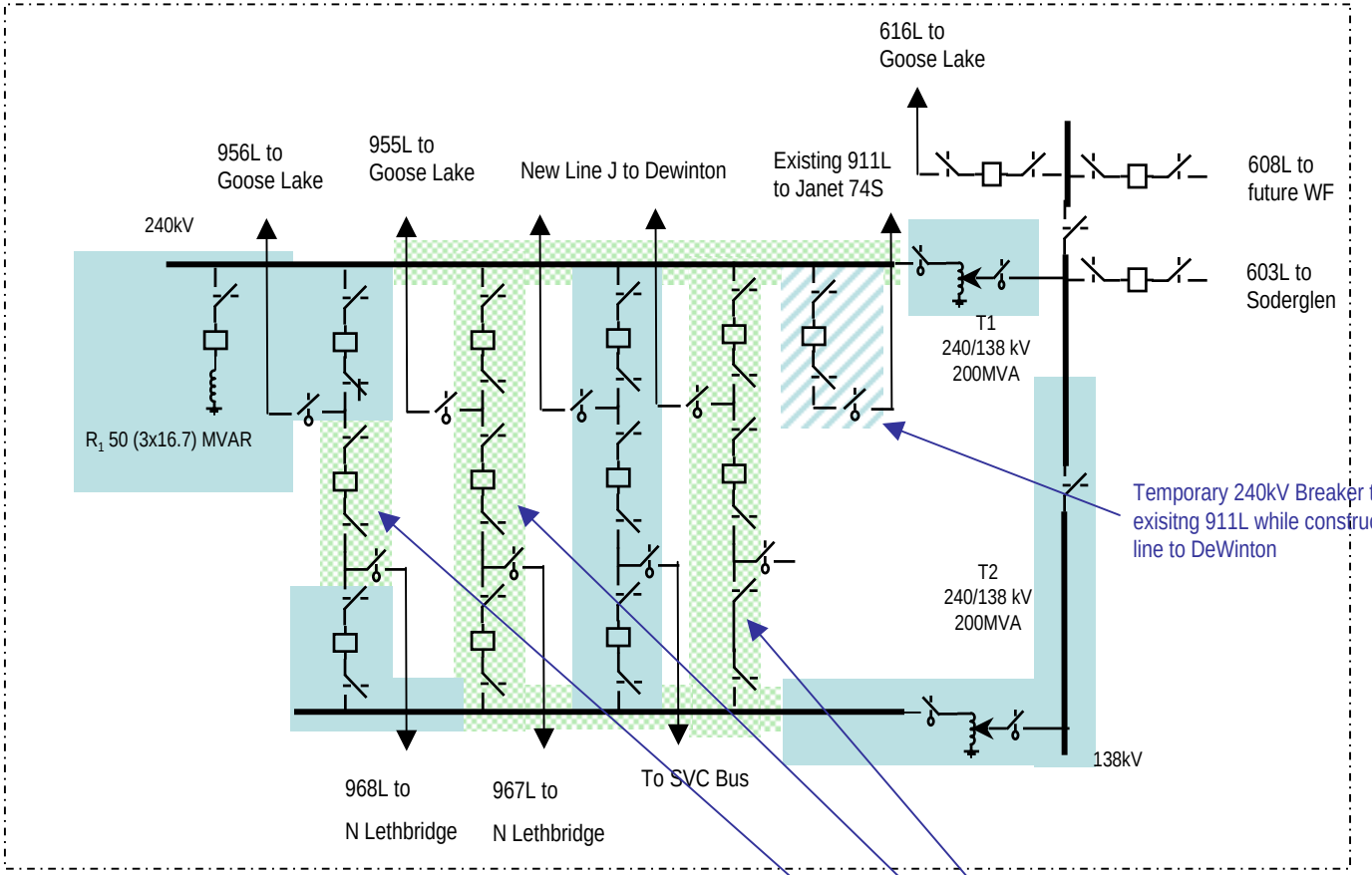
Estimate Summary for Need Identification Document (NID)

Project: SATD - Peigan 59S (Alts. 1A, 1C & 4)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 2,257,762	$ -	$ 2,257,762	$ -
Substation Facilities	$ 54,536,778	$ -	$ 54,536,778	$ -
Telecommunication	$ 109,917	$ -	$ 109,917	$ -
Total Facility Costs	**$ 56,904,457**	**$ -**	**$ 56,904,457**	**$ -**
Owners Costs	$ 380,000	$ -	$ 380,000	$ -
Distributed Costs	$ 18,303,106	$ -	$ 18,303,106	$ -
Total Owners and Dist. Costs	**$ 18,683,106**	**$ -**	**$ 18,683,106**	**$ -**
Total Direct Costs	**$ 75,587,563**	**$ -**	**$ 75,587,563**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 6,047,005	$ -	$ 6,047,005	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 6,047,005**	**$ -**	**$ 6,047,005**	**$ -**
TOTAL PROJECT COSTS	**$ 81,634,568**	**$ -**	**$ 81,634,568**	**$ -**

Assumptions and Risks

Post SW Development sub configuration is assumed as initial configuration. outages available
Breakers, Manual and motorized air breaks, CT's Bus post SW need to be replaced
Structures and spacing after SW Dev. adequate to take higher capacity equipment
Ground grid after SW Dev. adequate for higher capacity equipment. Additional cost for ground grid changes not included
Delivery time for SVC and reactors is about 20-24m



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Motorized air break with arcing horn
- Disconnect Switch
- Proposed Development
- Proposed Rebuilding / Replacement
- Provisions for future development

ALTALINK

SATD - Sub Peigan 59S – Alts 1A, 1C & 4

DATE	BY	SLD NO.
2008 -05 26	RG	08-141

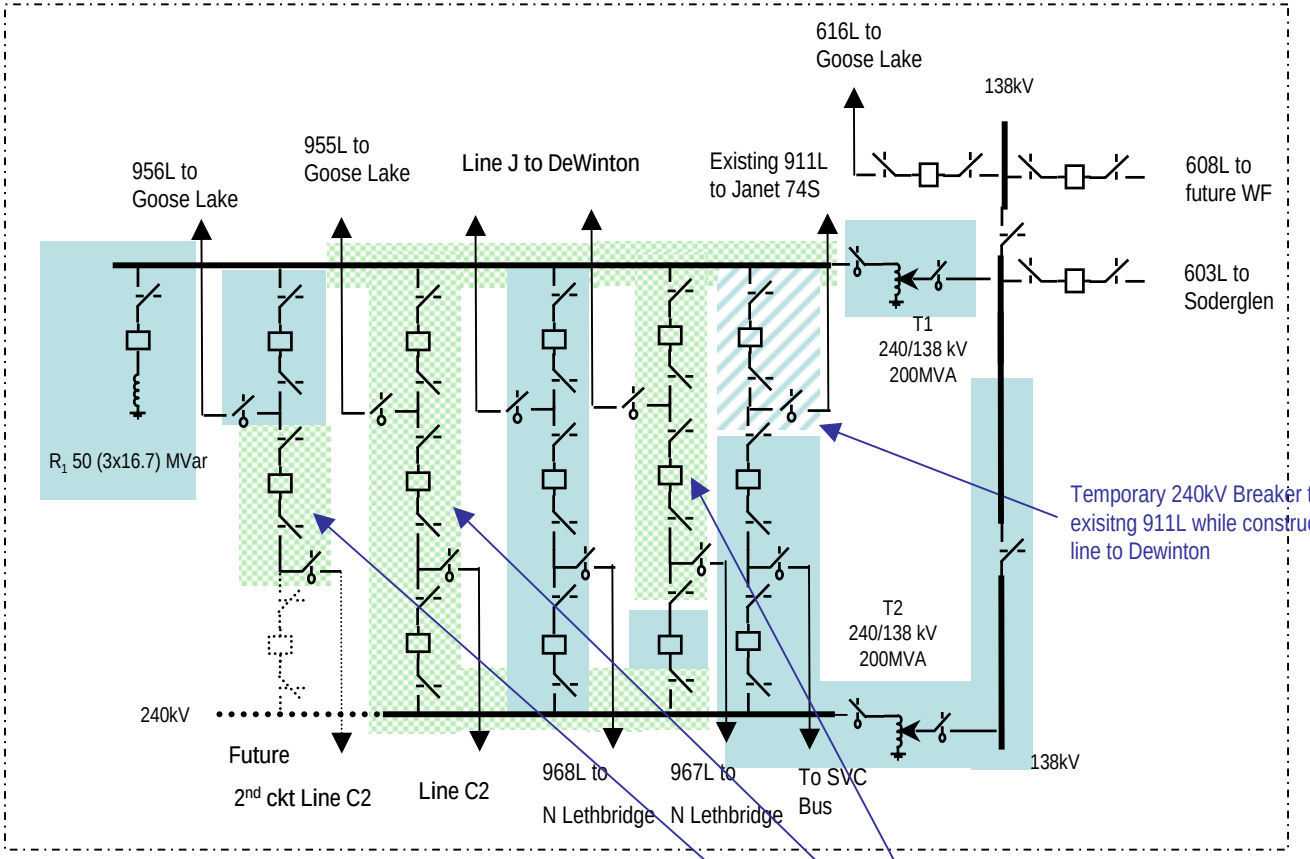
Estimate Summary for Need Identification Document (NID)

Project: SATD - Peigan 59S (Alt. 1B)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 3,190,583	$ -	$ 3,190,583	$ -
Substation Facilities	$ 55,791,322	$ -	$ 55,791,322	$ -
Telecommunication	$ 109,917	$ -	$ 109,917	$ -
Total Facility Costs	**$ 59,091,822**	**$ -**	**$ 59,091,822**	**$ -**
Owners Costs	$ 410,000	$ -	$ 410,000	$ -
Distributed Costs	$ 19,393,006	$ -	$ 19,393,006	$ -
Total Owners and Dist. Costs	**$ 19,803,006**	**$ -**	**$ 19,803,006**	**$ -**
Total Direct Costs	**$ 78,894,828**	**$ -**	**$ 78,894,828**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 6,311,586	$ -	$ 6,311,586	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 6,311,586**	**$ -**	**$ 6,311,586**	**$ -**
TOTAL PROJECT COSTS	**$ 85,206,415**	**$ -**	**$ 85,206,415**	**$ -**

Assumptions and Risks

Post SW Development sub configuration is assumed as initial configuration. Outages available as required.
Breakers, Manual and motorized air breaks, CT's, bus post SW need to be replaced.
Structures and spacing after SW Dev. adequate to take higher capacity equipment.
Ground grid after SW Dev. adequate for higher capacity equipment. Additional cost for ground grid changes not included.
Delivery time for SVC and reactor is about 20-24m.



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Disconnect Switch
- Motorized air break with arcing horn
- Proposed Development
- Proposed Rebuilding / Replacement
- Provisions for future development

ALTALINK

SATD - Sub Peigan 59S– Alt 1B

DATE	BY	SLD NO.
2008 -06-13	RG	08-138

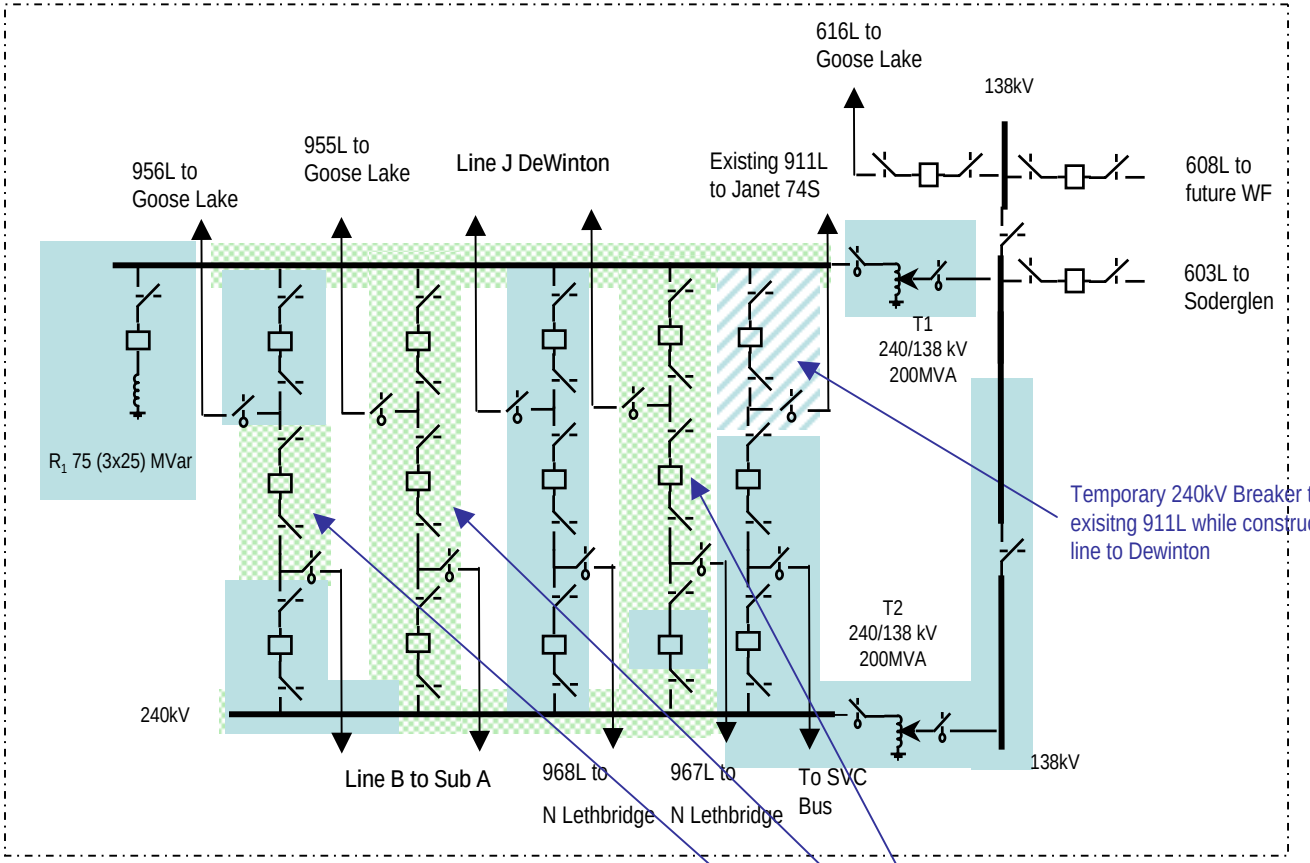
Estimate Summary for Need Identification Document (NID)

Project: SATD - Peigan 59S (Alt. 2)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 3,190,583	$ -	$ 3,190,583	$ -
Substation Facilities	$ 57,044,183	$ -	$ 57,044,183	$ -
Telecommunication	$ 109,917	$ -	$ 109,917	$ -
Total Facility Costs	**$ 60,344,684**	**$ -**	**$ 60,344,684**	**$ -**
Owners Costs	$ 410,000	$ -	$ 410,000	$ -
Distributed Costs	$ 19,703,716	$ -	$ 19,703,716	$ -
Total Owners and Dist. Costs	**$ 20,113,716**	**$ -**	**$ 20,113,716**	**$ -**
Total Direct Costs	**$ 80,458,399**	**$ -**	**$ 80,458,399**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 6,436,672	$ -	$ 6,436,672	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 6,436,672**	**$ -**	**$ 6,436,672**	**$ -**
TOTAL PROJECT COSTS	**$ 86,895,071**	**$ -**	**$ 86,895,071**	**$ -**

Assumptions and Risks

Post SW Development sub configuration is assumed as initial configuration. Outages available as required.
Breakers, manual and motorized air breaks, CT's, bus post SW need to be replaced.
Structures and spacing after SW Dev. adequate to take higher capacity equipment
Ground grid after SW Dev. adequate for higher capacity equipment. Additional cost for ground grid changes not included
Delivery time for SVC and reactors is about 20-24m



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Disconnect Switch
- Motorized air break with arcing horn
- Proposed Development
- Proposed Rebuilding / Replacement
- Provisions for future development

ALTALINK

SATD - Sub Peigan 59S – Alt 2

DATE	BY	SLD NO.
2008 -06-13	RG	08-139

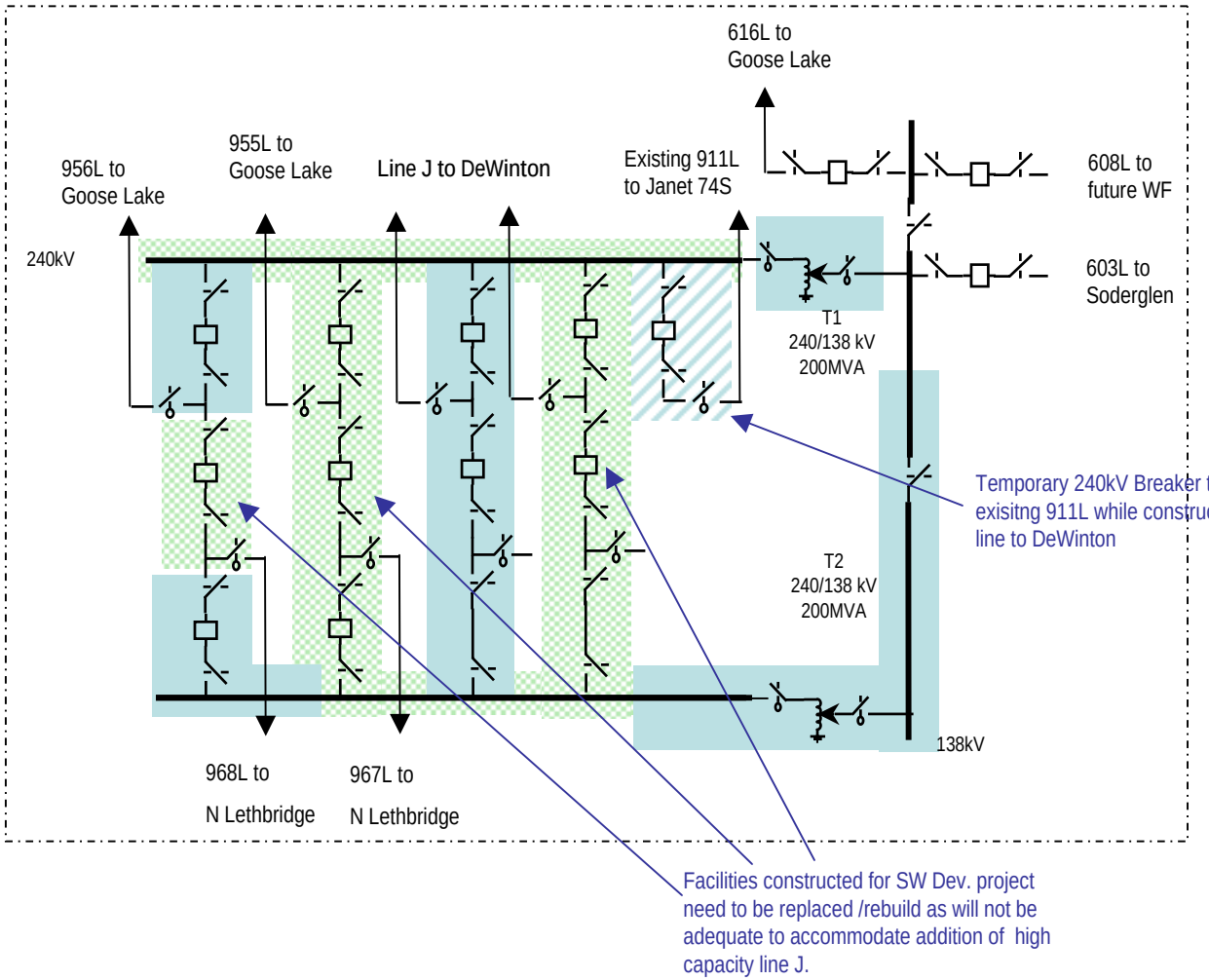
Estimate Summary for Need Identification Document (NID)

Project: SATD - Peigan 59S (Alt. 3)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 1,170,100	$ -	$ 1,170,100	$ -
Substation Facilities	$ 20,696,961	$ -	$ 20,696,961	$ -
Telecommunication	$ 109,917	$ -	$ 109,917	$ -
Total Facility Costs	**$ 21,976,978**	**$ -**	**$ 21,976,978**	**$ -**
Owners Costs	$ 180,000	$ -	$ 180,000	$ -
Distributed Costs	$ 9,532,380	$ -	$ 9,532,380	$ -
Total Owners and Dist. Costs	**$ 9,712,380**	**$ -**	**$ 9,712,380**	**$ -**
Total Direct Costs	**$ 31,689,358**	**$ -**	**$ 31,689,358**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 2,535,149	$ -	$ 2,535,149	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 2,535,149**	**$ -**	**$ 2,535,149**	**$ -**
TOTAL PROJECT COSTS	**$ 34,224,506**	**$ -**	**$ 34,224,506**	**$ -**

Assumptions and Risks

Post SW Development sub configuration is assumed as initial configuration. Outages available as required.
Breakers, Manual and motorized air breaks, CT's, bus post SW need to be replaced.
Structures and spacing after SW Dev. adequate to take higher capacity equipment.
Ground grid after SW Dev. adequate for higher capacity equipment. Additional cost for ground grid changes not included.
Construction proceeds in a continuous manner



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Disconnect Switch
- Motorized air break with arcing horn
- Proposed Development
- Proposed Rebuilding / Replacement
- Provisions for future development

ALTALINK

SATD - Sub Peigan 59S – Alt 3

DATE	BY	SLD NO.
2008 -05 26	RG	08-137

Estimate Summary for Need Identification Document (NID)

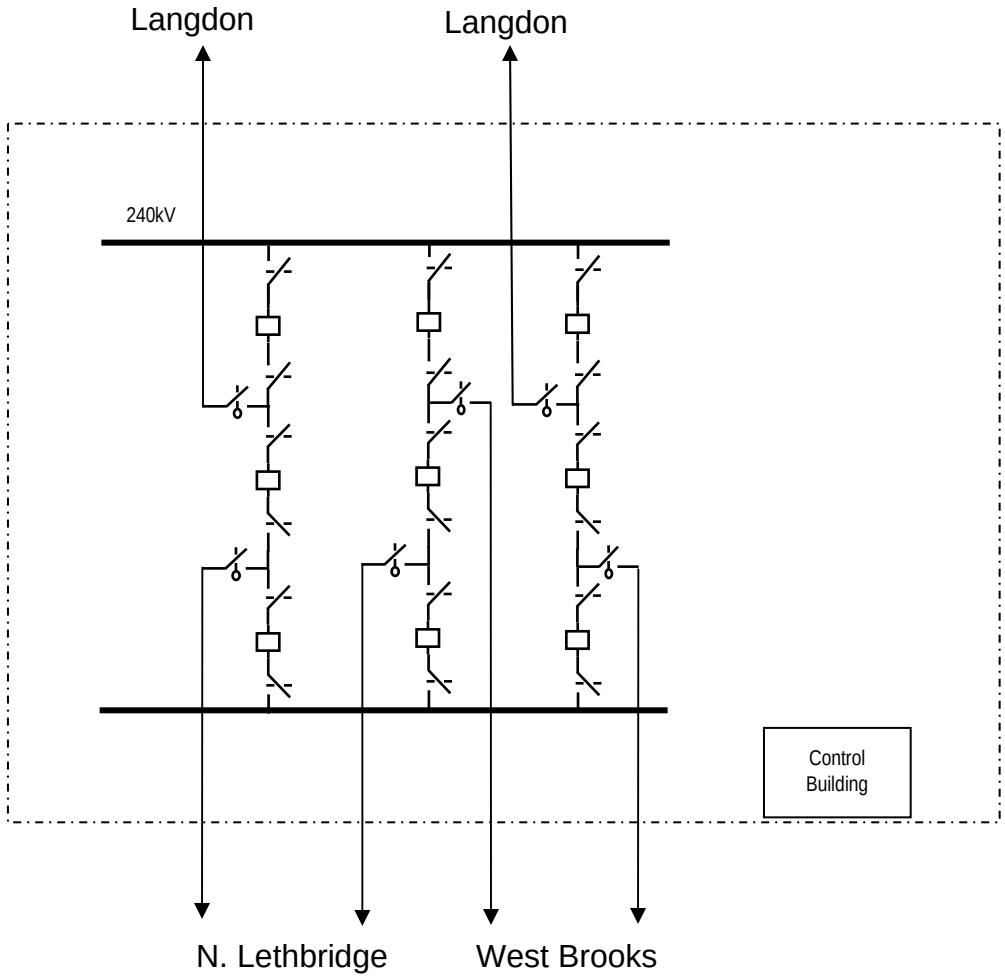
Project: SATD - Milo substation
Alt 1A, Alt 1B, Alt 1C, Alt 2, Alt 4

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 3, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 3,885,908	$ -	$ 3,885,908	$ -
Substation Facilities	$ 11,269,206	$ -	$ 11,269,206	$ -
Telecommunication	$ 804,888	$ -	$ 804,888	$ -
Total Facility Costs	**$ 15,960,002**	**$ -**	**$ 15,960,002**	**$ -**
Owners Costs	$ 330,000	$ -	$ 330,000	$ -
Distributed Costs	$ 6,525,645	$ -	$ 6,525,645	$ -
Total Owners and Dist. Costs	**$ 6,855,645**	**$ -**	**$ 6,855,645**	**$ -**
Total Direct Costs	**$ 22,815,648**	**$ -**	**$ 22,815,648**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 1,825,252	$ -	$ 1,825,252	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 1,825,252**	**$ -**	**$ 1,825,252**	**$ -**
TOTAL PROJECT COSTS	**$ 24,640,899**	**$ -**	**$ 24,640,899**	**$ -**

Assumptions and Risks

1) Live line work has been included.
2) Lines terminating at Milo junction are an important part of 240kV looped system and the line relocation sequence to the new substation shall be carefully studied.
3) Line renumbering is not included.
4) Only one circuit may be taken out at a time



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Fuse
- Disconnect Switch
- Proposed Development

ALTALINK

Milo Junction-Alt 1A, Alt 1B, Alt 1C, Alt 2, Alt 4

DATE	BY	SLD NO.
2008- May-15	GR	08 - 121

Estimate Summary for Need Identification Document (NID)

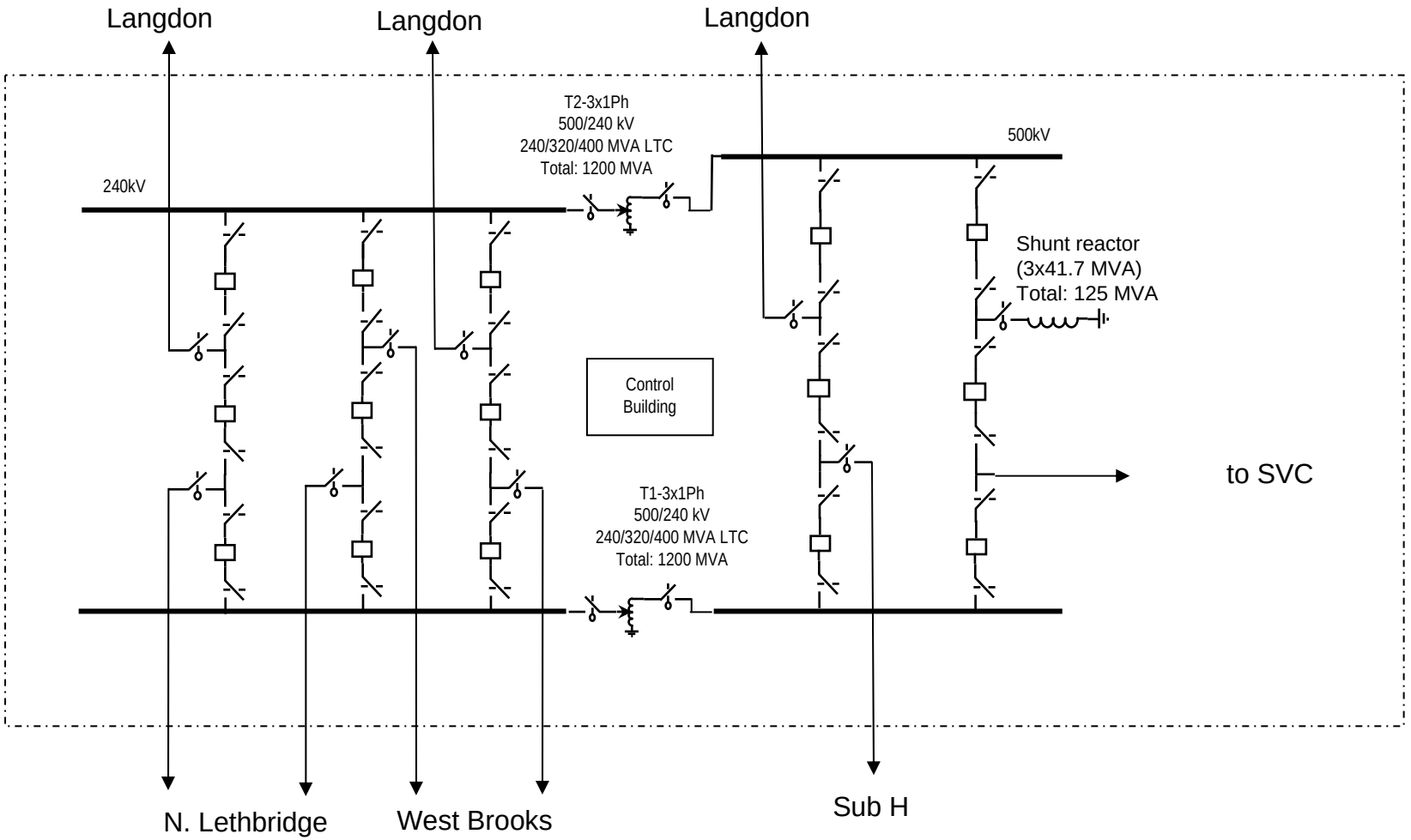
Project: SATD - Milo substation
Alt 3

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 17, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 3,885,908	$ -	$ 3,885,908	$ -
Substation Facilities	$ 110,797,149	$ -	$ 110,797,149	$ -
Telecommunication	$ 804,888	$ -	$ 804,888	$ -
Total Facility Costs	**$ 115,487,946**	**$ -**	**$ 115,487,946**	**$ -**
Owners Costs	$ 643,000	$ -	$ 643,000	$ -
Distributed Costs	$ 33,076,634	$ -	$ 33,076,634	$ -
Total Owners and Dist. Costs	**$ 33,719,634**	**$ -**	**$ 33,719,634**	**$ -**
Total Direct Costs	**$ 149,207,580**	**$ -**	**$ 149,207,580**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 11,936,606	$ -	$ 11,936,606	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 11,936,606**	**$ -**	**$ 11,936,606**	**$ -**
TOTAL PROJECT COSTS	**$ 161,144,186**	**$ -**	**$ 161,144,186**	**$ -**

Assumptions and Risks

1) Live line work has been included.
2) Lines terminating at Milo junction are an important part of 240kV looped system and the line relocation sequence to the new substation shall be carefully studied.
3) Line renumbering is not included.
4) Only one circuit may be taken out at a time
5) SVC and reactor delivery time is 20 to 24 months.



LEGEND:

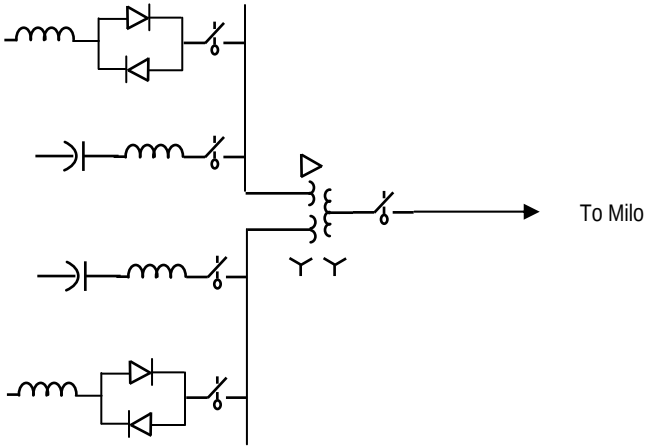
- Substation Fence
- Faulting Switch
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Proposed Development

ALTALINK

Milo Junction-Alt 3

DATE	BY	SLD NO.
2008- May-15	GR	08 - 154

Dynamic range of SVC: 0 to -400 MVAR



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Fuse
- Disconnect Switch
- Proposed Development

ALTALINK

Milo -SVC configuration - Alt 3

DATE	BY	SLD NO.
2008- June-16	GR	08 - 155

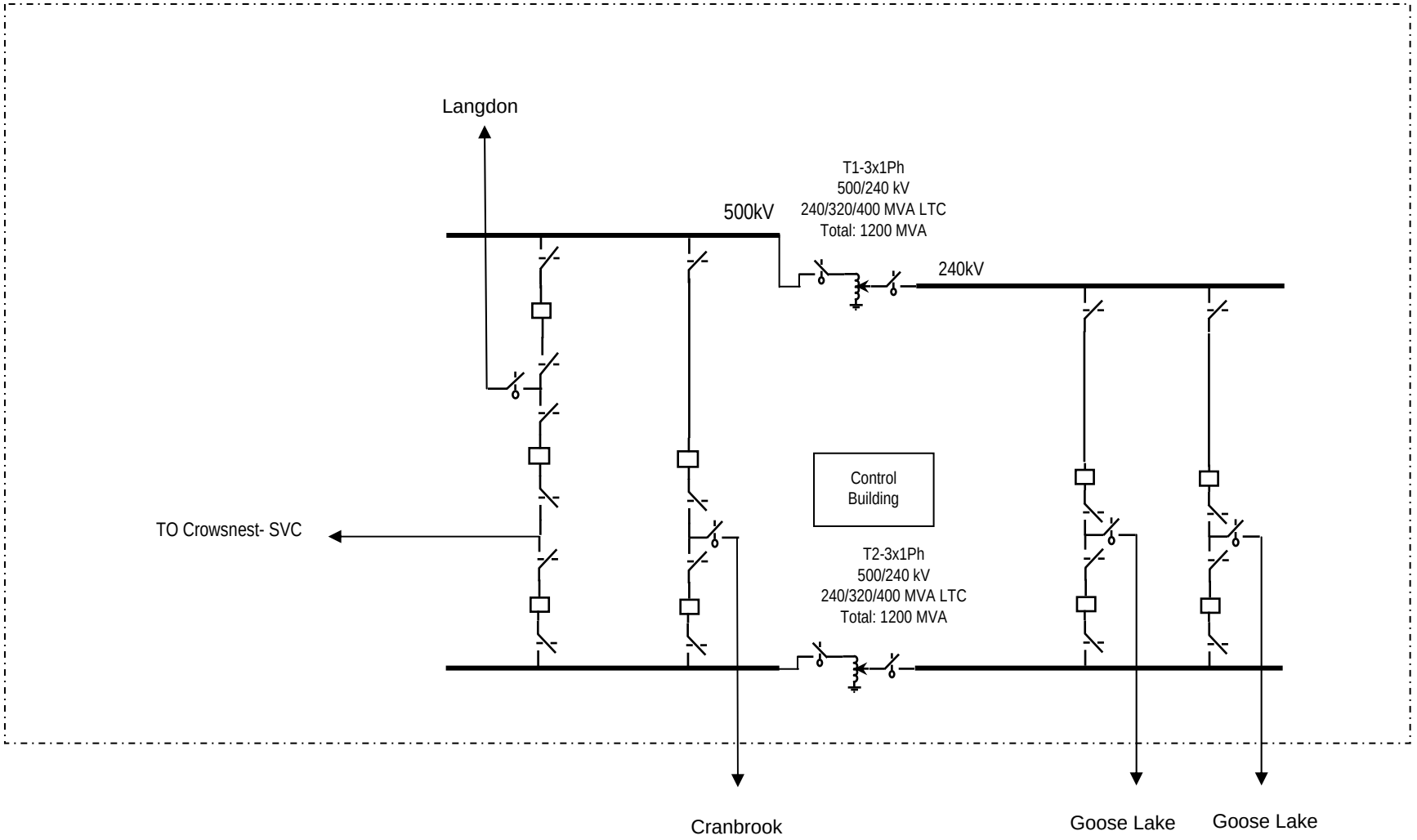
Estimate Summary for Need Identification Document (NID)

Project: SATD- Crowsnest substation (500kV/240kV) (Alts. 1A,1B,1C, 2 & 4)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: 18 July, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 3,072,849	$ -	$ 3,072,849	$ -
Substation Facilities	$ 91,590,147	$ -	$ 91,590,147	$ -
Telecommunication	$ 933,718	$ -	$ 933,718	$ -
Total Facility Costs	**$ 95,596,715**	**$ -**	**$ 95,596,715**	**$ -**
Owners Costs	$ 550,000	$ -	$ 550,000	$ -
Distributed Costs	$ 26,685,157	$ -	$ 26,685,157	$ -
Total Owners and Dist. Costs	**$ 27,235,157**	**$ -**	**$ 27,235,157**	**$ -**
Total Direct Costs	**$ 122,831,871**	**$ -**	**$ 122,831,871**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 9,826,550	$ -	$ 9,826,550	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 9,826,550**	**$ -**	**$ 9,826,550**	**$ -**
TOTAL PROJECT COSTS	**$ 132,658,421**	**$ -**	**$ 132,658,421**	**$ -**

Assumptions and Risks

1) No tower upgrade included for Beavais Lake 9232.
2) It's assumed enough land is available at the proposed location for the new substation construction.
3) Site preparation considered for a normal site. No abnormal filling included.
4) Outages will be available when required.
5) SVC and reactor delivery time is 20 to 24 months.



LEGEND:

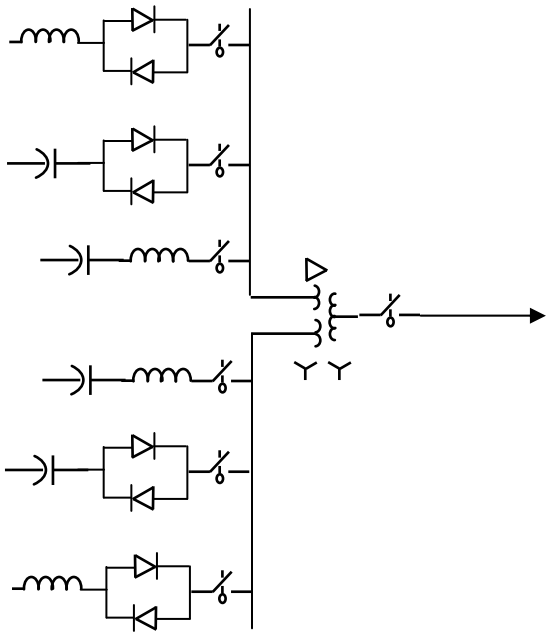
- Substation Fence
- Faulting Switch
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Proposed Development

ALTALINK

Crowsnest with SVC - Alt 1A, Alt 1B, Alt 1C, Alt 2, Alt 4

DATE	BY	SLD NO.
2008- June-16	GR	08 - 147

Dynamic range of SVC: 0 to +400 MVAR



LEGEND:

- Substation Fence
- Faulting Switch
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Proposed Development

ALTALINK

Crowsnest - SVC configuration -
Alt 1A, Alt 1B, Alt 1C, Alt 2, Alt 4

DATE	BY	SLD NO.
2008- June-16	GR	08 - 148

Estimate Summary for Need Identification Document (NID)

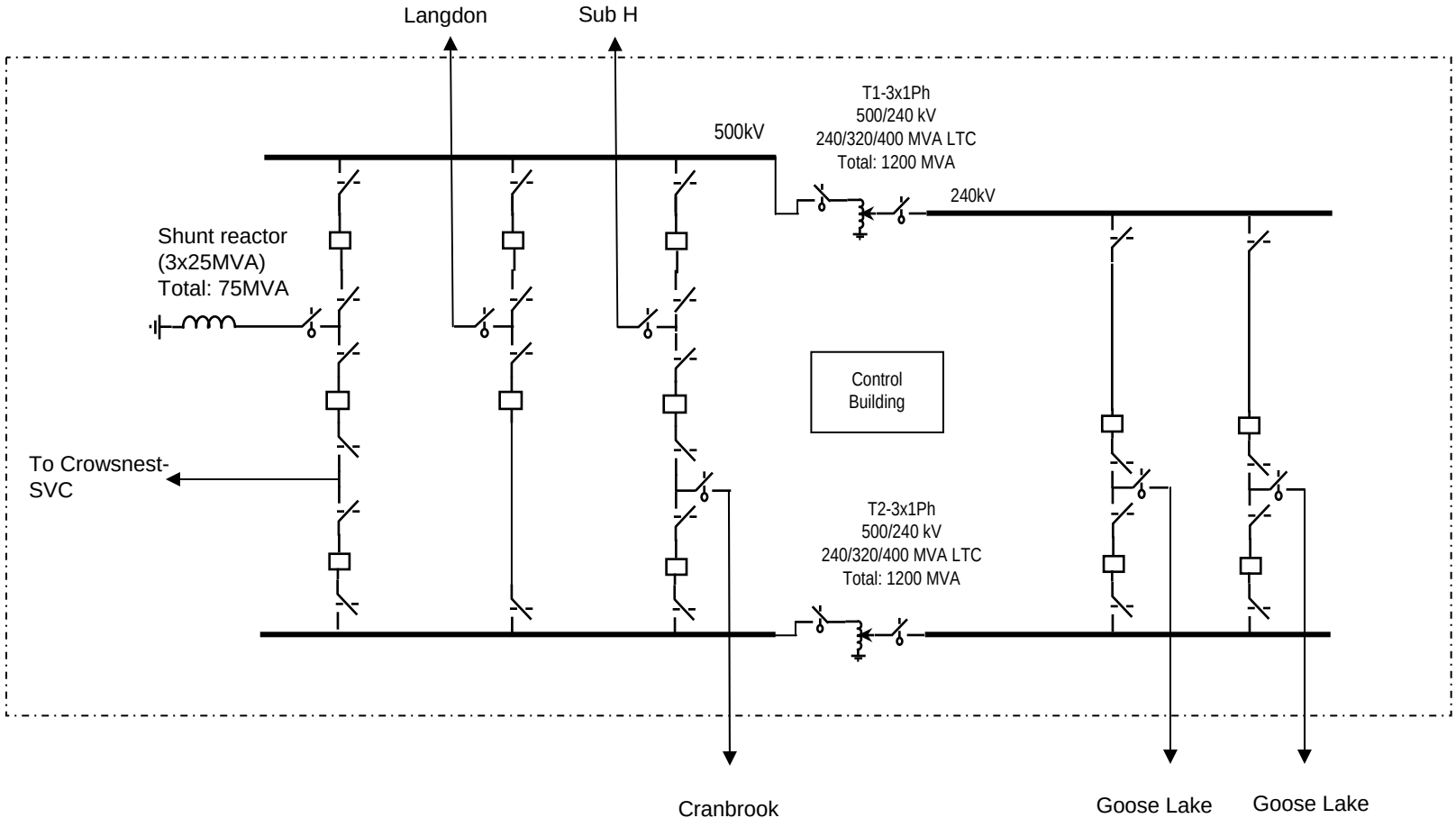
Project: SATD- Crowsnest substation (500kV/240kV)
Alt 3

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: 18 July, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 3,072,849	$ -	$ 3,072,849	$ -
Substation Facilities	$ 102,213,399	$ -	$ 102,213,399	$ -
Telecommunication	$ 933,718	$ -	$ 933,718	$ -
Total Facility Costs	**$ 106,219,966**	**$ -**	**$ 106,219,966**	**$ -**
Owners Costs	$ 560,000	$ -	$ 560,000	$ -
Distributed Costs	$ 30,080,933	$ -	$ 30,080,933	$ -
Total Owners and Dist. Costs	**$ 30,640,933**	**$ -**	**$ 30,640,933**	**$ -**
Total Direct Costs	**$ 136,860,899**	**$ -**	**$ 136,860,899**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 10,948,872	$ -	$ 10,948,872	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 10,948,872**	**$ -**	**$ 10,948,872**	**$ -**
TOTAL PROJECT COSTS	**$ 147,809,771**	**$ -**	**$ 147,809,771**	**$ -**

Assumptions and Risks

1) No tower upgrade included for Beavais Lake 9232.
2) It's assumed enough land is available at the proposed location for the new substation construction.
3) Site preparation considered for a normal site. No abnormal filling included.
4) Outages will be available when required.
5) SVC and reactor delivery time is 20 to 24 months.



LEGEND:

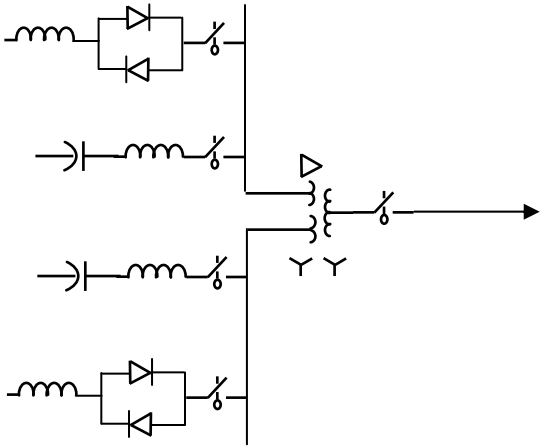
- Substation Fence
- Faulting Switch
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Generation
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Motorized air break with arcing horn
- Proposed Development

ALTALINK

Crowsnest with SVC and Reactor - Alt 3

DATE	BY	SLD NO.
2008- June-16	GR	08 - 149

Dynamic range of SVC: 0 to -300 MVAR



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Fuse
- Disconnect Switch
- Proposed Development

ALTALINK

Crowsnest-SVC configuration - Alt 3

DATE	BY	SLD NO.
2008- June-16	GR	08 - 150

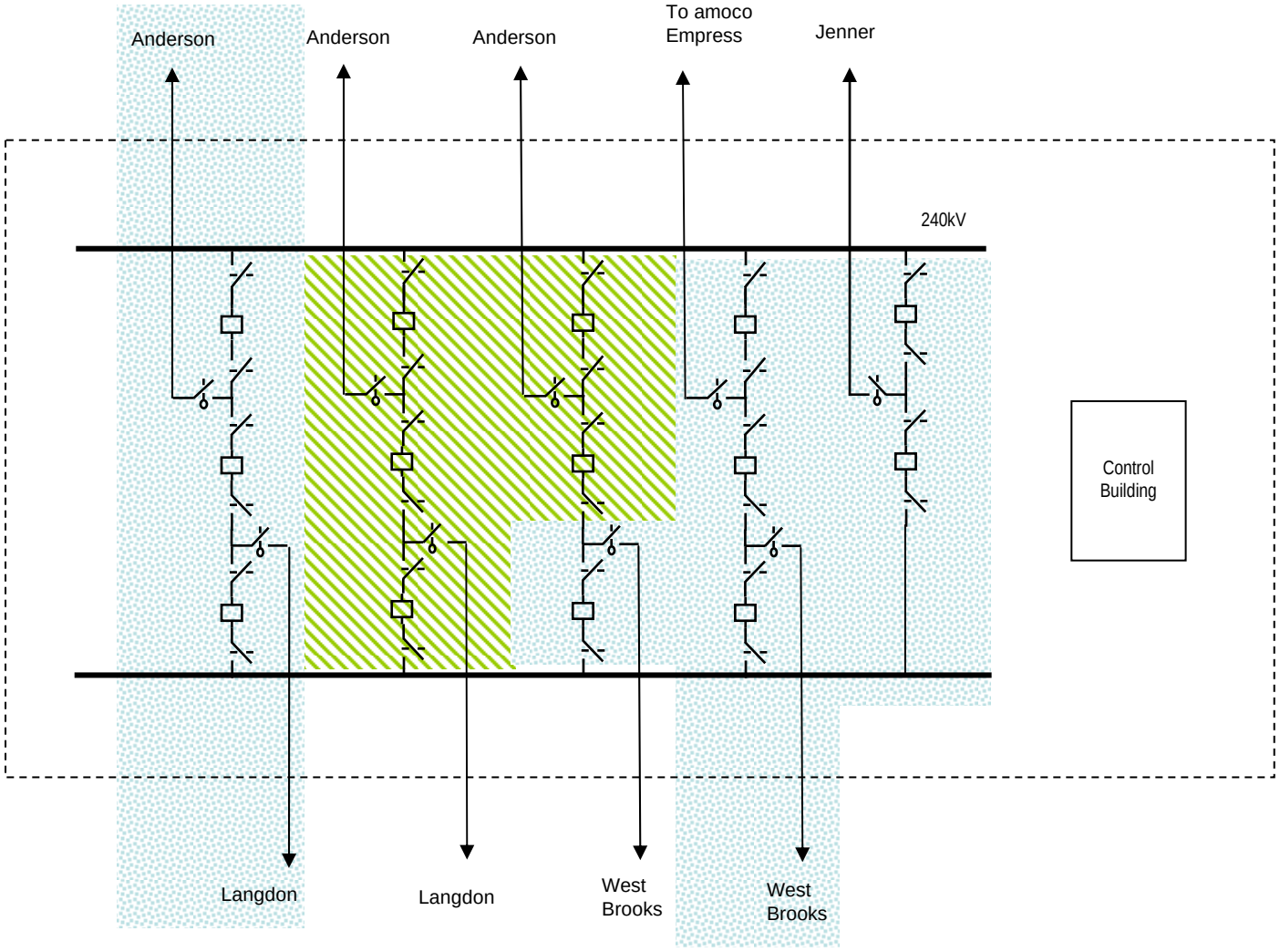
Estimate Summary for Need Identification Document (NID)

Project: SATD- Ware Junction (132S) substation upgrade (Alts. 1A, 1B, 2 & 4)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 17,2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 673,120	$ -	$ 673,120	$ -
Substation Facilities	$ 14,873,600	$ -	$ 14,873,600	$ -
Telecommunication	$ 347,200	$ -	$ 347,200	$ -
Total Facility Costs	**$ 15,893,920**	**$ -**	**$ 15,893,920**	**$ -**
Owners Costs	$ 100,000	$ -	$ 100,000	$ -
Distributed Costs	$ 6,803,877	$ -	$ 6,803,877	$ -
Total Owners and Dist. Costs	**$ 6,903,877**	**$ -**	**$ 6,903,877**	**$ -**
Total Direct Costs	**$ 22,797,797**	**$ -**	**$ 22,797,797**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 1,823,824	$ -	$ 1,823,824	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 1,823,824**	**$ -**	**$ 1,823,824**	**$ -**
TOTAL PROJECT COSTS	**$ 24,621,621**	**$ -**	**$ 24,621,621**	**$ -**

Assumptions and Risks

1) Existing equipment ratings such as CBs, CTs and switches are not adequate with the new lines coming into the substation.
2) Sufficient room available in the control building to accommodate new racks and modules.
3) Outages will be availed when required.
4) Only one circuit may be taken out at a time



LEGEND:

- Substation Fence
- Faulting Switch
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Addition
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Replacement
- Proposed Development

ALTALINK

Ware Junction- Alt 1A, Alt 1B, Alt 2,Alt 4

DATE	BY	SLD NO.
2008-06-23	GR	08 - 166

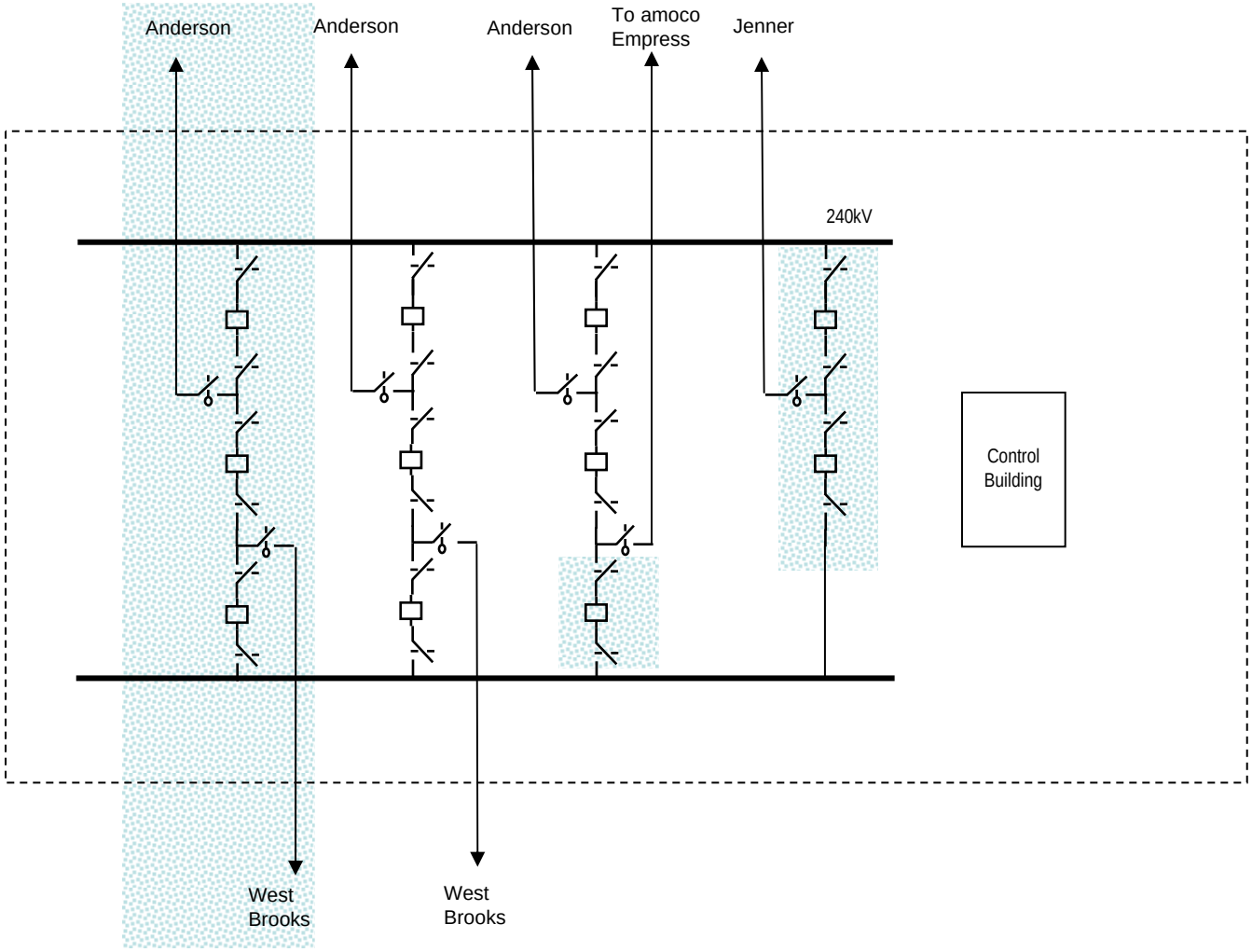
Estimate Summary for Need Identification Document (NID)

Project: SATD- Ware Junction (132S) sunbstation upgrade (Alts 1C & 3)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 17,2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 225,120	$ -	$ 225,120	$ -
Substation Facilities	$ 6,171,585	$ -	$ 6,171,585	$ -
Telecommunication	$ 50,400	$ -	$ 50,400	$ -
Total Facility Costs	**$ 6,447,105**	**$ -**	**$ 6,447,105**	**$ -**
Owners Costs	$ 80,000	$ -	$ 80,000	$ -
Distributed Costs	$ 3,004,660	$ -	$ 3,004,660	$ -
Total Owners and Dist. Costs	**$ 3,084,660**	**$ -**	**$ 3,084,660**	**$ -**
Total Direct Costs	**$ 9,531,765**	**$ -**	**$ 9,531,765**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 762,541	$ -	$ 762,541	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 762,541**	**$ -**	**$ 762,541**	**$ -**
TOTAL PROJECT COSTS	**$ 10,294,307**	**$ -**	**$ 10,294,307**	**$ -**

Assumptions and Risks

1) Existing equipment ratings such as CBs, CTs and switches are not adequate with the new lines coming into the substation.
2) Sufficient room available in the control building to accommodate new racks and modules.
3) Outages will be availed when required.
4) Only one circuit may be taken out at a time



LEGEND:

- Substation Fence
- Faulting Switch
- Transformer
- Fuse
- Motorized Air Break
- Circuit Breaker
- Addition
- Disconnect Switch
- AutoTransformer
- Capacitor Bank
- Replacement
- Proposed Development

ALTALINK

Ware Junction- Alt 1C, Alt 3

DATE	BY	SLD NO.
2008-06-23	GR	08 -167

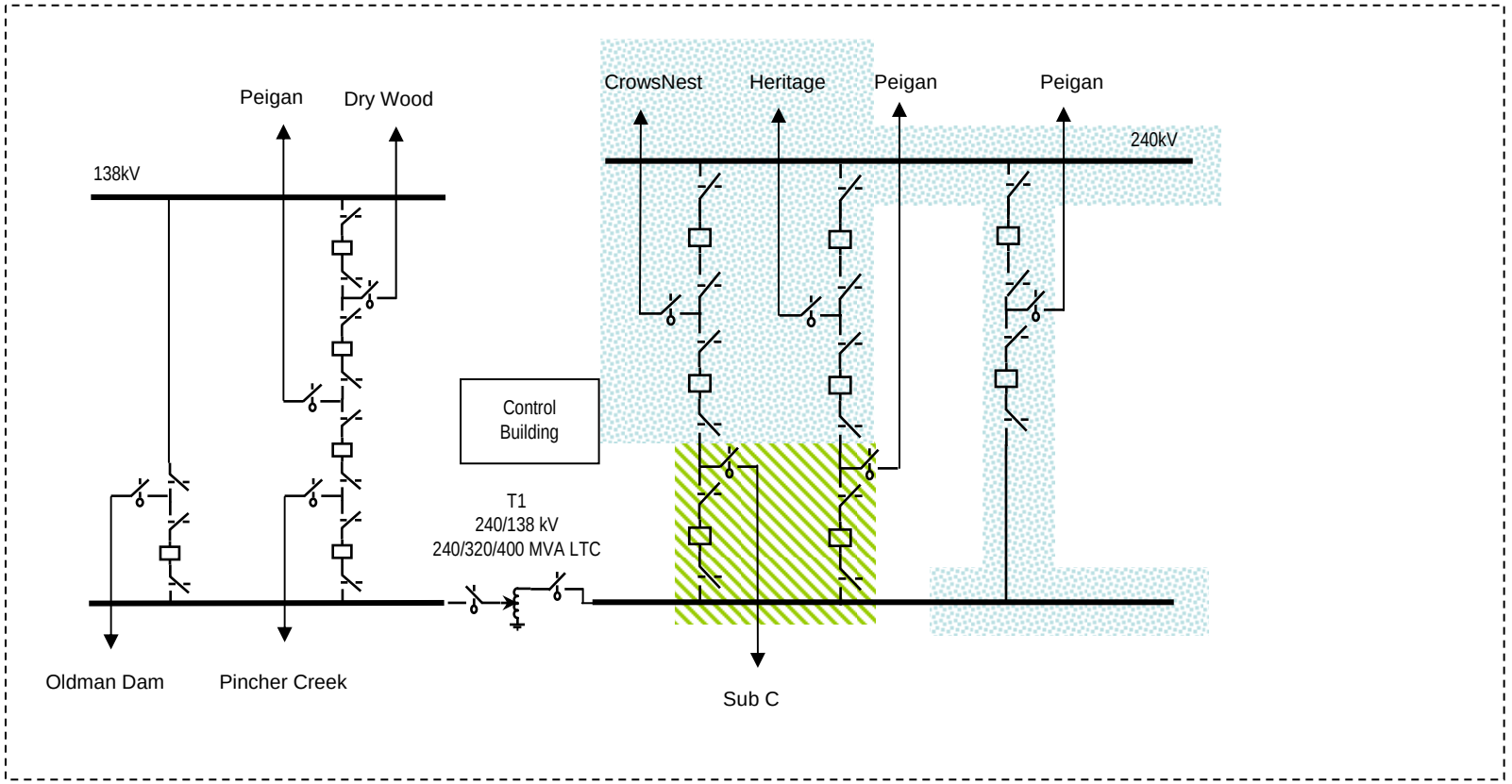
Estimate Summary for Need Identification Document (NID)

Project: SATD - Goose Lake (103S) substation upgrade (Alts 1A, 1C, 3 & 4)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 17, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 616,000	$ -	$ 616,000	$ -
Substation Facilities	$ 9,523,996	$ -	$ 9,523,996	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 10,139,996**	**$ -**	**$ 10,139,996**	**$ -**
Owners Costs	$ 80,000	$ -	$ 80,000	$ -
Distributed Costs	$ 5,169,481	$ -	$ 5,169,481	$ -
Total Owners and Dist. Costs	**$ 5,249,481**	**$ -**	**$ 5,249,481**	**$ -**
Total Direct Costs	**$ 15,389,477**	**$ -**	**$ 15,389,477**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 1,231,158	$ -	$ 1,231,158	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 1,231,158**	**$ -**	**$ 1,231,158**	**$ -**
TOTAL PROJECT COSTS	**$ 16,620,635**	**$ -**	**$ 16,620,635**	**$ -**

Assumptions and Risks

1) It's been assumed that SW project has been completed at the time of this project.
2) Existing equipment ratings such as CBs and switches are not adequate with the new lines coming into the substation.
3) Sufficient room available in the control building to accommodate new racks and modules.
4) Only one circuit may be taken out at a time. Outages will beavailable as required.



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Addition
- Replacement
- Fuse
- Disconnect Switch
- Proposed Development

ALTALINK

Goose Lake-Alt 1A, Alt 1C, Alt 3, Alt 4

DATE	BY	SLD NO.
2008-June-25	GR	08 - 168

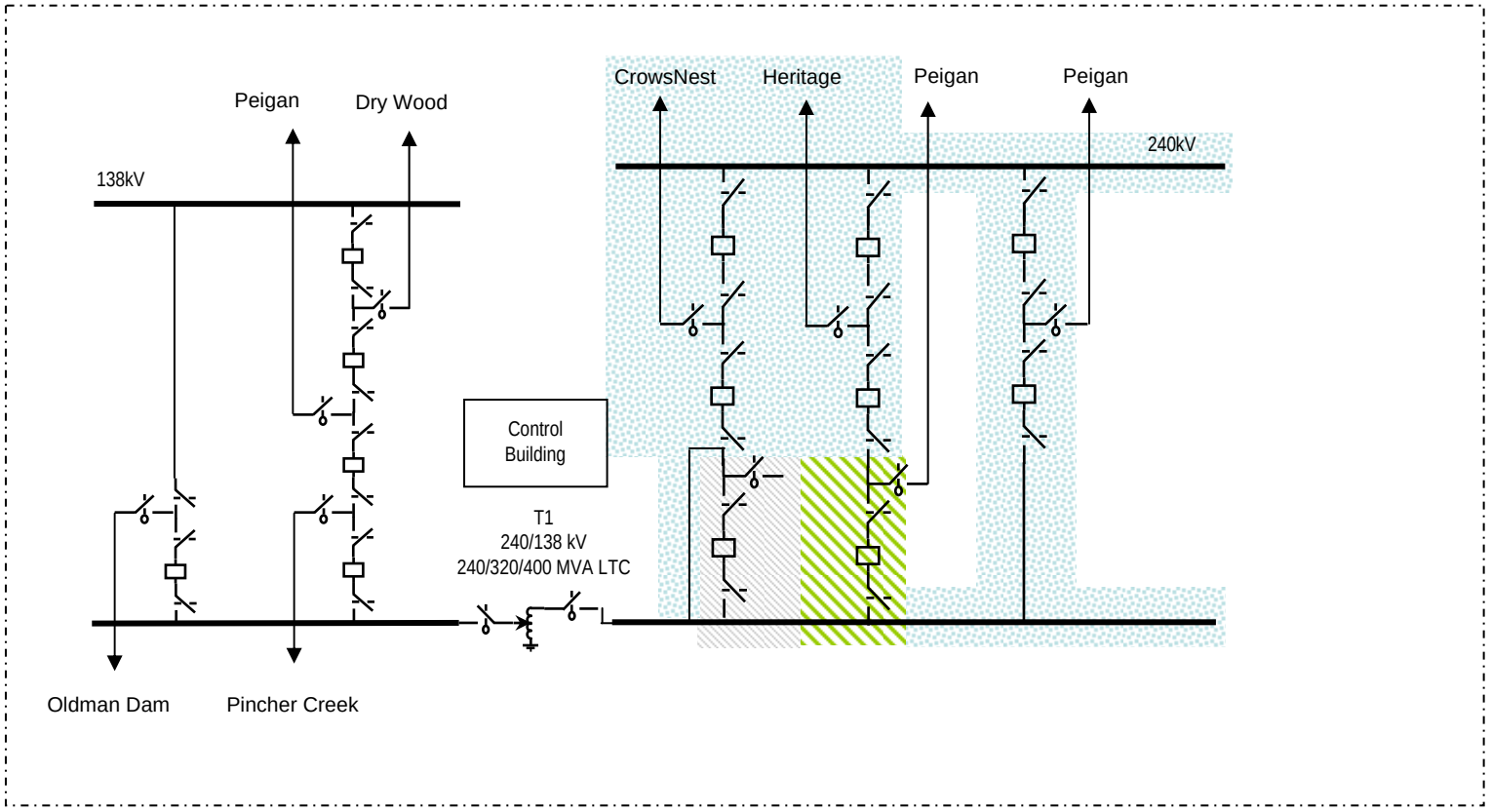
Estimate Summary for Need Identification Document (NID)

Project: SATD - Goose Lake (103S) substation upgrade (Alts. 1B & 2)
TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 17, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 616,000	$ -	$ 616,000	$ -
Substation Facilities	$ 8,992,727	$ -	$ 8,992,727	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 9,608,727**	**$ -**	**$ 9,608,727**	**$ -**
Owners Costs	$ 90,000	$ -	$ 90,000	$ -
Distributed Costs	$ 5,026,370	$ -	$ 5,026,370	$ -
Total Owners and Dist. Costs	**$ 5,116,370**	**$ -**	**$ 5,116,370**	**$ -**
Total Direct Costs	**$ 14,725,097**	**$ -**	**$ 14,725,097**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 1,178,008	$ -	$ 1,178,008	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 1,178,008**	**$ -**	**$ 1,178,008**	**$ -**
TOTAL PROJECT COSTS	**$ 15,903,105**	**$ -**	**$ 15,903,105**	**$ -**

Assumptions and Risks

1) It's been assumed that SW project has been completed at the time of this project.
2) Existing equipment ratings such as CBs and switches are not adequate with the new lines coming into the substation.
3) Sufficient room available in the control building to accommodate new racks and modules.
4) Only one circuit may be taken out at a time. Outages will be available when required.



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Addition
- Replacement
- Salvage
- Disconnect Switch
- Proposed Development

ALTALINK

Goose Lake - Alt 1B, Alt 2

DATE	BY	SLD NO.
2008-June-25	GR	08 -169

Estimate Summary for Need Identification Document (NID)

Project: SATD - West Brooks 28S With Line G4 Terminations (rev Alts. 1A & 1B)

TFO: AltaLink

Prepared by: A. Rothbauer

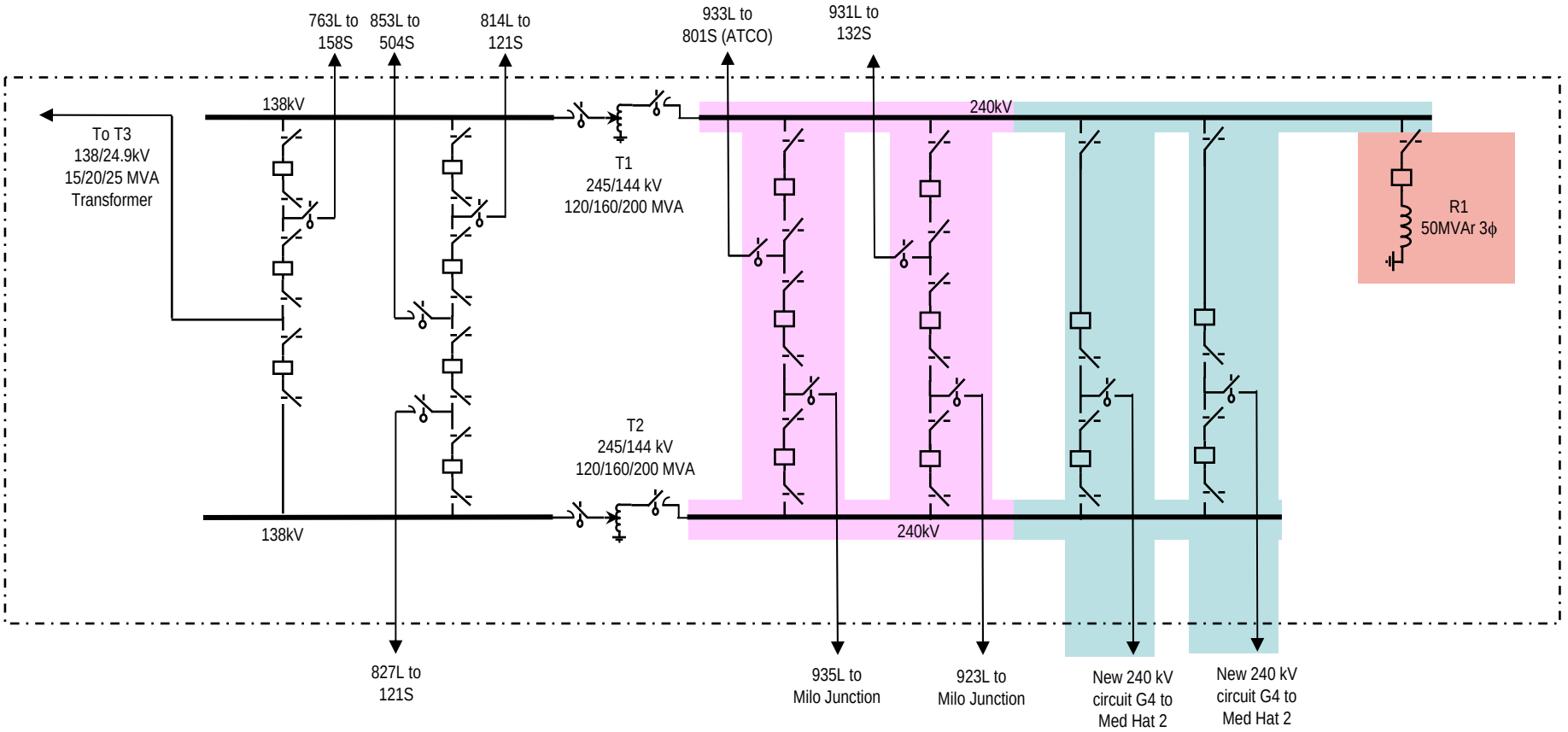
Date: September 25, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 13,079,719	$ -	$ 13,079,719	$ -
Telecommunication	$ 324,032	$ -	$ 324,032	$ -
Total Facility Costs	**$ 13,403,751**	**$ -**	**$ 13,403,751**	**$ -**
Owners Costs	$ 85,000	$ -	$ 85,000	$ -
Distributed Costs	$ 6,794,154	$ -	$ 6,794,154	$ -
Total Owners and Dist. Costs	**$ 6,879,154**	**$ -**	**$ 6,879,154**	**$ -**
Total Direct Costs	**$ 20,282,905**	**$ -**	**$ 20,282,905**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 1,622,632	$ -	$ 1,622,632	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 1,622,632**	**$ -**	**$ 1,622,632**	**$ -**
TOTAL PROJECT COSTS	**$ 21,905,537**	**$ -**	**$ 21,905,537**	**$ -**

Assumptions and Risks

Outages will be available when required and when scheduled. Construction will proceed in a continuous manner.
There are no unusual site development requirements. Land is avilable for expansion to the east.
Bus will rebuilt to be capable of 5kA. Breaker diameters will be rebuilt to be capable of 3kA.



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Underground
- Proposed Replacement
- Disconnect Switch
- Relocated Equipment
- Proposed Development
- Regulator

ALTALINK

West Brooks 28S with Line G4 Alternatives 1A and 1B

DATE	BY	SLD NO.
2008 - 09 - 25	ALR	08 - 304

Estimate Summary for Need Identification Document (NID)

Project: SATD - West Brooks 28S Including Line K & Line G4 Terminations (rev Alt. 1C)

TFO: AltaLink

Prepared by: A. Rothbauer

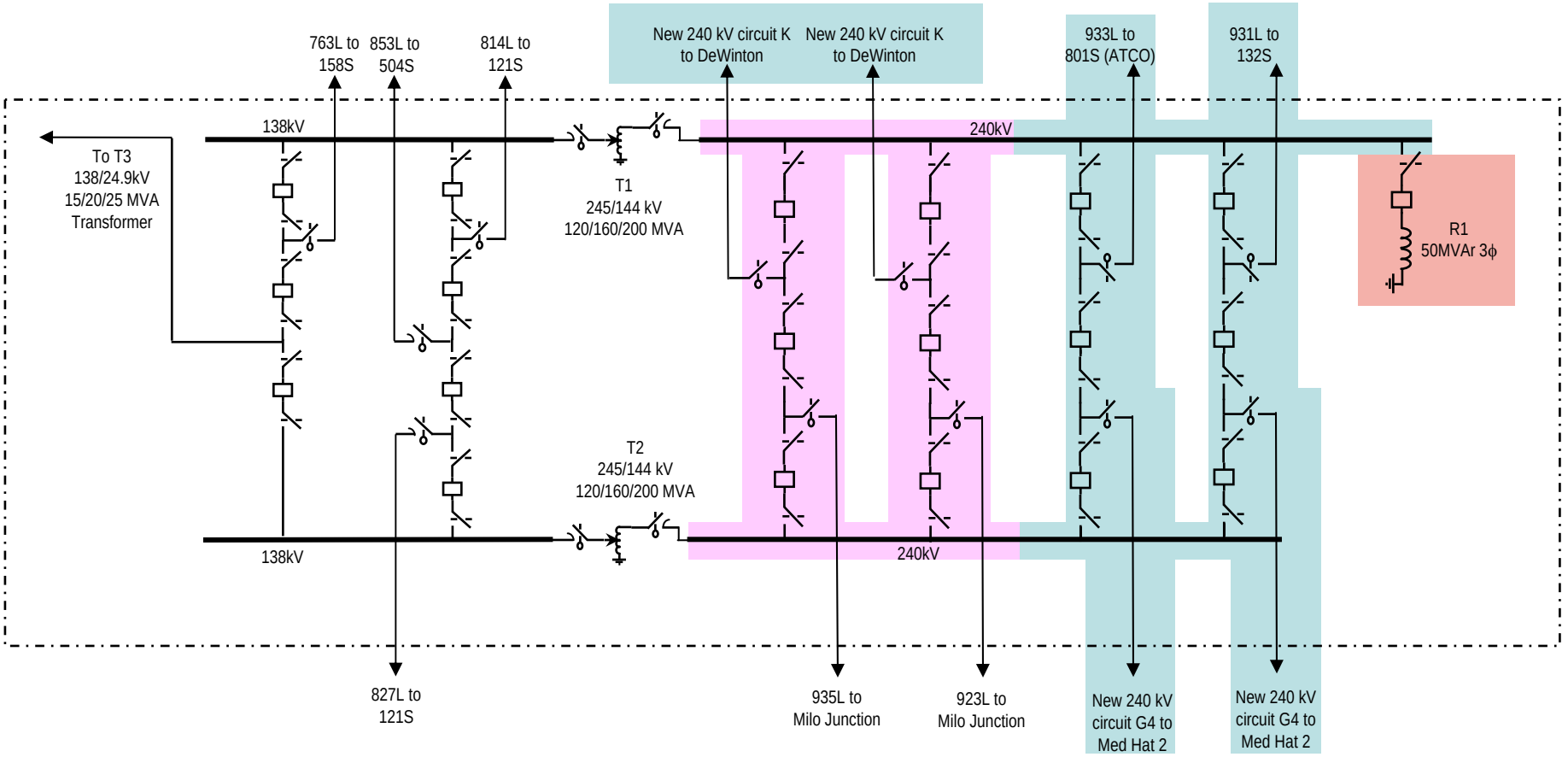
Date: September 25, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 446,880	$ -	$ 446,880	$ -
Substation Facilities	$ 15,635,147	$ -	$ 15,635,147	$ -
Telecommunication	$ 374,432	$ -	$ 374,432	$ -
Total Facility Costs	**$ 16,456,459**	**$ -**	**$ 16,456,459**	**$ -**
Owners Costs	$ 100,000	$ -	$ 100,000	$ -
Distributed Costs	$ 7,748,724	$ -	$ 7,748,724	$ -
Total Owners and Dist. Costs	**$ 7,848,724**	**$ -**	**$ 7,848,724**	**$ -**
Total Direct Costs	**$ 24,305,182**	**$ -**	**$ 24,305,182**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 1,944,415	$ -	$ 1,944,415	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 1,944,415**	**$ -**	**$ 1,944,415**	**$ -**
TOTAL PROJECT COSTS	**$ 26,249,597**	**$ -**	**$ 26,249,597**	**$ -**

Assumptions and Risks

Outages will be available when required and when scheduled. Construction will proceed in a continuous manner.
There are no unusual site development requirements. Land is avilable for expansion to the east.
Bus will rebuilt to be capable of 5kA. Breaker diameters will be rebuilt to be capable of 3kA.



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Underground
- Proposed Replacement
- Disconnect Switch
- Relocated Equipment
- Proposed Development
- Regulator

ALTALINK

West Brooks 28S with Line G4
Alternative 1C

DATE	BY	SLD NO.
2008 - 09 - 25	ALR	08 - 306

Estimate Summary for Need Identification Document (NID)

Project: SATD - West Brooks 28S Including Line G4 Terminations, SVC & Reactor (rev Alt. 2)

TFO: AltaLink

Prepared by: A. Rothbauer

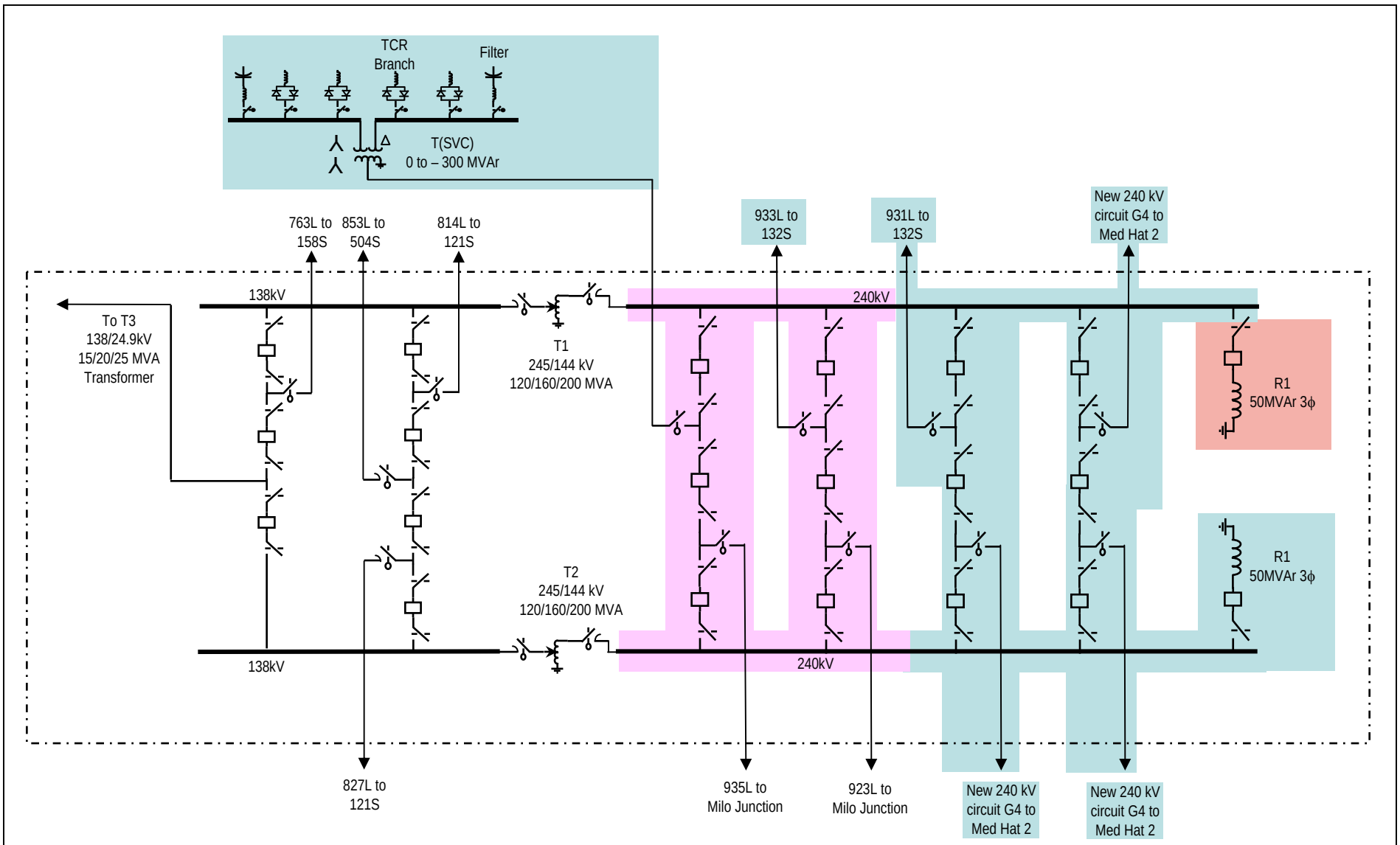
Date: 25/9/2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 670,880	$ -	$ 670,880	$ -
Substation Facilities	$ 59,164,799	$ -	$ 59,164,799	$ -
Telecommunication	$ 324,032	$ -	$ 324,032	$ -
Total Facility Costs	**$ 60,159,711**	**$ -**	**$ 60,159,711**	**$ -**
Owners Costs	$ 346,400	$ -	$ 346,400	$ -
Distributed Costs	$ 20,670,449	$ -	$ 20,670,449	$ -
Total Owners and Dist. Costs	**$ 21,016,849**	**$ -**	**$ 21,016,849**	**$ -**
Total Direct Costs	**$ 81,176,560**	**$ -**	**$ 81,176,560**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 6,494,125	$ -	$ 6,494,125	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 6,494,125**	**$ -**	**$ 6,494,125**	**$ -**
TOTAL PROJECT COSTS	**$ 87,670,685**	**$ -**	**$ 87,670,685**	**$ -**

Assumptions and Risks

Outages will be available when required and when scheduled. Construction will proceed in a continuous manner.
Only one circuit can be taken out at a time
There are no unusual site development requirements. Land is available for expansion to the east.
Existing bus will rebuilt to be capable of 5kA. Breaker diameters will be built to be capable of 3kA.
SVC and reactor costs are turn key.



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Proposed Replacement
- Disconnect Switch
- Underground
- Regulator
- Relocated Equipment
- Proposed Development

ALTALINK

West Brooks 28S with Line G4
Alternative 2

DATE	BY	SLD NO.
2008 - 09 - 25	ALR	08 - 305

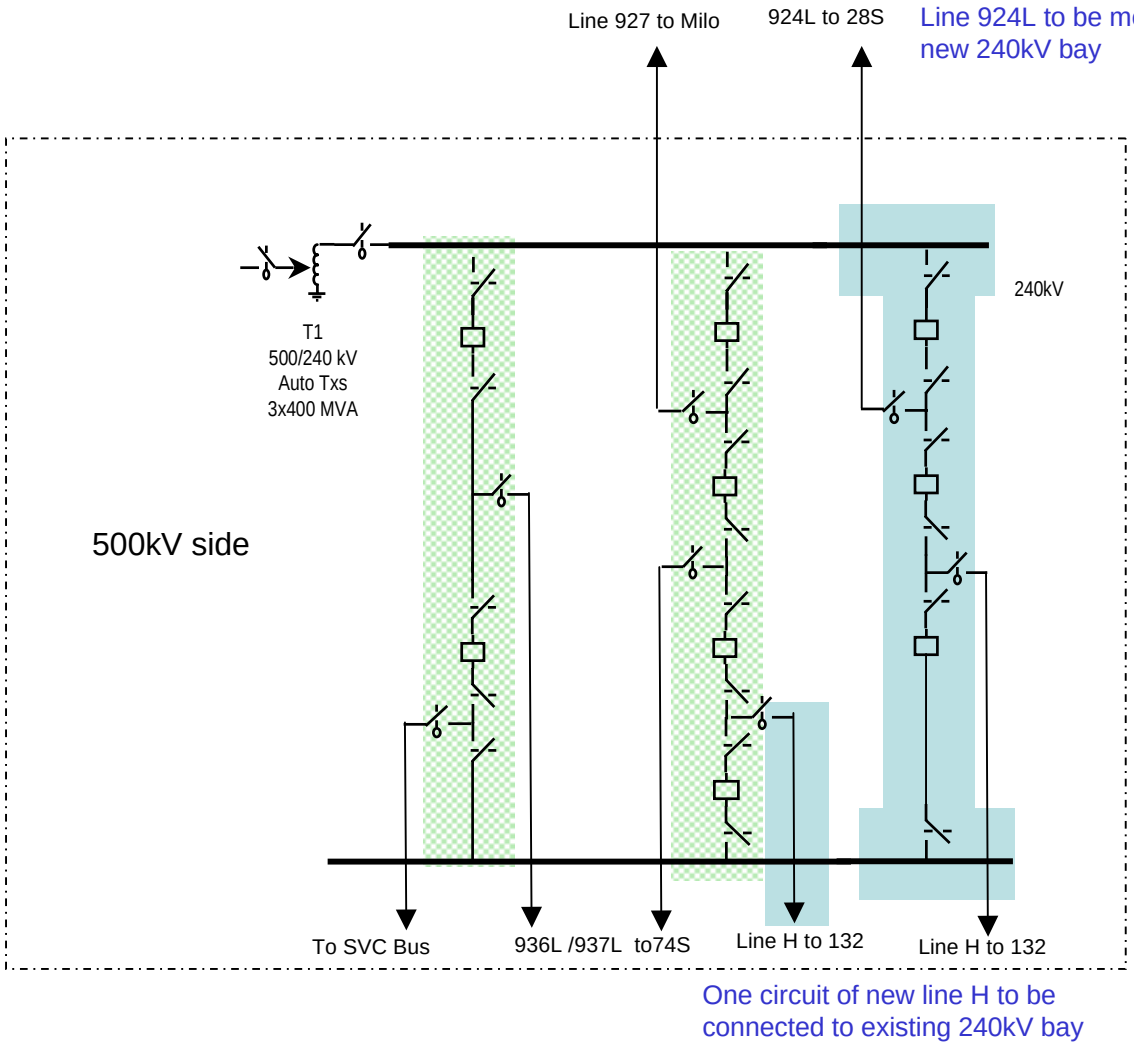
Estimate Summary for Need Identification Document (NID)

Project: SATD - 240kV Line H Termination at Langdon (Alts 1A, 1B, 2)
TFO: AltaLink
Prepared by: Rafael Guzmàn
Date: June 23, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 10,934,787	$ -	$ 10,934,787	$ -
Telecommunication	$ 324,032	$ -	$ 324,032	$ -
Total Facility Costs	**$ 11,258,819**	**$ -**	**$ 11,258,819**	**$ -**
Owners Costs	$ 95,000	$ -	$ 95,000	$ -
Distributed Costs	$ 5,550,095	$ -	$ 5,550,095	$ -
Total Owners and Dist. Costs	**$ 5,645,095**	**$ -**	**$ 5,645,095**	**$ -**
Total Direct Costs	**$ 16,903,914**	**$ -**	**$ 16,903,914**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 1,352,313	$ -	$ 1,352,313	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 1,352,313**	**$ -**	**$ 1,352,313**	**$ -**
TOTAL PROJECT COSTS	**$ 18,256,227**	**$ -**	**$ 18,256,227**	**$ -**

Assumptions and Risks

No land required. Sub expansion (130x30m Approx). Standard 240kV site preparation. Outages available when required
Existing SCADA system, only point addition. OPGW MUX/LAN required to fiber link Langdon and Ware Junction
Line 924 re-terminated in new 240kV bay
Existing 240kV breakers, air breaks, motorized air breaks, CTs need to be replaced due to higher ampacity requirements
Bus rating assumed to be sufficient for connection of new high capacity line H



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Disconnect Switch
- Motorized air break with arcing horn
- Proposed Development
- Proposed Rebuilding / Replacement
- Future Development

ALTALINK

Langdon 240kV – Alts 1A, 1B, 2

DATE	BY	SLD NO.
2008- June-20	RG	08-161

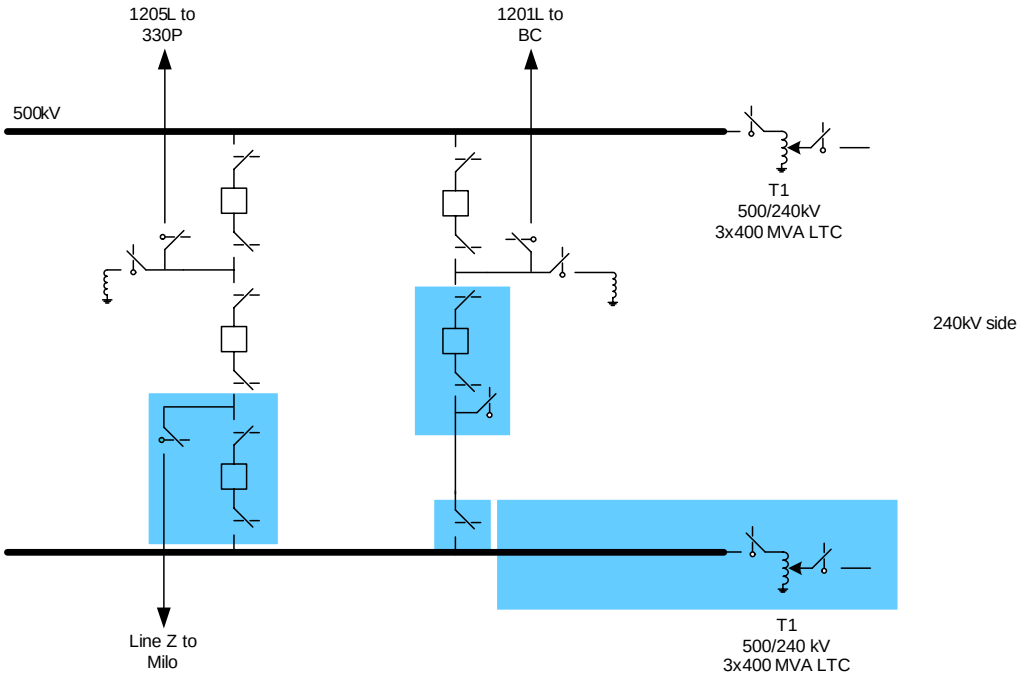
Estimate Summary for Need Identification Document (NID)

Project: SATD - 500kV Line Z termination at Langdon 102s sub. (Alt. 3)
TFO: AltaLink
Prepared by: Teshmont
Date: July 9, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 21,608,590	$ -	$ 21,608,590	$ -
Telecommunication	$ 291,592	$ -	$ 291,592	$ -
Total Facility Costs	**$ 21,900,182**	**$ -**	**$ 21,900,182**	**$ -**
Owners Costs	$ 95,000	$ -	$ 95,000	$ -
Distributed Costs	$ 7,423,764	$ -	$ 7,423,764	$ -
Total Owners and Dist. Costs	**$ 7,518,764**	**$ -**	**$ 7,518,764**	**$ -**
Total Direct Costs	**$ 29,418,946**	**$ -**	**$ 29,418,946**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 2,353,516	$ -	$ 2,353,516	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 2,353,516**	**$ -**	**$ 2,353,516**	**$ -**
TOTAL PROJECT COSTS	**$ 31,772,461**	**$ -**	**$ 31,772,461**	**$ -**

Assumptions and Risks

Control building at Langdon sufficient room to house addition control and protection panels.
Protective and control full redundancy design. No new communication equipment required
Outages available as required. Construction will proceed in a continuous manner.
No land required.



LEGEND:

- Motorized Air Break
- AutoTransformer
- Disconnect Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Reactor Bank
- Substation Fence
- Proposed Development

ALTALINK

Langdon 102S
500kV – Alternative 3

Date:	By:	SLD No.
2008-07-28		08-189

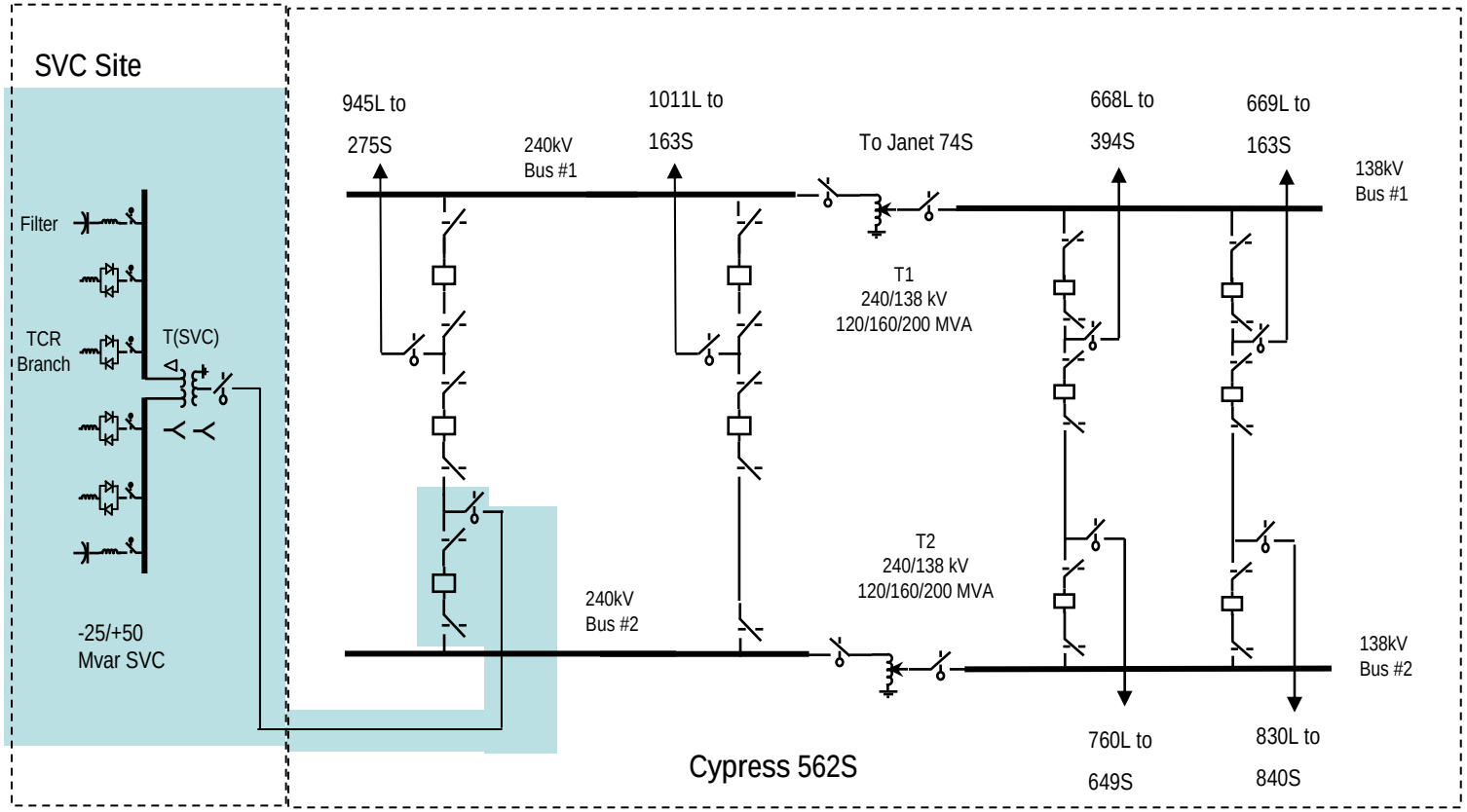
Estimate Summary for Need Identification Document (NID)

Project: SATD - Cypress 562 - SVC Addition (Alts 1A, 1B, 1C, 2, & 4)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: September 22, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 716,120	$ -	$ 716,120	$ -
Substation Facilities	$ 21,367,382	$ -	$ 21,367,382	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 22,083,503**	**$ -**	**$ 22,083,503**	**$ -**
Owners Costs	$ 110,000	$ -	$ 110,000	$ -
Distributed Costs	$ 6,593,779	$ -	$ 6,593,779	$ -
Total Owners and Dist. Costs	**$ 6,703,779**	**$ -**	**$ 6,703,779**	**$ -**
Total Direct Costs	**$ 28,787,281**	**$ -**	**$ 28,787,281**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 2,302,982	$ -	$ 2,302,982	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 2,302,982**	**$ -**	**$ 2,302,982**	**$ -**
TOTAL PROJECT COSTS	**$ 31,090,264**	**$ -**	**$ 31,090,264**	**$ -**

Assumptions and Risks

Initial Cypress 562S configuration for SE Development is assumed.
Crown Land is available adjacent to Cypress Substation.
Turn-key project. Delivery time for SVC is about 20-24m.



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Proposed Development
- Disconnect Switch
- Provisions for Future Development

ALTALINK

Sub Cypress 562S –SVC Addition
Alts 1A, 1B, 1C, 2, & 4

DATE	BY	SLD NO.
2008 - 09 - 23	RG	08-299

Estimate Summary for Need Identification Document (NID)

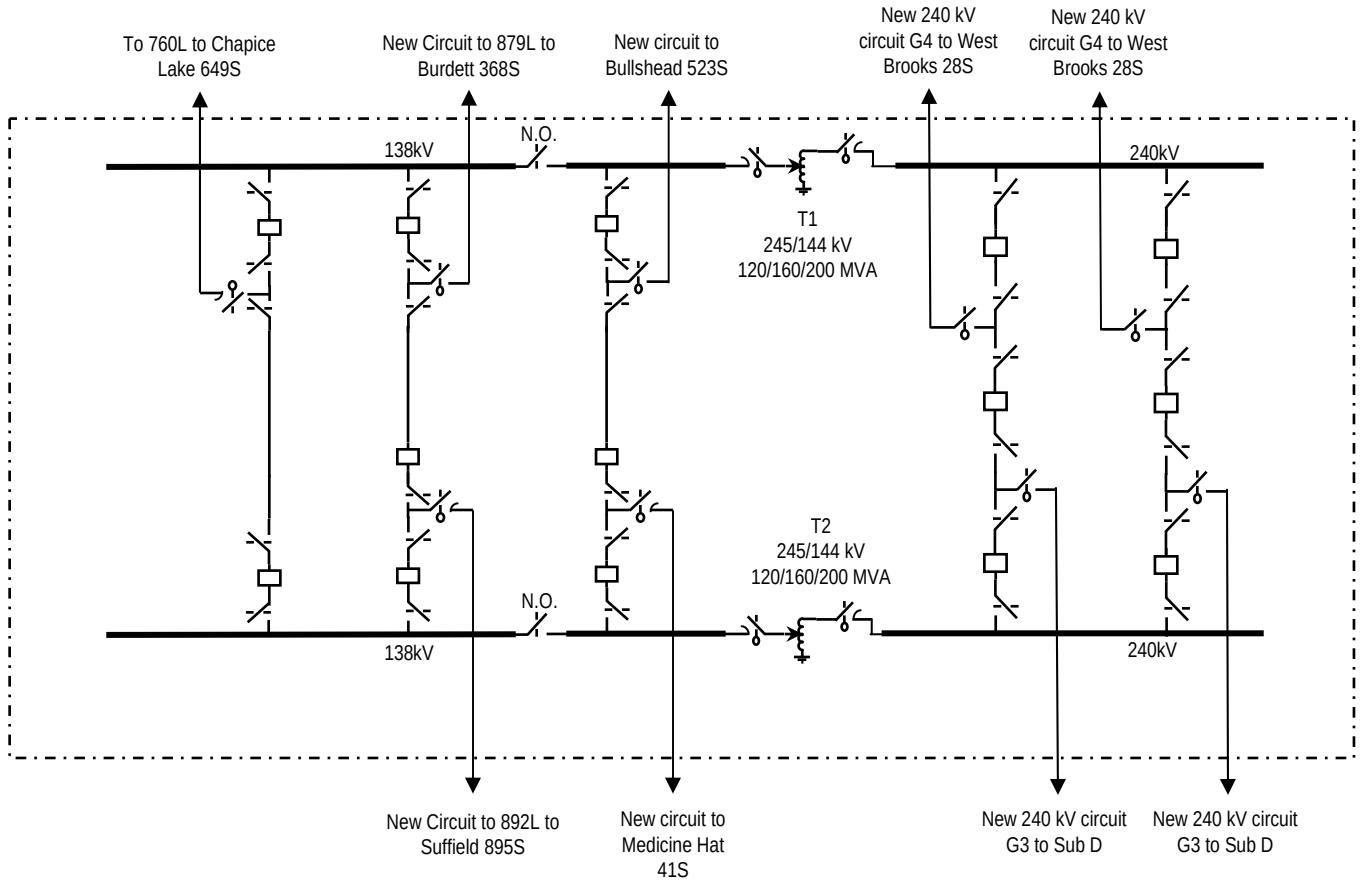
Project: SATD - New Med Hat 2 Substation with Medicne Hat Source and Island Bus Alternatives 1A, 1B, 1C and 2

TFO: AltaLink
Prepared by: Al Rothbauer
Date: September 23, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 25,412,161	$ -	$ 25,412,161	$ -
Telecommunication	$ 374,432	$ -	$ 374,432	$ -
Total Facility Costs	**$ 25,786,593**	**$ -**	**$ 25,786,593**	**$ -**
Owners Costs	$ 392,000	$ -	$ 392,000	$ -
Distributed Costs	$ 11,179,725	$ -	$ 11,179,725	$ -
Total Owners and Dist. Costs	**$ 11,571,725**	**$ -**	**$ 11,571,725**	**$ -**
Total Direct Costs	**$ 37,358,317**	**$ -**	**$ 37,358,317**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 2,988,665	$ -	$ 2,988,665	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 2,988,665**	**$ -**	**$ 2,988,665**	**$ -**
TOTAL PROJECT COSTS	**$ 40,346,983**	**$ -**	**$ 40,346,983**	**$ -**

Assumptions and Risks

Site will be available for development
Development will be done as a complete unit
Construction will be done in good weather conditions
Work will be proceed without disruptions
There will not be issues in getting P&L
A contingency of 20% is included



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Proposed Replacement
- Disconnect Switch
- Underground
- Regulator
- Relocated Equipment
- Proposed Development

ALTALINK

Medicine Hat 2 (MED HAT 2) Substation Alternatives 1A, 1B, 1C and 2

DATE	BY	SLD NO.
2008 – 09 - 15	ALR	08 - 261

Estimate Summary for Need Identification Document (NID)

Project: SATD - New Med Hat 2 Substation with Medicne Hat Source and Island Bus (Alts 3 & 4)

TFO: AltaLink

Prepared by: Al Rothbauer

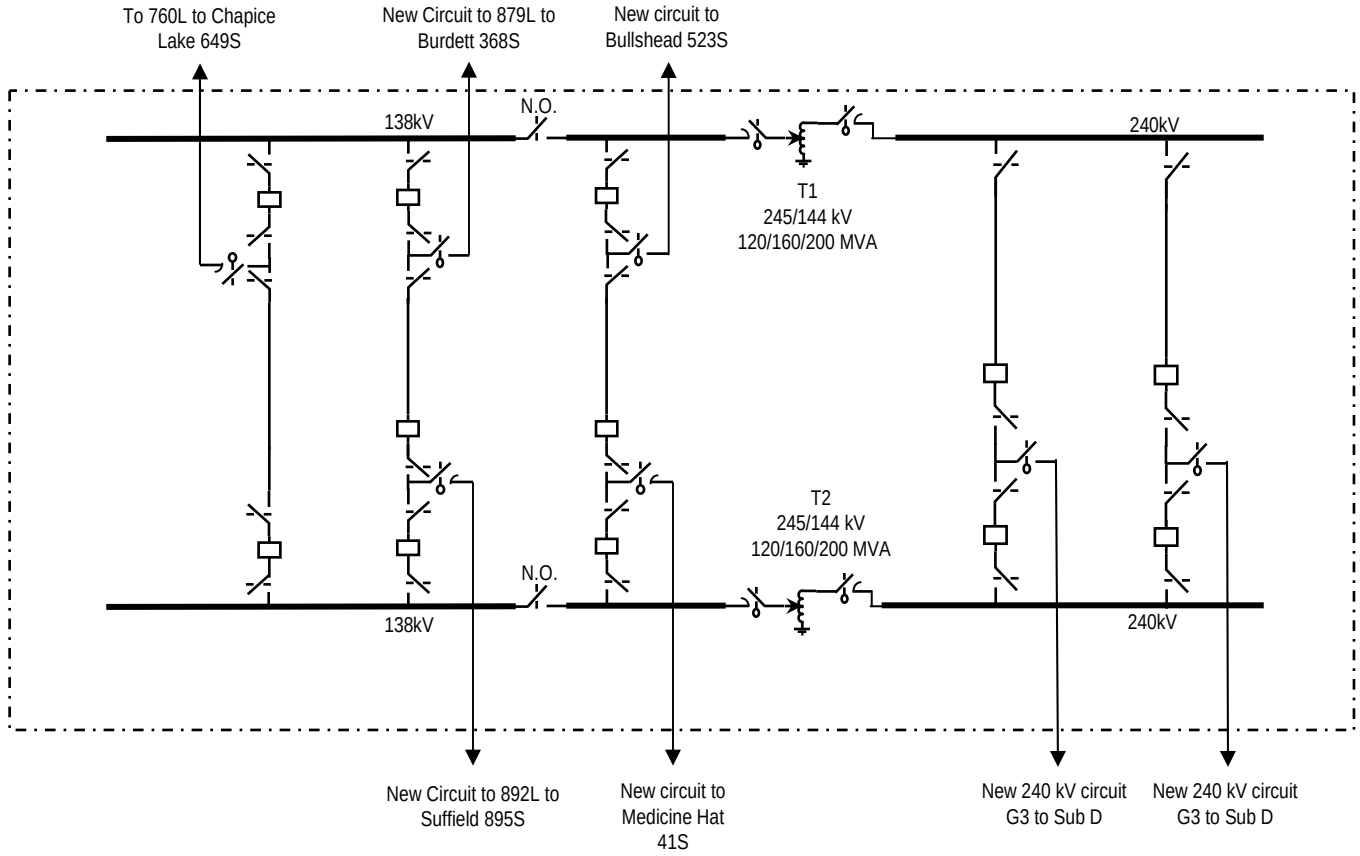
Date: September 23, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 22,723,519	$ -	$ 22,723,519	$ -
Telecommunication	$ 374,432	$ -	$ 374,432	$ -
Total Facility Costs	**$ 23,097,951**	**$ -**	**$ 23,097,951**	**$ -**
Owners Costs	$ 362,000	$ -	$ 362,000	$ -
Distributed Costs	$ 9,779,009	$ -	$ 9,779,009	$ -
Total Owners and Dist. Costs	**$ 10,141,009**	**$ -**	**$ 10,141,009**	**$ -**
Total Direct Costs	**$ 33,238,960**	**$ -**	**$ 33,238,960**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 2,659,117	$ -	$ 2,659,117	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 2,659,117**	**$ -**	**$ 2,659,117**	**$ -**
TOTAL PROJECT COSTS	**$ 35,898,077**	**$ -**	**$ 35,898,077**	**$ -**

Assumptions and Risks

Site will be available for development
Development will be done as a complete unit
Construction will be done in good weather conditions
Work will be proceed without disruptions
There will not be issues in getting P&L
A contingency of 20% is included



LEGEND:

- Substation Fence
- Motorized Air Break
- AutoTransformer
- Faulting Switch
- Circuit Breaker
- Capacitor Bank
- Transformer
- Generation
- Motorized air break with arcing horn
- Underground
- Proposed Replacement
- Disconnect Switch
- Relocated Equipment
- Proposed Development
- Regulator

ALTALINK

Medicine Hat 2 (MED HAT 2) Substation Alternatives 3 and 4

DATE	BY	SLD NO.
2008 – 09 - 24	ALR	08 - 303

Estimate Summary for Need Identification Document (NID)

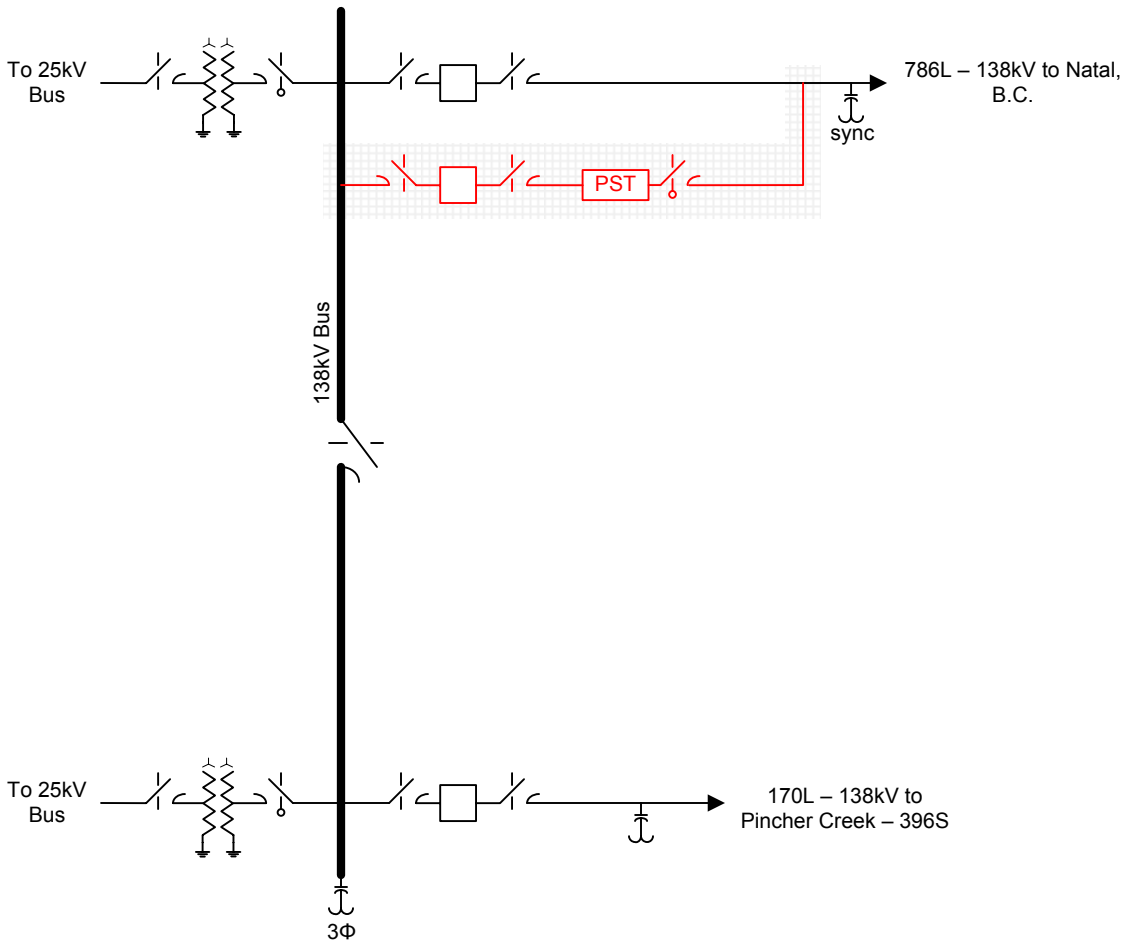
Project: SATD - Coleman 799S Phase-Shifting Transformer
All Alternatives

TFO: AltaLink
Prepared by: Teshmont
Date: September 22, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ 8,375,606	$ -	$ 8,375,606	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 8,375,606**	**$ -**	**$ 8,375,606**	**$ -**
Owners Costs	$ 120,000	$ -	$ 120,000	$ -
Distributed Costs	$ 3,795,080	$ -	$ 3,795,080	$ -
Total Owners and Dist. Costs	**$ 3,915,080**	**$ -**	**$ 3,915,080**	**$ -**
Total Direct Costs	**$ 12,290,687**	**$ -**	**$ 12,290,687**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 983,255	$ -	$ 983,255	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 983,255**	**$ -**	**$ 983,255**	**$ -**
TOTAL PROJECT COSTS	**$ 13,273,942**	**$ -**	**$ 13,273,942**	**$ -**

Assumptions and Risks

Phase-Shifting Transformer (PST) assumed to be 138/138kV, 120 MVA, +/- 60 Degrees
PST Forward and reverse Power Capability
Space provision at the control building is adequate
Outages available as required. Land available for expansion.
PST Delivery lead time of 24-28 months ARO



Legend

- Circuit Breaker
- Ganged Air-Switch (Motor Operated)
- Ganged Air-Switch (Manual Operated)
- OCTC Transformer
- UG Cable

ALTALINK

Coleman Station 799S – New Phase Shifting Transformer

Date:	By:	SLD No.
2008-09-18		08-281

Estimate Summary for Need Identification Document (NID)

Project: SATD- Line A1 (From Goose Lake sub to HWY 785 WF)
Alt 1A, 1B, 1C, 3, 4(240kV, D/C, Bundle of 1033 Curlew- ACSR)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 5,955,161	$ -	$ 5,955,161	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 5,955,161**	**$ -**	**$ 5,955,161**	**$ -**
Owners Costs	$ 660,837	$ -	$ 660,837	$ -
Distributed Costs	$ 1,719,988	$ -	$ 1,719,988	$ -
Total Owners and Dist. Costs	**$ 2,380,825**	**$ -**	**$ 2,380,825**	**$ -**
Total Direct Costs	**$ 8,335,986**	**$ -**	**$ 8,335,986**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 666,879	$ -	$ 666,879	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 666,879**	**$ -**	**$ 666,879**	**$ -**
TOTAL PROJECT COSTS	**$ 9,002,865**	**$ -**	**$ 9,002,865**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)

Project: SATD- Line A1 (From Goose Lake sub to HWY 785 WF)
Alt 2 (240kV, D/C, Bundle of 477 Hawk- ACSS)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: June 27, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 5,199,871	$ -	$ 5,199,871	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 5,199,871**	**$ -**	**$ 5,199,871**	**$ -**
Owners Costs	$ 660,838	$ -	$ 660,838	$ -
Distributed Costs	$ 1,598,764	$ -	$ 1,598,764	$ -
Total Owners and Dist. Costs	**$ 2,259,602**	**$ -**	**$ 2,259,602**	**$ -**
Total Direct Costs	**$ 7,459,473**	**$ -**	**$ 7,459,473**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 596,758	$ -	$ 596,758	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 596,758**	**$ -**	**$ 596,758**	**$ -**
TOTAL PROJECT COSTS	**$ 8,056,231**	**$ -**	**$ 8,056,231**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)

Project: SATD- Line A2 (From Heritage sub to HWY 785 WF)
Alt 1A, 1B, 1C, 3, 4(240kV, D/C, Bundle of 1033 Curlew- ACSR)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 10,325,926	$ -	$ 10,325,926	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 10,325,926**	**$ -**	**$ 10,325,926**	**$ -**
Owners Costs	$ 1,000,758	$ -	$ 1,000,758	$ -
Distributed Costs	$ 2,717,030	$ -	$ 2,717,030	$ -
Total Owners and Dist. Costs	**$ 3,717,788**	**$ -**	**$ 3,717,788**	**$ -**
Total Direct Costs	**$ 14,043,715**	**$ -**	**$ 14,043,715**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 1,123,497	$ -	$ 1,123,497	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 1,123,497**	**$ -**	**$ 1,123,497**	**$ -**
TOTAL PROJECT COSTS	**$ 15,167,212**	**$ -**	**$ 15,167,212**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)

Project: SATD- Line A2 (From Heritage sub to HWY 785 WF)
Alt 2 (240kV, D/C, Bundle of 477 Hawk- ACSS)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: June 27, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 8,959,626	$ -	$ 8,959,626	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 8,959,626**	**$ -**	**$ 8,959,626**	**$ -**
Owners Costs	$ 1,000,758	$ -	$ 1,000,758	$ -
Distributed Costs	$ 2,497,739	$ -	$ 2,497,739	$ -
Total Owners and Dist. Costs	**$ 3,498,497**	**$ -**	**$ 3,498,497**	**$ -**
Total Direct Costs	**$ 12,458,123**	**$ -**	**$ 12,458,123**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 996,650	$ -	$ 996,650	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 996,650**	**$ -**	**$ 996,650**	**$ -**
TOTAL PROJECT COSTS	**$ 13,454,773**	**$ -**	**$ 13,454,773**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)

Project: SATD- Line A3 (From Crowsnest to HWY 785 WF)
Alt 1A, 1B, 1C, 3, 4 (240kV, D/C, Bundle of 1033 Curlew- ACSR)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: July 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 43,155,813	$ -	$ 43,155,813	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 43,155,813**	**$ -**	**$ 43,155,813**	**$ -**
Owners Costs	$ 3,311,566	$ -	$ 3,311,566	$ -
Distributed Costs	$ 9,059,603	$ -	$ 9,059,603	$ -
Total Owners and Dist. Costs	**$ 12,371,169**	**$ -**	**$ 12,371,169**	**$ -**
Total Direct Costs	**$ 55,526,982**	**$ -**	**$ 55,526,982**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 4,442,159	$ -	$ 4,442,159	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 4,442,159**	**$ -**	**$ 4,442,159**	**$ -**
TOTAL PROJECT COSTS	**$ 59,969,141**	**$ -**	**$ 59,969,141**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
4) Induction study on other facilities not included, nor are the mitigation of induction effects.
5) Dead end structures as a provision for future interconnection of wind farms has been included.
6) A hearing is highly likely

Estimate Summary for Need Identification Document (NID)

Project: SATD- Line A3 (From Crowsnest sub to HWY 785 WF)
Alt 2 (240kV, D/C, Bundle of 477 Hawk- ACSS)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: June 27, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 34,993,781	$ -	$ 34,993,781	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 34,993,781**	**$ -**	**$ 34,993,781**	**$ -**
Owners Costs	$ 3,311,566	$ -	$ 3,311,566	$ -
Distributed Costs	$ 7,884,270	$ -	$ 7,884,270	$ -
Total Owners and Dist. Costs	**$ 11,195,836**	**$ -**	**$ 11,195,836**	**$ -**
Total Direct Costs	**$ 46,189,617**	**$ -**	**$ 46,189,617**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 3,695,169	$ -	$ 3,695,169	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 3,695,169**	**$ -**	**$ 3,695,169**	**$ -**
TOTAL PROJECT COSTS	**$ 49,884,787**	**$ -**	**$ 49,884,787**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
4) Induction study on other facilities not included, nor are the mitigation of induction effects.
5) Dead end structures as a provision for future interconnection of wind farms has been included.

Estimate Summary for Need Identification Document (NID)

Project: SATD - 240kV Line B from Peigan to Sub A (Alt. 2)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 18, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 61,278,907	$ -	$ 61,278,907	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 61,278,907**	**$ -**	**$ 61,278,907**	**$ -**
Owners Costs	$ 6,238,000	$ -	$ 6,238,000	$ -
Distributed Costs	$ 21,923,137	$ -	$ 21,923,137	$ -
Total Owners and Dist. Costs	**$ 28,161,137**	**$ -**	**$ 28,161,137**	**$ -**
Total Direct Costs	**$ 89,440,045**	**$ -**	**$ 89,440,045**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 7,155,204	$ -	$ 7,155,204	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 7,155,204**	**$ -**	**$ 7,155,204**	**$ -**
TOTAL PROJECT COSTS	**$ 96,595,248**	**$ -**	**$ 96,595,248**	**$ -**

Assumptions and Risks

2x477 Kcmil ACSS conductor, OHSW 5/16, OPGW to accommodate communication and protection circuits.
Lattice tower D/C. Existing tower family assumed as per SW Dev. Average span 330m.
Normal soil, concrete spread footing foundation. Geotechnical studies will be completed as required.
Pipeline and railroad induce voltage studies and mitigation plans are not included.
Routing is as proposed. ROW available as planned. Construction will proceed in a continuous manner with access suitable to all structures.

Estimate Summary for Need Identification Document (NID)

Project: SATD - 240kV Line C1 from Goose Lake to Sub C (Alts 1A, 1C, 3 & 4)

TFO: AltaLink

Prepared by: Rafael Guzman

Date: July 2, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 124,421,405	$ -	$ 124,421,405	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 124,421,405**	**$ -**	**$ 124,421,405**	**$ -**
Owners Costs	$ 15,738,791	$ -	$ 15,738,791	$ -
Distributed Costs	$ 32,552,153	$ -	$ 32,552,153	$ -
Total Owners and Dist. Costs	**$ 48,290,944**	**$ -**	**$ 48,290,944**	**$ -**
Total Direct Costs	**$ 172,712,349**	**$ -**	**$ 172,712,349**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 13,816,988	$ -	$ 13,816,988	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 13,816,988**	**$ -**	**$ 13,816,988**	**$ -**
TOTAL PROJECT COSTS	**$ 186,529,337**	**$ -**	**$ 186,529,337**	**$ -**

Assumptions and Risks

2x795 Kcmil ACSR conductor, OHSW 5/16, OPGW to accommodate communication and protection circuits.
Lattice tower D/C. Existing tower family assumed as per SW Dev. Average span 330m.
Normal soil, concrete spread footing foundation. Geotechnical studies will be completed as required.
Pipeline and railroad induce voltage studies and mitigation plans are not included.
Routing is as proposed. ROW available as planned. Construction will proceed in a continuous manner with access suitable to all structures.

Estimate Summary for Need Identification Document (NID)

Project: SATD - 240kV Line C2 from Peigan to Sub C (Alt. 1B)

TFO: AltaLink

Prepared by: Rafael Guzman

Date: July 2, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 135,732,442	$ -	$ 135,732,442	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 135,732,442**	**$ -**	**$ 135,732,442**	**$ -**
Owners Costs	$ 15,673,950	$ -	$ 15,673,950	$ -
Distributed Costs	$ 52,269,018	$ -	$ 52,269,018	$ -
Total Owners and Dist. Costs	**$ 67,942,968**	**$ -**	**$ 67,942,968**	**$ -**
Total Direct Costs	**$ 203,675,410**	**$ -**	**$ 203,675,410**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 16,294,033	$ -	$ 16,294,033	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 16,294,033**	**$ -**	**$ 16,294,033**	**$ -**
TOTAL PROJECT COSTS	**$ 219,969,442**	**$ -**	**$ 219,969,442**	**$ -**

Assumptions and Risks

2x795 Kcmil ACSS conductor, OHSW 5/16, OPGW to accommodate communication and protection circuits.
Lattice tower D/C. Existing tower family assumed as per SW Dev. Average span 330m.
Normal soil, concrete spread footing foundation. Geotechnical studies will be completed as required.
Pipeline and railroad induce voltage studies and mitigation plans are not included.
Routing is as proposed. ROW available as planned. Construction will proceed in a continuous manner with access suitable to all structures.

Estimate Summary for Need Identification Document (NID)

ALTALINK

Project:	**SATD - New 240kV Line D From MATL 120S to Proposed Sub C (Alts. 1A, 1B & 1C)**
TFO:	**AltaLink**
Prepared by:	**A. Rothbauer**
Date:	**July 7, 2008**
Accuracy:	**+30%/-15%**

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 37,479,268	$ -	$ 37,479,268	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 37,479,268**	**$ -**	**$ 37,479,268**	**$ -**
Owners Costs	$ 5,013,021	$ -	$ 5,013,021	$ -
Distributed Costs	$ 14,629,632	$ -	$ 14,629,632	$ -
Total Owners and Dist. Costs	**$ 19,642,653**	**$ -**	**$ 19,642,653**	**$ -**
Total Direct Costs	**$ 57,121,921**	**$ -**	**$ 57,121,921**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 4,569,754	$ -	$ 4,569,754	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 4,569,754**	**$ -**	**$ 4,569,754**	**$ -**
TOTAL PROJECT COSTS	**$ 61,691,675**	**$ -**	**$ 61,691,675**	**$ -**

Assumptions and Risks

MATL 120S initial development is complete
Routing is as proposed. ROW is available as planned.
No unusual soil conditions are encountered
Standard structures. Less than 8% are angle structures. Medium wind and ice loading.
For energized circuits, only one circuit may be taken out at a time
A hearing is highly likely

Estimate Summary for Need Identification Document (NID)

Project: SATD - New 240kV Line D From MATL 120S to Proposed Sub C (East Wind Scenario)

TFO: AltaLink

Prepared by: Rafael Guzmàn

Date: September 15, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 45,131,108	$ -	$ 45,131,108	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 45,131,108**	**$ -**	**$ 45,131,108**	**$ -**
Owners Costs	$ 5,013,021	$ -	$ 5,013,021	$ -
Distributed Costs	$ 16,966,492	$ -	$ 16,966,492	$ -
Total Owners and Dist. Costs	**$ 21,979,513**	**$ -**	**$ 21,979,513**	**$ -**
Total Direct Costs	**$ 67,110,621**	**$ -**	**$ 67,110,621**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 5,368,850	$ -	$ 5,368,850	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 5,368,850**	**$ -**	**$ 5,368,850**	**$ -**
TOTAL PROJECT COSTS	**$ 72,479,471**	**$ -**	**$ 72,479,471**	**$ -**

Assumptions and Risks

MATL 120S initial development is complete
Routing is as proposed. ROW is available as planned.
No unusual soil conditions are encountered
Standard structures. Less than 8% are angle structures. Medium wind and ice loading.
For energized circuits, only one circuit may be taken out at a time
A hearing is highly likely

Estimate Summary for Need Identification Document (NID)

Project: SATD - New 240kV Line D2 From MATL 120S to Proposed Sub C (Alt.2)

TFO: AltaLink

Prepared by: A. Rothbauer

Date: July 8, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 56,963,443	$ -	$ 56,963,443	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 56,963,443**	**$ -**	**$ 56,963,443**	**$ -**
Owners Costs	$ 5,013,021	$ -	$ 5,013,021	$ -
Distributed Costs	$ 20,200,922	$ -	$ 20,200,922	$ -
Total Owners and Dist. Costs	**$ 25,213,943**	**$ -**	**$ 25,213,943**	**$ -**
Total Direct Costs	**$ 82,177,386**	**$ -**	**$ 82,177,386**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 6,574,191	$ -	$ 6,574,191	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 6,574,191**	**$ -**	**$ 6,574,191**	**$ -**
TOTAL PROJECT COSTS	**$ 88,751,577**	**$ -**	**$ 88,751,577**	**$ -**

Assumptions and Risks

MATL 120S initial development is complete
Routing is as proposed. ROW is available as planned.
No unusual soil conditions are encountered
Standard structures. Less than 8% are angle structures. Medium wind and ice loading.
For energized circuits, only one circuit may be taken out at a time
A hearing is highly likely

Estimate Summary for Need Identification Document (NID)

ALTALINK

Project:	**SATD - 240kV Line E From Proposed Sub C to Sub D Alts 1A, 1B and 1C**
TFO:	**AltaLink**
Prepared by:	**A.Rothbauer + G.Rahimi**
Date:	**September 23, 2008**
Accuracy:	**+30%/-15%**

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 51,319,855	$ -	$ 51,319,855	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 51,319,855**	**$ -**	**$ 51,319,855**	**$ -**
Owners Costs	$ 5,708,555	$ -	$ 5,708,555	$ -
Distributed Costs	$ 12,930,657	$ -	$ 12,930,657	$ -
Total Owners and Dist. Costs	**$ 18,639,212**	**$ -**	**$ 18,639,212**	**$ -**
Total Direct Costs	**$ 69,959,067**	**$ -**	**$ 69,959,067**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 5,596,725	$ -	$ 5,596,725	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 5,596,725**	**$ -**	**$ 5,596,725**	**$ -**
TOTAL PROJECT COSTS	**$ 75,555,793**	**$ -**	**$ 75,555,793**	**$ -**

Assumptions and Risks

Routing is as proposed. ROW is available as planned.
No unusual soil conditions are encountered
Standard structures. Less than 8% are angle structures. Medium wind and ice loading.
For energized circuits, only one circuit may be taken out at a time
A hearing is highly likely

Estimate Summary for Need Identification Document (NID)

ALTALINK

Project: SATD - New 240kV Line E From Proposed Sub C to Sub D (Alts 3 & 4)

TFO: AltaLink

Prepared by: A. Rothbauer

Date: July 8, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 42,591,975	$ -	$ 42,591,975	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 42,591,975**	**$ -**	**$ 42,591,975**	**$ -**
Owners Costs	$ 5,708,555	$ -	$ 5,708,555	$ -
Distributed Costs	$ 11,214,623	$ -	$ 11,214,623	$ -
Total Owners and Dist. Costs	**$ 16,923,178**	**$ -**	**$ 16,923,178**	**$ -**
Total Direct Costs	**$ 59,515,153**	**$ -**	**$ 59,515,153**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 4,761,212	$ -	$ 4,761,212	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 4,761,212**	**$ -**	**$ 4,761,212**	**$ -**
TOTAL PROJECT COSTS	**$ 64,276,365**	**$ -**	**$ 64,276,365**	**$ -**

Assumptions and Risks

Routing is as proposed. ROW is available as planned.
No unusual soil conditions are encountered
Standard structures. Less than 8% are angle structures. Medium wind and ice loading.
For energized circuits, only one circuit may be taken out at a time
A hearing is highly likely

Estimate Summary for Need Identification Document (NID)

Project: SATD - Line G3 (From sub D to Med Hat 2)
Alts. 1A,1B and 1C (240kV, D/C, 2x1033 Curlew - ACSR)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 29, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 100,308,320	$ -	$ 100,308,320	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 100,308,320**	**$ -**	**$ 100,308,320**	**$ -**
Owners Costs	$ 5,717,000	$ -	$ 5,717,000	$ -
Distributed Costs	$ 22,626,338	$ -	$ 22,626,338	$ -
Total Owners and Dist. Costs	**$ 28,343,338**	**$ -**	**$ 28,343,338**	**$ -**
Total Direct Costs	**$ 128,651,658**	**$ -**	**$ 128,651,658**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 10,292,133	$ -	$ 10,292,133	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 10,292,133**	**$ -**	**$ 10,292,133**	**$ -**
TOTAL PROJECT COSTS	**$ 138,943,791**	**$ -**	**$ 138,943,791**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)

Project: SATD - Line G3 (From sub D to Med Hat 2)
Alt 2 (240kV, D/C, 2x477 Hawk - ACSS)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 29, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 82,835,200	$ -	$ 82,835,200	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 82,835,200**	**$ -**	**$ 82,835,200**	**$ -**
Owners Costs	$ 5,717,000	$ -	$ 5,717,000	$ -
Distributed Costs	$ 19,361,197	$ -	$ 19,361,197	$ -
Total Owners and Dist. Costs	**$ 25,078,197**	**$ -**	**$ 25,078,197**	**$ -**
Total Direct Costs	**$ 107,913,397**	**$ -**	**$ 107,913,397**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 8,633,072	$ -	$ 8,633,072	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 8,633,072**	**$ -**	**$ 8,633,072**	**$ -**
TOTAL PROJECT COSTS	**$ 116,546,469**	**$ -**	**$ 116,546,469**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)

Project: SATD - Line G3 (From sub D to Med Hat 2)
Alts. 3 and 4 (240kV, D/C, 2x795 Drake - ACSR)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 29, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 69,881,408	$ -	$ 69,881,408	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 69,881,408**	**$ -**	**$ 69,881,408**	**$ -**
Owners Costs	$ 5,717,000	$ -	$ 5,717,000	$ -
Distributed Costs	$ 17,262,577	$ 6,509,111	$ 23,771,688	$ -
Total Owners and Dist. Costs	**$ 22,979,577**	**$ 6,509,111**	**$ 29,488,688**	**$ -**
Total Direct Costs	**$ 92,860,985**	**$ 6,509,111**	**$ 99,370,096**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 7,428,879	$ 520,729	$ 7,949,608	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 7,428,879**	**$ 520,729**	**$ 7,949,608**	**$ -**
TOTAL PROJECT COSTS	**$ 100,289,864**	**$ 7,029,840**	**$ 107,319,704**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)

Project: SATD - Line G4 (From Med Hat 2 to West Brooks)
Alts. 1A,1B and 1C (240kV, D/C, 2x1033 Curlew - ACSR)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 15, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 115,060,331	$ -	$ 115,060,331	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 115,060,331**	**$ -**	**$ 115,060,331**	**$ -**
Owners Costs	$ 7,688,000	$ -	$ 7,688,000	$ -
Distributed Costs	$ 26,117,348	$ -	$ 26,117,348	$ -
Total Owners and Dist. Costs	**$ 33,805,348**	**$ -**	**$ 33,805,348**	**$ -**
Total Direct Costs	**$ 148,865,679**	**$ -**	**$ 148,865,679**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 11,909,254	$ -	$ 11,909,254	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 11,909,254**	**$ -**	**$ 11,909,254**	**$ -**
TOTAL PROJECT COSTS	**$ 160,774,933**	**$ -**	**$ 160,774,933**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
4) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)

Project: SATD - Line G4 (From Med Hat 2 to West Brooks)
Alt 2 (240kV, D/C, 2x477 Hawk - ACSS)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 15, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 95,015,372	$ -	$ 95,015,372	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 95,015,372**	**$ -**	**$ 95,015,372**	**$ -**
Owners Costs	$ 7,688,000	$ -	$ 7,688,000	$ -
Distributed Costs	$ 22,271,340	$ -	$ 22,271,340	$ -
Total Owners and Dist. Costs	**$ 29,959,340**	**$ -**	**$ 29,959,340**	**$ -**
Total Direct Costs	**$ 124,974,713**	**$ -**	**$ 124,974,713**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 9,997,977	$ -	$ 9,997,977	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 9,997,977**	**$ -**	**$ 9,997,977**	**$ -**
TOTAL PROJECT COSTS	**$ 134,972,690**	**$ -**	**$ 134,972,690**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) Induction study on other facilities not included, nor are the mitigation of induction effects.

Estimate Summary for Need Identification Document (NID)

Project: SATD - Line G5 (From sub D to West Brooks)
Alt 2 (240kV, S/C, 2x477 Hawk - ACSS)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: September 29, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 88,924,640	$ -	$ 88,924,640	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 88,924,640**	**$ -**	**$ 88,924,640**	**$ -**
Owners Costs	$ 9,399,900	$ -	$ 9,399,900	$ -
Distributed Costs	$ 21,160,146	$ -	$ 21,160,146	$ -
Total Owners and Dist. Costs	**$ 30,560,046**	**$ -**	**$ 30,560,046**	**$ -**
Total Direct Costs	**$ 119,484,686**	**$ -**	**$ 119,484,686**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 9,558,775	$ -	$ 9,558,775	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 9,558,775**	**$ -**	**$ 9,558,775**	**$ -**
TOTAL PROJECT COSTS	**$ 129,043,461**	**$ -**	**$ 129,043,461**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) Induction study on other facilities not included, nor are the mitigation of induction effects.
4) The route for line G5 is the same as line G3 and line G4.

Estimate Summary for Need Identification Document (NID)

Project: SATD- Line H (From Ware junction sub to Langdon sub)
Alt 1A, 1B (240kV, D/C, Bundle of 1033 Curlew-ACSR)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: June 20, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 134,728,764	$ -	$ 134,728,764	$ -
Substation Facilities	$ 16,717,241	$ -	$ 16,717,241	$ -
Telecommunication	$ 226,053	$ -	$ 226,053	$ -
Total Facility Costs	**$ 151,672,057**	**$ -**	**$ 151,672,057**	**$ -**
Owners Costs	$ 22,630,000	$ -	$ 22,630,000	$ -
Distributed Costs	$ 53,987,070	$ -	$ 53,987,070	$ -
Total Owners and Dist. Costs	**$ 76,617,070**	**$ -**	**$ 76,617,070**	**$ -**
Total Direct Costs	**$ 228,289,127**	**$ -**	**$ 228,289,127**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 18,263,130	$ -	$ 18,263,130	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 18,263,130**	**$ -**	**$ 18,263,130**	**$ -**
TOTAL PROJECT COSTS	**$ 246,552,258**	**$ -**	**$ 246,552,258**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
4) Induction study on other facilities not included, nor are the mitigation of induction effects.
5) A hearing is highly likely

Estimate Summary for Need Identification Document (NID)

Project: SATD- Line H (From Ware junction sub to Langdon sub)
Alt 2 (240kV, D/C, Bundle of 477 Hawk- ACSS)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: June 20, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 108,579,074	$ -	$ 108,579,074	$ -
Substation Facilities	$ 16,717,241	$ -	$ 16,717,241	$ -
Telecommunication	$ 226,053	$ -	$ 226,053	$ -
Total Facility Costs	**$ 125,522,368**	**$ -**	**$ 125,522,368**	**$ -**
Owners Costs	$ 22,630,000	$ -	$ 22,630,000	$ -
Distributed Costs	$ 47,501,947	$ -	$ 47,501,947	$ -
Total Owners and Dist. Costs	**$ 70,131,947**	**$ -**	**$ 70,131,947**	**$ -**
Total Direct Costs	**$ 195,654,315**	**$ -**	**$ 195,654,315**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 15,652,345	$ -	$ 15,652,345	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 15,652,345**	**$ -**	**$ 15,652,345**	**$ -**
TOTAL PROJECT COSTS	**$ 211,306,660**	**$ -**	**$ 211,306,660**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) Induction study on other facilities not included, nor are the mitigation of induction effects.
4) A hearing is highly likely

Estimate Summary for Need Identification Document (NID)

Project: SATD - 240kV Line J from Peigan to DeWinton (Alts. 1A, 1B, 1C, 3, 4)

TFO: AltaLink

Prepared by: Rafael Guzman

Date: July 15, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 147,513,246	$ -	$ 147,513,246	$ -
Substation Facilities	$ 16,717,241	$ -	$ 16,717,241	$ -
Telecommunication	$ 226,053	$ -	$ 226,053	$ -
Total Facility Costs	**$ 164,456,540**	**$ -**	**$ 164,456,540**	**$ -**
Owners Costs	$ 23,085,604	$ -	$ 23,085,604	$ -
Distributed Costs	$ 58,316,871	$ -	$ 58,316,871	$ -
Total Owners and Dist. Costs	**$ 81,402,475**	**$ -**	**$ 81,402,475**	**$ -**
Total Direct Costs	**$ 245,859,014**	**$ -**	**$ 245,859,014**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 19,668,721	$ -	$ 19,668,721	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 19,668,721**	**$ -**	**$ 19,668,721**	**$ -**
TOTAL PROJECT COSTS	**$ 265,527,735**	**$ -**	**$ 265,527,735**	**$ -**

Assumptions and Risks

DeWinton 224S in place before Line J is built. Project will proceed in a continuous manner.
Lattice tower. New tower family is required. Cost of development new tower family included. Average span 350m.
8-10 % angle / Dead-end structures. Normal soil. Geo-technical studies will be completed as required.
Pipeline and railroad induced voltage studies and mitigation plans are not included.
OHSW /OPGW will terminate on the last structure outside substation fence. Telecom equipment at SB1 for voice and data

Estimate Summary for Need Identification Document (NID)

Project: SATD - 240kV Line J from Peigan to DeWinton (Alt. 2)
TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 15, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 118,882,198	$ -	$ 118,882,198	$ -
Substation Facilities	$ 16,717,241	$ -	$ 16,717,241	$ -
Telecommunication	$ 226,053	$ -	$ 226,053	$ -
Total Facility Costs	**$ 135,825,492**	**$ -**	**$ 135,825,492**	**$ -**
Owners Costs	$ 23,085,604	$ -	$ 23,085,604	$ -
Distributed Costs	$ 51,043,430	$ -	$ 51,043,430	$ -
Total Owners and Dist. Costs	**$ 74,129,034**	**$ -**	**$ 74,129,034**	**$ -**
Total Direct Costs	**$ 209,954,527**	**$ -**	**$ 209,954,527**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 16,796,362	$ -	$ 16,796,362	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 16,796,362**	**$ -**	**$ 16,796,362**	**$ -**
TOTAL PROJECT COSTS	**$ 226,750,889**	**$ -**	**$ 226,750,889**	**$ -**

Assumptions and Risks

DeWinton 224S in place before Line J is built. Project will proceed in a continuous manner.
Lattice tower. New tower family is required. Cost of development new tower family included. Average span 350m.
8-10 % angle / Dead-end structures. Normal soil. Geo-technical studies will be completed as required.
Pipeline and railroad induced voltage studies and mitigation plans are not included.
OHSW /OPGW will terminate on the last structure outside substation fence. Telecom equipment at SB1 for voice and data

Estimate Summary for Need Identification Document (NID)

Project: SATD- Line K (From West Brooks sub to Dewinton sub)
Alt 1C (240kV, D/C, Bundle of 1033 Curlew- ACSR)

TFO: AltaLink
Prepared by: Golaleh Rahimi
Date: June 20, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 144,562,980	$ -	$ 144,562,980	$ -
Substation Facilities	$ 16,717,241	$ -	$ 16,717,241	$ -
Telecommunication	$ 226,053	$ -	$ 226,053	$ -
Total Facility Costs	**$ 161,506,273**	**$ -**	**$ 161,506,273**	**$ -**
Owners Costs	$ 22,053,874	$ -	$ 22,053,874	$ -
Distributed Costs	$ 57,167,669	$ -	$ 57,167,669	$ -
Total Owners and Dist. Costs	**$ 79,221,543**	**$ -**	**$ 79,221,543**	**$ -**
Total Direct Costs	**$ 240,727,816**	**$ -**	**$ 240,727,816**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 19,258,225	$ -	$ 19,258,225	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 19,258,225**	**$ -**	**$ 19,258,225**	**$ -**
TOTAL PROJECT COSTS	**$ 259,986,041**	**$ -**	**$ 259,986,041**	**$ -**

Assumptions and Risks

1) OPGW has been considered for one of the circuits to accomodate communication.
2) Line cost has been estimated based on the proposed routing. If routing changes cost will change accordingly.
3) A new family of D/C towers has to be introduced internally for 2x1033 curlew.
4) Induction study on other facilities not included, nor are the mitigation of induction effects.
5) A hearing is highly likely

Estimate Summary for Need Identification Document (NID)

Project: SATD - 500kV Line X from Crowsnest sub to sub H (Alt. 3)
TFO: AltaLink
Prepared by: Teshmont
Date: July 9, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 252,547,680	$ -	$ 252,547,680	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 252,547,680**	**$ -**	**$ 252,547,680**	**$ -**
Owners Costs	$ 37,395,553	$ -	$ 37,395,553	$ -
Distributed Costs	$ 94,873,922	$ -	$ 94,873,922	$ -
Total Owners and Dist. Costs	**$ 132,269,475**	**$ -**	**$ 132,269,475**	**$ -**
Total Direct Costs	**$ 384,817,155**	**$ -**	**$ 384,817,155**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 30,785,372	$ -	$ 30,785,372	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 30,785,372**	**$ -**	**$ 30,785,372**	**$ -**
TOTAL PROJECT COSTS	**$ 415,602,527**	**$ -**	**$ 415,602,527**	**$ -**

Assumptions and Risks

Single circuit Transmission line. One OPGW and one OHSW. Tower configuration similar to installed 500kV towers within AML's 85/15 ratio between suspension and angle/dead structures. 400m span. Plain terrain. Sand and fluvial soil.
Pre-construction activities cost and the cost of special spans, tall structures and river/lake crossings has no been considered.
Construction will proceed in a continuous manner. Land available as planned. Access suitable to all structures.
Pipeline /railroad induced voltage studies and mitigation plans are not included.
Geo-technical studies will be completed as required.

Estimate Summary for Need Identification Document (NID)

Project: SATD - 500kV Line Y from Milo Junction sub to sub H (Alt. 3)

TFO: AltaLink

Prepared by: Teshmont

Date: July 9, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 203,819,106	$ -	$ 203,819,106	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 203,819,106**	**$ -**	**$ 203,819,106**	**$ -**
Owners Costs	$ 26,410,958	$ -	$ 26,410,958	$ -
Distributed Costs	$ 75,554,976	$ -	$ 75,554,976	$ -
Total Owners and Dist. Costs	**$ 101,965,934**	**$ -**	**$ 101,965,934**	**$ -**
Total Direct Costs	**$ 305,785,040**	**$ -**	**$ 305,785,040**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 24,462,803	$ -	$ 24,462,803	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 24,462,803**	**$ -**	**$ 24,462,803**	**$ -**
TOTAL PROJECT COSTS	**$ 330,247,844**	**$ -**	**$ 330,247,844**	**$ -**

Assumptions and Risks

Single circuit Transmission line. One OPGW and one OHSW. Tower configuration similar to installed 500kV towers within AML's
85/15 ratio between suspension and angle/dead structures. 400m span. Plain terrain. Sand and fluvial soil.
Pre-construction activities cost and the cost of special spans, tall structures and river/lake crossings has no been considered.
Construction will proceed in a continuous manner. Land available as planned. Access suitable to all structures.
Pipeline /railroad induced voltage studies and mitigation plans are not included. Geo-technical studies will be completed as required.

Estimate Summary for Need Identification Document (NID)

Project: SATD - 500kV Line Z from Milo Junction sub to Langdon sub. (Alt. 3)

TFO: AltaLink

Prepared by: Teshmont

Date: July 9, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 106,361,783	$ -	$ 106,361,783	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 106,361,783**	**$ -**	**$ 106,361,783**	**$ -**
Owners Costs	$ 15,870,000	$ -	$ 15,870,000	$ -
Distributed Costs	$ 39,751,242	$ -	$ 39,751,242	$ -
Total Owners and Dist. Costs	**$ 55,621,242**	**$ -**	**$ 55,621,242**	**$ -**
Total Direct Costs	**$ 161,983,026**	**$ -**	**$ 161,983,026**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 12,958,642	$ -	$ 12,958,642	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 12,958,642**	**$ -**	**$ 12,958,642**	**$ -**
TOTAL PROJECT COSTS	**$ 174,941,668**	**$ -**	**$ 174,941,668**	**$ -**

Assumptions and Risks

Single circuit Transmission line. One OPGW and one OHSW. Tower configuration similar to installed 500kV towers within AML's facility
85/15 ratio between suspension and angle/dead structures. 400m span. Plain terrain. Sand and fluvial soil.
Pre-construction activities cost and the cost of special spans, tall structures and river/lake crossings has no been considered.
Construction will proceed in a continuous manner. Land available as planned. Access suitable to all structures.
Pipeline /railroad induced voltage studies and mitigation plans are not included.
Geo-technical studies will be completed as required.

Estimate Summary for Need Identification Document (NID)

Project: SATD - 500 kV HVDC converter stations at Langdon, New Sub A, 500 kV HVDC Line (Alt.4)

TFO: AltaLink

Prepared by: Teshmont + G.Rahimi

Date: September 25, 2008

Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 290,806,460	$ -	$ 290,806,460	$ -
Substation Facilities	$ 566,775,850	$ -	$ 566,775,850	$ -
Telecommunication	$ 822,696	$ -	$ 822,696	$ -
Total Facility Costs	**$ 858,405,006**	**$ -**	**$ 858,405,006**	**$ -**
Owners Costs	$ 46,450,000	$ -	$ 46,450,000	$ -
Distributed Costs	$ 268,185,185	$ -	$ 268,185,185	$ -
Total Owners and Dist. Costs	**$ 314,635,185**	**$ -**	**$ 314,635,185**	**$ -**
Total Direct Costs	**$ 1,173,040,191**	**$ -**	**$ 1,173,040,191**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 93,843,215	$ -	$ 93,843,215	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 93,843,215**	**$ -**	**$ 93,843,215**	**$ -**
TOTAL PROJECT COSTS	**$ 1,266,883,406**	**$ -**	**$ 1,266,883,406**	**$ -**

Assumptions and Risks

Bipolar dc system with a rating of 2000MW, +/-500kV, one twelve valve group per pole, ac system voltage 240kV.
Ground and line electrodes at both substations. Rectifier and inverter assumed to be identical.
85:15 radio of number of suspension vs angle/dead structures. 400m span.
No pre-construction nor special long spans, water crossing cost included.
Pipeline/railroad induced volatge studies and mitigation plans not included.
Land available as planned.

Estimate Summary for Need Identification Document (NID)

Project: SATD - Salvage Line 911L
All Alternatives

TFO: AltaLink
Prepared by: Rafael Guzman
Date: July 17, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ -	$ -	$ -	$ -
Substation Facilities	$ -	$ -	$ -	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ -**	**$ -**	**$ -**	**$ -**
Owners Costs	$ 80,000	$ -	$ 80,000	$ -
Distributed Costs	$ 2,962,975	$ -	$ 2,962,975	$ -
Total Owners and Dist. Costs	**$ 3,042,975**	**$ -**	**$ 3,042,975**	**$ -**
Total Direct Costs	**$ 3,042,975**	**$ -**	**$ 3,042,975**	**$ -**
Salvage Costs	$ 14,398,240	$ -	$ 14,398,240	$ -
Other Costs				
E&S	$ 1,395,297	$ -	$ 1,395,297	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 15,793,537**	**$ -**	**$ 15,793,537**	**$ -**
TOTAL PROJECT COSTS	**$ 18,836,512**	**$ -**	**$ 18,836,512**	**$ -**

Assumptions and Risks

TransAlta's assets portion (Breaker /Line section) are worth approximately $2.5 -3M
From structure inside Peigan sub to structure inside Janet sub ~ 161km

Estimate Summary for Need Identification Document (NID)

Project: SATD Blackie Area 138 kV Line Reconfiguration

TFO: AltaLink
Prepared by: Al Rothbauer
Date: September 23, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 11,005,912	$ -	$ 11,005,912	$ -
Substation Facilities	$ 67,200	$ -	$ 67,200	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 11,073,112**	**$ -**	**$ 11,073,112**	**$ -**
Owners Costs	$ 544,760	$ -	$ 544,760	$ -
Distributed Costs	$ 4,611,189	$ -	$ 4,611,189	$ -
Total Owners and Dist. Costs	**$ 5,155,949**	**$ -**	**$ 5,155,949**	**$ -**
Total Direct Costs	**$ 16,229,062**	**$ -**	**$ 16,229,062**	**$ -**
Salvage Costs	$ 532,000	$ -	$ 532,000	$ -
Other Costs				
E&S	$ 1,340,885	$ -	$ 1,340,885	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 1,872,885**	**$ -**	**$ 1,872,885**	**$ -**
TOTAL PROJECT COSTS	**$ 18,101,947**	**$ -**	**$ 18,101,947**	**$ -**

Assumptions and Risks

ROWs will be available as defined
Development will be done as a complete unit
Construction will be done in good weather conditions
Work will be proceed without disruptions
There will not be issues in getting P&L
A contingency of 20% is included
Outages will be available as required
Development will be done in the sequence defined

Estimate Summary for Need Identification Document (NID)

Project: SATD Medicine Hat Area 138 kV Line Reconfiguration

TFO: AltaLink
Prepared by: Al Rothbauer
Date: September 23, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 31,479,582	$ -	$ 31,479,582	$ -
Substation Facilities	$ 84,000	$ -	$ 84,000	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 31,563,582**	**$ -**	**$ 31,563,582**	**$ -**
Owners Costs	$ 2,053,838	$ -	$ 2,053,838	$ -
Distributed Costs	$ 12,419,808	$ -	$ 12,419,808	$ -
Total Owners and Dist. Costs	**$ 14,473,646**	**$ -**	**$ 14,473,646**	**$ -**
Total Direct Costs	**$ 46,037,227**	**$ -**	**$ 46,037,227**	**$ -**
Salvage Costs	$ 523,600	$ -	$ 523,600	$ -
Other Costs				
E&S	$ 3,724,866	$ -	$ 3,724,866	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 4,248,466**	**$ -**	**$ 4,248,466**	**$ -**
TOTAL PROJECT COSTS	**$ 50,285,694**	**$ -**	**$ 50,285,694**	**$ -**

Assumptions and Risks

ROWs will be available as defined
Development will be done as a complete unit
Construction will be done in good weather conditions
Work will be proceed without disruptions
There will not be issues in getting P&L
A contingency of 20% is included
Outages will be available as required
Development will be done in the sequence defined

Estimate Summary for Need Identification Document (NID)

Project: SATD - Upgrading 138kV 760L
From Cypress 562S to Amoco Empres 163S
Wind Scenario
East

TFO: AltaLink
Prepared by: Rafael Guzmàn
Date: September 11, 2008
Accuracy: +30%/-15%

	System Portion	Customer Portion	TOTAL	Capital Maintenance
Transmission Lines	$ 1,553,006	$ 23,583	$ 1,576,588	$ -
Substation Facilities	$ 137,069	$ -	$ 137,069	$ -
Telecommunication	$ -	$ -	$ -	$ -
Total Facility Costs	**$ 1,690,075**	**$ 23,583**	**$ 1,713,657**	**$ -**
Owners Costs	$ 250,000	$ -	$ 250,000	$ -
Distributed Costs	$ 552,034	$ 3,785	$ 555,819	$ -
Total Owners and Dist. Costs	**$ 802,034**	**$ 3,785**	**$ 805,819**	**$ -**
Total Direct Costs	**$ 2,492,109**	**$ 27,368**	**$ 2,519,476**	**$ -**
Salvage Costs	$ -	$ -	$ -	$ -
Other Costs				
E&S	$ 199,369	$ 2,189	$ 201,558	$ -
AFUDC	$ -	$ -	$ -	$ -
Total Indirect Costs	**$ 199,369**	**$ 2,189**	**$ 201,558**	**$ -**
TOTAL PROJECT COSTS	**$ 2,691,477**	**$ 29,557**	**$ 2,721,034**	**$ -**

Assumptions and Risks

New line is required to meet AEU new Code. Routing is as proposed. ROW is available as planned.
No unusual soil conditions are encountered.
Air breaker at Amoco Empress 760L termination to be replaced to match conductor size capacity
Medium wind and ice loading.
Salvage cost are not included

APPENDIX H PARTICIPANT INVOLVEMENT PROGRAM

1.0 PARTICIPANT INVOLVEMENT PROGRAM – OVERVIEW

The AESO conducted a Participant Involvement Program (PIP) throughout the development of its Needs Identification Document to address the need to integrate wind energy into the provincial transmission system in southern Alberta. The AESO PIP ran between October 2007 and October 2008, and was designed to notify, consult and engage a variety of stakeholders with interests in transmission development in southern Alberta. These stakeholders were identified as:

- Residents, occupants, landowners and businesses in southern Alberta;
- Elected and administrative government officials at local, municipal and provincial levels;
- Industry;
- First Nations and Métis with interests in southern Alberta; and
- Advocacy groups

The AESO used a variety of means to notify, consult and engage members of these groups about:

1) The need for transmission development in southern Alberta; and
2) Alternatives for meeting this need.

Please see Table H-1 for a complete account of the methods used by the AESO to notify, consult and engage stakeholders for this application.

Table H- 1: Communications methods used by the AESO

Communications Vehicle	Objective		
	Notification	Consultation	Engagement (Aboriginal)
Mailout	X		
Newspaper ads	X		
Media	X		
Press release	X		
Radio ads	X		
Web postings	X		
Meetings (presentations)	X	X	X
Open Houses (information sessions)	X	X	X
Correspondence (email, mail)	X	X	X
Telephone	X	X	X
Industry Sessions	X	X	X

The AESO used these communications methods to carry out a variety of PIP activities aimed at sharing information with stakeholders and gathering their feedback. Table H-2 below describes in greater detail the PIP activities that the AESO executed in support of this application.

Table H- 2: PIP activities described

PIP activity	Description	Target Audience	Number	Date (or range)
Industry information session	Presentations to industry wind integration, including transmission planning, interconnection processes, related matters	Wind developers, generators, TFOs, DFOs, others	2 sessions (approximately 85 notified of intention to attend)	October 19, 2007
Newspaper ads placed in southern Alberta newspapers	Open House advertisement	Residents, occupants, landowners and businesses	21 local papers	October-November, 2007
	Thank you ad	Residents, occupants, landowners and businesses	21 local papers	December, 2007
	Open house advertisement	Residents, occupants, landowners and businesses	21 local papers	April-May, 2008
	Thank you ad	Residents, occupants, landowners and businesses	21 local papers	June, 2008

PIP activity	Description	Target Audience	Number	Date (or range)
Media	Articles on AESO need and consultation efforts	Residents, occupants, landowners and businesses	14	November 14, 2007 to January 23, 2008
	Articles on AESO need, alternatives and consultation efforts	Residents, occupants, landowners and businesses	12	April 26 to May 26, 2008
Mailout by postal code	Need overview and Open House schedules	Residents, occupants, landowners and businesses	121,500 (pieces)	April 07, 2008
Media Release	Notice advising of Open Houses	Southern Alberta media	1	April 24, 2008
Radio ads	Notice advising of Open Houses	Residents, occupants, landowners and businesses	51 spots	November 9 – 20, 2007
Web postings	Various information documents	All stakeholders (with internet access)	22	November 1, 2007 to present
Meetings	Presentations on need	Elected and administrative government officials, First Nations, and advocacy groups	27 Meetings	October 18, 2007 and February 27, 2008
Meetings	Presentations on need and alternatives	Elected and administrative government officials, First Nations, and advocacy groups	19 Meetings	April 22 – October 9, 2008

PIP activity	Description	Target Audience	Number	Date (or range)
Open Houses (Round 1)	Sharing information on need	All stakeholders (near event locations)	9 (170 visitors self-registered)	November 14 – 28, 2007
Open Houses (Round 2)	Sharing information on need and alternatives	All stakeholders (near event locations)	12 (327 visitors self-registered)	April 28 – May 15, 2008
Mail out (addressed mail) and email	Update on round 1 Open Houses	Registered visitors to round one open houses	88	January 31, 2008
	Stakeholder mail out advising on need	MLAs; CAOs; Town, County and MD Councils; First Nations and Métis; and advocacy groups	57	February 07, 2008
	MLA mail out on second round of Open Houses and information related to need	MLAs	11	April 21, 2008
	CAO mail out on second round of Open Houses and information related to need	CAOs	13	April 22, 2008
	Report on second round of Open Houses	MLAs; CAOs; Town, County and MD Councils; First Nations; advocacy groups and other registered stakeholders (e.g., private citizens)	246	July 21, 2008

1.1 Description of Participant Involvement Program Products and Activities

AESO Need Overview on Area Reinforcement

The AESO developed a 'need overview,' a background document that describes the need for transmission reinforcement in southern Alberta. The need overview explains that the primary driver for transmission development in southern Alberta is the need to integrate wind interest. The need overview was posted to the AESO web site. A copy of the need overview has been included in APPENDIX H.

Advertising

Between November and December 2007, and between April and June 2008, the AESO advertised in local southern Alberta newspapers to notify readers of:

- The need for transmission development in southern Alberta; and
- Open House dates, locations and times

Following the Open Houses, the AESO placed newspaper advertisements to thank visitors who attended and to remind other public stakeholders that information remains available on the AESO web site. Table H-3 shows the dates and publications in which the AESO advertised the need for transmission development in southern Alberta and notice of the Open Houses.

Table H- 3: Newspaper Advertising Schedule (2007-2008)

Publication	Description of advertisement				
	Round One Open house		Thank you ad (1st)	Round Two Open House	Thank you Ad (2nd)
Lethbridge Herald	10-Nov-2007	17-Nov-2007	15-Dec-2007	22-Apr-2008	10-Jun-2008
Medicine Hat	10-Nov-2007	21-Nov-2007	15-Dec-2007	23-Apr-2008	11-Jun-2008
Bassano Times	13-Nov-2007	20-Nov-2007	18-Dec-2007	22-Apr-2008	10-Jun-2008
Bow Island Commentator	13-Nov-2008	20-Nov-2007	18-Dec-2007	22-Apr-2008	10-Jun-2008
Brooks & County Chronicle	12-Nov-2007	19-Nov-2007	17-Dec-2007	23-Apr-2008	9-Jun-2008
Brooks Bulletin	13-Nov-2007	20-Nov-2007	18-Dec-2007	22-Apr-2008	10-Jun-2008
Cardston The Star (Temple City Star)	15-Nov-2007	22-Nov-2007	20-Dec-2007	24-Apr-2008	12-Jun-2008
Claresholm Local Press	14-Nov-2007		19-Dec-2007	23-Apr-2008	11-Jun-2008
Coaldale Sunny South News	13-Nov-2007	27-Nov-2007	18-Dec-2007	22-Apr-2008	11-Jun-2008
Crowsnest Pass Herald	13-Nov-2007	20-Nov-2007	18-Dec-2007	22-Apr-2008	10-Jun-2008
Crowsnest Pass Promoter	16-Nov-2007	23-Nov-2007	21-Dec-2007	25-Apr-2008	13-Jun-2008
Fort Macleod Gazette	14-Nov-2007	28-Nov-2007	19-Dec-2007	23-Apr-2008	11-Jun-2008
High River Times	13-Nov-2007		18-Dec-2007	30-Apr-2008	11-Jun-2008

Publication	Description of advertisement				
	Round One Open house		Thank you ad (1st)	Round Two Open House	Thank you Ad (2nd)
Lethbridge Southern Times	14-Nov-2007		19-Dec-2007	23-Apr-2008	11-Jun-2008
Nanton News	14-Nov-2007		19-Dec-2007	30-Apr-2008	11-Jun-2008
Okotoks Western Wheel	14-Nov-2007		19-Dec-2007	30-Apr-2008	11-Jun-2008
Pincher Creek Echo	16-Nov-2007	23-Nov-2007	21-Dec-2007	25-Apr-2008	13-Jun-2008
Prairie post	16-Nov-2007		21-Dec-2007	25-Apr-2008	13-Jun-2008
Taber Times	14-Nov-2007		19-Dec-2007	23-Apr-2008	11-Jun-2008
Vauxhall Advance	15-Nov-2007		20-Dec-2007	22-Apr-2008	10-Jun-2008
Vulcan Advocate	15-Nov-2007		20-Dec-2007	23-Apr-2008	11-Jun-2008

The advertisements for Open Houses provided a general overview of the need, a map of the existing facilities, areas potentially affected and contact information for the AESO. The advertisements also notified readers of the dates and times of for the Open Houses. Copies of these newspaper advertisements were posted to the AESO web site. Copies of the advertisements are available in APPENDIX H.

The AESO also advertised the Open Houses in November, 2007, on local radio stations throughout southern Alberta. Table H-4 below shows the radio advertising that the AESO executed. A copy of the radio script may be found in APPENDIX H

Table H- 4: Radio advertisements, November 2007

Market	Station	Common Call	Format	Length	Start Date	Time Period	Flight Duration	Weekly Spots
Claresholm	CHQR	CHQR AM 770	News/Talk	:30	9-Nov-07	5a-9p	1 Day	3
Nanton	CHRB	AM 1140	News/Weather/ Sports	:30	9-Nov-07	6a-7p	1 Day	3
Lethbridge	CFRV-FM	The River	Modern Adult Contemporary	:30	12-Nov-07	6a-7p	1 Day	3
Taber	CJOC-FM	The Lounge	Classic Adult Contemporary	:30	12-Nov-07	6a-7p	1 Day	3
	CJRX-FM	Rock 106	Rock	:30	12-Nov-07	6a-7p	1 Day	3
	CHLB-FM	Country 95.5	Hit Country	:30	13-Nov-07	6a-7p	1 Day	3
	CJBZ-FM	B-93	Hot AC	:30	13-Nov-07	6a-7p	1 Day	3
Medicine Hat								
	CFMY-FM	My FM	Contemporary Hit	:30	14-Nov-07	6a-7p	1 Day	3

Market	Station	Common Call	Format	Length	Start Date	Time Period	Flight Duration	Weekly Spots
			Radio					
	CHAT-FM	New Country	Country	:30	14-Nov-07	6a-7p	1 Day	3
Brooks	CIBQ-AM	Q13	Country	:30	15-Nov-07	6a-7p	1 Day	3
Medicine Hatt	CHAT-FM	The Fox	Top 40	:30	15-Nov-07	6a-7p	1 Day	3 Spots
Pincher Creek	CJPR-FM	Mountain Radio	Country	:30	19-Nov-07	6a-7p	1 Day	3 Spots
Cardston	CFRV-FM	The River	Modern Adult Contemporary	:30	19-Nov-07	6a-7p	1 Day	3 Spots
Fort Macleod	CJOC-FM	The Lounge	Classic Adult Contemporary	:30	19-Nov-07	6a-7p	1 Day	3 Spots
	CJRX-FM	Rock 106	Rock	:30	19-Nov-07	6a-7p	1 Day	3 Spots
	CHLB-FM	Country 95.5	Hit Country	:30	20-Nov-07	6a-7p	1 Day	3 Spots
	CJBZ-FM	B-93	Hot AC	:30	20-Nov-07	6a-7p	1 Day	3 Spots

Open Houses

Round One, (November, 2007)

The AESO hosted Open Houses in nine southern Alberta communities, between November 14 and November 28, 2007. These Open Houses attracted 170 registered visitors. Over 50 AESO employees participated in these events. Additionally, representatives from the TFO (AltaLink) and the Canadian Wind Energy Association (CanWEA) also participated.

Round Two (April – May, 2008)

In late April and early May of this year, the AESO hosted 12 Open Houses throughout southern Alberta to discuss alternatives that had been developed for meeting the need for more capacity on the transmission system. This round attracted 327 registered visitors. Over 30 AESO employees took part. Representatives from the TFO (AltaLink) and the Canadian Wind Energy Association (CanWEA) also participated in this round.

Please find copies of the poster boards displayed during each round of open houses in APPENDIX H.

Visitors attending each event were asked to register and complete surveys before leaving. These surveys allowed the AESO to gather visitors' feedback on

the need and the alternatives to meet this need. Please find copies of the surveys fro each round in APPENDIX H.

Stakeholder Meetings

Throughout the development of this application, the AESO met with:

- Elected and administrative officials from Towns, Municipal Districts, Counties, Improvement Areas and First Nations organizations; and
- Advocacy groups from the electricity industry and those representing environmental concerns.

Please find a list of meeting participants in APPENDIX H . Copies of the presentations delivered during these meetings are inserted in APPENDIX H.

In addition to meetings, the AESO sent information to MLAs across southern Alberta, including:

- Banff-Cochrane, Hon. Janis Tarchuk, PC
- Medicine Hat, Hon. Rob Renner, PC
- Cardston-Taber-Warner, Broyce Jacobs, PC
- Cypress-Medicine Hat, Len Mitzel, PC
- Livingstone-Macleod, Evan Berger, PC
- Lethbridge-West, Greg Weadick, PC
- Lethbridge-East, Bridget Pastoor, Lib
- Little Bow, Barry McFarland, PC
- Highwood, George Groeneveld, PC
- Strathmore-Brooks, Arno Doerksen, PC
- Drumheller-Stettler, Hon. Jack Hayden, PC
- Foothills-Rocky View, Hon. Ted Morton, PC

Further, the AESO sent information directly to specific stakeholder groups, such as towns, municipal districts and counties, FNs and Métis, and advocacy groups. Please find a complete list of stakeholders to whom the AESO sent information directly (addressed mail) in APPENDIX H.

Postal Code Mail Out (unaddressed mail)

In April, 2008, the AESO developed a letter providing AESO application and contact information for mail out by postal code (unaddressed mail) on April 7, 2008. This letter, along with the AESO need overview explaining the need for transmission in southern Alberta, was mailed to approximately 121,500 addresses (includes residences, businesses, schools, farms and hospitals) throughout southern Alberta. This letter was also posted to the AESO web site. A copy of this letter has been included in this APPENDIX H.

Various Technical Documents

The AESO also posted various technical documents on its website. These documents described the AESO's assessment of the need, the scope of the need application and an account of how it screened alternatives. Copies of these documents may be found in APPENDIX H

Public responses to AESO PIP efforts

The AESO also received a variety of comments and inquires from stakeholders on the need to reinforce the southern Alberta transmission system and the alternatives the AESO developed to meet this need. This feedback was included in letters, emails and phone calls received by the AESO from stakeholders.

The largest source of stakeholder feedback, however, came from visitors' surveys and informal interviews with visitors at Open Houses held by the AESO in the fall of 2007 and the spring of 2008. The AESO received 66 completed visitor surveys from first round of Open Houses, held between November 14 and November 28; the AESO received an additional 132 surveys from the second round, held between April 28 and May 15. These surveys provided the AESO with qualitative and quantitative feedback on both visitors' Open House experience and their opinions about the need for transmission in southern Alberta and the alternatives proposed by the AESO for addressing this need. Meetings with stakeholders also afforded the AESO insights into stakeholders preferences for transmission development in southern Alberta.

All forms of feedback provided opportunity for the AESO to learn the preferences of stakeholders

The AESO has responded to all inquiries and concerns received as a result of PIP activities.

Ongoing Dialogue

In addition to the PIP activities described above, the AESO has additional communications tools in place to involve stakeholders in this application. These tools include a dedicated, toll-free stakeholder relations telephone line (888.866.2959) and a dedicated email address (stakeholder.relations@aeso.ca). AESO contact information, along with the AESO's mailing address (2500, 330 5th Ave, SW, Calgary) and web site address (www.aeso.ca), and a privacy statement that describes how the AESO honours Alberta's Personal Information Protection Act, was included on all communications materials and correspondence related to this application. Finally, the AESO published notice of various milestones and other information associated with this application in its weekly stakeholder newsletter throughout the development of this application. The AESO will continue to inform the stakeholders of ongoing application activities.

1.2 Issues and Concerns Raised

The main sources of comments, questions and concerns from the public were received by the AESO through Open Houses and also meetings attended with various stakeholders.

In the first round, Open House visitors and meeting participants:

- Requested more information on the need and possible solutions;
- Commented on the AESO's participant involvement process;
- Expressed both concern and support for transmission development and the wind development it would encourage;
- Asked questions about the regulatory process (e.g., who are the players and how does it work?); and
- Inquired about underground transmission development.

Open House visitors and meeting participants expressed they were happy with the opportunity to learn more about the need for transmission, however, they expressed a preference for discussing the project when the AESO was further along in its planning process and could provide alternatives related to geographic areas.

In the second round, Open House visitors and meeting participants responded with comments and questions related to:

- Social matters including:
  - Health, safety, environment and public preference, especially with respect to aesthetic considerations and property values;
  - Land use within the study area and the impact potential transmission development may have on multiple-use areas, wildlife and livestock; some comments advised planners to avoid certain areas;
  - Siting and the regulatory process, along with references to the location of generation;
  - Perspectives on generation fuel sources (e.g., renewables, micro generation and fossil fuels);
  - AESO consultation, including advice on whom to involve in our PIP, and PIP activities executed by other industry participants such as the AUC and TFOs such as AltaLink;
  - Regulatory matters such as other applications in the region and also rate of growth in Alberta; and
  - Policies, including those related to export, deregulation and support for renewable energy technologies;

- Technical matters, including:
  - Engineering design with respect to the need for transmission reinforcement in southern Alberta;
  - Technical requirements, such as capacity, efficiency, reliability and system impact;
  - Evaluations that address operating standards; and
  - The efficiency of generation fuel sources such as wind;

- Project cost matters including:
    - Capital costs of each alternative; and
    - Other cost factors such as line losses.

After 21 Open Houses with almost 500 visitors, and 46 meetings with stakeholders, some trends in stakeholder feedback emerged.

Visitors to Open Houses held in southeast Alberta primarily sought information on wind energy and transmission development. Development on the scale proposed by wind developers and the AESO seemed new for many southeastern stakeholders. Visitors to Open Houses held in southwestern Alberta, many of whom have been living with wind developments longer than stakeholders in the southeast, offered more particular views on the need for transmission development. Many of these stakeholders for example, advised the AESO to consider underground transmission, build big and follow existing rights-of-way.

Feedback from meetings the AESO held with stakeholders in local governments, First Nations and those belonging to industry and advocacy groups ranged widely. Below is a general high-level synopsis:

- Municipalities were interested in mainly in tax revenue generated from industry (including power generation) locating to areas with adequate transmission capacity to support operations within the jurisdictions of Counties, Municipal Districts and Towns;
- First Nations requested TFO's keep them informed of routing discussions and some expressed interest in wind power generation;
- Stakeholders in industry emphasized costs of transmission developments as the key factor in determining preferred alternatives; others noted that carbon offsets were a key advantage of industrial wind development;
- Stakeholders from environmental advocacy groups suggested environmental concerns should be a deciding factor in the AESO's determination of a preferred option; and
- Wind developers suggested adequate transmission must be built in a timely way.

The AESO's review of stakeholder feedback reveals the need for bulk system transmission development in southern Alberta is recognized and accepted.

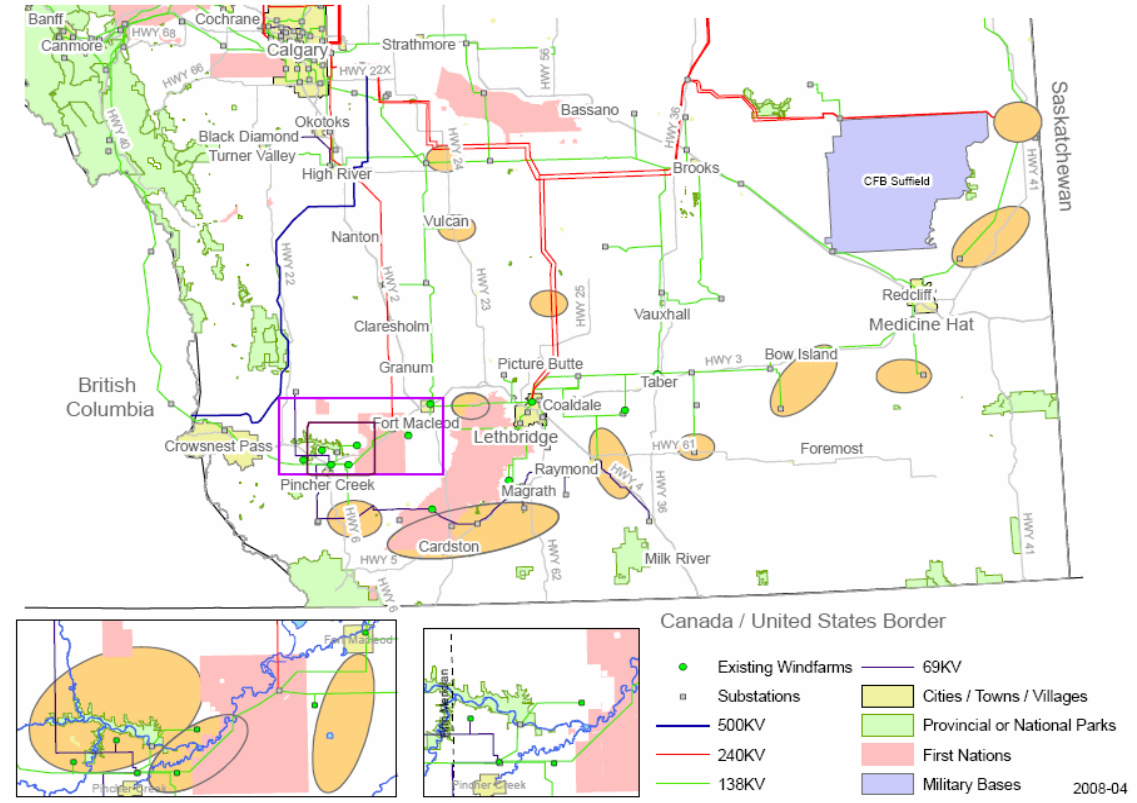
Southern Alberta Transmission Reinforcement

For more information please contact the AESO at 1.888.866.2959,
www.aeso.ca or stakeholder.relations@aeso.ca

Who is the AESO?

The Alberta Interconnected Electric System (AIES), our province's transmission system or "grid," is planned and operated by the Alberta Electric System Operator (AESO). This network of higher-voltage transmission lines, towers and equipment carries ('transmits') electricity from generators to large industrial customers as well as lower-voltage systems that distribute it to cities, towns and rural areas. Our job is to maintain safe, reliable and economic operations on the provincial transmission grid.

Southern Alberta Wind Interest Map



The map above shows areas, in orange, where wind power developments have been proposed; these areas are otherwise known as planning zones.

Why Transmission system reinforcement is needed for Southern Alberta?

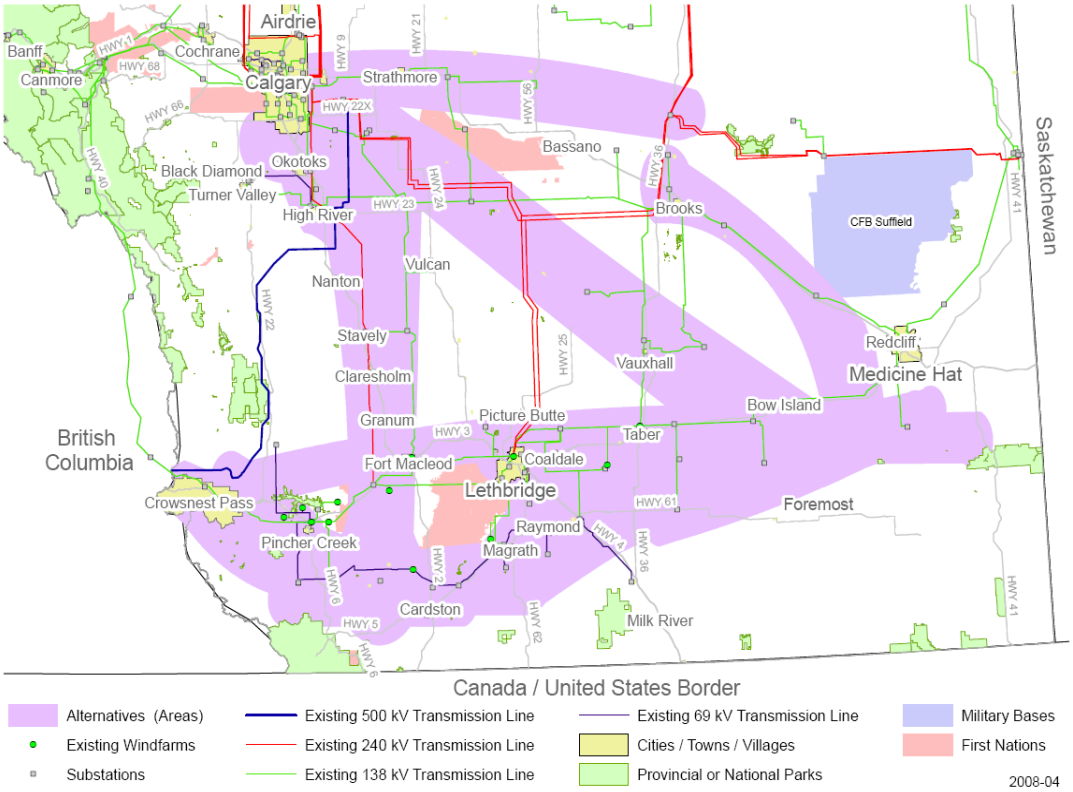
Interest in wind development in southern Alberta is increasing. We are now planning the transmission system to interconnect new wind farms; however, since the existing transmission system in the south is at capacity (i.e., the system cannot carry additional electricity), system reinforcement is needed to move new wind generated power to areas that need it.

What's happening right now?

The AESO has received applications for wind power development of over 10,000 mega-watts (MW) in Alberta, with more than 7,000 MW distributed across southern Alberta. The AESO, however, anticipates the total wind generation that will likely develop as ranging between 2000 MW to 3900 MW over the next 10 years. (This range includes 523 MW of wind generation currently installed.) The existing transmission system in southern Alberta has very little capacity to connect new wind generation. Therefore, the AESO has developed transmission development alternatives to integrate the anticipated wind generation development in southern Alberta. These alternatives consist of 240 kV AC (2 alternatives), 500 kV AC and HVDC transmission systems. These transmission system alternatives were developed to not only interconnect new generation but also to provide additional, reliable bulk system capacity from the generation sites to the areas where power is needed.

(over)

Consultation with stakeholders will help the AESO determine what alternatives are best suited for southern Alberta.



The map above shows a shaded area where the AESO has identified four alternatives for transmission system reinforcement.

Where will the new lines be proposed?

So far, our planning study has produced four main alternatives to address the challenges facing the transmission system in southern Alberta. After gathering stakeholder insights on our alternatives, our study will identify areas where transmission lines and other related facilities could be added to improve the system.

Consultation with stakeholders will identify a preferred solution for strengthening the system; the preferred solution will form part of our Need Information Document (NID) which we will submit to the Alberta Utilities Commission (AUC) later this year. We will also submit individual Abbreviated Needs Information Documents (ANIDs) to the AUC to connect wind projects that successfully meet AESO interconnection milestones.

Should the AUC approve our Need applications, we will assign the larger system reinforcement and each new interconnection to Transmission Facility Owner AltaLink, to build the additional transmission facilities required. Before AltaLink can begin constructing these facilities, it must develop a Facilities application and submit this document to the AUC for approval. Further consultation with stakeholders will form a crucial component of this application process.

The AESO is committed to protecting your personal privacy in accordance with Alberta's Personal Information Protection Act. Any personal information collected by the AESO with regard to this project may be used to provide you with further information about the project, may be disclosed to the Alberta Utilities Commission (and as a result, may become public), and may also be disclosed to the eligible Transmission Facility Owner(s). If you have any questions about how the AESO will use and disclose your personal information collected with regard to this project, please contact us at 888.866.2959 or at stakeholder.relations@aeso.ca

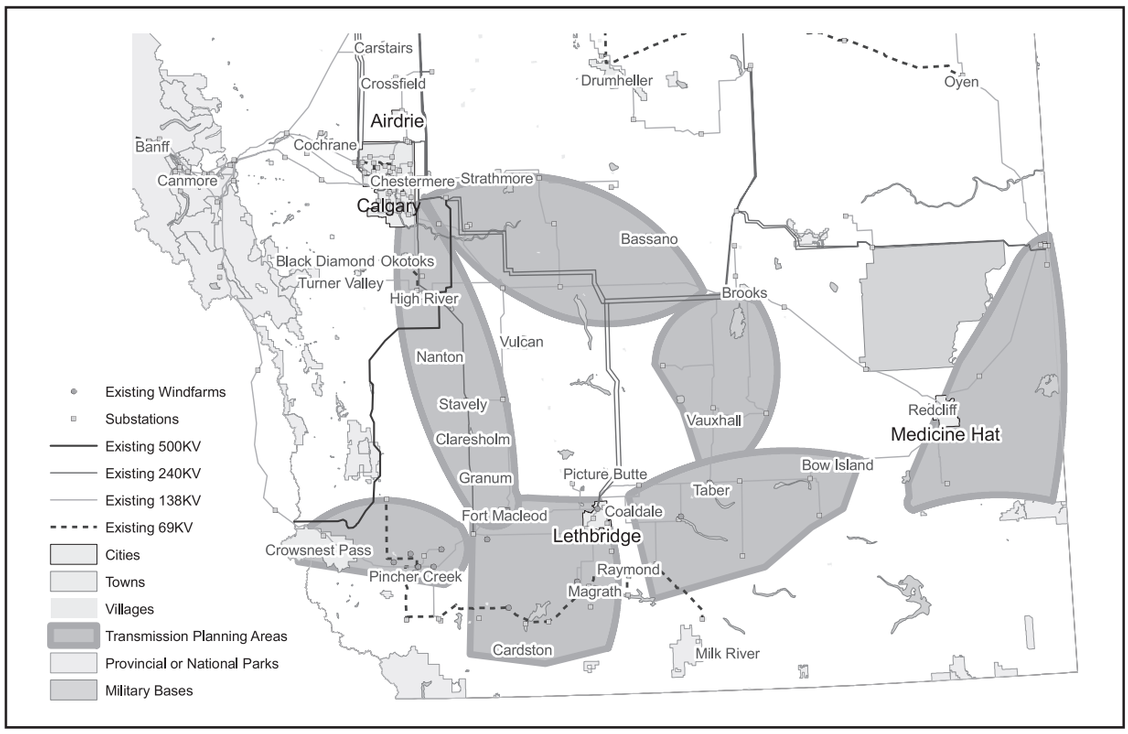
.

Public Information Sessions

Potential System Reinforcement in Southern Alberta to support Additional Wind Development

Claresholm	*Nanton*	*Lethbridge*	*Taber*	*Medicine Hat*
Wednesday, Nov. 14 4pm – 8pm Claresholm Community Centre	**Thursday, Nov. 15 4pm – 8pm Memorial Centre (Upper hall)**	**Monday, Nov. 19 4pm – 8pm Fraternal Order of Eagles (Lower hall)**	**Tuesday, Nov. 20 4pm – 8pm Royal Cdn. Legion (Billy Williams Hall)**	**Wednesday, Nov. 21 4pm – 8pm Moose Lodge**

Brooks	*Pincher Creek*	*Cardston*	*Fort Macleod*
Thursday, Nov. 22 4pm – 8pm Heritage Inn	**Monday, Nov. 26 4pm – 8pm Pincher Creek Community Hall**	**Tuesday, Nov. 27 4pm – 8pm Civic Centre**	**Wednesday, Nov. 28 4pm – 8pm District Community Hall**



The AESO invites you to an Open House to discuss the need for transmission development in Southern Alberta

The Alberta Electric System Operator (AESO) has identified the potential for a significant increase in power generation projects throughout southern Alberta, including substantial wind power development.

In its role of planning the transmission system for all Albertans, the AESO is currently investigating the need to reinforce the transmission system so these generation projects can be connected reliably to the provincial grid. Connecting these projects helps meet demand for electricity in other areas of the province. Work is underway to determine how much additional transmission development will be required.

The map above illustrates, in general, potential areas that may require additional transmission capacity in order to carry more electricity.

Please note: The map does not identify potential line routes. Line routes are developed with public consultation later in the regulatory process governing transmission development in Alberta.

Line routes are developed after the need for transmission development has been determined.

The AESO is holding its first series of Open Houses in southern Alberta to provide opportunities at this early stage in the planning process to discuss the issues facing the transmission system and to review the process for reinforcing the transmission system. Detailed alternatives will only be developed and presented for further discussion once the input from these Open Houses has been incorporated into the planning process.

Please join us to learn more and provide your feedback at our Open Houses on the need for transmission development in Southern Alberta. AESO staff will be on hand discuss this need, answer your questions and record your comments.

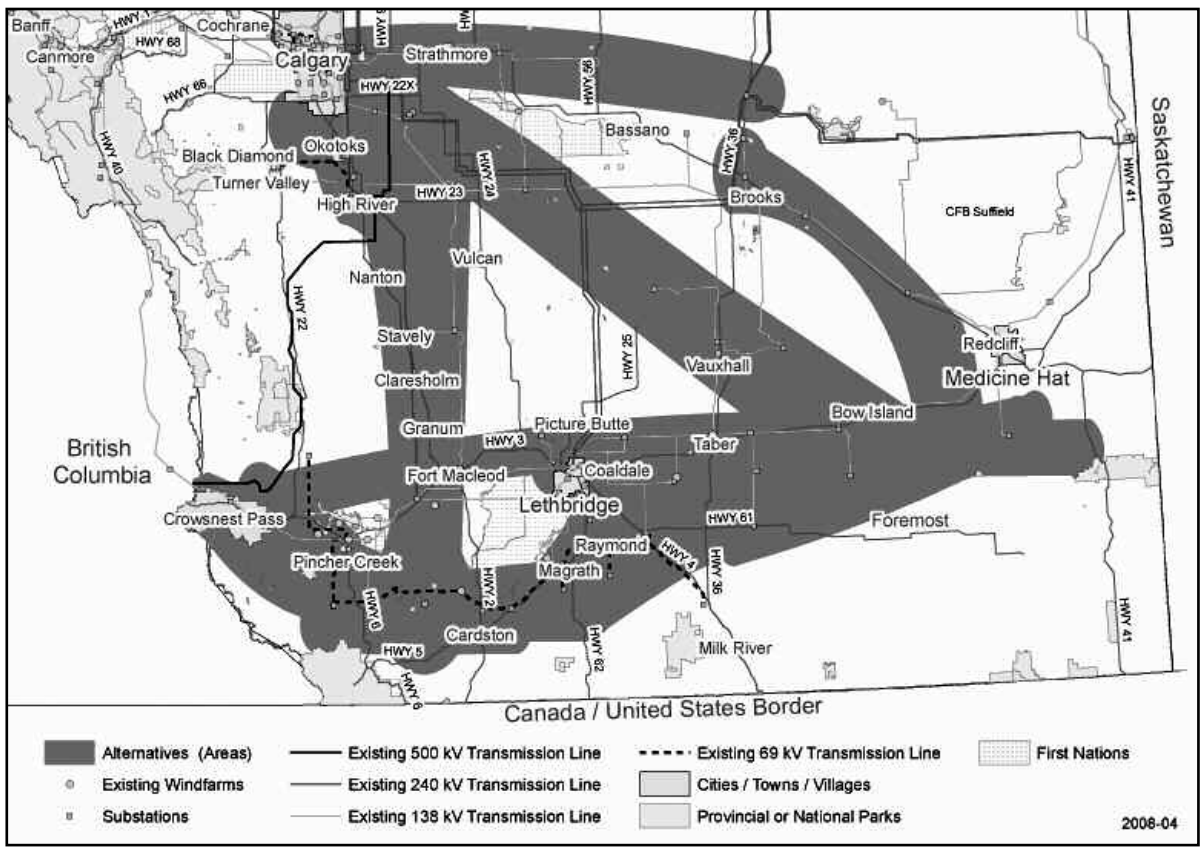
Please visit our web site, www.aeso.ca for more information or call the AESO at 1.888.866.2959.

tmp.worldwide
Integrated Marketing Communications
Artist: 2N
Production Only
Docket: 103005
Date: Nov 1, 2007
Size: 7.48"
Proof: 3
1 of 1
Publication(s):

Public Information Sessions

Potential system reinforcement in southern Alberta to support additional wind development

Foremost **Monday, April 28** **4pm – 8pm** **Foremost Community Hall**	***Bow Island*** **Tuesday, April 29** **4pm – 8pm** **Bow Island Legion Hall**	***Medicine Hat*** **Wednesday, April 30** **4pm – 8pm** **Moose Lodge**	***Brooks*** **Thursday, May 1** **4pm – 8pm** **Heritage Inn**
Taber **Monday, May 5** **4pm – 8pm** **Royal Canadian Legion** **Taber Branch**	***Lethbridge*** **Tuesday, May 6** **4pm – 8pm** **Fraternal Order of Eagles** **(Lower hall)**	***Cardston*** **Wednesday, May 7** **4pm – 8pm** **Tanner Centre**	***Pincher Creek*** **Thursday, May 8** **4pm – 8pm** **Heritage Inn**
Fort Macleod **Monday, May 12** **4pm – 8pm** **District Community Hall**	***Claresholm*** **Tuesday, May 13** **4pm – 8pm** **Claresholm Community Centre**	***Nanton*** **Wednesday, May 14** **4pm – 8pm** **Memorial Centre (Upper hall)**	***Strathmore*** **Thursday, May 15** **4pm – 8pm** **Strathmore Civic Centre**



The AESO invites you to an Open House to discuss the need for transmission development in southern Alberta

The Alberta Electric System Operator (AESO) has identified the potential for an increase in power generation projects throughout southern Alberta, including substantial wind power development.

In our role as planner of the transmission system for all Albertans, we are currently investigating the need to reinforce the transmission system so these generation projects can be connected reliably to the provincial grid.

Connecting these projects helps meet demand for electricity both locally and in other areas of the province. We are working to determine how much additional transmission development will be required.

The AESO is holding a series of Open Houses throughout southern Alberta to provide opportunities for residents to discuss the need to improve the transmission system and to provide a better understanding of where transmission development may take place. AESO planners have developed four possibilities for improving the transmission system; these Open House events will provide visitors with information about these alternatives and help AESO staff gather visitors' comments.

The map above illustrates general areas where potential transmission development might occur; after presenting alternatives for improving the transmission system to southern Alberta residents and other stakeholders, and gathering the insights of these stakeholders, the AESO will make an informed recommendation about how to improve the transmission system in southern Alberta. We invite southern Alberta residents living within the shaded area or near it to visit us at one of our events.

Please note: The map does not identify potential line routes. Line routes are developed with public consultation later in the regulatory process governing transmission development in Alberta.

Please join us at our Open Houses to learn more and to provide your insights on the need for transmission development in southern Alberta. AESO staff will be on hand discuss this need, answer your questions and record your comments.

Please visit our web site, www.aeso.ca for more information, or contact the AESO at 1-888-866-2959 or stakeholder.relations@aeso.ca.

The AESO is committed to protecting your personal privacy in accordance with Alberta's Personal Information Protection Act. Any personal information collected by the AESO with regard to this project may be used to provide you with further information about the project, may be disclosed to the Alberta Utilities Commission (and as a result, may become public), and may also be disclosed to the eligible Transmission Facility Operator(s). If you have any questions about how the AESO will use and disclose your personal information collected with regard to this project, please contact us at 1-888-866-2959 or at stakeholder.relations@aeso.ca.

tmp.worldwide
Integrated Marketing Communications

Artist: Tess

Production Only

Docket: 103019

Date: April 8, 2008

Size: 7.75”

Proof: 4

1 of 3

Publication(s):

8 colum

Southern Alberta System Reinforcement

Thank you.

We held open houses in communities throughout Southern Alberta in November to talk with community members about the need to strengthen the transmission system in order to connect new sources of electricity generation such as wind energy.

The comments we received during our open houses will inform our planning studies and will help us identify a range of alternatives to address transmission planning challenges in Southern Alberta.

After we identify and test these alternatives, we will return to Southern Alberta communities to present these alternatives and to gather more of your insights. We plan to hold a second round of Open Houses next spring (2008).

Your insights are critical to help us plan a transmission system that all Albertans can rely on. We are committed to a consultation process that values local perspectives.

For more information on our activities, or to provide your feedback, please visit our website at www.aeso.ca, email us at stakeholder.relations@aeso.ca or call toll-free at 1.888.866.2959.

Thank you for your continuing interest in our work.

tmp.worldwide
Integrated Marketing Communications

Artist: 2N

Production Only
Docket: 103010
Date: Dec 11, 2007
Size: 6.75"
Proof: 2
2 of 3
Publication(s):
Various

www.aeso.ca

aeso
ALBERTA ELECTRIC SYSTEM OPERATOR

Southern Alberta System Reinforcement

Thank you.

Between April 28th and May 15th, we held open houses in communities throughout Southern Alberta to talk with residents about the need to strengthen the transmission system in this region. Thank you for participating.

With a dual mandate to both plan the transmission system so that generators can get their product to consumers and to connect new electricity generation facilities such as proposed wind farms to the grid, the AESO presented some conceptual alternatives that would address the need for more capacity on the transmission system in Southern Alberta.

The comments we received from you during our open houses will help in assessing the merits of the various alternatives to address the lack of transmission capacity in Southern Alberta.

Your insights are critical to help us plan a transmission system that all Albertans can rely on. We are committed to a consultation process that values local perspectives.

For more information on our activities, or to provide feedback, please visit our website at www.aeso.ca, email us at stakeholder.relations@aeso.ca or call toll-free at 1.888.866.2959.

Thank you for your continuing interest in our work.

tmp.worldwide
Integrated Marketing Communications

Artist: 2N

Production Only

Docket: *103026*

Date: *May 27, 2008*

Size: *4.56”*

Proof: *2*

1 of 3

Publication(s):

LH
MH

SASR Radio script November, 2007

The Alberta Electric System Operator is planning for potential transmission development throughout southern Alberta and would like your input.

Throughout November a series of Open Houses will be held in various communities to outline the need for transmission reinforcement and to gather public feedback as part of the planning process.

Please check your local newspaper for information on dates, times and locations or contact the AESO toll free at 1.888.866.2959 or www.aeso.ca.

Southern Alberta Transmission Development

27 February 2008

Reliable **Power**

Reliable **Markets**

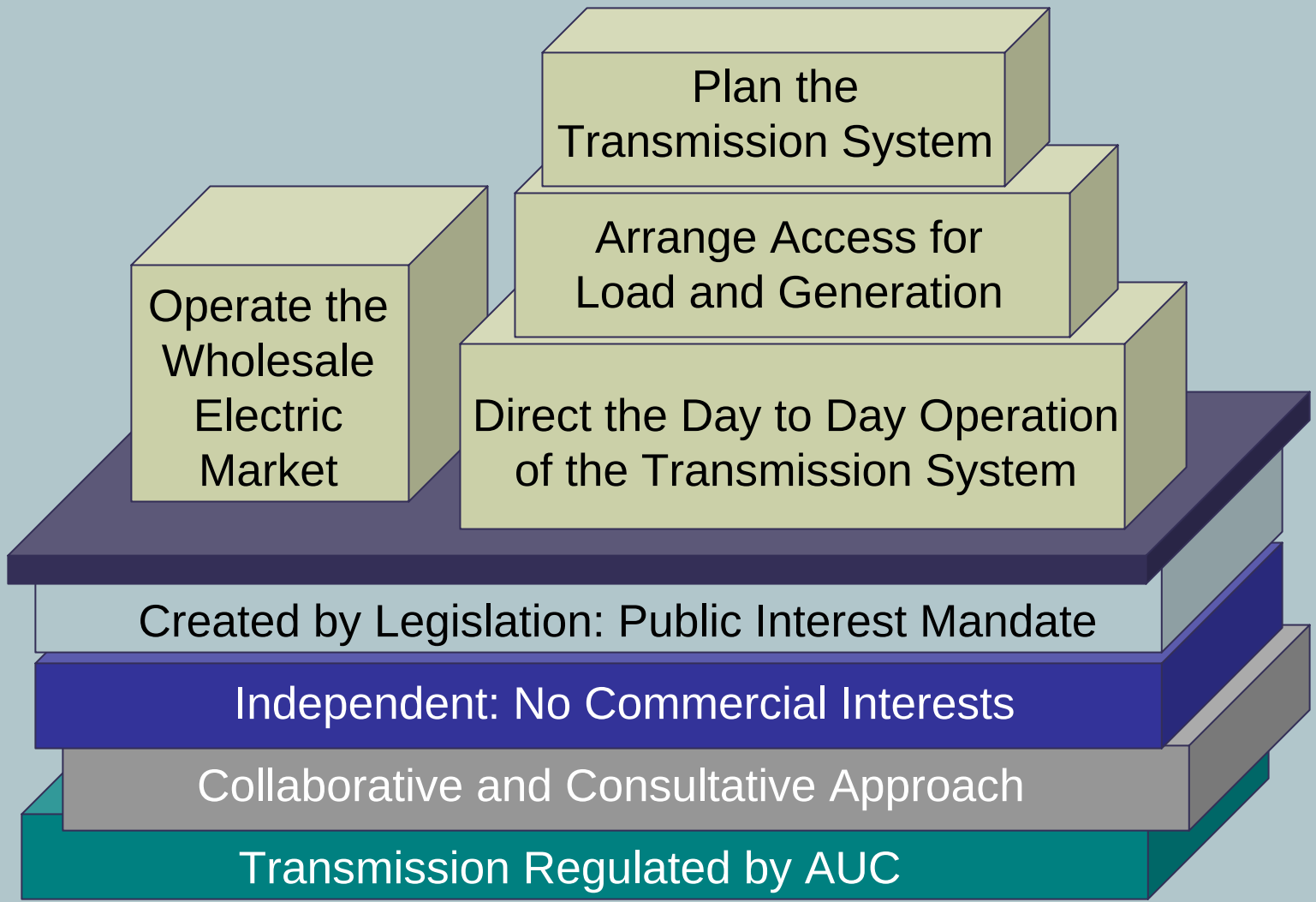
Reliable **People**

aeso
ALBERTA ELECTRIC SYSTEM OPERATOR

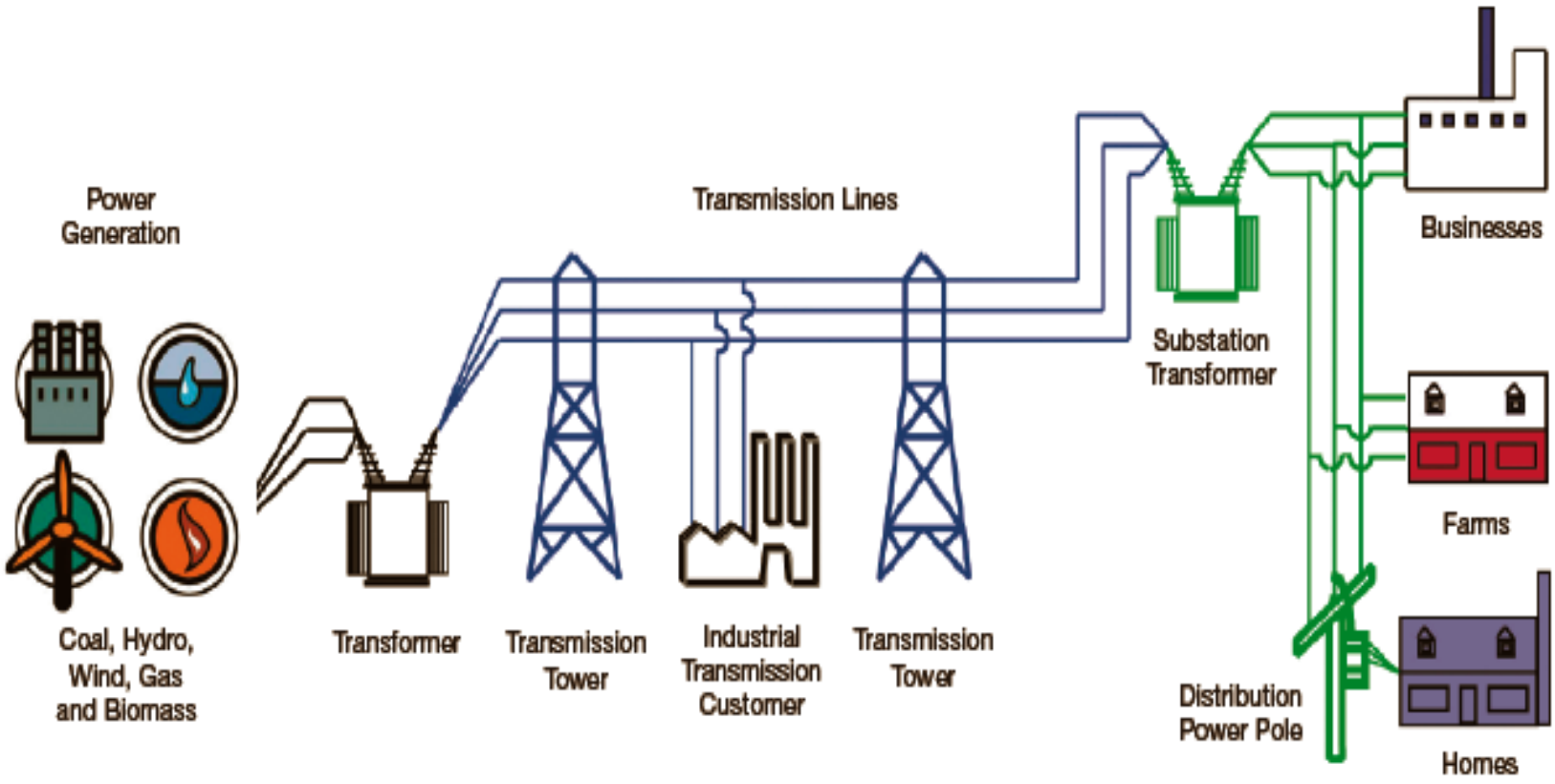
Topics to be presented

- Overview of the AESO
- Transmission System Planning
- Need for reinforcement in Southern Alberta
- Stakeholder engagement process
- Next steps

AESO: Our role and context



The Flow of Power



There are three distinct functions involved in moving power from its source to consumers; each plays a different role in a complete electric system.

Transmission Planning
A two-stage process

- AESO
  - identify the need for transmission development
  - submit a **Needs Identification Document**, to the Alberta Utilities Commission (AUC) which will include a recommendation for transmission reinforcement in the area
- Transmission Facility Owner (TFO)
  - detailed routing and specific siting
  - detailed engineering
  - separate consultation process
  - submit a **Facilities Application**, which will include a specific route proposal, with the Alberta Utilities Commission

Present work underway

- Southwest Transmission Development
  - Will address load growth and some wind generation development
  - TFO in Facility Application Stage
- Southeast Transmission Development
  - Will address load growth and some wind generation development
  - Need Application Submitted in September

The Situation Today

The AESO Wind Integration Process

- Temporary wind capacity threshold of 900 MW implemented in 2006
  - in response to a substantial increase in interest in wind development and technical studies, completed in 2005/2006, which indicated wind power poses system reliability concerns as wind penetration increases in the absence of corresponding mitigation measures
- In March, 2007, consultative work began on a Market Operational Framework to define mitigation measures and determine associated cost allocations
- On September 26, 2007 the DoE, AESO and CanWEA announced the 900 MW threshold has been removed and replaced by the Market Operational Framework, effective immediately

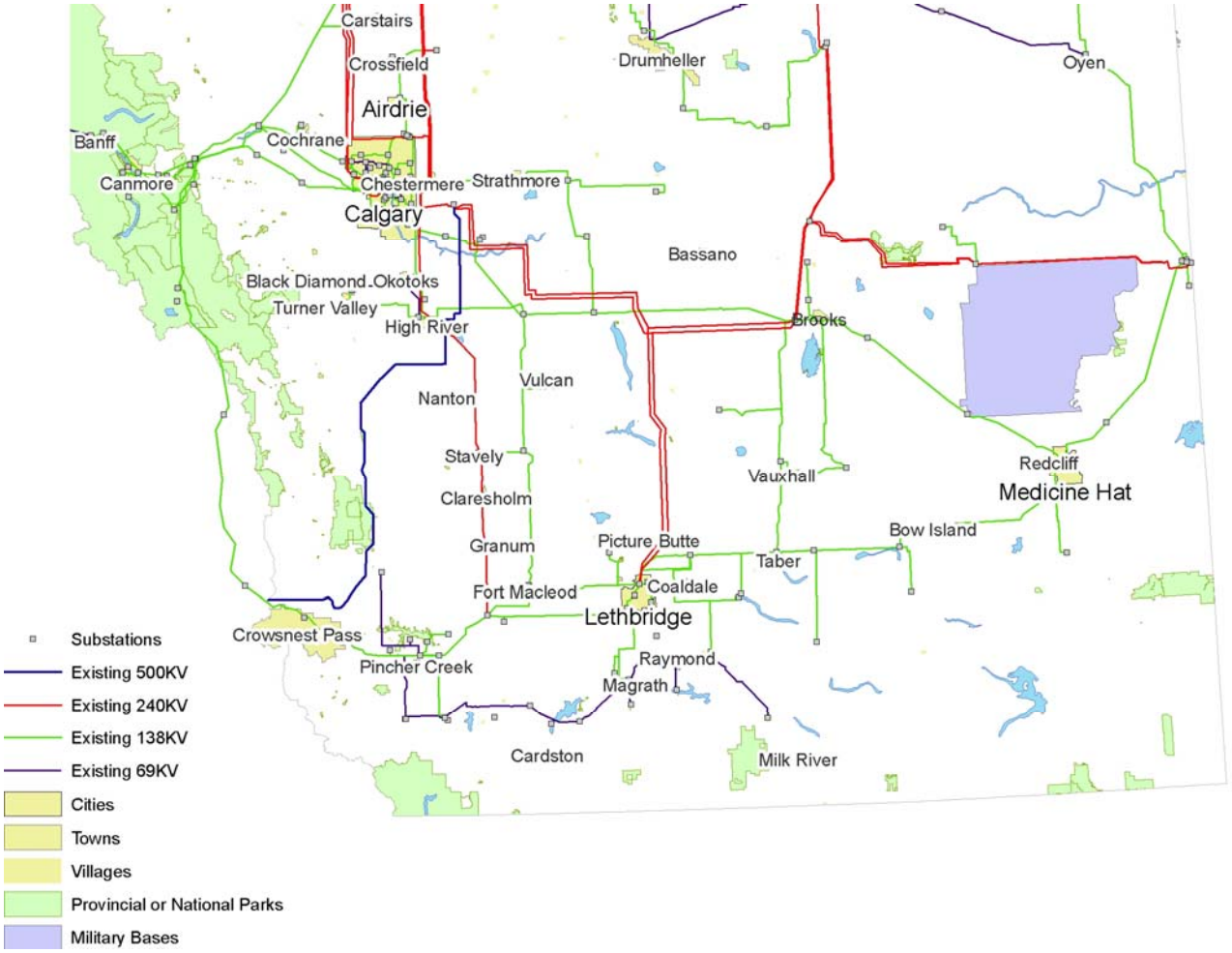
What is causing the need for system reinforcement?

- Approximately 50 potential Wind Farm's totaling over 6000 MW – but not all will likely develop
- Wind Generation Scenarios forecast 1600 MW to 3400 MW of additional wind capacity in the next 10 Years
- Wind farms have the potential to serve an energy demand of 2X the City of Calgary
- Existing infrastructure does not have the capability to handle additional generation of the magnitude expected (not all 6000 MW)
- AESO worked with CanWea to develop reasonable forecast of additional wind generation for the next ten years

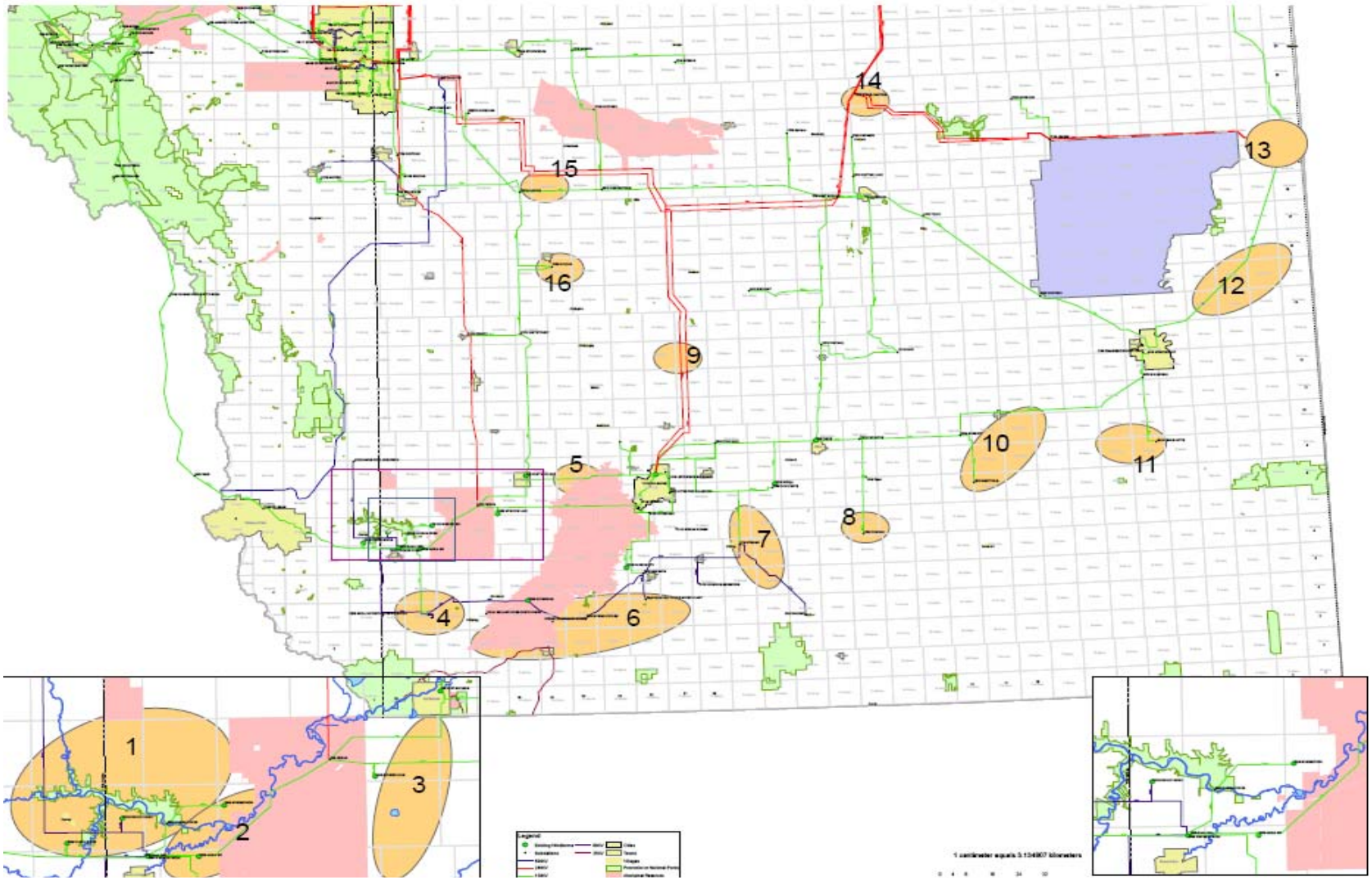
How will the Wind Farms connect to the grid?

- In addition to the transmission system reinforcement, each individual wind power development will need to be connected to the system

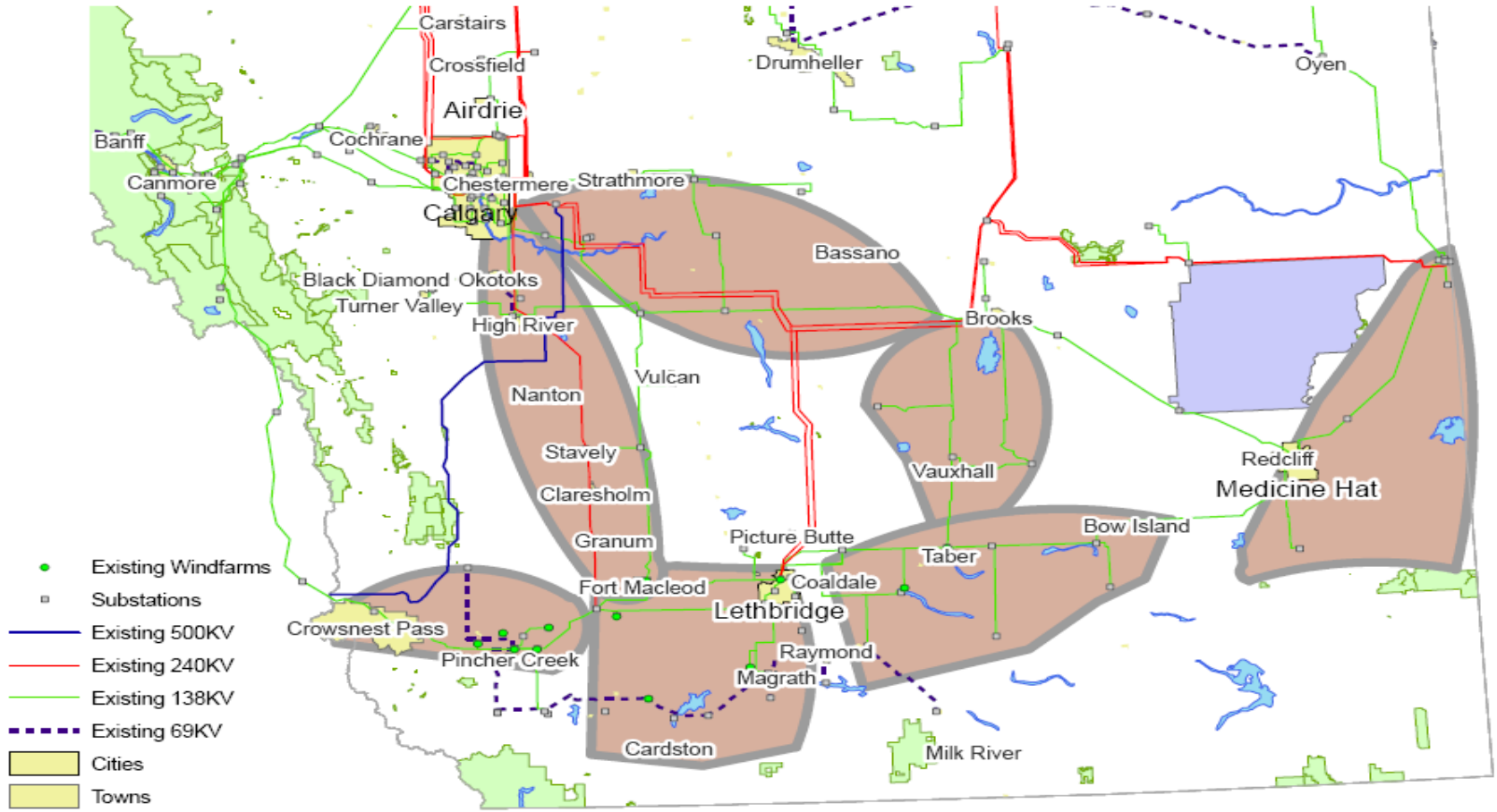
Southern Alberta existing transmission system



Wind Farm Zone Planning Map



Potential Transmission Development in Southern Alberta



Technical alternatives

- 500 kV (e.g., BC intertie)
- 240 kV
- 138 kV (to connect wind farms)
- HVDC and HVDC Light
- Overhead and underground

Planning Considerations

- Assess alternatives based on a balance of:
  - Impacts:
    - Social/Landowner
    - Environmental
    - Land Use
  - Technical performance including reliability and future flexibility
  - Cost

Stakeholder Engagement Process

Consultation with:

- Southern Alberta Residents
  - Open Houses – November 2007 and April 2008
    - Information provided via AESO web site
    - Newspaper advertisements
    - Radio advertisements
    - Transmission projects phone line - 1-888-866-2959
    - Follow up
- Southern Alberta Government representatives (municipal and provincial)
- Area First Nations
- Industry stakeholders

Next steps

- System Development
  - Ongoing stakeholder discussions by both AESO and TFOs
  - Open houses – April 2008
  - File Need Application May 2008
- Wind Power Interconnections
  - Ongoing discussions with individual customers
  - Separate stakeholder engagement process for each individual wind power development
  - Abbreviated Need Identification Documents filed with the AUC as they are completed

Contact us

- General AESO Enquiries
  - at our web site, http://www.aeso.ca
  - via email to stakeholder.relations@aeso.ca

- Southern Alberta Transmission Development:
  - Via email to stakeholder.relations@aeso.ca
  - Via telephone at 1-888-866-2959
  - At our web site, http://www.aeso.ca/transmission/9837.html


aeso
ALBERTA
ELECTRIC
SYSTEM
OPERATOR

Southern Alberta System Reinforcement
- Planning Update -

Ata Rehman, P. Eng.
Manager, South System Planning

19 June 2008

Reliable **Power**

Reliable **Markets**

Reliable **People**

aeso
ALBERTA ELECTRIC SYSTEM OPERATOR

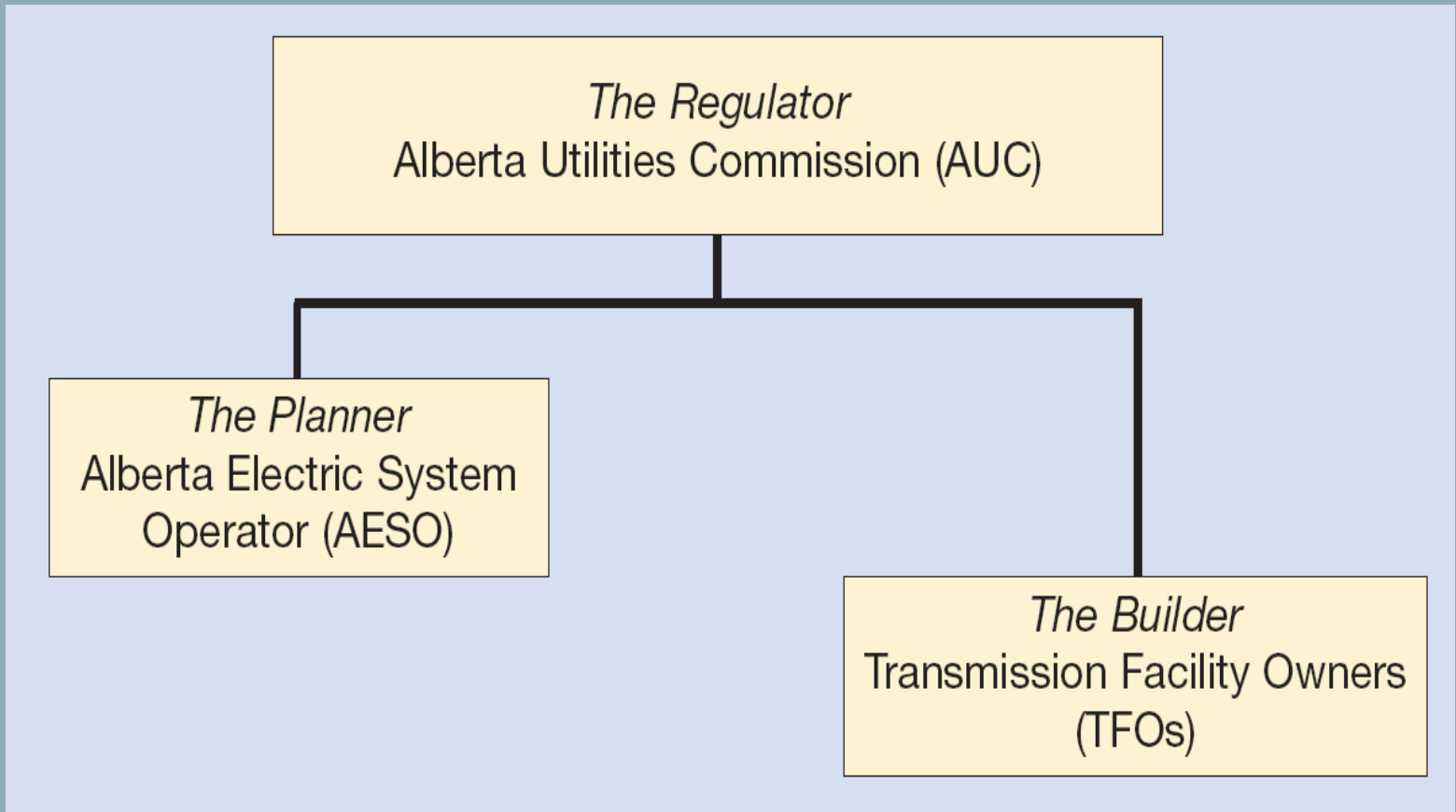
South System Planning - Update

- Overview of the Need
- Basis and Planning Assumptions
- Transmission Development Alternatives
- Next Steps
- Timelines

AESO Vision

The AESO will be seen as a key contributor to the development of Alberta and the quality of life for Albertans, through our leadership role in the facilitation of fair, efficient and openly competitive electricity markets and the reliable operation and development of the Alberta Interconnected Electric System (AIES).

Regulatory Process: The Players



Regulatory process: The Process

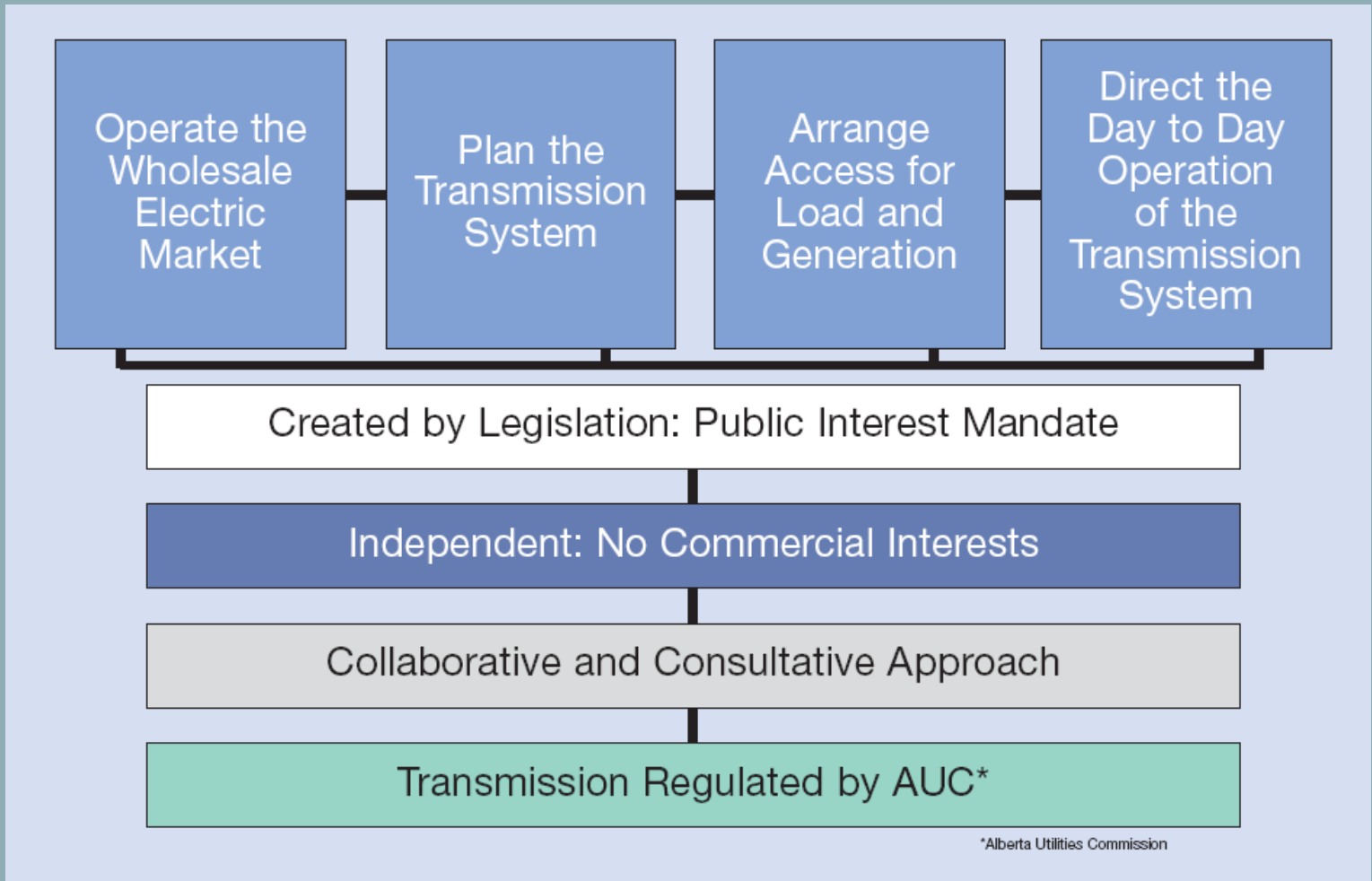
The Process (two parts)

1. The Need: The AESO studies the need for transmission development and applies to the AUC for approval.

2. The Facilities (lines, towers and substations): To meet the need, the TFO applies to the AUC for approval to construct facilities.

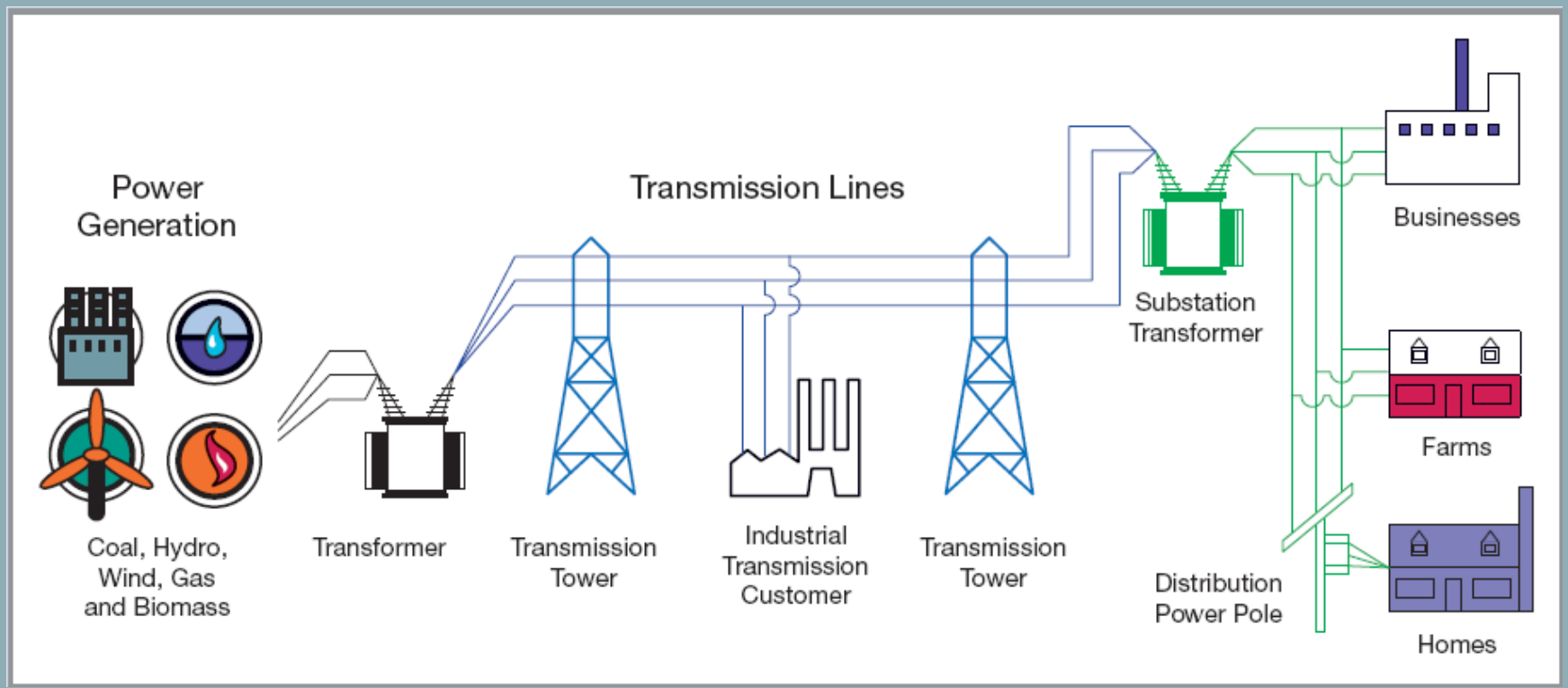
   In southern Alberta the TFO is AltaLink.

AESO – Our role



The Big Picture

The flow of power



The Big Picture (cont'd)

Alberta's Electricity Generation

Coal-Fired Plants		5,893 MW
Natural Gas-Fired Plants		4,669 MW
Hydro Power		869 MW
Green Power	Wind Power	523 MW
Green Power	Other Renewables	234 MW
Total Installed Generating Capacity		**12,188 MW**

Transmission Interconnections

British Columbia	Import: 0-780 MW; Export 0-800 MW
Saskatchewan	Import: 0-150 MW; Export 0-60 MW

Figures as of April 2008

The Big Picture (cont'd)

Alberta's Electric System

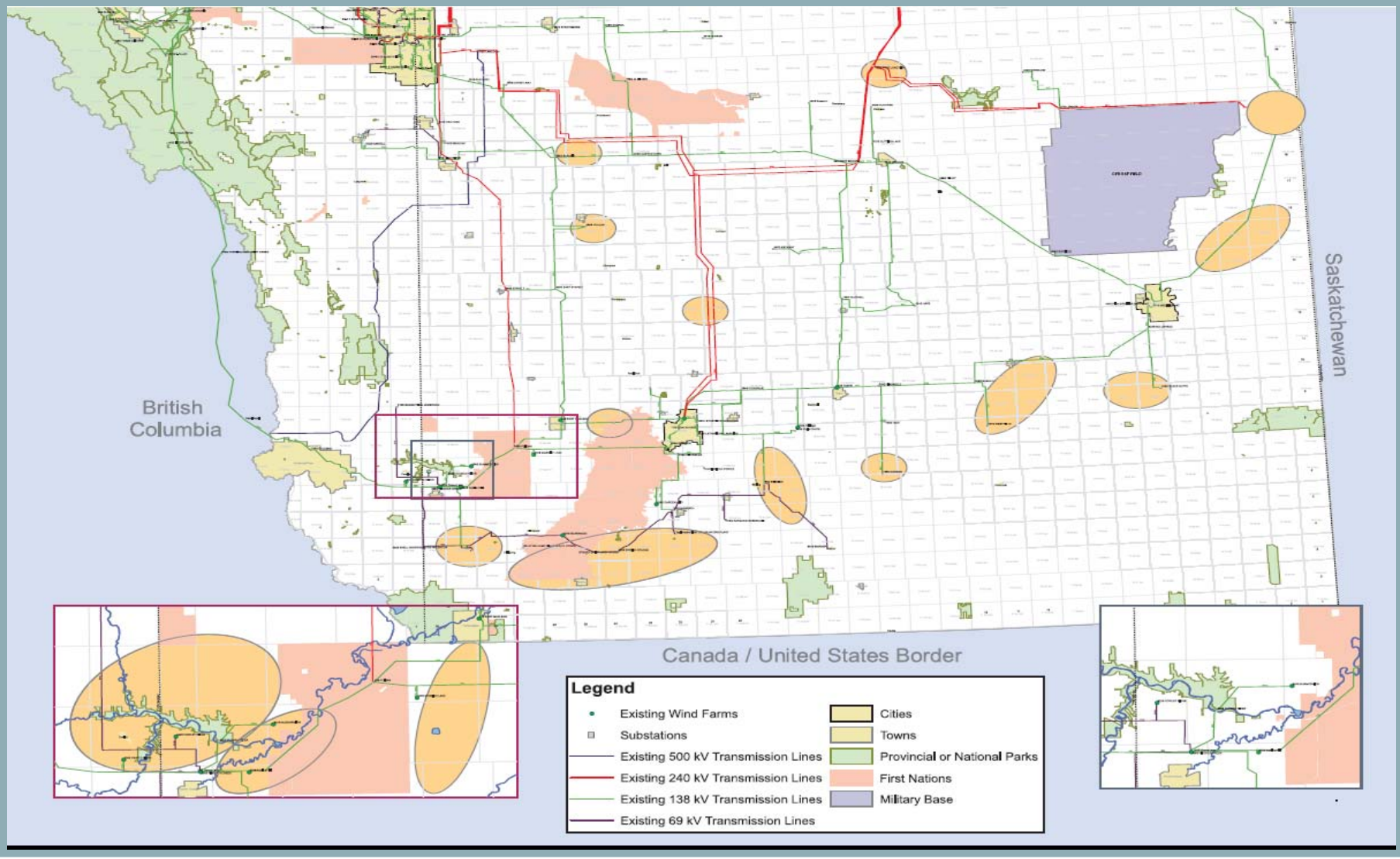
- More than 21,000 km of transmission lines
- Interties B.C. (up to 780 MW) & Saskatchewan (up to 150 MW)
- Over 280 generating units
- 9,701 MW system peak demand
- About 200 market participants
- 12,188 MW total maximum generating capacity

Planning for need

Planning considerations:

- Social
- Technical
- Economic

Overview of the Need – Wind Interest in Southern Alberta



Overview of the Need Cont.

- Southern Region – 10 Planning Areas
- Current Total Wind Interest > 11,000 MW
- Wind Interest in South > 9,500 MW
- Wind Interest in Central Area > 1,500 MW
- Very Small Capability in the Existing South Transmission System to interconnect additional wind

Southern System Development Options

- 240 kV AC
- 500 kV AC
- 765 kV AC
- HVDC (Classic)
- HVDC (VSC)

240 kV Option

- Suitable for Interconnecting 2,700 MW of Wind Interest in Southern Alberta
- Economical Solution
- Existing Voltage in the System
- Relatively Easy to Construct – ROW
- At the Limit in Terms of Distances
- Losses Could Play Significant Role

500 kV Option

- Technically Robust
- Lower Losses
- Expandability for the 20 Year Scenario
- Higher Initial Capital Cost
- Larger Footprint
- Category C Contingencies Could be an Issue
- Could be an Overbuild

HVDC Classic

- Maximizes the Use of ROW
- Lower Footprint
- Possibly Lower Losses
- Higher Initial Capital Cost
- Reduced Flexibility for Expansion
- Still Requires “AC Collector System”

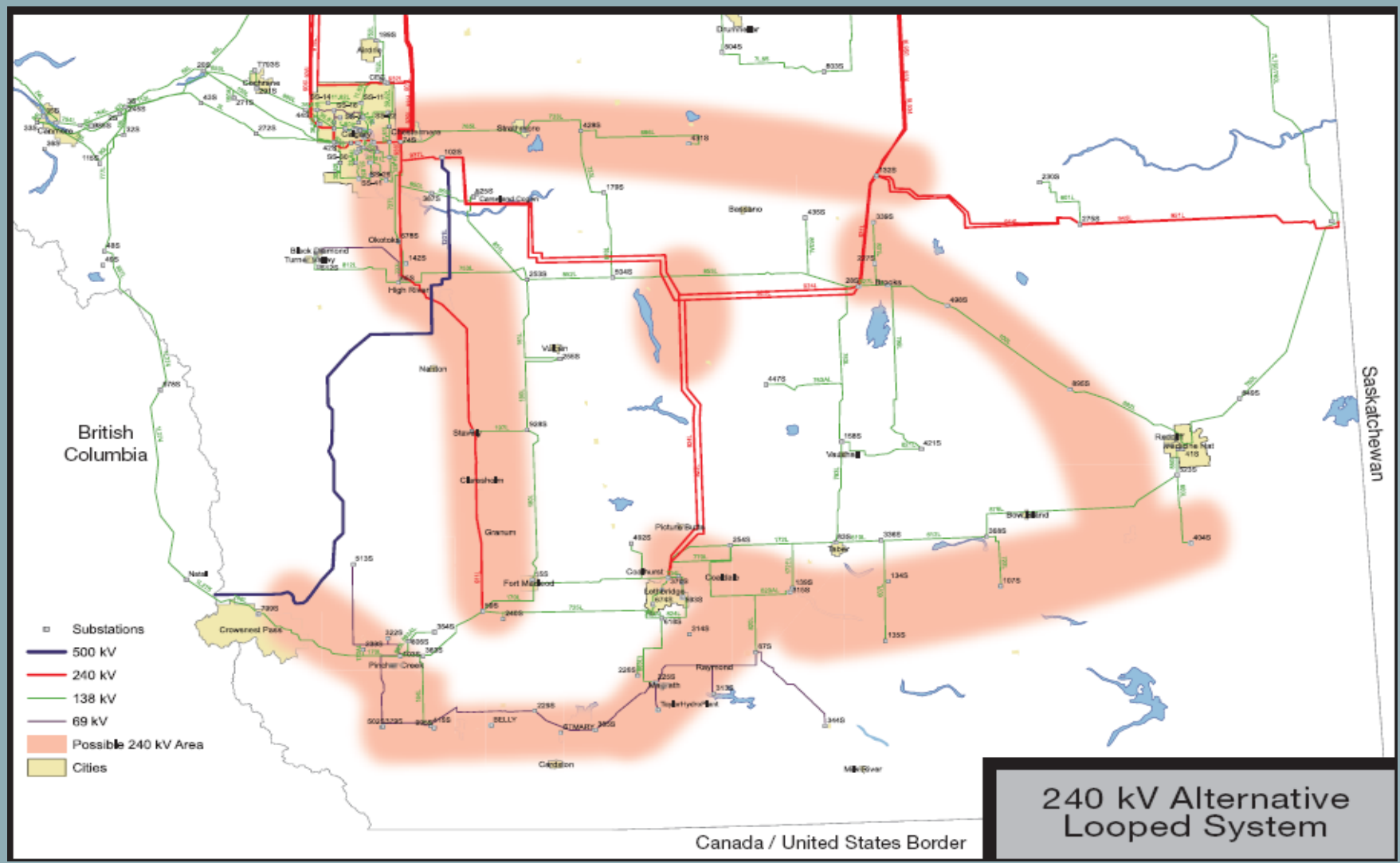
765 kV Option

- High Capacity
- Not Suitable in Southern Alberta as Wind Interest is Spread Across
- Distances < 300 km
- New Voltage in the System
- Not Considered Further

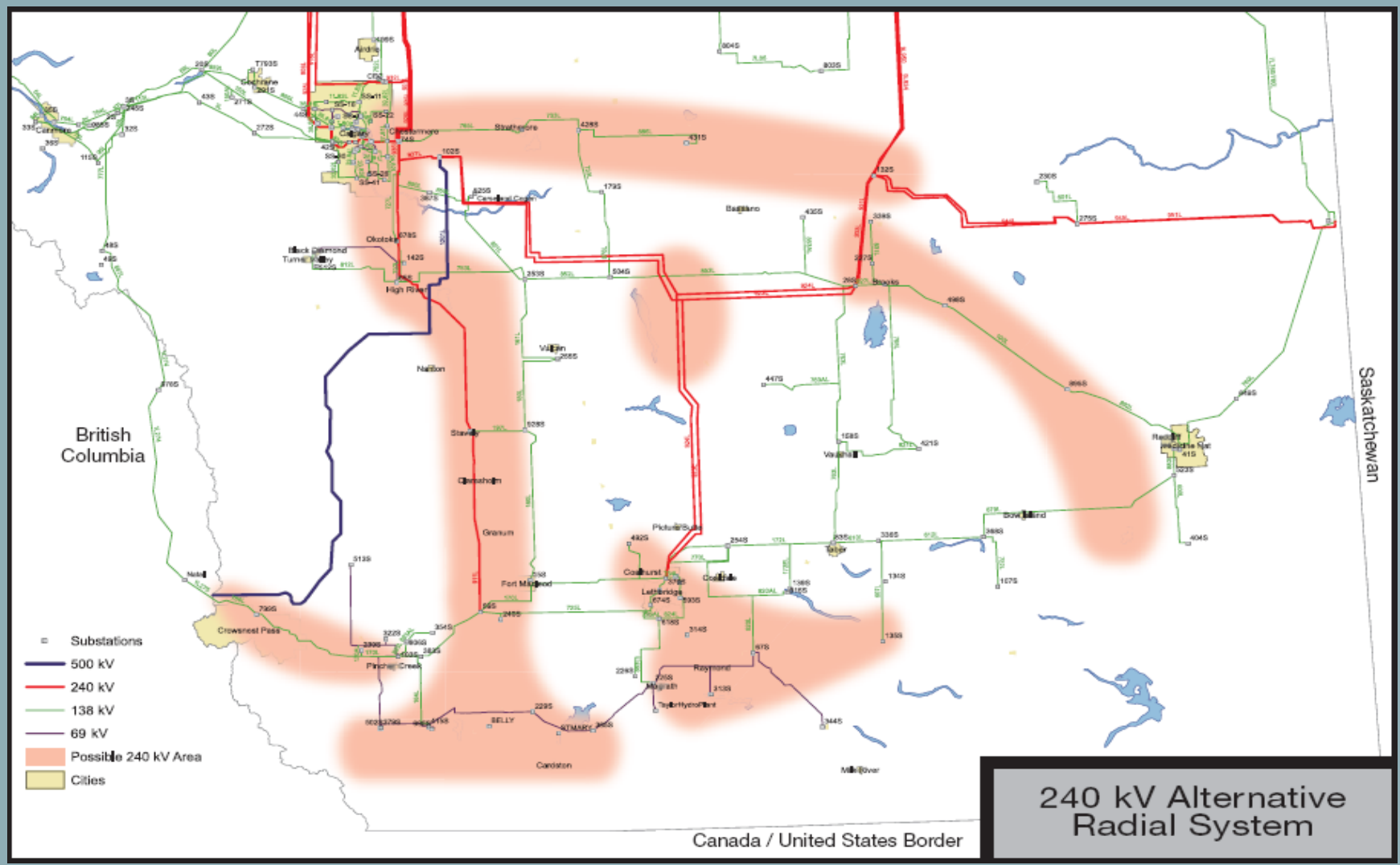
HVDC (VSC Technology)

- Suitable for Transmitting Smaller Magnitudes of Power
- Max Size Currently in Commercial Operation < 500 MW
- High Initial Capital Cost
- Higher Losses
- Reduced Flexibility
- Not Considered Further

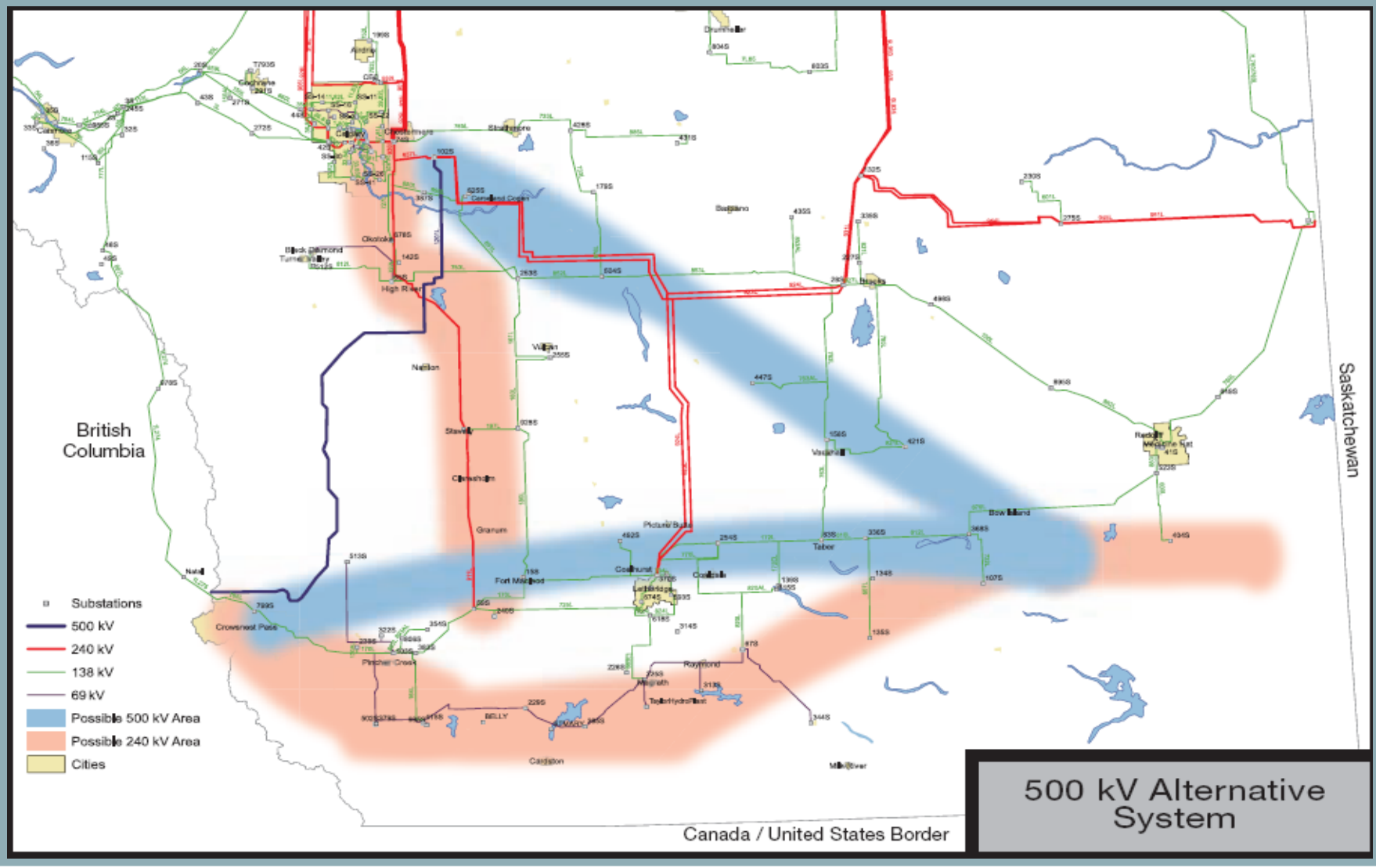
240 kV Alternative – Looped System



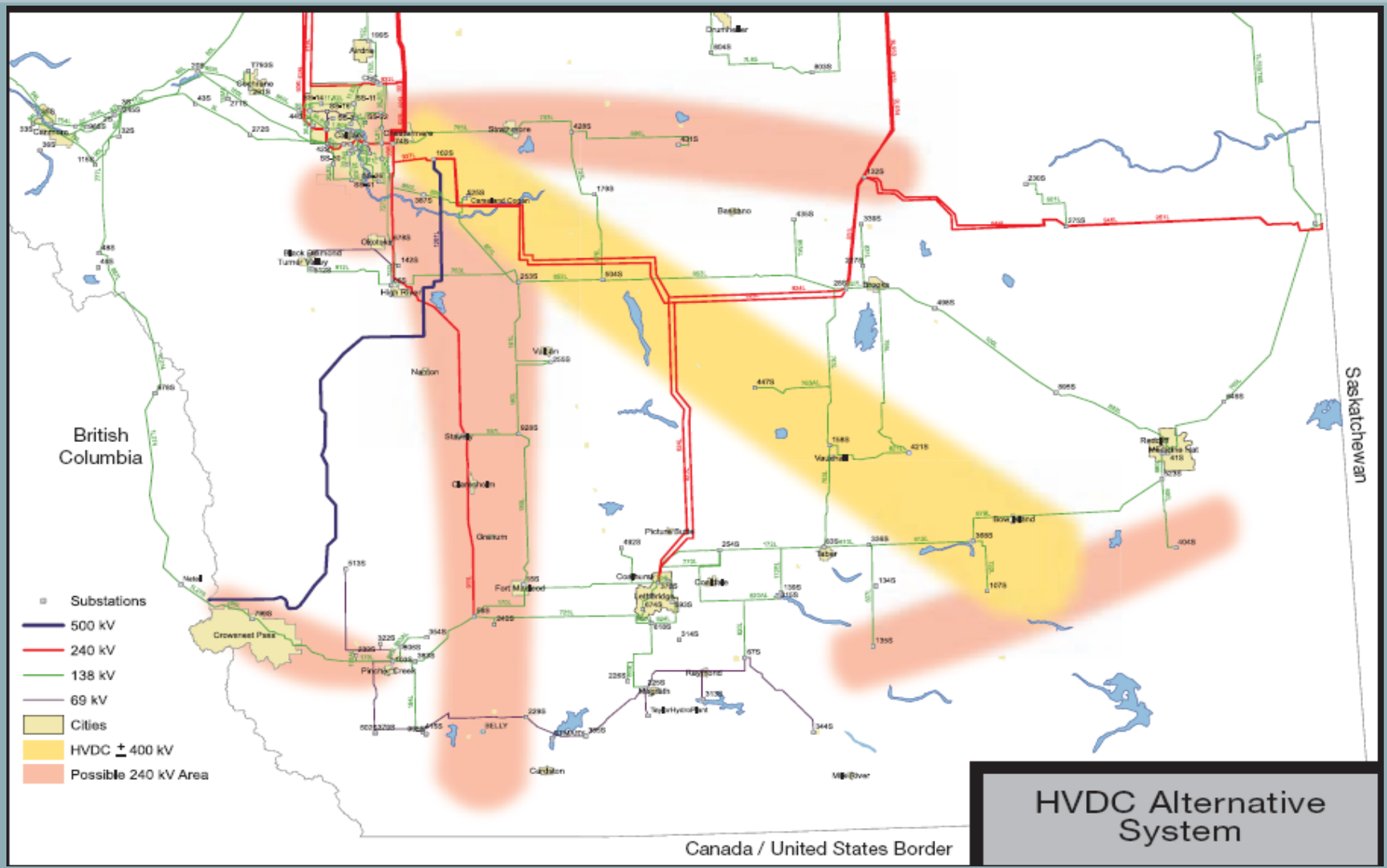
240 kV Alternative – Radial System



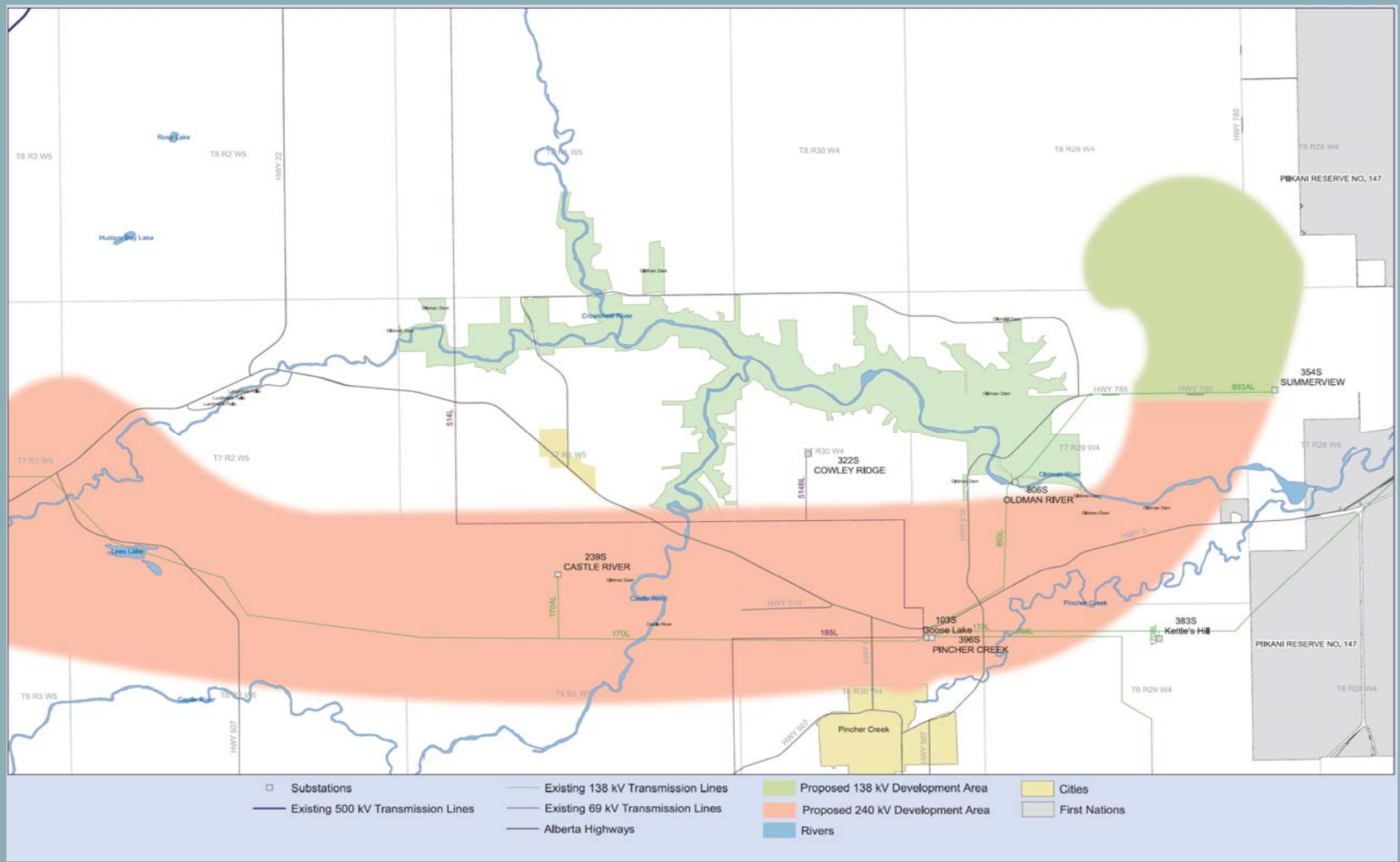
500 kV Alternative – Looped System



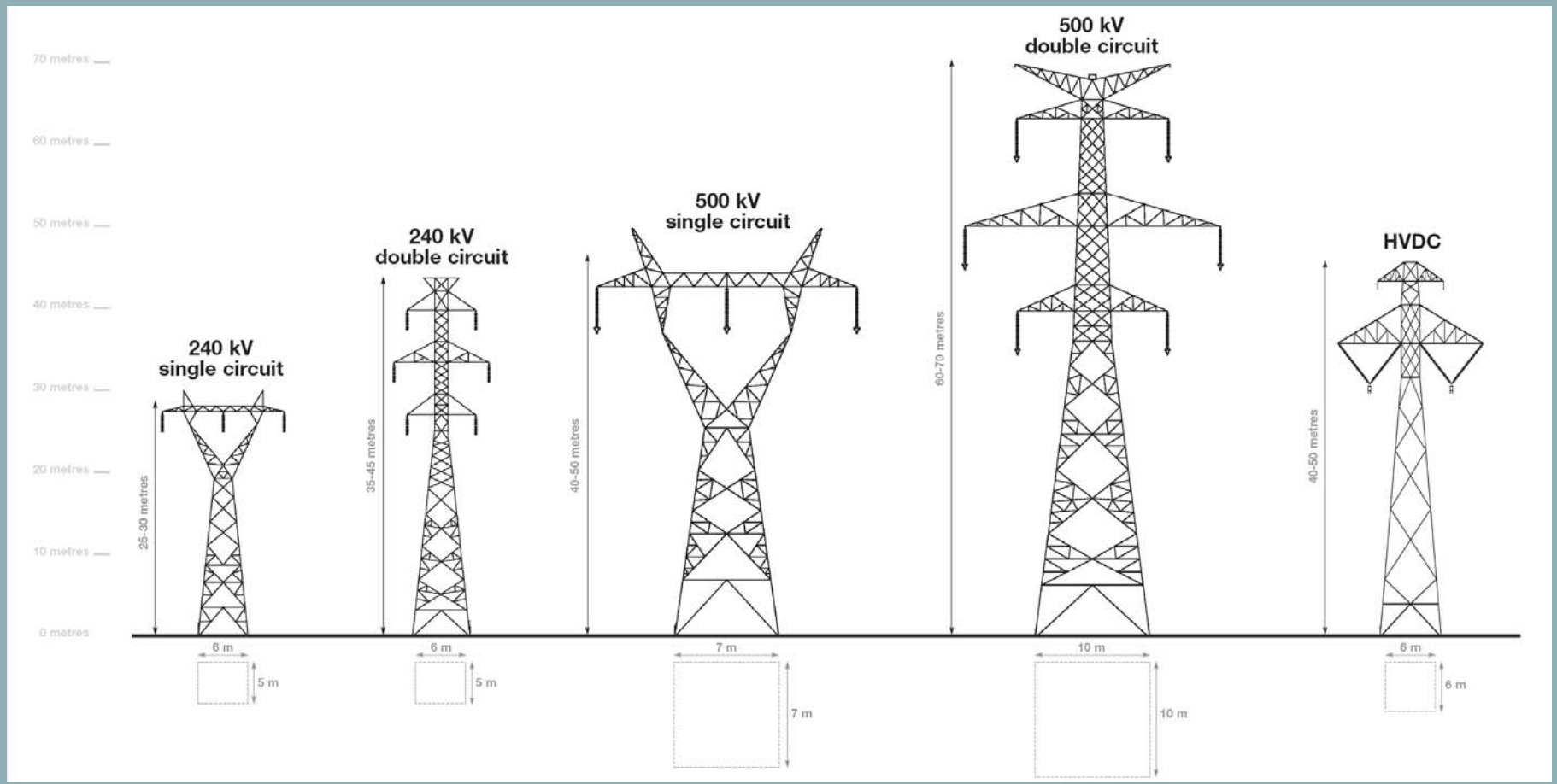
HVDC System


British Columbia
Saskatchewan
Substations
500 kV
240 kV
138 kV
69 kV
Cities
HVDC ± 400 kV
Possible 240 kV Area
Canada / United States Border
HVDC Alternative System

Possible Transmission Development in Pincher Creek Area



Types of Possible Towers



Consultation

- Participant Involvement Program

Activities:

  - Open Houses
  - Meetings with:
    - First Nations
    - Municipal Districts and Counties
    - Special Interest Groups
    - DOE/AUC

Need Identification Document

- Preparation of Need Application
  - Recommendation of South System Plan Based on
    - Technical
    - Economic
    - Social

Next Steps

- Request Need Level Cost Estimates from AltaLink
- Detailed Evaluation of Alternatives
- Conductor Selection Studies
- Meetings

South System Planning - Schedule

- Finalize Study Scope – Jan 25 (Completed)
- Need Assessment Report – (In Progress)
- Alternative Development and Screening Report – (In Progress)
- 2nd Round of Consultation – (open houses completed)
- Alternative Assessment and Recommendation – August
- Need Application Filing with AUC – Q3/Q4, 2008
- Targeted ISD – Starting in 2011/2012

Further Information

www.aeso.ca

Matt Gray

Adviser, Transmission

Stakeholder Relations

403 539 2656

matt.gray@aeso.ca


aeso
ALBERTA
ELECTRIC
SYSTEM
OPERATOR

SASR – Addressed Mail List

Stakeholders on the is list were sent a package of project specific information on the need for transmisison development in southern Alberta. The package was mailed in early February, 2008.

Alberta Association of Municipal Districts and Counties (AAMDC)

Alberta Direct Connect (ADC)

Alberta Environment Network

Alberta Urban Municipalities Association (AUMA)

Blood Tribe

City of Brooks

County of Newell

County of Warner

ENMAX Corporation

Fortis Alberta

Carnahan Stony Tribe

Improvement District 4 (Waterton)

Livingstone Landowner Group

MATL

Metis Nation Alberta

Medicine Hat Chamber of Commerce

Alberta Association of Municipal Districts and Counties (AAMDC)

Alberta Direct Connect (ADC)

Alberta Environment Network

Alberta Urban Municipalities Association (AUMA)

Blood Tribe

City of Brooks

County of Newell

County of Warner

ENMAX Corporation

Fortis Alberta

Carnahan Stony Tribe

Improvement District 4 (Waterton)

Livingstone Landowner Group
MATL
Metis Nation Alberta
Medicine Hat Chamber of Commerce
Medicine Hat Industrial Group (MHIG)
Municipal District of Foothills
Municipal District of Ranchland
Municipality of Crowsnest Pass
Oldman Watershed Council
The Pekisko Group
Sierra Club of Canada, Prairie Chapter
Town of Bassano
Town of Bow Island
Town of Coalhurst
Town of Granum
Town of High River
Town of Magrath
Town of Milk River
Town of Okotoks
Town of Picture Butte
Town of Raymond
Town of Stavely
Town of Vulcan
Utilities Consumer Advocate
Alberta Association of Municipal Districts and Counties (AAMDC)
Alberta Direct Connect (ADC)
Alberta Environment Network
Alberta Urban Municipalities Association (AUMA)
Blood Tribe
City of Brooks
County of Newell
County of Warner
ENMAX Corporation

Fortis Alberta
Carnahan Stony Tribe
Improvement District 4 (Waterton)
Livingstone Landowner Group
MATL
Metis Nation Alberta
Medicine Hat Chamber of Commerce
Medicine Hat Industrial Group (MHIG)
Municipal District of Foothills
Municipal District of Ranchland
Municipality of Crowsnest Pass
Oldman Watershed Council
The Pekisko Group
Sierra Club of Canada, Prairie Chapter
Town of Bassano
Town of Bow Island
Town of Coalhurst
Town of Granum
Town of High River
Town of Magrath
Town of Milk River
Town of Okotoks
Town of Picture Butte
Town of Raymond
Town of Stavely
Town of Vulcan
Utilities Consumer Advocate
Town of Vauxhall
Vauxhall Stock Grazing Association
Village of Arrowwood
Village of Barons
Village of Carmangay
Village of Champion

Village of Coutts
Village of Cowley
Village of Duchess
Village of Empress
Village of Foremost
Village of Glenwood
Village of Hillspring
Village of Lomond
Village of Milo
Village of Spring Hill
Village of Stirling
Village of Tilley
Village of Warner
Vulcan County
Wheatland County

07 April 2008

Dear Stakeholder:

Re: Open Houses in support of potential transmission development in southern Alberta, April 28 to May15, 2008

The Alberta Electric System Operator (AESO) is responsible for the safe, reliable and economic planning and operation of the Alberta Interconnected Electric System (AIES). We are currently planning to integrate proposed wind developments into the transmission system in southern Alberta. Our plan will include system reinforcements to enable new wind generated power in southern Alberta to be used locally and in other parts of the electricity system. Please find more information about our efforts enclosed.

Also, the AESO will be holding Open Houses in southern Alberta in the following communities:

Monday	April 28	Foremost	Foremost Community Hall
Tuesday	April 29	Bow Island	Bow Island Legion Hall
Wednesday	April 30	Medicine Hat	Moose Lodge
Thursday	May 1	Brooks	Heritage Inn
Monday	May 5	Taber	Royal Canadian Legion – Taber Branch
Tuesday	May 6	Lethbridge	FOE (Fraternal Order of Eagles) Lower Hall
Wednesday	May 7	Cardston	Tanner Centre
Thursday	May 8	Pincher Creek	Heritage Inn
Monday	May 12	Fort Macleod	District Community Hall
Tuesday	May 13	Claresholm	Claresholm Community Centre
Wednesday	May 14	Nanton	Memorial Center (Upper Hall)
Thursday	May 15	Strathmore	Strathmore Civic Centre

Open houses will be held from **4 pm to 8 pm** on each day.

Should you wish to discuss our planning efforts in southern Alberta further, please direct comments and questions to:

Matt Gray
AESO – Alberta Electric System Operator
2500, 330 - 5th Ave SW, Calgary, AB T2P 0L4
1.888.866.2959
stakeholder.relations@aeso.ca

We are committed to a consultation process founded upon principles of fairness and transparency.

Sincerely,

Ata Rehman, P. Eng.
Manager, South System Planning

Southern Alberta Transmission Reinforcement

For more information please contact the AESO at 1.888.866.2959,
www.aeso.ca or stakeholder.relations@aeso.ca

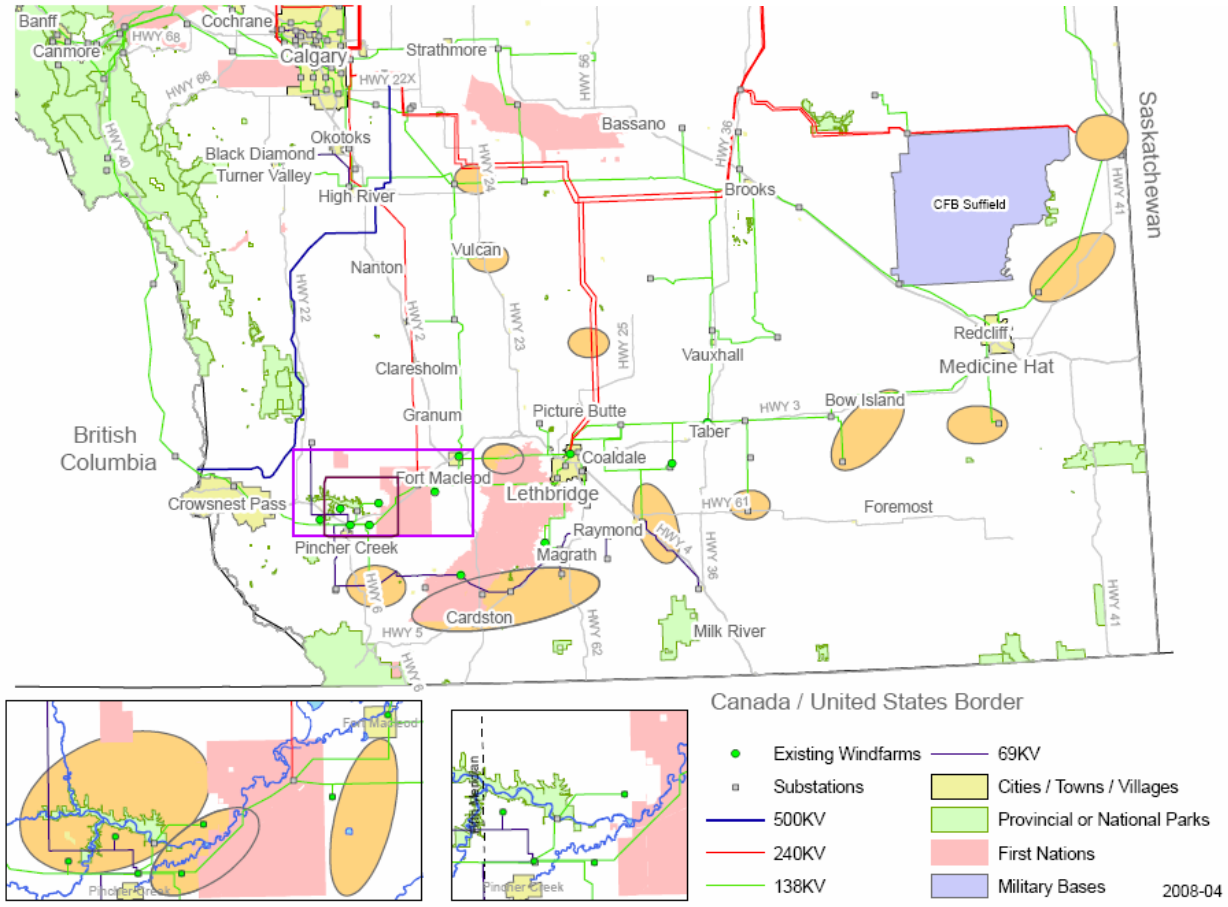
Who is the AESO?

The Alberta Interconnected Electric System (AIES), our province's transmission system or "grid," is planned and operated by the Alberta Electric System Operator (AESO). This network of higher-voltage transmission lines, towers and equipment carries ('transmits') electricity from generators to large industrial customers as well as lower-voltage systems that distribute it to cities, towns and rural areas. Our job is to maintain safe, reliable and economic operations on the provincial transmission grid.

Why Transmission system reinforcement is needed for Southern Alberta?

Interest in wind development in southern Alberta is increasing. We are now planning the transmission system to interconnect new wind farms; however, since the existing transmission system in the south is at capacity (i.e., the system cannot carry additional electricity), system reinforcement is needed to move new wind generated power to areas that need it.

Southern Alberta Wind Interest Map



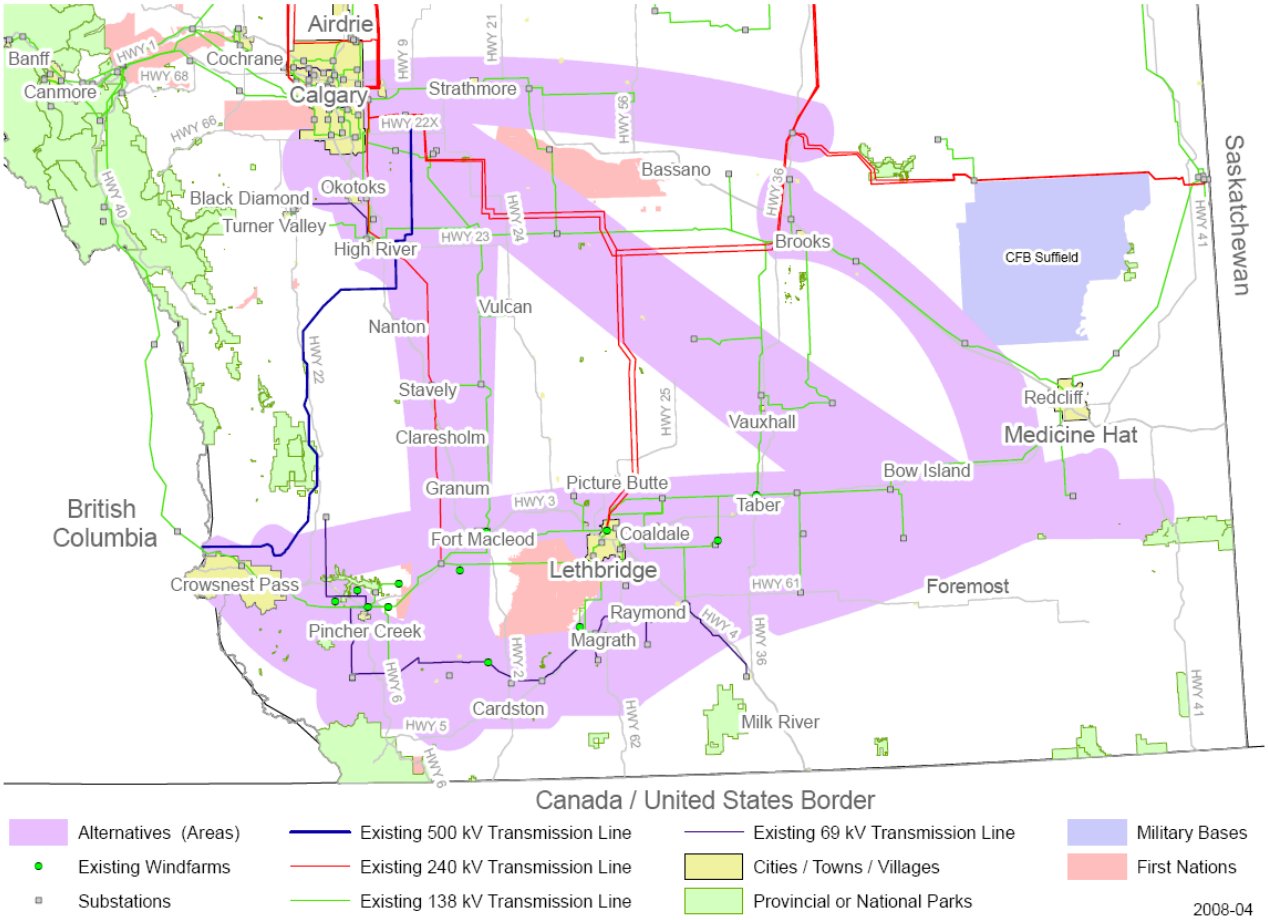
The map above shows areas, in orange, where wind power developments have been proposed; these areas are otherwise known as planning zones.

What's happening right now?

The AESO has received applications for wind power development of over 10,000 mega-watts (MW) in Alberta, with more than 7,000 MW distributed across southern Alberta. The AESO, however, anticipates the

total wind generation that will likely develop as ranging between 2000 MW to 3900 MW over the next 10 years. (This range includes 523 MW of wind generation currently installed.)

The existing transmission system in southern Alberta has very little capacity to connect new wind generation. Therefore, the AESO has developed transmission development alternatives to integrate the anticipated wind generation development in southern Alberta. These alternatives consist of 240 kV AC (2 alternatives), 500 kV AC and HVDC transmission systems. These transmission system alternatives were developed to not only interconnect new generation but also to provide additional, reliable bulk system capacity from the generation sites to the areas where power is needed. Consultation with stakeholders will help the AESO determine what alternatives are best suited for southern Alberta.



The map above shows the area where the AESO has identified alternatives for transmission system reinforcement. The shaded area represents the approximate locations of four transmission development alternatives.

Where will the new lines be proposed?

So far, our planning study has produced four main alternatives to address the challenges facing the transmission system in southern Alberta. After gathering stakeholder insights on our alternatives, our study will identify areas where transmission lines and other related facilities could be added to improve the system. (over)

Consultation with stakeholders will identify a preferred solution for strengthening the system; the preferred solution will form part of our Need Information Document (NID) which we will submit to the Alberta Utilities Commission (AUC) later this year. We will also submit individual Abbreviated Needs Information Documents (ANIDs) to the AUC to connect wind projects that successfully meet AESO interconnection milestones.

Should the AUC approve our Need applications, we will assign the larger system reinforcement and each new interconnection to Transmission Facility Owner AltaLink, to build the additional transmission facilities required. Before AltaLink can begin constructing these facilities, it must develop a Facilities application and submit this document to the AUC for approval. Further consultation with stakeholders will form a crucial component of this application process.