

CHR 2007 / Change of Layouts for MF and SP

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Why?

Muskrat Falls:

- Presence of weak soil
- Lower soil bearing capacity

Soldiers Pond:

- Smaller area than contractual for HVDC (296m instead of 336m).
- Difficult extension on each side due to presence of rocks for LCP site preparation.

Executive Summary

	MF			SP			TOTAL Contracts		Total Grid
	CD501	CD0502	Global	CD501	CD0502		CD501	CD0502	
Equipt & Design	9,302,961	-2,996,250	6,306,710	82,011	332,497	414,508	9,384,971	-2,663,753	6,721,218
CW Baseline	6,017,458	-1,672,255	4,345,203	33,000	-50,770	-17,770	6,050,458	-1,723,025	4,327,433
Time	2 months grace period								

Related claims to Changes of Layouts in MF and SP

- CHR006: 153KCAD / initiated on 10-Oct-2014
 - in progress with LCP.
 - include only engineering time from July to end of Nov 2014 for layouts alternatives.

- CHR004: 69KCAD / initiated on 19-Sept-2014
 - additional bore holes and geotechnical survey for SP and MF.
 - include only Stantec costs

- CHR-2007: this one
 - engineering time to define and validate the layouts with LCP. Period: end of Nov Jan 2015.
 - CW design for 150KPA soil condition.
 - costs impacts for equipment and related construction with 250KPA soil conditions (plus and minus).

- CHR00X: to come. Expected on mid may 2015.
 - CW costs for the foundations works with 150KPA including acceleration for works on 2015. Based on ongoing engineering.
 - Alstom time for CW baseline and fees (10% + 20% on additional CW baseline)
 - Electrical reworks.
 - Time & Material approach to manage unforeseen new soil conditions.

Chronology – MF (1/2)

- 21-Oct-2013 - Tender stage / Technical clarification #5 : New plot size 260m x 304m instead of 360mx 304m due to clay and slit area.
- Presence of Silt and Clay was identified in the AMEC report (2010) / part of Contractual document (Exh. 11 – CPY supplied documents).
- Further investigated in the Golder report (2013) (not contractual but provided on 27-Aug-2014 – LILLP-AG-0012)
- 9&10- July- 2014 - CW workshop in St John's: Disclosure of an incident involving an excavator drove at MF converter station area
- 23-July and 26-Aug-2014, LTR-CD0501-AG-LILLP-005/010 Contractor notify CPY about local difficulties (the large voids around the boulders).
- 5 sept 2014 – AG-LILLP-0020: weak soil confirmed. Additional soil investigations requested and CTR to evaluate alternatives in term of schedule (Refer to CHR-004 and CHR-006)
- 11-Nov-2014 by LTR-CD0501-AG-LILLP-0048, ALSTOM notified Company, as a Prudent Contractor, that the site preparation works are not compliant with the standard industry practices. Additionally, they are in contradiction with the contractual technical specification (refer to Compensation Report for MF received on 31-Oct-2014 by Aconex email)

Chronology – MF (2/2)

- On 14-Nov-2014 by LTR-CD0501-AG-LILLP-0049, ALSTOM submitted a rough order of magnitude of the impact assessment identifying preliminary costs
- On 21-Nov-2014, CPY rejected CTR assessment and instructed to proceed with the base layouts for MF.
- On 26-Nov-2014 by LTR-CD0501-AG-LILLP-0054, CTR acknowledged receipt of CPY's decision and CTR stressed that the initial and contractual layout has a large proportion of its installations, including buildings and heavy equipment, located on the weak soil area.
- On 2-Dec- 2014 at St John's, the CONTRACTOR and its subcontractor, presented to COMPANY the result of the site investigation in MF
- On 17-Dec-2014 by AG-LILLP-0061 and further the presentation of the geotechnical results held on 02-Dec-2014, CTR notified CPY of unforeseen geotechnical conditions and that both team will work closely to mitigate the impacts.
- on 19-Dec-2014, CTR & CPY agreed on layout optimization for MF and SP, as set forth in the MoM referenced MOMCD0501001-0041 dated 17-dec-2014 and **accepted by Company on 9-Jan-2015.**

Chronology – SP

- 30- April-2013:Tender stage / ALSTOM Bid Clarification - 2) *the HVdc Converter Station property dimensions have been altered from 314 m x 280 m to 325 m x 270 m – Technical Sketches attached with a length of 325m*
- 24-Sept-2013 negotiation period: Clarif. #3- item 1.13 : CPY provided layouts with a length of 325m (*ILK-SN-CD-4500-CV-PL-0037-01.pdf ;ILK-SN-CD-4500-CV-SE-0006-01.pdf*)
- 14/15-April 2014 - Kick-Off (after LNTP): CTR requested CPY to review the SP plot due to an error on the length
- June 2014 – Contract Signature: CTR noted that the drawings were replaced (same doc number but with different version) with an updated version which has not been agreed with Alstom. **Not provided officially to Alstom before signature of contract in St-John's.** Revised drawing have **268m length** (calculated from coordinates) for Soldiers Pond Converter Station site.
- 12-Sept-2014, by AG-LILLP-0024, CTR informed that the information provided by CPY related to the coordinates and levelling at SP shown that the area is not sufficient and not reflected the length of 325m
- 25 sept 2014 – AG-LILLP-0030: CTR received CHR-004 to study the alternative layout for SP
- The remaining of the Chronology is similar to MF

Hypothesis Considered (Part 1/3)

- Other ongoing changes are not considered (Network Harmonic Impedance and other). The following number of Shunt elements was considered for space availability:
 - 4 AC filters at Muskrat Falls
 - 5 AC filters and 1 AC shunt capacitor bank at Soldiers Pond
- Works based on 5 days * 8 hour / 40 hours per week
- CW performed during the first year as scheduled during tender. No winter works considered.
- Consistency of the soil all along the needed space (soil properties and bearing capacities).
- Soil bearing capacity at 250KPa SLS and grading properly done by LCP (as per specifications). As soil bearing capacity is 150KPA, it will be subject to other Change Request/Change Order. Ongoing studies.
- Any additional needed site preparation performed by Company as per Contract Scope of Work.
- No additional presence of weak soil.

Hypothesis Considered (Part 2/3)

- At SP, the fence on the North-East side of site is limited to the area where the equipment of Contractor is installed. Contractor did not allow any site preparation outside of the Contractor fence.
- Costs associated to design, supply and install the LV Cabling Crossings (bridge/duct/trench/etc.) over the drainage ditch are excluded (if required).
- External interfaces points are moved to Contractor proximity.
- Grounding circuit hypothesis unchanged (as per Contract) / no impacts considered.
- Availability of fill materials on site (free supplied by LCP).
- Availability of concrete as per quantity needed.

Hypothesis Considered (Part 3/3)

The revised agreed layouts do not fully comply with the existing Contract specifications :

- Noise Limit
- Fence arrangement
- Location of Interface Points with external parties

Exceptions should be granted. If not, additional studies will be completed and additional costs confirmed to Cpy.

List of the Impacts

Description	Impacts	Add			Comments
	Time / Progress	Time	Equipment	CW Baseline	
Development in parallele of the design activities in MF (electromechanical and Civil).	yes				
Additional design for the new optimized and agreed layouts on CD0501 and CD0502 for MF and SP	yes	yes			subject to CHR006 initiated until end of Nov 2014. Then included in this CHR
Additional resources & mobilization brought to the project		yes			included in this CHR
Delay and stress of other design activities that the initial team had to deliver	yes	yes			included in this CHR
Additional equipment including design, specifications, procurement and tests, delivery to site, storage, installation, commissioning of the needed additional equipment.		yes	yes	yes	included in this CHR
removal of some equipment including design, specifications, procurement and tests, delivery to site, storage, installation, commissioning		yes	yes	yes	included in this CHR
Additional CW design (calculation notes, foundations types, etc..) for the foundations taking into account the new bearing capacity		yes			included in this CHR additional design done for 150KPA
Delay in the delivery of the related CW design documents	yes				included in this CHR
Delay in the RFP CW finalization	yes	yes			Acceleration of the RFP and associated documents
Construction works baseline increase				yes	not included for the 150KPA, only add equipment
Sites mobilization date and activities (acceleration)				yes	to limit impact and perform all works scheduled on 2015

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Impacts on Schedule

- Design Activities Delayed due to prioritization of Layout optimization activities in Dec 2014.
- Rework on Overall Layout design Primary Engineering for MF and SP
- At MF, the change of location of the Converter Transformers, Star-Delta yard, Control Building and Cooler banks have required additional civil design activities for foundations (update).
- Stress on ongoing activities/additional resources needed for the RFP CW and works completion on 2015.
- **Increase risks profile of the delivery of the project (501 and 502).**

Time impact on Progress / Project execution

- The design of the MF foundations has been developed in parallel until resolution and approval of the layout with Company.
- A dedicated team has been mobilized on the MF layout. Some other scheduled works have been postponed.
- Several sessions have been held with Company to agree on the hypothesis, options, to define the directions.
- Several layouts options have been prepared and presented to Company.
- Further electrical basic engineering has been performed to ensure that options was viable.
- Impacts on the initiation of CW RFP (2 months delay) and update of the CW RFP /BOQ still ongoing.
- Impact on the monthly project progress indicators.

MF / Impacts on Equipment

- Some equipment has been moved to other areas on the same site
- Some equipment has been canceled
- Some equipment has been added. As per rates applied for the baseline and soils conditions as per tender & Contract.
- Additional works due to additional equipment only. Not taking into account revised bearing capacity of 150KPA.

		Muskrat Falls					
SELLING PRICE in CAD		Alternative Layout #2 VS Base Case Layout					
Item	Unit	Quantities On CD0501 Site	Quantities On CD0502 Site	Impact on CD0501 - Eqt & Install. in CAD	Impact on CD0501 - Civil Works in CAD	Impact on CD0502 - Eqt & Install. in CAD	Impact on CD0502 - Civil Works in CAD
		Quantity	Quantity				
Additional Gantries	Unit	0	-2	-37,440	-33,000	-814,320	-412,500
Additional Mats (lightning & lighting)	Unit	14	0	422,582	308,000	0	0
Additional Strain Bus & Shield wire	Meter	1,439	-4,724	308,299	0	-1,040,285	0
Additional Busbar	Meter	988	26	723,672	0	19,044	0
Additional LV Cabling Lengths AC Yard (filters)	Meter	38,500	0	3,329,172	0	0	0
Additional Trenches with Drains in AC yard (600mm x 400m)	Meter	1,143	-400	0	2,857,500	0	-1,000,000
Grounding Wire inside Trench	Meter	1,143	-400	196,276	0	-68,688	0
Additional PI, CT, SA & accessories	Unit	156	-24	1,739,556	1,188,000	-409,536	-396,000
Additional pigtails & accessories	Unit	1176	-364	198,374	0	-61,402	0
Additional CW	Lot				1,696,958		136,245
SubTotal Equipment & Installation (1)				6,880,491		-2,375,187	
SubTotal Civil Works (2)					6,017,458		-1,672,255

MF / overall VO

		Muskrat Falls			
SELLING PRICE in CAD		Alternative Layout #2 VS Base Case Layout			
		Impact on CD0501 - Eqt & Install. in CAD	Impact on CD0501 - Civil Works in CAD	Impact on CD0502 - Eqt & Install. in CAD	Impact on CD0502 - Civil Works in CAD
Item	Unit				
Additional Gantries	Unit	-37,440	-33,000	-814,320	-412,500
Additional Mats (lightning & lighting)	Unit	422,582	308,000	0	0
Additional Strain Bus & Shield wire	Meter	308,299	0	-1,040,285	0
Additional Busbar	Meter	723,672	0	19,044	0
Additional LV Cabling Lengths AC Yard (filters)	Meter	3,329,172	0	0	0
Additional Trenches with Drains in AC yard (600mm x 400m)	Meter	0	2,857,500	0	-1,000,000
Grounding Wire inside Trench	Meter	196,276	0	-68,688	0
Additional PI, CT, SA & accessories	Unit	1,739,556	1,188,000	-409,536	-396,000
Additional pigtails & accessories	Unit	198,374	0	-61,402	0
Additional CV	Lot		1,696,958		136,245
SubTotal Equipment & Installation (1)		6,880,491		-2,375,187	
SubTotal Civil Works (2)			6,017,458		-1,672,255
			501	502	
Engineering: 6.5% of (1)		6.50%	447,232	-154,387	
Procurement			70,000	10,000	
Project Management			20,000	5,000	
Quality Assurance			80,000	20,000	
Reduced Profit on C/W 10% of (2)	10%		601,746	-167,226	
Risk and Site management & organization on Civil Work 20% of (2)	20%		1,203,492	-334,451	
SubTotal (3)			2,422,469	-621,064	
			CD0501	CD052	
Additional Baseline for Civil Works (CAD) (2)			6,017,458	-1,672,255	
Change Order Value (CAD) (1)-(3)-(4)			9,302,961	-2,996,250	

- 6.5% engineering based on Contract ratio
- Reduced profit as per exhibit 17.
- Risks and site Org: as already agreed in previous VO.

SP / Impacts on Equipment

- Some equipment has been moved to other areas on the same site
- Some equipment has been canceled
- Some equipment has been added. As per rates applied for the baseline and soils conditions as per tender & Contract.
- Additional works due to additional equipment only.

Soldiers Pond							
Optimized Layout 18 DEC 2014 vs Base Case Layout							
		Quantities On CD0501 Site	Quantities On CD0502 Site	Impact on CD0501 - Eqt & Install. in CAD	Impact on CD0501 - Civil Works in CAD	Impact on CD0502 - Eqt & Install. in CAD	Impact on CD0502 - Civil Works in CAD
Item	Unit	Quantity of Unit	Quantity of Unit				
Additional Gantries	Unit	0	0	0	0	399,600	82,500
Additional Mats (lightning & lighting)	Unit	0	0	0	0	0	0
Additional Strain Bus & Shield wire	Meter	0	-400	0	0	-78,912	0
Additional Busbar	Meter	0	0	0	0	0	0
Additional LV Cabling Lengths AC Yard		0	-350	0	0	-30,265	0
Additional Ducts and Trenches and grounding wire		0	-75	0	0	-4,293	-62,500
Additional PI, CT, SA & accessories		2	0	58,320	33,000	0	0
Additional pigtails & accessories		0	0	0	0	0	0
Additional CV	Lot				0		-70,770
SubTotal Equipment & Installation (1)				58,320		286,130	
SubTotal Civil Works (2)					33,000		-50,770

SP / overall VO

		Soldiers Pond			
		Optimized Layout 18 DEC 2014 vs Base Case Layout			
		Impact on CD0501 - Eqt & Install. in CAD	Impact on CD0501 - Civil Works in CAD	Impact on CD0502 - Eqt & Install. in CAD	Impact on CD0502 - Civil Works in CAD
Item	Unit				
Additional Gantries	Unit	0	0	399,600	82,500
Additional Mats (lightning & lighting)	Unit	0	0	0	0
Additional Strain Bus & Shield wire	Meter	0	0	-78,912	0
Additional Busbar	Meter	0	0	0	0
Additional LY Cabling Lengths AC Yard	Meter	0	0	-30,265	0
Additional Ducts and Trenches and grounding wire	Meter	0	0	-4,293	-62,500
Additional PI, CT, SA & accessories	Unit	58,320	33,000	0	0
Additional pigtaills & accessories	Unit	0	0	0	0
Additional CV	Lot		0		-70,770
SubTotal Equipment & Installation (1)		58,320		286,130	
SubTotal Civil Works (2)			33,000		-50,770

Engineering: 6.5% of (1)		6.50%		3,791	18,598
Procurement				5,000	25000
Management				2,000	10000
Quality Assurance				3,000	8,000
Reduced Profit on CW 10% of (2)	10%			3,300	-5,077
Risk and Site management & organization on Civil Work 20% of (2)	20%			6,600	-10,154
SubTotal (3)				23,691	46,367
				CD0501	CD052
Additional Baseline for Civil Works (CAD) (2)				33,000	-50,770
Change Order Value (CAD) (1)+(3)+(4)				82,011	332,497

- 6.5% engineering based on Contract ratio
- Reduced profit as per exhibit 17.
- Risks and site Org: as already agreed in previous VO.

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Risks and Opportunities Update

- Risks:

- soil consistency and presence of additional pocket of silt unknown.
- stress on CW schedule and execution teams / additional works and resources to perform the works within the schedule.
- bearing capacity uncertain
- constructability constraint

- Opportunities:

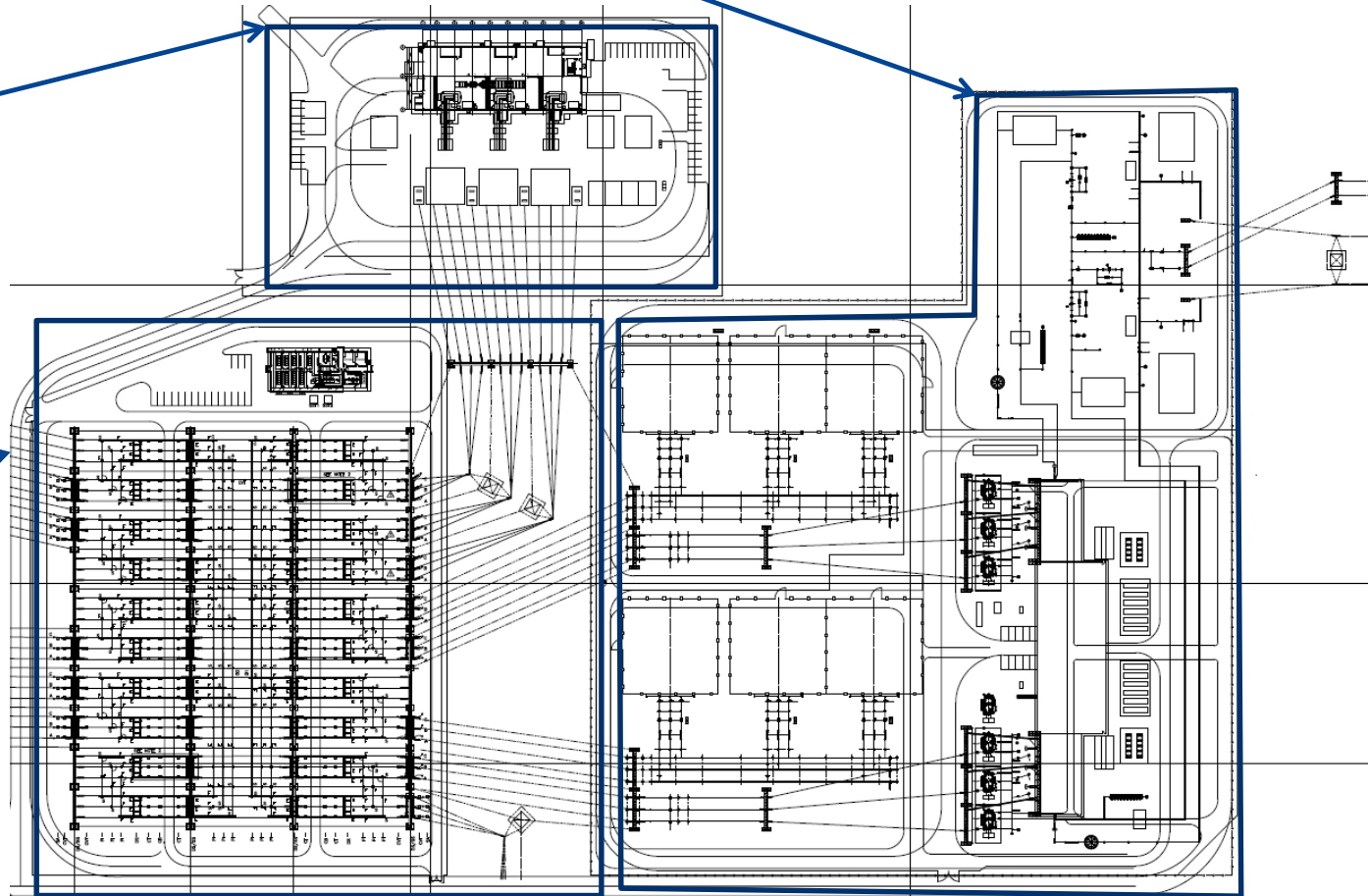
- Works to be completed on 2015 so only one mobilization.
- change of the geotechnical conditions in Time&Material Method (costs control)

Soldiers Pond Entire Site

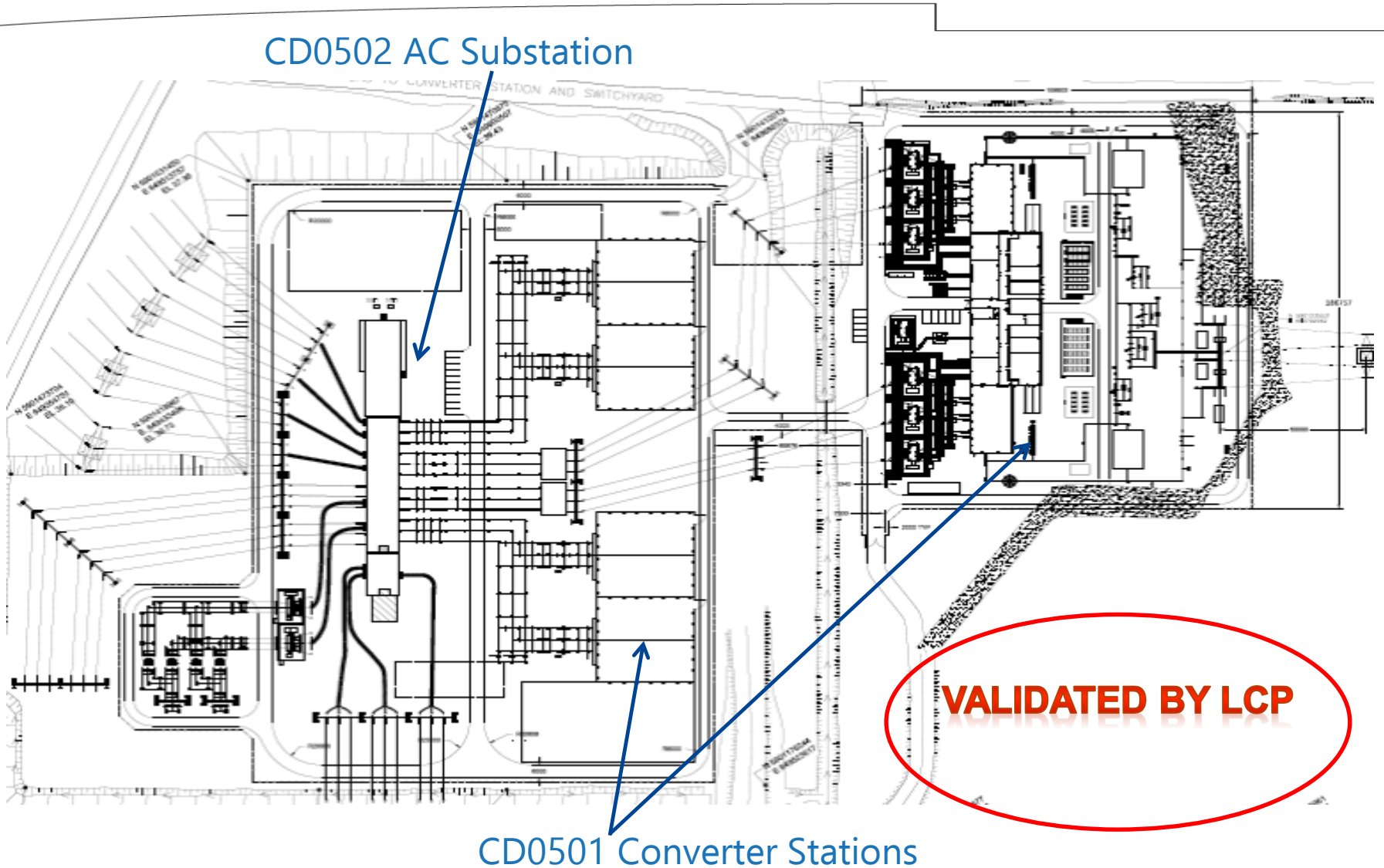
CD0501 Converter Stations

CD0534 Synchronous Condensers

CD0502 AC Substations



Muskrat Falls 315 kV Entire Site



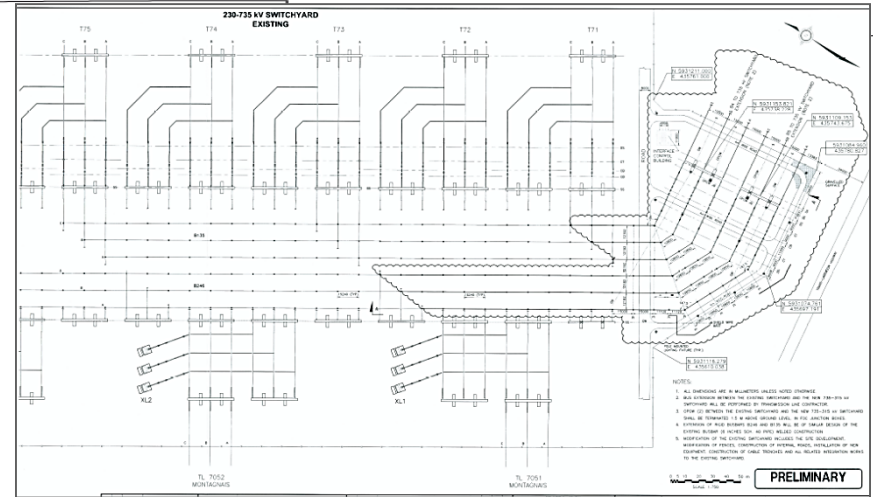
VALIDATED BY LCP

SOW - Churchill Falls

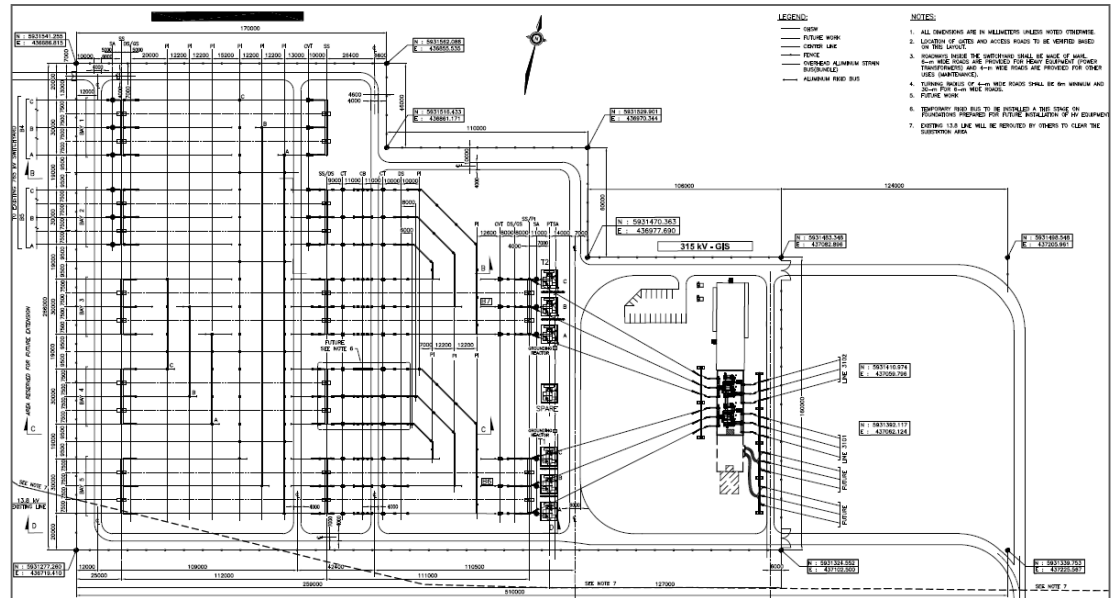
Churchill Falls 735-315kV

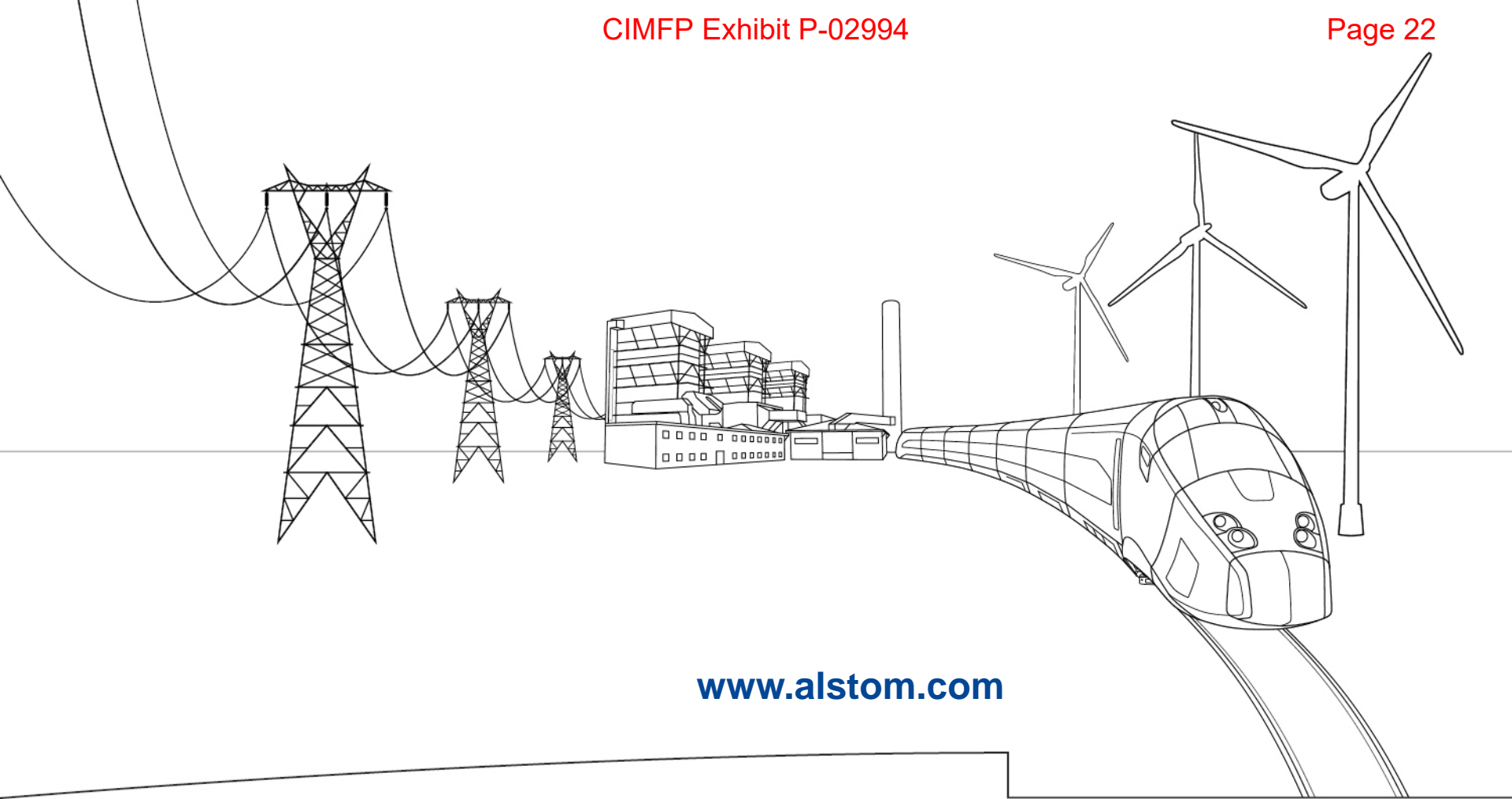
- 2 sites
- 735kV AIS switchyard (5 circuit breakers, 14 disconnect, 42 ITs)
- 6 + 1 spare 735/315kV Auto Transformers (free-issued with 2 grounding reactors/ resistors)
- 315kV GIS (6 circuit breakers) and AIS interconnections
- Control and GIS Buildings

CF 735kV Extension



735/315kV Substation





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