

From: [Raydugin, Yuri](#)
To: jasonkean@nalcenergy.com
Cc: tonyscott@nalcenergy.com; davepardy@nalcenergy.com; [Stanton, Lee](#)
Subject: Cost & Schedule Risks for Probabilistic Analyses (After addressing only)
Date: Tuesday, May 15, 2012 9:46:58 AM
Attachments: [.png](#)
[LCP RR for MONTE CARLO YR051112.xlsx](#)

Jason,

Please find attached a file with risks selected for probabilistic cost & schedule risk analyses risk register AFTER ADDRESSING. Additional tabs of the file show thinking process to retail/ exclude risks. (Definitions of ranges, corporate risks, etc. are shown in each tab below the risk lists.) For instance, ranges should be taken into account before considering risks, cost escalation - in corresponding model, etc. to exclude double dipping. Risks that had deterministic scores 1 - 5 are neglected. As normally done, corporate risks are excluded from the probabilistic models as they destroy baselines, if occurred. Although their lists should be clearly stated as waivers. We need to agree on this approach.

There are several construction windows we might want to keep an eye on. This is a feature of LCP (mostly C1) that we cannot do just a regular schedule risk analysis but need to include conditional branching features (when windows are missed). As discussed with Lee, there are two very major windows we must consider:

- River closure failure (R-40)
- Spillway construction window - phase 2 (R-26) and associated risks R-189 (Impoundment 2), R-183 (Rollway construction vs. Impoundment 2)

Riverside cofferdam height (R-38) could be also considered. Some other windows (clearing window (R-18), impoundment 1 (R-188), bird nesting (R-21, R-106), etc.) probably could be neglected. Although it would be good to investigate some of the milestones like this. We need to discuss this and agree on.

Please let me know when we may discuss these data. A major concern of mine is that we don't know what Westney need and what method they use. So the data are prepared according to my understanding of probabilistic risk analysis.

Thanks,

Yuri

Yuri Raydugin

Risk Manager

Lower Churchill Project

SNC-Lavalin Inc.

(709) 752-3461 x 5060

Yuri.Raydugin@snclavalin.com



LCP COST RISKS AFTER ADDRESSING RETAINED FOR PROBABILISTIC COST RISK MODEL																		
DEFINITION							DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING						
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level	Cost Impact, 000\$			Probability, %		Correlations	COMMENTS
												P10	ML	P90	Min	Max		
R5	C1	Accommodation Capacity	As starter camp for construction is designed for about 150 workers and accommodation for about 500 workers in Sep. 2012 will be needed, available accommodation in neighboring Goose Bay might not meet the accommodation requirements leading to initial lack of workers at the beginning of construction	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Likely	50% - 90%	12							
R9	C1	Excavation vs. Water Contamination	As a result of excavation works and use of explosives, level of water contamination in stilling basin may exceed acceptable level (oil, sediment, explosive's residues, etc.) leading to extra costs and delays to comply with regulations.	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R10	C1	Archeological Sites (C1)	As the C1 construction area is known for archeological significance, delays may occur with permit's obtaining and start of excavation works which leads to work stoppage and overall project delay	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Likely	50% - 90%	12							
R12	C1	Riverside Cofferdam Options vs. Schedule	As cost effective option for the river side cofferdam is selected (concrete dam), the option under consideration may require more time to construct leading to delay of the cofferdam completion that causes overtopping and site flooding	T	Risk Event (Cost)		Extreme	>100,000	Unlikely	0.1% - 1%	10							
R19	C1	Fish Habitat (C1)	As requirements by DFO on fish habitat replacement are very likely and are not fully factored in to the base estimate, the requirement to replace the habitat may be significant by DFO leading to extra costs	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	6							
R20	C1	Terrestrial Habitat (C1) (Loss of Wetlands)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs	T	Risk Event (Cost)		Major	10,000-100,000	Possible	1% - 50%	12							
R24	C1	Contractor's Coordination/ Powerhouse	As construction of powerhouse is to be carried out by several contractors, lack of coordination and clear contractual responsibilities especially in case of unforeseen conditions may become a source of extra claims leading to capital overspending	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R29	C1	Wild Fires (C1)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C1 camp & site evacuation, injuries/ fatalities or loss of equipment	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R31	C1	T&G Late Design Changes	Some reasons for design changes during the T&G equipment manufacturing may be put forward by the customers leading to extra costs and schedule delays to accommodate the changes in design and civil works	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R33	C1	Manufacturing Labour Availability (C1)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C1 costs and schedule delays	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	6							
R37	C1	Logistics (C1)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C1 equipment & materials to the sites that leads to schedule delays and extra costs	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R43	C1	Construction Labour Availability (C1)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C1 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Risk Event (Cost)		Extreme	>100,000	Likely	50% - 90%	20							
R44	C1	Contractors' Availability (C1)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C1 construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	T	Risk Event (Cost)		Major	10,000-100,000	Likely	50% - 90%	16							
R49	C1	T&G Quality Issues	Potential quality control issue in manufacturing of turbines and generators may lead to cost, schedule delay or in use operability or reliability issues	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R53	C1	Debris and Trash Management at Intake in Operations	As a result of trash build up, energy output of the unit could be reduced, leading to loss of revenue and poorer OpEx	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R57	C1	Commissioning Failures (C1)	As "stress" testing of C1 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R58	C1	Construction Debris vs. Commissioning	Due to presence of construction debris after the end of construction, these may cause problems during commissioning, leading to extra costs and schedule delays	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R59	C1	Contractor's Errors/ Omissions (C1)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C1 re-work, extra costs and schedule delay	T	Risk Event (Cost)		Major	10,000-100,000	Unlikely	0.1% - 1%	8							
R60	C1	Design & Manufacturing Errors/ Omissions (C1)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							

LCP COST RISKS AFTER ADDRESSING RETAINED FOR PROBABILISTIC COST RISK MODEL																		
DEFINITION							DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING						
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level	Cost Impact, 000\$			Probability, %		Correlations	COMMENTS
												P10	ML	P90	Min	Max		
R64	C1	Interfaces (C1)	As multiple complex hard & soft C1interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Risk Event (Cost)		Major	10,000-100,000	Possible	1% - 50%	12							
R65	C1	Availability of Construction Management Personnel (C1)	Due to features of the labour market in NL and lack of qualified C1 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel by SLI may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Likely	50% - 90%	12							
R74	C1	Design Change (C1)	As final design is nearly frozen, some design elements could be transferred to/ from C1 in future even after project sanctioning, leading to re-design, re-definition of packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R147	C1	Supplier Availability (C1)	As there is limited number of qualified C1 suppliers in a situation of a heated market it could be difficult to engage at least one of qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Risk Event (Cost)		Major	10,000-100,000	Possible	1% - 50%	12							
R149	C1	Geotech vs. Claims (C1)	As detail geotech study data are not available during C1 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R153	C1	Conservative Design (C1)	As conservative design approach ("worst case" scenarios) is used at C1 early design phases for all three components due to lack of design input data and multiple inputs (interfaces), it could be possible to optimise the design in the course of engineering development leading to cost reductions, accelerated schedules and better constructability	O	Risk Event (Cost)	opportunity	Major	10,000-100,000	Likely	50% - 90%	16							
R174	C1	T&G Package Bid Closing & Negotiations	As A) T&G bid closing is delayed for 1.5 mos (9-Dec-2011 => 27-Jan-2012); B) Bid closing is followed by negotiations; C) negotiations are followed by the T&G contract award (still the same date as planned before the bid closing delay) D) T&G award is followed by the civil works (bulk excavation & concrete) with a 1 month float, negotiations could not absorb the bid closing delay or might take more time than planned in master schedule, giving rise to delay of civil works and "domino effect" of delays down the line in the LCP master schedule	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	12							
R188	C1	Impoundment in Winter: Head Pond (12.5 - 25M)	Due to a need to carry out head pond impoundment in winter, increasing of water level from natural 12.5m to 25m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair).	T	Risk Event (Cost)	it is probabilistic branching in schedule RR	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R189	C1	Impoundment in Winter (25 - 39m)	In case of powerhouse late completion and, hence, due to the need to carry out impoundment in winter to prevent possible revenue loss, increasing of water level from 25m to 39m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair, delay of commissioning).	T	Risk Event (Cost)	it is probabilistic branching in schedule RR	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R25	C1	Post-Award Drawings (C1)	As T&G tender drawings are not supposed to be the C1 construction drawings, late changes after the contract's award may occur leading to extra costs and schedule delays to start civil works	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R61	C1	Supplier's QA/QC (C1)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C1 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	6							
R76	C3	Maritime Link Assumptions	Changes in reliability assumptions made for maritime link could change scope and may cause schedule delay and increase cost	T	Risk Event (Cost)	relevant?	Major	10,000-100,000	Possible	1% - 50%	12							
R109	C3	Post-Award Drawings (C3)	As tender drawings are not supposed to be the C3 construction drawings, late changes after the contract's award may occur leading to extra costs	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R111	C3	Wild Fires (C3)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C3 camp & site evacuation, injuries/ fatalities or loss of equipment	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R115	C3	Manufacturing Capacity & Availability (C3)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C3 costs and schedule delays	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R123	C3	Construction Labour Availability (C3)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C3 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Risk Event (Cost)		Extreme	>100,000	Likely	50% - 90%	20							

LCP COST RISKS AFTER ADDRESSING RETAINED FOR PROBABILISTIC COST RISK MODEL																		
DEFINITION							DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING						
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level	Cost Impact, 000\$			Probability, %		Correlations	COMMENTS
												P10	ML	P90	Min	Max		
R125	C3	Contractors' Availability (C3)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C3 construction costs, lower productivity, less attractive contract terms for LCP, safety impact, etc.	T	Risk Event (Cost)		Major	10,000-100,000	Likely	50% - 90%	16							
R132	C3	Commissioning Failures (C3)	As "stress" testing of C3 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	T	Risk Event (Cost)		Major	10,000-100,000	Unlikely	0.1% - 1%	8							
R134	C3	Contractor's Errors/ Omissions (C3)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C3 re-work, extra costs and schedule delay	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	6							
R152	C3	Fiber Optic Line (C3)	As the fiber optic line development is not part of the LCP project and is to be developed by Bell Aliant, timely availability of fiber optic communication might become problematic leading to issues with coordination of sites, crews, contractors, etc. and safety issues	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R158	C3	Supplier's QA/QC (C3)	Due to failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C3 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	6							
R162	C3	Interfaces (C3)	As multiple complex hard & soft C3 interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Likely	50% - 90%	12							
R164	C3	Availability of Construction Management Personnel (C3)	Due to features of the labour market in NL and lack of qualified C3 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Risk Event (Cost)		Minor	100 - 1,000	Likely	50% - 90%	8							
R168	C3	Scope Change (C3)	As final scope is not frozen, some scope elements could be transferred to/ from C3 in future even after project sanctioning, leading to re-design, re-definition of corresponding packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R68	C4	Insulator Supplier Availability (hvdc) (C4)	As there is limited number of qualified C4 HVdc suppliers for insulators supply (2 suppliers only), in a situation of a heated market it could be difficult to engage at least one of them on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R85	C4	HVdc & HVac Contractor Availability (C4)	As several other transmission line projects are planned in North America, it might become difficult to attract skilled on-site contractors that leads to higher construction costs, lower productivity and less attractive for LCP contracting terms	T	Risk Event (Cost)		Major	10,000-100,000	Likely	50% - 90%	16							
R87	C4	Weather and Pollution Design Data (C4)	As limited amount of historic data is available for transmission line design in NL, quality of the design may suffer resulting in suboptimal solutions, extra costs, re-work, schedule delays and reputational impact	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R89	C4	RoW (C4)	Due to features of land registry in the province, it will be difficult to identify all land owners along route thay leads to surprises in land ownerships and claims from owners	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	6							
R92	C4	Late Design Change (C4)	As late design criteria change initiated by customer for transmission line is possible, redesign may occur leading to re-definition of corresponding packages, schedule delay and extra costs	T	Risk Event (Cost)		Major	10,000-100,000	Unlikely	0.1% - 1%	8							
R94	C4	Helicopter Use in Labrador for HVac (C4)	In some remote areas of Labrador use of helicopter could be considered as opportunity to reduce labour numbers and accelerate the schedule	O	Risk Event (Cost)	opportunity	Moderate	1,000 - 10,000	Likely	50% - 90%	12							
R95	C4	EA Release for HVdc (C4)	Due to delay in EA release, start of early C4 construction activities may be delayed leading to missed construction windows in some cases and overall project delay and extra costs to comply	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Likely	50% - 90%	12							
R105	C4	Terrestrial Habitat (HVac) (C4)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs and schedule delay	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	6							
R106	C4	Bird Nesting (HVac) (C4)	As the construction site is located in the forest area used by birds for nesting, the nesting season (May - August) may preclude summer clearing activities as recommended by the EA panel leading to project delay and extra costs to comply	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	6							
R118	C4	Adverse Weather (C4)	As several C4 construction activities are planned for winter, abnormal winter weather (low temperatures, snow storms, snow falls, etc.) may occur during the construction leading to lower productivity, construction delay and safety risks	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	6							
R122	C4	Logistics (C4)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C4 equipment & materials to the sites that leads to schedule delays and extra costs	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R124	C4	Construction Labour Availability (C4)	Due to a) features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.); b) planning of power line construction in various (remote) areas of NL, the lack of quantity of construction manpower may lead to C4 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Risk Event (Cost)		Extreme	>100,000	Likely	50% - 90%	20							

LCP COST RISKS AFTER ADDRESSING RETAINED FOR PROBABILISTIC COST RISK MODEL

DEFINITION							DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING						
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level	Cost Impact, 000\$			Probability, %		Correlations	COMMENTS
												P10	ML	P90	Min	Max		
R151	C4	Geotech vs. Claims (C4)	As detail geotech study data are not available during C4 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6							
R159	C4	Supplier's QA/QC (C4)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C4 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Risk Event (Cost)		Minor	100 - 1,000	Possible	1% - 50%	6							
R163	C4	Interfaces (C4)	As multiple complex hard & soft C4 interfaces require inputs from project components and disciplines and outputs to contractors, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Likely	50% - 90%	12							
R165	C4	Availability of SLI Construction Management Personnel (C4)	Due to features of the labour market in NL and lack of qualified C4 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R54	LCP	RFP/ Contract Quality	As an intent to maintain project schedule when working under time crunch or due to incomplete contracting strategy, fast tracking approach towards RFP/ contracts development and deviation from established procurement/ contracting procedures might be adopted that lead to sub-standard, incomplete or inadequate package scopes and unclearly defined contractual obligations in terms of scope, cost, schedule, quality, safety	T	Risk Event (Cost)		Major	10,000-100,000	Possible	1% - 50%	12							
R72	LCP	Final Project Integration	Due to complexity, overall integration of all LCP components and activities plus external Island Link prior to project commissioning, may represent significant challenge leading to overall delay of commissioning	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R80	LCP	Early Procurement	Due to volatility of equipment pricing, early procurement of equipment could result in lower costs and allow some float in the schedule	O	Risk Event (Cost)	opportunity	Moderate	1,000 - 10,000	Likely	50% - 90%	12							
R86	LCP	Sourcing Globally	Due to slow economy in some parts of the world, opportunity could be exploited to source services from markets all over the world giving rise to cost savings	O	Risk Event (Cost)	opportunity	Major	10,000-100,000	Possible	1% - 50%	12							
R141	LCP	Innu Involvement/ IBA	Due to intimate involvement of Innu people in delivery of the project (IBA), there might be instances of negative influence on LCP contracting, permitting, labour relations, that leads to narrower choices of contractors, suppliers and labour, issues with environmental monitoring and permitting (destruction of land and hunting areas during construction, etc.) leading to extra costs, schedule delays, safety issues, etc.	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R157	LCP	Facilities Sharing	As each component develops all required facilities independently (including accommodation), there could be an opportunity to share facilities and optimise their use among components, leading to overall CapEx reduction	O	Risk Event (Cost)	opportunity	Moderate	1,000 - 10,000	Likely	50% - 90%	12							
R182	LCP	Opposition by 'non-IBA' First Nations Groups	As a) IBA agreement covers mostly economic aspects of Innu people benefits; b) some Innu people oppose to LCP due to environmental and cultural concerns; c) some other First Nation's people (e.g., Métis) seem to wish benefiting from LCP same way as Innu people, representatives of First Nations could block the construction sites to apply pressure on LCP and to promote their agendas leading to schedule delay, extra costs and reputational damage	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							
R184	LCP	Unionised vs. Non-unionised Package Contracts	As a) non-unionised contracts are planned for several packages; b) significant enough difference in rates for unionised vs. non-unionised labour is expected; c) communication among unionised vs. non-unionised workers at various LCP sites is expected; e) no camp or basic camp is to be provided to non-unionised workers, strike/ unrest among non-unionised workers may occur, leading to disruption of clearing works, moving of workers to unionised contracts, schedule delays, safety and security impact, reputation damage	T	Risk Event (Cost)		Moderate	1,000 - 10,000	Possible	1% - 50%	9							

Corporate Risk: Extreme impact along with rare probability (usually). If occurs it distroys baseline - that would be another project (if at all)
In case a risk has deterministic **score 1 - 5** after addressing it is considered acceptable with nearly zero residual impact after addressing (except for risks with extreme impacts and rare probabilities - corporate risks)
Ranges means there is no risk event - general uncertainty around durations of normal activities
Umbrellas used at LCP level to coordinate managing corresponding risks at the component level - corresponding risks are taken in to account at the component level.
Conditional branching points to possibility to be late to complete an activity during allowed seasonal construction window, so that the activity should be put off until next construction window, schedule driven costs are associated
Schedule driven costs: extra costs due to schedule delays (burn rate x delay), will be taken into account through special procedure (including delays to base estimate), excluded from cost risk model

LCP SCHEDULE RISKS AFTER ADDRESSING RETAINED FOR PROBABILISTIC SCHEDULE RISK MODEL								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS	
															P10	ML	P90	Min	Max			
R5	C1	Accommodation Capacity	As starter camp for construction is designed for about 150 workers and accommodation for about 500 workers in Sep. 2012 will be needed, available accommodation in neighboring Goose Bay might not meet the accommodation requirements leading to initial lack of workers at the beginning of construction	T	Construction	Risk Event (Schedule)		Moderate	30 - 90	Likely	50% - 90%	12	early works									
R9	C1	Excavation vs. Water Contamination	As a result of excavation works and use of explosives, level of water contamination in stilling basin may exceed acceptable level (oil, sediment, explosive's residues, etc.) leading to extra costs and delays to comply with regulations.	T	Construction	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	excavation									
R10	C1	Archeological Sites (C1)	As the C1 construction area is known for archeological significance, delays may occur with permit's obtaining and start of excavation works which leads to work stoppage and overall project delay	T	Regulatory	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	civil works									
R12	C1	Riverside Cofferdam Options vs. Schedule	As cost effective option for the river side cofferdam is selected (concrete dam), the option under consideration may require more time to construct leading to delay of the cofferdam completion that causes overtopping and site flooding	T	Technical	Risk Event (Schedule)	Could be conditional branching	Extreme	> 360	Unlikely	0.1% - 1%	10	riverside correfdam construction									
R18	C1	Clearing Windows	As the reservoir clearing is not possible during ice forming (early winter) and ice breaking (late spring) any delay in preceding activities may lead to missing of the clearing windows resulting in overall project delay	T	Construction	Conditional Branching	milestone to investigate	Moderate	30 - 90	Possible	1% - 50%	9	CONSTRUCTION WINDOW: clearing package									
R19	C1	Fish Habitat (C1)	As requirements by DFO on fish habitat replacement are very likely and are not fully factored in to the base estimate, the requirement to replace the habitat may be significant by DFO leading to extra costs and schedule delays	T	Environmental	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	???									
R20	C1	Terrestrial Habitat (C1) (Loss of Wetlands)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs and schedule delays	T	Environmental	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	clearing package									
R22	C1	Safety vs. Schedule Acceleration (C1)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	T	HSS	Risk Event (Schedule)		Minor	7 -- 30	Possible	1% - 50%	6	each construction package C1									
R24	C1	Contractor's Coordination/ Powerhouse	As construction of powerhouse is to be carried out by several contractors, lack of coordination and clear contractual responsibilities especially in case of unforeseen conditions may become a source of extra claims leading to schedule delays and capital overspending	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	powerhouse packages									
R26	C1	Spillway Construction Window (Phase 2)	As A) construction of the spillway (second phase) is to be fulfilled during an "ice-free" window, B) there is no float in schedule with predecessor activities (EA release, camp, road, etc.), any delay in previous activities may trigger missing of the window which results in schedule delay	T	Construction	Conditional Branching	milestone to investigate, relates to impoundment 2 (along with R-183. R-189)	Major	90 - 360	Possible	1% - 50%	12	CONSTRUCTION WINDOW: spillway construction									
R29	C1	Wild Fires (C1)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C1 camp & site evacuation, injuries/ fatalities or loss of equipment	T	HSS	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	each construction package C1									
R31	C1	T&G Late Design Changes	Some reasons for design changes during the T&G equipment manufacturing may be put forward by the customers leading to extra costs and schedule delays to accommodate the changes in design and civil works	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	T&G package									
R33	C1	Manufacturing Labour Availability (C1)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C1 costs and schedule delays	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C1									
R36	C1	Construction Permits (C1)	As several dozens of C1 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory	Risk Event (Schedule)		Extreme	> 360	Possible	1% - 50%	15	each construction package C1									
R37	C1	Logistics (C1)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C1 equipment & materials to the sites that leads to schedule delays and extra costs	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C1 except T&G (R-51)									
R38	C1	Riverside Cofferdam Height vs. Late Start & Construction Delays	Due to delays with predecessor's activities and various difficulties and delays with construction of the cofferdam (selected concrete option), there might be not enough time to construct high enough cofferdam on time (mid-January 2013) leading to a) overtopping the cofferdam, b) flooding the excavation area, c) loss of cofferdam and giving rise to safety and environmental impacts	T	Construction	Conditional Branching	CORPORATE RISK if occurs, milestone to investigate!!	Extreme	> 360	Unlikely	0.1% - 1%	10	CONSTRUCTION WINDOW: cofferdam construction									
R40	C1	River Closure Failure	a) As river closure and construction of the upstream cofferdam is planned for summer (when normally level of water is lowest); b) the main dam fill-in material compaction (clay in water) is possible only before freezing temperatures, unusually high level of water could occur that prevents river closure by the upstream cofferdam on time and leads to a) missed window (before October) to finish the cofferdam at level 20m; b) lower height of the cofferdam by spring flooding, its overflooding and loss	T	Construction	Conditional Branching	CORPORATE RISK if occurs, milestone to investigate!!	Extreme	> 360	Rare	<0.1%	5	CONSTRUCTION WINDOW: U/S cofferdam									
R43	C1	Construction Labour Availability (C1)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C1 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Construction	Risk Event (Schedule)		Extreme	> 360	Likely	50% - 90%	20	each construction package C1									
R44	C1	Contractors' Availability (C1)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C1 construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	15	each construction package C1									
R49	C1	T&G Quality Issues	Potential quality control issue in manufacturing of turbines and generators may lead to cost, schedule delay or in use operability or reliability issues	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	T&G supply package									

LCP SCHEDULE RISKS AFTER ADDRESSING RETAINED FOR PROBABILISTIC SCHEDULE RISK MODEL								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS	
															P10	ML	P90	Min	Max			
R51	C1	Major Equipment Delivery (C1): Planning	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones might not be met leading to overall C1 schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	T&G supply package only (other C1 packages: R-37)									
R57	C1	Commissioning Failures (C1)	As "stress" testing of C1 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	T	Commissioning & Start-up	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	commissioning C1									
R58	C1	Construction Debris vs. Commissioning	Due to presence of construction debris after the end of construction, these may cause problems during commissioning, leading to extra costs and schedule delays	T	Commissioning & Start-up	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	commissioning C1									
R59	C1	Contractor's Errors/ Omissions (C1)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C1 re-work, extra costs and schedule delay	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each construction package C1									
R60	C1	Design & Manufacturing Errors/ Omissions (C1)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each supply package C1									
R63	C1	Extra Cofferdam Work	As design of coffer dam foundation is done before the detail geotech study is done and a worst case scenario approach is used, additional works may be required in construction leading to extra time and schedule delay	T	Technical	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	cofferdam construction									
R64	C1	Interfaces (C1)	As multiple complex hard & soft C1interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Interface	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each engineering package C1									
R65	C1	Availability of Construction Management Personnel (C1)	Due to features of the labour market in NL and lack of qualified C1 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel by SLI may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Construction	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	each construction package C1									
R74	C1	Design Change (C1)	As final design is nearly frozen, some design elements could be transferred to/ from C1 in future even after project sanctioning, leading to re-design, re-definition of packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	T	Organisational/ Enterprise	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each engineering package C1									
R147	C1	Supplier Availability (C1)	As there is limited number of qualified C1 suppliers in a situation of a heated market it could be difficult to engage at least one of qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C1									
R153	C1	Conservative Design (C1)	As conservative design approach ("worst case" scenarios) is used at C1 early design phases for all three components due to lack of design input data and multiple inputs (interfaces), it could be possible to optimise the design in the course of engineering development leading to cost reductions, accelerated schedules and better constructability	O	Technical	Risk Event (Schedule)	opportunity	Moderate	30 - 90	Likely	50% - 90%	12	each construction package C1									
R174	C1	T&G Package Bid Closing & Negotiations	As A) T&G bid closing is delayed for 1.5 mos (9-Dec-2011 => 27-Jan-2012); B) Bid closing is followed by negotiations; C) negotiations are followed by the T&G contract award (still the same date as planned before the bid closing delay) D) T&G award is followed by the civil works (bulk excavation & concrete) with a 1 month float, negotiations could not absorb the bid closing delay or might take more time than planned in master schedule, giving rise to delay of civil works and "domino effect" of delays down the line in the LCP master schedule	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	T&G supply package (procurement)									
R183	C1	Rollway Construction vs. Impoundment 2	As a) for stability purposes it is necessary to partially construct two rollways following the spring flood of 2016 up to elevation 10m before full impoundment to elevation 39.0m; b) The rollways will start at elevation 5m and will go up to elevation 15.7m when fully complete; c) It is anticipated that it will take approximately 45 days to partially construct the rollways to elevation 10m, delays in construction of the rollways could impact on the impoundment schedule leading to overall C1 construction delay	T	Construction	Conditional Branching	milestone to investigate (along with R-26 and R-189)	Moderate	30 - 90	Possible	1% - 50%	9	CONSTRUCTION WINDOW: impoundment 2									
R185	C1	Main Camp Capacity	As a) current baseline is to build a main C1 camp for 1,500 people; b) comparison with other similar projects (comparable volume of concrete works, etc.) pointed to higher number of required workers due to safety requirements, lower productivity, rotation, etc., planned camp capacity could not satisfy project requirements at peak of works leading to schedule delay	T	Construction	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	concrete works C1									
R188	C1	Impoundment in Winter: Head Pond (12.5 - 25M)	Due to a need to carry out head pond impoundment in winter, increasing of water level from natural 12.5m to 25m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair).	T	Technical	Conditional Branching	milestone to investigate	Moderate	30 - 90	Unlikely	0.1% - 1%	6	CONSTRUCTION WINDOW: impoundment 1									
R189	C1	Impoundment 2 in Winter (25 - 39m)	In case of powerhouse late completion and, hence, due to the need to carry out impoundment in winter to prevent possible revenue loss, increasing of water level from 25m to 39m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair, delay of commissioning).	T	Technical	Conditional Branching	milestone to investigate (along with R-26 and R-183)	Moderate	30 - 90	Unlikely	0.1% - 1%	6	CONSTRUCTION WINDOW: impoundment 2									
R21	C1	Bird Nesting (C1)	As the C1 construction site is located in the forest area used by birds for nesting, the nesting season (May - August) may preclude summer clearing activities as recommended by the EA panel leading to project delay	T	Environmental	Risk Event (Schedule)	could be conditional branching	Moderate	30 - 90	Possible	1% - 50%	9	clearing package									
R25	C1	Post-Award Drawings (C1)	As T&G tender drawings are not supposed to be the C1 construction drawings, late changes after the contract's award may occur leading to extra costs and schedule delays to start civil works	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	civil works C1									
R61	C1	Supplier's QA/QC (C1)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C1 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C1									

LCP SCHEDULE RISKS AFTER ADDRESSING RETAINED FOR PROBABILISTIC SCHEDULE RISK MODEL								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS	
															P10	ML	P90	Min	Max			
R70	C3	Electrode Return vs. Delay	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, the electrode use may be challenged during permitting process leading to schedule delay	T	Regulatory	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	Another risk R-67 is corporate risk if metal return is required									
R71	C3	CFLco - Nalcor Interface	Possibility of interface with CFLco (Hydro Quebec) not being managed well, could lead to non timely decision making	T	External	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	CF switchyard construction package									
R76	C3	Maritime Link Assumptions	Changes in reliability assumptions made for maritime link could change scope and may cause schedule delay and increase cost	T	Interface	Risk Event (Schedule)	relevant?	Major	90 -- 360	Possible	1% - 50%	12	to discuss if risk is relevant any more									
R78	C3	System Integration and Commissioning	Due to need to coordinate commissioning at multiple sites between CFLco, NL Hydro and SNC, lack of experienced personnel may take place leading to schedule and cost impact	T	Commissioning & Start-up	Risk Event (Schedule)		Minor	7 -- 30	Likely	50% - 90%	8	each commissioning package C3									
R79	C3	Transformer Testing	Due to possibility of transformer test failure at site, the failure could occur requiring transportation of the transformer back to workshop and causing schedule delay and increased cost	T	Commissioning & Start-up	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	transformer installation package									
R109	C3	Post-Award Drawings (C3)	As tender drawings are not supposed to be the C3 construction drawings, late changes after the contract's award may occur leading to extra costs	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	each construction package C3									
R111	C3	Wild Fires (C3)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C3 camp & site evacuation, injuries/ fatalities or loss of equipment	T	HSS	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	each construction package C3									
R115	C3	Manufacturing Capacity & Availability (C3)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C3 costs and schedule delays	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each supply package C3									
R119	C3	Construction Permits (C3)	As several dozens of C3 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each construction package C3									
R123	C3	Construction Labour Availability (C3)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C3 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Commercial	Risk Event (Schedule)		Extreme	> 360	Likely	50% - 90%	20	each construction package C3									
R125	C3	Contractors' Availability (C3)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C3 construction costs, lower productivity, less attractive contract terms for LCP, safety impact, etc.	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	each construction package C3									
R130	C3	Major Equipment Delivery (C3) Planning	As a result of poor scheduling, logistics planning, schedule risks and interface management, major contract delivery milestones might not be met, leading to overall C3 schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C3									
R132	C3	Commissioning Failures (C3)	As "stress" testing of C3 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	T	Commissioning & Start-up	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	commissioning C3									
R134	C3	Contractor's Errors/ Omissions (C3)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C3 re-work, extra costs and schedule delay	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each construction package C3									
R136	C3	Design & Manufacturing Errors/ Omissions (C3)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C3 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each supply package C3									
R152	C3	Fiber Optic Line (C3)	As the fiber optic line development is not part of the LCP project and is to be developed by Bell Aliant, timely availability of fiber optic communication might become problematic leading to issues with coordination of sites, crews, contractors, etc. and safety issues	T	Technical	Risk Event (Schedule)		Minor	7 -- 30	Possible	1% - 50%	6	each construction package C3									
R158	C3	Supplier's QA/QC (C3)	Due to failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C3 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package c3									
R162	C3	Interfaces (C3)	As multiple complex hard & soft C3 interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Interface	Risk Event (Schedule)		Moderate	30 - 90	Likely	50% - 90%	12	each engineering, supply & construction package C3									
R164	C3	Availability of Construction Management Personnel (C3)	Due to features of the labour market in NL and lack of qualified C3 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Construction	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	each construction package C3									
R168	C3	Scope Change (C3)	As final scope is not frozen, some scope elements could be transferred to/ from C3 in future even after project sanctioning, leading to re-design, re-definition of corresponding packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	T	Organisational/ Enterprise	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each engineering, supply & construction package C3									
R68	C4	Insulator Supplier Availability (hvdc) (C4)	As there is limited number of qualified C4 HVdc suppliers for insulators supply (2 suppliers only), in a situation of a heated market it could be difficult to engage at least one of them on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	insulator supply package									
R85	C4	HVdc & HVac Contractor Availability (C4)	As several other transmission line projects are planned in North America, it might become difficult to attract skilled on-site contractors that leads to higher construction costs, lower productivity and less attractive for LCP contracting terms	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	each construction package HVac & HVdc									

LCP SCHEDULE RISKS AFTER ADDRESSING RETAINED FOR PROBABILISTIC SCHEDULE RISK MODEL																						
DEFINITION								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS	
																P10	ML	P90	Min	Max		
R87	C4	Weather and Pollution Design Data (C4)	As limited amount of historic data is available for transmission line design in NL, quality of the design may suffer resulting in suboptimal solutions, extra costs, re-work, schedule delays and reputational impact	T	Technical	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	engineering C4									
R89	C4	RoW (C4)	Due to features of land registry in the province, it will be difficult to identify all land owners along route they leads to surprises in land ownerships and claims from owners	T	External	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	permits after EA release C4									
R92	C4	Late Design Change (C4)	As late design criteria change initiated by customer for transmission line is possible, redesign may occur leading to re-definition of corresponding packages, schedule delay and extra costs	T	Technical	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each engineering, supply and construction package C4									
R94	C4	Helicopter Use in Labrador for HVac (C4)	In some remote areas of Labrador use of helicopter could be considered as opportunity to reduce labour numbers and accelerate the schedule	O	Construction	Risk Event (Schedule)		Moderate	30 - 90	Likely	50% - 90%	12	HVac construction packages									
R95	C4	EA Release for HVdc (C4)	Due to delay in EA release, start of early C4 construction activities may be delayed leading to missed construction windows in some cases and overall project delay	T	Regulatory	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	permits after EA release C4									
R105	C4	Terrestrial Habitat (HVac) (C4)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs and schedule delay	T	Environmental	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	after construction?									
R106	C4	Bird Nesting (HVac) (C4)	As the construction site is located in the forest area used by birds for nesting, the nesting season (May - August) may preclude summer clearing activities as recommended by the EA panel leading to project delay	T	Environmental	Risk Event (Schedule)	could be conditional branching	Moderate	30 - 90	Possible	1% - 50%	9	each C4 construction inpackage that includes May - August activities									
R118	C4	Adverse Weather (C4)	As several C4 construction activities are planned for winter, abnormal winter weather (low temperatures, snow storms, snow falls, etc.) may occur during the construction leading to lower productivity, construction delay and safety risks	T	Construction	Risk Event (Schedule)		Minor	7 -- 30	Possible	1% - 50%	6	each construction package C4 that includes winter activities									
R120	C4	Construction Permits (C4)	As several dozens of C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory	Ranges & Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	permits after EA release C4									
R122	C4	Logistics (C4)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C4 equipment & materials to the sites that leads to schedule delays and extra costs	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	all supply packages except to remote locations (R-93)									
R124	C4	Construction Labour Availability (C4)	Due to a) features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.); b) planning of power line construction in various (remote) areas of NL, the lack of quantity of construction manpower may lead to C4 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Commercial	Risk Event (Schedule)		Extreme	> 360	Likely	50% - 90%	20	each construction package C4									
R131	C4	Major Material Delivery (C4): Planning for HVac	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones for HVac might not be met leading to overall C4 schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each major HVac package									
R135	C4	Contractor's Errors/ Omissions (C4)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C4 re-work, extra costs and schedule delay	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each construction package C4									
R137	C4	Design & Manufacturing Errors/ Omissions (C4)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C4 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each supply package C4									
R159	C4	Supplier's QA/QC (C4)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C4 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C4									
R163	C4	Interfaces (C4)	As multiple complex hard & soft C4 interfaces require inputs from project components and disciplines and outputs to contractors, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Interface	Risk Event (Schedule)		Moderate	30 - 90	Likely	50% - 90%	12	each engineering, supply & construction package C4									
R165	C4	Availability of SLI Construction Management Personnel (C4)	Due to features of the labour market in NL and lack of qualified C4 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Construction	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each construction package C4									
R186	C4	Major Material Delivery (C4): Planning for HVdc	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones for HVdc might not be met leading to overall C4 schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each major HVdc package									
R54	LCP	RFP/ Contract Quality	As an intent to maintain project schedule when working under time crunch or due to incomplete contracting strategy, fast tracking approach towards RFP/ contracts development and deviation from established procurement/ contracting procedures might be adopted that lead to sub-standard, incomplete or inadequate package scopes and unclearly defined contractual obligations in terms of scope, cost, schedule, quality, safety	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each procurement activity C1, C3, C4									
R72	LCP	Final Project Integration	Due to complexity, overall integration of all LCP components and activities plus external Island Link prior to project commissioning, may represent significant challenge leading to overall delay o commissioning	T	Organisational/ Enterprise	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	commissioning C1, C3, C4									
R80	LCP	Early Procurement	Due to volatility of equipment pricing, early procurement of equipment could result in lower cost and allow some float in the schedule	O	Commercial	Risk Event (Schedule)	opportunity	Major	90 - 360	Likely	50% - 90%	16	each procurement activity C1, C3, C4									
R81	LCP	Project Controls: Packages	Due to possible a) problems with delivery of packages (quality, labour availability, etc.), b) project document controls under-staffing, c) difficulties to measure progress and quantities of construction packages, d) late engineering changes, some packages could be delivered with delays and increased quantities, leading to overall schedule delays and extra costs	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each procurement activity C1, C3, C4									

LCP SCHEDULE RISKS AFTER ADDRESSING RETAINED FOR PROBABILISTIC SCHEDULE RISK MODEL								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING								
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS
															P10	ML	P90	Min	Max		
R141	LCP	Innu Involvement/ IBA	Due to intimate involvement of Innu people in delivery of the project (IBA), there might be instances of negative influence on LCP contracting, permitting, labour relations, that leads to narrower choices of contractors, suppliers and labour, issues with environmental monitoring and permitting (destruction of land and hunting areas during construction, etc.) leading to extra costs, schedule delays, safety issues, etc.	T	External	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	C3/ C4 EA release and construction permits								
R182	LCP	Opposition by 'non-IBA' First Nations Groups	As a) IBA agreement covers mostly economic aspects of Innu people benefits; b) some Innu people oppose to LCP due to environmental and cultural concerns; c) some other First Nation's people (e.g., Métis) seem to wish benefiting from LCP same way as Innu people, representatives of First Nations could block the construction sites to apply pressure on LCP and to promote their agendas leading to schedule delay, extra costs and reputational damage	T	External	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each construction package C1, C3, C4								
R184	LCP	Unionised vs. Non-unionised Package Contracts	As a) non-unionised contracts are planned for several packages; b) significant enough difference in rates for unionised vs. non-unionised labour is expected; c) communication among unionised vs. non-unionised workers at various LCP sites is expected; e) no camp or basic camp is to be provided to non-unionised workers, strike/ unrest among non-unionised workers may occur, leading to disruption of clearing works, moving of workers to unionised contracts, schedule delays, safety and security impact, reputation damage	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	clearing package C1								

Corporate Risk: Extreme impact along with rare probability (usually). If occurs it distroys baseline - that would be another project (if at all)
In case a risk has deterministic **score 1 - 5** after addressing it is considered acceptable with nearly zero residual impact after addressing (except for risks with extreme impacts and rare probabilities - corporate risks)
Ranges means there is no risk event - general uncertainty around durations of normal activities
Umbrellas used at LCP level to coordinate managing correpsonding risks at the component level - corresponding risks are taken in to account at the component level.
Conditional branching points to possibility to be late to complete an activity during allowed seasonal construction window, so that the activity should be put off untill next construction window

LCP COST RISKS AFTER ADDRESSING EXCLUDED FROM PROBABILISTIC RISK REGISTER (48 risks)

ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R11	C1	Optimisation of Geotech vs. Upstream Cofferdam Design	As conservative approach is used for design of the main upstream cofferdam, the base estimate may turn out to be inflated leading to capital cost savings	O	Ranges (Cost)	skewed range		Moderate	1,000 - 10,000	Likely	50% - 90%	12
R16	C1	River/ Reservoir Bank's Instability	As most of river and reservoir banks consist of clay soil, instability of them might occur during the reservoir flooding that gives rise to extra stabilisation costs to avoid/ address the instability (including stabilisation of some adjacent roads)	T	Corporate Risk			Extreme	>100,000	Rare	<0.1%	5
R26	C1	Spillway Construction Window	As A) construction of the spillway is to be fulfilled during an "ice-free" window, B) there is no float in schedule with predecessor activities (EA release, camp, road, etc.), any delay in previous activities may trigger missing of the window which results in schedule delay	T	Schedule Driven Cost	it is probabilistic branching in schedule RR	?	Major	10,000-100,000	Possible	1% - 50%	12
R28	C1	Riverside Cofferdam Catastrophic Flooding	As certain flooding reliability design factors are used for cofferdam design (one in 20 years events), a flooding might happen that exceed the reliability design factors used leading to catastrophic failure of the cofferdam, injuries/ fatalities, loss of equipment and reputational damage	T	Corporate Risk			Extreme	>100,000	Rare	<0.1%	5
R30	C1	Loss of Power Supply	As a switch from temporary 25 kV transmission line to permanent 315 kV line is planned before reservoir flooding, temporary loss of power supply to the site/ camp may occur during the switch that is not covered by emergency generators leading to interruption of construction and camp operations	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R32	C1	Lower Level of Design and Supporting Information (C1)	Due to lower level of C1 engineering staffing or challenging timelines, lower level of details of design for development of the base estimate, higher uncertainties could lead to higher cost contingencies and drive extra uncertainties in adjacent disciplines (civil, electrical, etc.)	T	Ranges (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R36	C1	Construction Permits (C1)	As several dozens of C1 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Schedule Driven Cost			Moderate	1,000 - 10,000	Possible	1% - 50%	9

LCP COST RISKS AFTER ADDRESSING EXCLUDED FROM PROBABILISTIC RISK REGISTER (48 risks)

ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R38	C1	Riverside Cofferdam Height vs. Late Start & Construction Delays	Due to delays with predecessor's activities and various difficulties and delays with construction of the cofferdam (selected concrete option), there might be not enough time to construct high enough cofferdam on time (mid-January 2013) leading to a) overtopping the cofferdam, b) flooding the excavation area, c) loss of cofferdam and giving rise to safety and environmental impacts	T	Corporate Risk			Extreme	>100,000	Unlikely	0.1% - 1%	10
R40	C1	River Closure Failure	a) As river closure and construction of the upstream cofferdam is planned for summer (when normally level of water is lowest); b) the main dam fill-in material compaction (clay in water) is possible only before freezing temperatures, unusually high level of water could occur that prevents river closure by the upstream cofferdam on time and leads to a) missed window (before October) to finish the cofferdam at level 20m; b) lower height of the cofferdam by spring flooding, its overflowing and loss	T	Corporate Risk			Major	10,000-100,000	Rare	<0.1%	4
R41	C1	Spillway Operation Failure in Construction	Due to spillway gates obstruction by debris and failure of gates to operate, the spillway operation might be limited, leading to overtopping, site flooding and loss of the cofferdam as well as to environmental and safety consequences	T	Corporate Risk			Extreme	>100,000	Rare	<0.1%	5
R45	C1	Reservoir Induced Seismic Activity	As sometimes flooding of a reservoir triggers seismic activity, the induced seismic activity during flooding may cause damage to dam structures, leading to extra cost to repair the damage or even catastrophic disruption of a dam	T	Corporate Risk			Extreme	>100,000	Rare	<0.1%	5
R56	C1	Powerhouse Flooding	Due to failure to identify the risks, inadequate procedures or not following procedures (including human errors and pump stoppage) powerhouse flooding may occur leading to loss of lives and equipment	T	Risk Event (Cost)			Extreme	>100,000	Rare	<0.1%	5
R127	C1	Construction Labor Productivity (C1)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions the, available construction manpower may have lower productivity than assumed in C1 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Ranges (Cost)	could be treated as schedule driven costs		Extreme	>100,000	Likely	50% - 90%	20

LCP COST RISKS AFTER ADDRESSING EXCLUDED FROM PROBABILISTIC RISK REGISTER (48 risks)

ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R183	C1	Rollway Construction vs. Impoundment	As a) for stability purposes it is necessary to partially construct two rollways following the spring flood of 2016 up to elevation 10m before full impoundment to elevation 39.0m; b) The rollways will start at elevation 5m and will go up to elevation 15.7m when fully complete; c) It is anticipated that it will take approximately 45 days to partially construct the rollways to elevation 10m, delays in construction of the rollways could impact on the impoundment schedule leading to overall C1 construction delay	T	Schedule Driven Cost	it is probabilistic branching in schedule RR		Minor	100 - 1,000	Possible	1% - 50%	6
R185	C1	Main Camp Capacity	As a) current baseline is to build a main C1 camp for 1,500 people; b) comparison with other similar projects (comparable volume of concrete works, etc.) pointed to higher number of required workers due to safety requirements, lower productivity, rotation, etc., planned camp capacity could not satisfy project requirements at peak of works leading to schedule delay	T	Schedule Driven Cost			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R67	C3	Electrode vs. EA Release Special Condition	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, a special condition may be attached to EA release to use the metallic return leading to cost implications	T	Corporate Risk			Extreme	>100,000	Possible	1% - 50%	15
R70	C3	Electrode Return vs. Delay	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, the electrode use may be challenged during permitting process leading to schedule delay	T	Schedule Driven Cost			Moderate	1,000 - 10,000	Likely	50% - 90%	12
R71	C3	CFLco - Nalcor Interface	Possibility of interface with CFLco (Hydro Quebec) not being managed well, could lead to non timely decision making	T	Schedule Driven Cost			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R75	C3	Outage Planning	Due to features of the communication process and decision making, timely scheduling of outages during commissioning to switch power on may become challenging leading to schedule delay and late completion date as well as safety impact	T	Schedule Driven Cost			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R78	C3	System Integration and Commissioning	Due to need to coordinate commissioning at multiple sites between CFLco, NL Hydro and SNC, lack of experienced personnel may take place leading to schedule and cost impact	T	Schedule Driven Cost			Minor	100 - 1,000	Likely	50% - 90%	8

LCP COST RISKS AFTER ADDRESSING EXCLUDED FROM PROBABILISTIC RISK REGISTER (48 risks)

ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R79	C3	Transformer Testing	Due to possibility of transformer test failure at site, the failure could occur requiring transportation of the transformer back to workshop and causing schedule delay and increased cost	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R113	C3	Lower Level of Design (C3)	Due to C3 challenging engineering staffing or timelines, lower level of details of design for development of the base estimate, higher uncertainties could lead to higher cost contingencies and drive extra uncertainties in adjacent disciplines (civil, electrical, etc.)	T	Ranges (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R119	C3	Construction Permits (C3)	As several dozens of C3 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Schedule Driven Cost			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R128	C3	Construction Labor Productivity (C3)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C3 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, etc.	T	Ranges (Cost)	could be treated as schedule driven costs		Major	10,000- 100,000	Likely	50% - 90%	16
R136	C3	Design & Manufacturing Errors/ Omissions (C3)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C3 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R150	C3	Geotech vs. Claims (C3)	As detail geotech study data are not available during C3 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R93	C4	Remote Site Logistics (C4)	As construction of transmission lines is planned in several remote location (especially in Labrador) and delivery to these sites are possible only in certain season windows, logistics difficulties to deliver construction equipment, materials and crews may occur leading to extra logistics costs, schedule delay (including triggering delays till next window) and safety impact	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Rare	< 0.1%	3
R110	C4	Post-Award Drawings (C4)	As tender drawings are not supposed to be the C4 construction drawings, late changes after the contract's award may occur leading to extra costs	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R120	C4	Construction Permits (C4)	As several dozens of C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Schedule Driven Cost			Major	10,000- 100,000	Possible	1% - 50%	12

Ranges (Cost) Risk Event (Cost) Cost Escalation Schedule Driven Cost Probabilistic Branching Corporate Risk N/A: Umbrella

LCP COST RISKS AFTER ADDRESSING EXCLUDED FROM PROBABILISTIC RISK REGISTER (48 risks)

ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R129	C4	Construction Labour Productivity (C4)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C4 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Ranges (Cost)			Major	10,000-100,000	Likely	50% - 90%	16
R135	C4	Contractor's Errors/ Omissions (C4)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C4 re-work, extra costs and schedule delay	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R137	C4	Design & Manufacturing Errors/ Omissions (C4)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C4 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R155	C4	Optimisation of the Conservative Design (C4)	As conservative design approach ("worst case" scenarios) is used at C4 early design phases for all three components due to lack of design input data and multiple inputs (interfaces), it could be possible to optimise the design in the course of engineering development leading to cost reductions, accelerated schedules and better constructability	O	Ranges (Cost)			Moderate	1,000 - 10,000	Likely	50% - 90%	12
R3	LCP	EA Release Special Conditions	Due to high interest of the government, general public and NGO's in the LCP, special conditions may be attached to the project permits (EA vs. Environmental Protection Plan) resulting in scope change, schedule delays and extra costs to comply	T	N/A: Umbrella			Major	10,000-100,000	Possible	1% - 50%	12
R52	LCP	Contracting Strategy Adjustments	Due to heated market conditions or financing constraints, LCP may need to change contracting strategy, causing delays in schedule and increase in cost	T	N/A: Umbrella			Major	10,000-100,000	Possible	1% - 50%	12
R69	LCP	Knowledge Transfer	Due to maturity of owner and wealth of experience, opportunity exist for interfacing between Nalcor and SLI on existing system and hvdc system	O		OPERATIONS: to exclude		Moderate	1,000 - 10,000	Likely	50% - 90%	12
R77	LCP	Class of Estimate & Cost Escalation	Because the base estimate for DG3 is preliminary and done in money of the base period, the real pricing in the time of purchasing may be different due to market conditions then, leading to extra costs	T	Ranges (Cost)			Major	10,000-100,000	Almost Certain	>90%	20
R84	LCP	Operation Staff	Due to current limited number of operators within Nalcor, understaffing during commissioning and operations may occur, leading to commissioning delay, start of operations and lower acct productivity	T		OPERATIONS: to exclude		Moderate	1,000 - 10,000	Possible	1% - 50%	9
R144	LCP	Spare Parts v. RAM	As RAM analysis for whole system has yet to be carried out according to declared level of availability, spare part requirements could be too conservative and become an additional OpEx cost that leads to poorer project economics and lower attractiveness for stakeholders	T		OPERATIONS: to exclude		Moderate	1,000 - 10,000	Possible	1% - 50%	9
R156	LCP	SLI - Nalcor Contract, Coordination and Alignment	As a) coordination between SLI and Nalcor reflects current contract between the organisations; b) different organisational approaches/ cultures exist as related to the contract interpretation and decision making; c) lack of staffing in both organisations takes place, the lack of alignment and decision-making efficiency could occur, leading to non timely decision making, lower quality of decisions, re-work, schedule delay and extra costs	T	Ranges (Cost)			Major	10,000-100,000	Likely	50% - 90%	16

Ranges (Cost) Risk Event (Cost) Cost Escalation Schedule Driven Cost Probabilistic Branching Corporate Risk N/A: Umbrella

LCP COST RISKS AFTER ADDRESSING EXCLUDED FROM PROBABILISTIC RISK REGISTER (48 risks)

ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R172	LCP	Construction Labour Availability -LCP	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may occur leading to LCP schedule delay and extra labour costs to attract as well as giving rise to reduction of quality of works, safety risks impact, etc.	T	N/A: Umbrella			Extreme	>100,000	Likely	50% - 90%	20
R173	LCP	Construction Labor Productivity - LCP	Due to a) features of the labour market in NL, b) issues with availability of skilled workers, c) labour agreement with Unions; d) inadequate organisation of construction works, the available construction manpower may have lower productivity than assumed in LCP base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Ranges (Cost)			Extreme	>100,000	Likely	50% - 90%	20
R175	LCP	Sensitive Areas -LCP	Due to exposure of C1, C3, C4 to sensitive areas (archeological sites, fish habitat, terrestrial habitat, bird nesting), delays may occur with permit's obtaining and start of construction works which leads to work stoppage and overall project delay	T	N/A: Umbrella			Major	10,000-100,000	Possible	1% - 50%	12
R176	LCP	Construction Permits LCP	As several dozens of C1, C3, C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	N/A: Umbrella			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R177	LCP	Contractor's Availability - LCP	As several mega projects are planned in North America related to hydro power generation and transmission, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	T	N/A: Umbrella			Extreme	>100,000	Almost Certain	>90%	25
R178	LCP	Interfaces - LCP	As multiple complex hard & soft interfaces require inputs from project components and disciplines as well as external organisations (CFLco, SOBI, etc.), efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays, failures during commissioning, etc.	T	N/A: Umbrella			Extreme	>100,000	Almost Certain	>90%	25
R179	LCP	Supplier's Availability LCP	As there is limited number of qualified suppliers in a situation of a heated market it could be difficult to engage qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	N/A: Umbrella			Major	10,000-100,000	Possible	1% - 50%	12
R187	LCP	IT/ IS	Due to possible a) challenges to implement integrated IT/ IS in several project locations; b) requirements to effectively support construction management, project/ document control (including progress management); c) requirements to integrate vendors; d) differences in Nalcor and SLI corporate IT/IS; e) budget restrictions; adopted IT/ IS could be breached or have low efficiency, leading to loss of critical data, lower efficiency of project & document controls and construction management, lower level of vendor integration, schedule delay and project extra costs.	T	Ranges (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9

Corporate Risk: Extreme impact along with rare probability (usually). If occurs it distroys baseline - that would be another project (if at all
In case a risk has deterministic **score 1 - 5** after addressing it is considered acceptable with nearly zero residual impact after addressing (except for risks with extreme impacts and rare probabilities - corporate risks
Ranges means there is no risk event - general uncertainty around one-point costs
Umbrellas used at LCP level to coordinate managing correpsonding risks at the component level - corresponding risks are taken in to account at the component level
Conditional branching points to possibility to be late to complete an activity during allowed seasonal construction window, so that the activity should be put off untill next construction window, schedule driven costs are associate
Schedule driven costs: extra costs due to schedule delays (burn rate x delay), will be taken into account through special procedure (including delays to base estimate), excluded from cost risk mode

Ranges (Cost) Risk Event (Cost) Cost Escalation Schedule Driven Cost Probabilistic Branching Corporate Risk N/A: Umbrella

LCP COST RISKS AFTER ADDRESSING

ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R5	C1	Accommodation Capacity	As starter camp for construction is designed for about 150 workers and accommodation for about 500 workers in Sep. 2012 will be needed, available accommodation in neighboring Goose Bay might not meet the accommodation requirements leading to initial lack of workers at the beginning of construction	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Likely	50% - 90%	12
R9	C1	Excavation vs. Water Contamination	As a result of excavation works and use of explosives, level of water contamination in stilling basin may exceed acceptable level (oil, sediment, explosive's residues, etc.) leading to extra costs and delays to comply with regulations.	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R10	C1	Archeological Sites (C1)	As the C1 construction area is known for archeological significance, delays may occur with permit's obtaining and start of excavation works which leads to work stoppage and overall project delay	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Likely	50% - 90%	12
R11	C1	Optimisation of Geotech vs. Upstream Cofferdam Design	As conservative approach is used for design of the main upstream cofferdam, the base estimate may turn out to be inflated leading to capital cost savings	O	Ranges (Cost)	skewed range		Moderate	1,000 - 10,000	Likely	50% - 90%	12
R12	C1	Riverside Cofferdam Options vs. Schedule	As cost effective option for the river side cofferdam is selected (concrete dam), the option under consideration may require more time to construct leading to delay of the cofferdam completion that causes overtopping and site flooding	T	Risk Event (Cost)			Extreme	>100,000	Unlikely	0.1% - 1%	10
R16	C1	River/ Reservoir Bank's Instability	As most of river and reservoir banks consist of clay soil, instability of them might occur during the reservoir flooding that gives rise to extra stabilisation costs to avoid/ address the instability (including stabilisation of some adjacent roads)	T	Corporate Risk			Extreme	>100,000	Rare	<0.1%	5
R19	C1	Fish Habitat (C1)	As requirements by DFO on fish habitat replacement are very likely and are not fully factored in to the base estimate, the requirement to replace the habitat may be significant by DFO leading to extra costs	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	6

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R20	C1	Terrestrial Habitat (C1) (Loss of Wetlands)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs	T	Risk Event (Cost)			Major	10,000-100,000	Possible	1% - 50%	12
R24	C1	Contractor's Coordination/ Powerhouse	As construction of powerhouse is to be carried out by several contractors, lack of coordination and clear contractual responsibilities especially in case of unforeseen conditions may become a source of extra claims leading to capital overspending	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R26	C1	Spillway Construction Window	As A) construction of the spillway is to be fulfilled during an "ice-free" window, B) there is no float in schedule with predecessor activities (EA release, camp, road, etc.), any delay in previous activities may trigger missing of the window which results in schedule delay	T	Schedule Driven Cost	it is probabilistic branching in schedule RR	?	Major	10,000-100,000	Possible	1% - 50%	12
R28	C1	Riverside Cofferdam Catastrophic Flooding	As certain flooding reliability design factors are used for cofferdam design (one in 20 years events), a flooding might happen that exceed the reliability design factors used leading to catastrophic failure of the cofferdam, injuries/ fatalities, loss of equipment and reputational damage	T	Corporate Risk			Extreme	>100,000	Rare	<0.1%	5
R29	C1	Wild Fires (C1)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C1 camp & site evacuation, injuries/ fatalities or loss of equipment	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R30	C1	Loss of Power Supply	As a switch from temporary 25 kV transmission line to permanent 315 kV line is planned before reservoir flooding, temporary loss of power supply to the site/ camp may occur during the switch that is not covered by emergency generators leading to interruption of construction and camp operations	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R31	C1	T&G Late Design Changes	Some reasons for design changes during the T&G equipment manufacturing may be put forward by the customers leading to extra costs and schedule delays to accommodate the changes in design and civil works	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R32	C1	Lower Level of Design and Supporting Information (C1)	Due to lower level of C1 engineering staffing or challenging timelines, lower level of details of design for development of the base estimate, higher uncertainties could lead to higher cost contingencies and drive extra uncertainties in adjacent disciplines (civil, electrical, etc.)	T	Ranges (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R33	C1	Manufacturing Labour Availability (C1)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C1 costs and schedule delays	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	6
R36	C1	Construction Permits (C1)	As several dozens of C1 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Schedule Driven Cost			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R37	C1	Logistics (C1)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C1 equipment & materials to the sites that leads to schedule delays and extra costs	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R38	C1	Riverside Cofferdam Height vs. Late Start & Construction Delays	Due to delays with predecessor's activities and various difficulties and delays with construction of the cofferdam (selected concrete option), there might be not enough time to construct high enough cofferdam on time (mid-January 2013) leading to a) overtopping the cofferdam, b) flooding the excavation area, c) loss of cofferdam and giving rise to safety and environmental impacts	T	Corporate Risk			Extreme	>100,000	Unlikely	0.1% - 1%	10
R40	C1	River Closure Failure	a) As river closure and construction of the upstream cofferdam is planned for summer (when normally level of water is lowest); b) the main dam fill-in material compaction (clay in water) is possible only before freezing temperatures, unusually high level of water could occur that prevents river closure by the upstream cofferdam on time and leads to a) missed window (before October) to finish the cofferdam at level 20m; b) lower height of the cofferdam by spring flooding, its overflowing and loss	T	Corporate Risk			Major	10,000-100,000	Rare	<0.1%	4
R41	C1	Spillway Operation Failure in Construction	Due to spillway gates obstruction by debris and failure of gates to operate, the spillway operation might be limited, leading to overtopping, site flooding and loss of the cofferdam as well as to environmental and safety consequences	T	Corporate Risk			Extreme	>100,000	Rare	<0.1%	5

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R43	C1	Construction Labour Availability (C1)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C1 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Risk Event (Cost)			Extreme	>100,000	Likely	50% - 90%	20
R44	C1	Contractors' Availability (C1)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C1 construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	T	Risk Event (Cost)			Major	10,000-100,000	Likely	50% - 90%	16
R45	C1	Reservoir Induced Seismic Activity	As sometimes flooding of a reservoir triggers seismic activity, the induced seismic activity during flooding may cause damage to dam structures, leading to extra cost to repair the damage or even catastrophic disruption of a dam	T	Corporate Risk			Extreme	>100,000	Rare	<0.1%	5
R49	C1	T&G Quality Issues	Potential quality control issue in manufacturing of turbines and generators may lead to cost, schedule delay or in use operability or reliability issues	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R53	C1	Debris and Trash Management at Intake in Operations	As a result of trash build up, energy output of the unit could be reduced, leading to loss of revenue and poorer OpEx	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R56	C1	Powerhouse Flooding	Due to failure to identify the risks, inadequate procedures or not following procedures (including human errors and pump stoppage) powerhouse flooding may occur leading to loss of lives and equipment	T	Risk Event (Cost)			Extreme	>100,000	Rare	<0.1%	5
R57	C1	Commissioning Failures (C1)	As "stress" testing of C1 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R58	C1	Construction Debris vs. Commissioning	Due to presence of construction debris after the end of construction, these may cause problems during commissioning, leading to extra costs and schedule delays	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R59	C1	Contractor's Errors/ Omissions (C1)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C1 re-work, extra costs and schedule delay	T	Risk Event (Cost)			Major	10,000-100,000	Unlikely	0.1% - 1%	8
R60	C1	Design & Manufacturing Errors/ Omissions (C1)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R64	C1	Interfaces (C1)	As multiple complex hard & soft C1interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Risk Event (Cost)			Major	10,000-100,000	Possible	1% - 50%	12
R65	C1	Availability of Construction Management Personnel (C1)	Due to features of the labour market in NL and lack of qualified C1 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel by SLI may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Likely	50% - 90%	12
R74	C1	Design Change (C1)	As final design is nearly frozen, some design elements could be transferred to/ from C1 in future even after project sanctioning, leading to re-design, re-definition of packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R127	C1	Construction Labor Productivity (C1)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions the, available construction manpower may have lower productivity than assumed in C1 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Ranges (Cost)	could be treated as schedule driven costs		Extreme	>100,000	Likely	50% - 90%	20
R147	C1	Supplier Availability (C1)	As there is limited number of qualified C1 suppliers in a situation of a heated market it could be difficult to engage at least one of qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Risk Event (Cost)			Major	10,000-100,000	Possible	1% - 50%	12

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R149	C1	Geotech vs. Claims (C1)	As detail geotech study data are not available during C1 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R153	C1	Conservative Design (C1)	As conservative design approach ("worst case" scenarios) is used at C1 early design phases for all three components due to lack of design input data and multiple inputs (interfaces), it could be possible to optimise the design in the course of engineering development leading to cost reductions, accelerated schedules and better constructability	O	Risk Event (Cost)	opportunity		Major	10,000-100,000	Likely	50% - 90%	16
R174	C1	T&G Package Bid Closing & Negotiations	As A) T&G bid closing is delayed for 1.5 mos (9-Dec-2011 => 27-Jan-2012); B) Bid closing is followed by negotiations; C) negotiations are followed by the T&G contract award (still the same date as planned before the bid closing delay) D) T&G award is followed by the civil works (bulk excavation & concrete) with a 1 month float, negotiations could not absorb the bid closing delay or might take more time than planned in master schedule, giving rise to delay of civil works and "domino effect" of delays down the line in the LCP master schedule	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	12
R183	C1	Rollway Construction vs. Impoundment	As a) for stability purposes it is necessary to partially construct two rollways following the spring flood of 2016 up to elevation 10m before full impoundment to elevation 39.0m; b) The rollways will start at elevation 5m and will go up to elevation 15.7m when fully complete; c) It is anticipated that it will take approximately 45 days to partially construct the rollways to elevation 10m, delays in construction of the rollways could impact on the impoundment schedule leading to overall C1 construction delay	T	Schedule Driven Cost	it is probabilistic branching in schedule RR		Minor	100 - 1,000	Possible	1% - 50%	6
R185	C1	Main Camp Capacity	As a) current baseline is to build a main C1 camp for 1,500 people; b) comparison with other similar projects (comparable volume of concrete works, etc.) pointed to higher number of required workers due to safety requirements, lower productivity, rotation, etc., planned camp capacity could not satisfy project requirements at peak of works leading to schedule delay	T	Schedule Driven Cost			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R188	C1	Impoundment in Winter: Head Pond (12.5 - 25M)	Due to a need to carry out head pond impoundment in winter, increasing of water level from natural 12.5m to 25m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair).	T	Risk Event (Cost)	it is probabilistic branching in schedule RR		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R189	C1	Impoundment in Winter (25 - 39m)	In case of powerhouse late completion and, hence, due to the need to carry out impoundment in winter to prevent possible revenue loss, increasing of water level from 25m to 39m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair, delay of commissioning).	T	Risk Event (Cost)	it is probabilistic branching in schedule RR		Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R25	C1	Post-Award Drawings (C1)	As T&G tender drawings are not supposed to be the C1 construction drawings, late changes after the contract's award may occur leading to extra costs and schedule delays to start civil works	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R61	C1	Supplier's QA/QC (C1)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C1 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	6
R67	C3	Electrode vs. EA Release Special Condition	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, a special condition may be attached to EA release to use the metallic return leading to cost implications	T	Corporate Risk			Extreme	>100,000	Possible	1% - 50%	15
R70	C3	Electrode Return vs. Delay	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, the electrode use may be challenged during permitting process leading to schedule delay	T	Schedule Driven Cost			Moderate	1,000 - 10,000	Likely	50% - 90%	12
R71	C3	CFLco - Nalcor Interface	Possibility of interface with CFLco (Hydro Quebec) not being managed well, could lead to non timely decision making	T	Schedule Driven Cost			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R75	C3	Outage Planning	Due to features of the communication process and decision making, timely scheduling of outages during commissioning to switch power on may become challenging leading to schedule delay and late completion date as well as safety impact	T	Schedule Driven Cost			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R76	C3	Maritime Link Assumptions	Changes in reliability assumptions made for maritime link could change scope and may cause schedule delay and increase cost	T	Risk Event (Cost)	relevant?		Major	10,000-100,000	Possible	1% - 50%	12

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R78	C3	System Integration and Commissioning	Due to need to coordinate commissioning at multiple sites between CFLco, NL Hydro and SNC, lack of experienced personnel may take place leading to schedule and cost impact	T	Schedule Driven Cost			Minor	100 - 1,000	Likely	50% - 90%	8
R79	C3	Transformer Testing	Due to possibility of transformer test failure at site, the failure could occur requiring transportation of the transformer back to workshop and causing schedule delay and increased cost	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R109	C3	Post-Award Drawings (C3)	As tender drawings are not supposed to be the C3 construction drawings, late changes after the contract's award may occur leading to extra costs	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R111	C3	Wild Fires (C3)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C3 camp & site evacuation, injuries/ fatalities or loss of equipment	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R113	C3	Lower Level of Design (C3)	Due to C3 challenging engineering staffing or timelines, lower level of details of design for development of the base estimate, higher uncertainties could lead to higher cost contingencies and drive extra uncertainties in adjacent disciplines (civil, electrical, etc.)	T	Ranges (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R115	C3	Manufacturing Capacity & Availability (C3)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C3 costs and schedule delays	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R119	C3	Construction Permits (C3)	As several dozens of C3 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Schedule Driven Cost			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R123	C3	Construction Labour Availability (C3)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C3 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Risk Event (Cost)			Extreme	>100,000	Likely	50% - 90%	20

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R125	C3	Contractors' Availability (C3)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C3 construction costs, lower productivity, less attractive contract terms for LCP, safety impact, etc.	T	Risk Event (Cost)			Major	10,000-100,000	Likely	50% - 90%	16
R128	C3	Construction Labor Productivity (C3)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C3 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, etc.	T	Ranges (Cost)	could be treated as schedule driven costs		Major	10,000-100,000	Likely	50% - 90%	16
R132	C3	Commissioning Failures (C3)	As "stress" testing of C3 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	T	Risk Event (Cost)			Major	10,000-100,000	Unlikely	0.1% - 1%	8
R134	C3	Contractor's Errors/ Omissions (C3)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C3 re-work, extra costs and schedule delay	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	6
R136	C3	Design & Manufacturing Errors/ Omissions (C3)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C3 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R150	C3	Geotech vs. Claims (C3)	As detail geotech study data are not available during C3 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R152	C3	Fiber Optic Line (C3)	As the fiber optic line development is not part of the LCP project and is to be developed by Bell Aliant, timely availability of fiber optic communication might become problematic leading to issues with coordination of sites, crews, contractors, etc. and safety issues	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R158	C3	Supplier's QA/QC (C3)	Due to failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C3 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	6
R162	C3	Interfaces (C3)	As multiple complex hard & soft C3 interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Likely	50% - 90%	12
R164	C3	Availability of Construction Management Personnel (C3)	Due to features of the labour market in NL and lack of qualified C3 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Risk Event (Cost)			Minor	100 - 1,000	Likely	50% - 90%	8
R168	C3	Scope Change (C3)	As final scope is not frozen, some scope elements could be transferred to/ from C3 in future even after project sanctioning, leading to re-design, re-definition of corresponding packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R68	C4	Insulator Supplier Availability (hvdc) (C4)	As there is limited number of qualified C4 HVdc suppliers for insulators supply (2 suppliers only), in a situation of a heated market it could be difficult to engage at least one of them on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R85	C4	HVdc & HVac Contractor Availability (C4)	As several other transmission line projects are planned in North America, it might become difficult to attract skilled on-site contractors that leads to higher construction costs, lower productivity and less attractive for LCP contracting terms	T	Risk Event (Cost)			Major	10,000-100,000	Likely	50% - 90%	16
R87	C4	Weather and Pollution Design Data (C4)	As limited amount of historic data is available for transmission line design in NL, quality of the design may suffer resulting in suboptimal solutions, extra costs, re-work, schedule delays and reputational impact	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R89	C4	RoW (C4)	Due to features of land registry in the province, it will be difficult to identify all land owners along route that leads to surprises in land ownerships and claims from owners	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	6
R92	C4	Late Design Change (C4)	As late design criteria change initiated by customer for transmission line is possible, redesign may occur leading to re-definition of corresponding packages, schedule delay and extra costs	T	Risk Event (Cost)			Major	10,000-100,000	Unlikely	0.1% - 1%	8
R93	C4	Remote Site Logistics (C4)	As construction of transmission lines is planned in several remote location (especially in Labrador) and delivery to these sites are possible only in certain season windows, logistics difficulties to deliver construction equipment, materials and crews may occur leading to extra logistics costs, schedule delay (including triggering delays till next window) and safety impact	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Rare	< 0.1%	3
R94	C4	Helicopter Use in Labrador for HVac (C4)	In some remote areas of Labrador use of helicopter could be considered as opportunity to reduce labour numbers and accelerate the schedule	O	Risk Event (Cost)	opportunity		Moderate	1,000 - 10,000	Likely	50% - 90%	12
R95	C4	EA Release for HVdc (C4)	Due to delay in EA release, start of early C4 construction activities may be delayed leading to missed construction windows in some cases and overall project delay and extra costs to comply	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Likely	50% - 90%	12
R105	C4	Terrestrial Habitat (HVac) (C4)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs and schedule delay	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	6
R106	C4	Bird Nesting (HVac) (C4)	As the construction site is located in the forest area used by birds for nesting, the nesting season (May - August) may preclude summer clearing activities as recommended by the EA panel leading to project delay and extra costs to comply	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	6
R110	C4	Post-Award Drawings (C4)	As tender drawings are not supposed to be the C4 construction drawings, late changes after the contract's award may occur leading to extra costs	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R118	C4	Adverse Weather (C4)	As several C4 construction activities are planned for winter, abnormal winter weather (low temperatures, snow storms, snow falls, etc.) may occur during the construction leading to lower productivity, construction delay and safety risks	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	6
R120	C4	Construction Permits (C4)	As several dozens of C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Schedule Driven Cost			Major	10,000-100,000	Possible	1% - 50%	12
R122	C4	Logistics (C4)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C4 equipment & materials to the sites that leads to schedule delays and extra costs	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R124	C4	Construction Labour Availability (C4)	Due to a) features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.); b) planning of power line construction in various (remote) areas of NL, the lack of quantity of construction manpower may lead to C4 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Risk Event (Cost)			Extreme	>100,000	Likely	50% - 90%	20
R129	C4	Construction Labour Productivity (C4)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C4 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Ranges (Cost)			Major	10,000-100,000	Likely	50% - 90%	16

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R135	C4	Contractor's Errors/ Omissions (C4)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C4 re-work, extra costs and schedule delay	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R137	C4	Design & Manufacturing Errors/ Omissions (C4)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C4 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Risk Event (Cost)			Minor	100 - 1,000	Unlikely	0.1% - 1%	4
R151	C4	Geotech vs. Claims (C4)	As detail geotech study data are not available during C4 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	6
R155	C4	Optimisation of the Conservative Design (C4)	As conservative design approach ("worst case" scenarios) is used at C4 early design phases for all three components due to lack of design input data and multiple inputs (interfaces), it could be possible to optimise the design in the course of engineering development leading to cost reductions, accelerated schedules and better constructability	O	Ranges (Cost)			Moderate	1,000 - 10,000	Likely	50% - 90%	12
R159	C4	Supplier's QA/QC (C4)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C4 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Risk Event (Cost)			Minor	100 - 1,000	Possible	1% - 50%	6
R163	C4	Interfaces (C4)	As multiple complex hard & soft C4 interfaces require inputs from project components and disciplines and outputs to contractors, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Likely	50% - 90%	12
R165	C4	Availability of SLI Construction Management Personnel (C4)	Due to features of the labour market in NL and lack of qualified C4 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R3	LCP	EA Release Special Conditions	Due to high interest of the government, general public and NGO's in the LCP, special conditions may be attached to the project permits (EA vs. Environmental Protection Plan) resulting in scope change, schedule delays and extra costs to comply	T	N/A: Umbrella			Major	10,000-100,000	Possible	1% - 50%	12
R52	LCP	Contracting Strategy Adjustments	Due to heated market conditions or financing constraints, LCP may need to change contracting strategy, causing delays in schedule and increase in cost	T	N/A: Umbrella			Major	10,000-100,000	Possible	1% - 50%	12
R54	LCP	RFP/ Contract Quality	As an intent to maintain project schedule when working under time crunch or due to incomplete contracting strategy, fast tracking approach towards RFP/ contracts development and deviation from established procurement/ contracting procedures might be adopted that lead to sub-standard, incomplete or inadequate package scopes and unclearly defined contractual obligations in terms of scope, cost, schedule, quality, safety	T	Risk Event (Cost)			Major	10,000-100,000	Possible	1% - 50%	12
R69	LCP	Knowledge Transfer	Due to maturity of owner and wealth of experience, opportunity exist for interfacing between Nalcor and SLI on existing system and hvdc system	O		OPERATIONS: to exclude		Moderate	1,000 - 10,000	Likely	50% - 90%	12
R72	LCP	Final Project Integration	Due to complexity, overall integration of all LCP components and activities plus external Island Link prior to project commissioning, may represent significant challenge leading to overall delay of commissioning	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R77	LCP	Class of Estimate & Cost Escalation	Because the base estimate for DG3 is preliminary and done in money of the base period, the real pricing in the time of purchasing may be different due to market conditions then, leading to extra costs	T	Ranges (Cost)			Major	10,000-100,000	Almost Certain	>90%	20
R80	LCP	Early Procurement	Due to volatility of equipment pricing, early procurement of equipment could result in lower cost and allow some float in the schedule	O	Risk Event (Cost)	opportunity		Moderate	1,000 - 10,000	Likely	50% - 90%	12

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R84	LCP	Operation Staff	Due to current limited number of operators within Nalcor, understaffing during commissioning and operations may occur, leading to commissioning delay, start of operations and lower acet productivity	T		OPERATIONS: to exclude		Moderate	1,000 - 10,000	Possible	1% - 50%	9
R86	LCP	Sourcing Globally	Due to slow economy in some parts of the world, opportunity could be exploited to source services from markets all over the world giving rise to cost savings	O	Risk Event (Cost)	opportunity		Major	10,000-100,000	Possible	1% - 50%	12
R141	LCP	Innu Involvement/ IBA	Due to intimate involvement of Innu people in delivery of the project (IBA), there might be instances of negative influence on LCP contracting, permitting, labour relations, that leads to narrower choices of contractors, suppliers and labour, issues with environmental monitoring and permitting (destruction of land and hunting areas during construction, etc.) leading to extra costs, schedule delays, safety issues, etc.	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R144	LCP	Spare Parts v. RAM	As RAM analysis for whole system has yet to be carried out according to declared level of availability, spare part requirements could be too conservative and become an additional OpEx cost that leads to poorer project economics and lower attractiveness for stakeholders	T		OPERATIONS: to exclude		Moderate	1,000 - 10,000	Possible	1% - 50%	9
R156	LCP	SLI - Nalcor Contract, Coordination and Alignment	As a) coordination between SLI and Nalcor reflects current contract between the organisations; b) different organisational approaches/ cultures exist as related to the contract interpretation and decision making; c) lack of staffing in both organisations takes place, the lack of alignment and decision-making efficiency could occur, leading to non timely decision making, lower quality of decisions, re-work, schedule delay and extra costs	T	Ranges (Cost)			Major	10,000-100,000	Likely	50% - 90%	16
R157	LCP	Facilities Sharing	As each component develops all required facilities independently (including accommodation), there could be an opportunity to share facilities and optimise their use among components, leading to overall CapEx reduction	O	Risk Event (Cost)	opportunity		Moderate	1,000 - 10,000	Likely	50% - 90%	12
R172	LCP	Construction Labour Availability -LCP	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may occur leading to LCP schedule delay and extra labour costs to attract as well as giving rise to reduction of quality of works, safety risks impact, etc.	T	N/A: Umbrella			Extreme	>100,000	Likely	50% - 90%	20
R173	LCP	Construction Labor Productivity - LCP	Due to a) features of the labour market in NL, b) issues with availability of skilled workers, c) labour agreement with Unions; d) inadequate organisation of construction works, the available construction manpower may have lower productivity than assumed in LCP base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Ranges (Cost)			Extreme	>100,000	Likely	50% - 90%	20
R175	LCP	Sensitive Areas -LCP	Due to exposure of C1, C3, C4 to sensitive areas (archeological sites, fish habitat, terrestrial habitat, bird nesting), delays may occur with permit's obtaining and start of construction works which leads to work stoppage and overall project delay	T	N/A: Umbrella			Major	10,000-100,000	Possible	1% - 50%	12
R176	LCP	Construction Permits LCP	As several dozens of C1, C3, C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	N/A: Umbrella			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R177	LCP	Contractor's Availability - LCP	As several mega projects are planned in North America related to hydro power generation and transmission, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	T	N/A: Umbrella			Extreme	>100,000	Almost Certain	>90%	25

LCP COST RISKS AFTER ADDRESSING												
ID	Comp	Risk Title	Risk Description	Risk	Factor	Comments on Factor	Correlations	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R178	LCP	Interfaces - LCP	As multiple complex hard & soft interfaces require inputs from project components and disciplines as well as external organisations (CFLco, SOBI, etc.), efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays, failures during commissioning, etc.	T	N/A: Umbrella			Extreme	>100,000	Almost Certain	>90%	25
R179	LCP	Supplier's Availability LCP	As there is limited number of qualified suppliers in a situation of a heated market it could be difficult to engage qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	N/A: Umbrella			Major	10,000-100,000	Possible	1% - 50%	12
R182	LCP	Opposition by 'non-IBA' First Nations Groups	As a) IBA agreement covers mostly economic aspects of Innu people benefits; b) some Innu people oppose to LCP due to environmental and cultural concerns; c) some other First Nation's people (e.g., Métis) seem to wish benefiting from LCP same way as Innu people, representatives of First Nations could block the construction sites to apply pressure on LCP and to promote their agendas leading to schedule delay, extra costs and reputational damage	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R184	LCP	Unionised vs. Non-unionised Package Contracts	As a) non-unionised contracts are planned for several packages; b) significant enough difference in rates for unionised vs. non-unionised labour is expected; c) communication among unionised vs. non-unionised workers at various LCP sires is expected; e) no camp or basic camp is to be provided to non-unionised workers, strike/ unrest among non-unionised workers may occur, leading to disruption of clearing works, moving of workers to unionised contracts, schedule delays, safety and security impact, reputation damage	T	Risk Event (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9
R187	LCP	IT/ IS	Due to possible a) challenges to implement integrated IT/ IS in several project locations; b) requirements to effectively support construction management, project/ document control (including progress management); c) requirements to integrate vendors; d) differences in Nalcor and SLI corporate IT/IS; e) budget restrictions; adopted IT/ IS could be breached or have low efficiency, leading to loss of critical data, lower efficiency of project & document controls and construction management, lower level of vendor integration, schedule delay and project extra costs.	T	Ranges (Cost)			Moderate	1,000 - 10,000	Possible	1% - 50%	9

Corporate Risk: Extreme impact along with rare probability (usually). If occurs it distroys baseline - that would be another project (if at all
In case a risk has deterministic **score 1 - 5** after addressing it is considered acceptable with nearly zero residual impact after addressing (except for risks with extreme impacts and rare probabilities - corporate risks
Ranges means there is no risk event - general uncertainty around durations of normal activities
Umbrellas used at LCP level to coordinate managing correpsponding risks at the component level - corresponding risks are taken in to account at the component level
Conditional branching points to possibility to be late to complete an activity during allowed seasonal construction window, so that the activity should be put off untill next construction window, schedule driven costs are associate
Schedule driven costs: extra costs due to schedule delays (burn rate x delay), will be taken into account through special procedure (including delays to base estimate), excluded from cost risk mode

LCP SCHEDULE RISKS AFTER ADDRESSING EXCLUDED FROM PROBABILISTIC RISK REGISTER (40 risks)																						
DEFINITION								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS	
															P10	ML	P90	Min	Max			
R13	C1	Safety vs. Heavy Equipment (C1)	Due to use of heavy equipment for civil works and road construction (and in constraint space in some areas), incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C1									
R14	C1	Safety vs. Construction Hazards (C1)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, working close to moving water, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C1									
R15	C1	Safety vs. Traffic Incidents (C1)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C1									
R23	C1	Employment Expectations	As local people and truck owners/ drivers from neighbouring provinces have employment expectations associated with LCP, the construction site might get blocked at the beginning of construction which leads to construction delays, security issues and reputational impact	T	External	Risk Event (Schedule)		Insignigicant	< 7	Possible	1% - 50%	3	early works									
R28	C1	Riverside Cofferdam Catastrophic Flooding	As certain flooding reliability design factors are used for cofferdam design (one in 20 years events), a flooding might happen that exceed the reliability design factors used leading to catastrophic failure of the cofferdam, injuries/ fatalities, loss of equipment and reputational damage	T	Technical	Corporate Risk		Extreme	> 360	Rare	<0.1%	5	EXCLUDED: no mapping									
R30	C1	Loss of Power Supply	As a switch from temporary 25 kV transmission line to permanent 315 kV line is planned before reservoir flooding, temporary loss of power supply to the site/ camp may occur during the switch that is not covered by emergency generators leading to interruption of construction and camp operations	T	Construction	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	?? To specify the moment									
R41	C1	Spillway Operation Failure in Construction	Due to spillway gates obstruction by debris and failure of gates to operatate, the spillway operation might be limited, leading to overtopping, site flooding and loss of the cofferdam as well as to environmental and safety consequences	T	Construction	Corporate Risk		Extreme	> 360	Rare	<0.1%	5	no mapping									
R45	C1	Reservoir Induced Seismic Activity	As sometimes flooding of a reservoir triggers seismic activity, the induced seismic activity during flooding may cause damage to dam structures, leading to extra cost to repair the damage or even catastrophic disruption of a dam	T	Technical	Corporate Risk		Extreme	> 360	Rare	<0.1%	5	no mapping									
R56	C1	Powerhouse Flooding	Due to failure to identify the risks, inadequate procedures or not following procedures (including human errors and pump stoppage) powerhouse flooding may occur leading to loss of lives and equipment	T	Technical	Corporate Risk		Extreme	> 360	Rare	<0.1%	5	no mapping									
R83	C1	Site Safety Coordination (C1)	Due to involvement of multiple organizations at the C1 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C1									
R67	C3	Electrode vs. EA Release Special Condition	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, a special condition may be attached to EA release to use the metallic return leading to cost implications and critical delay	T	Regulatory	Corporate Risk		Extreme	> 360	Possible	1% - 50%	15	Another risk R-70 is about "normal" delay during hearings									
R75	C3	Outage Planning	Due to features of the communication process and decision making, timely scheduling of outages during commissioning to switch power on may become challenging leading to schedule delay and late completion date as well as safety impact	T	Commissioning & Start-up	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each commissioning package C3									
R82	C3	Site Safety Coordination (C1)	Due to construction period of equipment in non-energized environment, risk exist when commissioning equipment	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each commissioning package C3									
R98	C3	Safety vs. Heavy Equipment (C3)	Due to use of heavy equipment by C3 for civil works incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C3									
R100	C3	Safety vs. Construction Hazards (C3)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C3									
R102	C3	Safety vs. Traffic Incidents (C3)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C3									
R107	C3	Safety vs. Schedule Acceleration (C3)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C3									
R117	C3	Adverse Winter Weather (C3)	As several C3 construction activities are planned for winter, abnormal winter weather (low temperatures, snow storms, snow falls, etc.) may occur during the construction leading to lower productivity, construction delay and safety risks	T	Construction	Risk Event (Schedule)		Minor	7 – 30	Rare	<0.1%	2	each construction package C3 with winter exposure									
R128	C3	Construction Labor Productivity (C3)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C3 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, etc.	T	Construction	Ranges (Schedule)		Major	90 - 360	Likely	50% - 90%	16	to take into account in all construction packages C3									
R150	C3	Geotech vs. Claims (C3)	As detail geotech study data are not available during C3 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Commercial	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	civil works C3									
R170	C3	Site Safety Coordination (C3)	Due to involvement of multiple organizations at the C3 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C3									
R93	C4	Remote Site Logistics (C4)	As construction of transmission lines is planned in several remote location (especially in Labrador) and delivery to these sites are possible only in certain season windows, logistics difficulties to deliver construction equipment, materials and crews may occur leading to extra logistics costs, schedule delay (including triggering delays till next window) and safety impact	T	Commercial	Conditional Branching		Moderate	30 - 90	Rare	< 0.1%	3	DELIVERY WINDOW to Labrador C4	"normal" logistics; R-122								
R99	C4	Safety vs. Heavy Equipment (C4)	Due to use of heavy equipment by C4 for civil works incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4									

DEFINITION								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING										
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS		
															P10	ML	P90	Min	Max				
R101	C4	Safety vs. Construction Hazards (C4)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4										
R103	C4	Safety vs. Traffic Incidents (C4)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4										
R108	C4	Safety vs. Schedule Acceleration (C4)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4										
R110	C4	Post-Award Drawings (C4)	As tender drawings are not supposed to be the C4 construction drawings, late changes after the contract's award may occur leading to extra costs and delays	T	Commercial	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4										
R112	C4	Wild Fires (C4)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C4 camp & site evacuation, injuries/ fatalities or loss of equipment, delays	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4										
R129	C4	Construction Labour Productivity (C4)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C4 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Construction	Ranges (Schedule)		Major	90 - 360	Likely	50% - 90%	16	to take into account in all construction packages C4										
R171	C4	Site Safety Coordination (C4)	Due to involvement of multiple organizations at the C4 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4										
R180	C4	Transmission Line River Crossing vs. TSS (CD0512)	As part of the Construction Power Supply package scope includes river crossing and clearing of the river bank area, these activities could disturb and contaminate the river giving rise to higher Total Suspended Solids (TSS) levels (Standard: TSS <30 p.p.m.) and leading to extra costs and delays to comply with regulations	T	Environmental	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	CD 0512										
R144	LCP	Spare Parts v. RAM	As RAM analysis for whole system has yet to be carried out according to declared level of availability, spare part requirements could be too conservative and become an additional OpEx cost that leads to poorer project economics and lower attractiveness for stakeholders	T	Operations	John Mallam (NE)	excluded as operation's risk	Moderate	30 - 90	Possible	1% - 50%	9	OPERATIONS - excluded										
R156	LCP	SLI - Nalcor Contract, Coordination and Alignment	As a) coordination between SLI and Nalcor reflects current contract between the organisations; b) different organisational approaches/ cultures exist as related to the contract interpretation and decision making; c) lack of staffing in both organisations takes place, the lack of alignment and decision-making efficiency could occur, leading to non timely decision making, lower quality of decisions, re-work, schedule delay and extra costs	T	Organisational/ Enterprise	Ranges (Schedule)		Major	90 - 360	Likely	50% - 90%	16	to take into account in all engineering packages										
R172	LCP	Construction Labour Availability -LCP	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may occur leading to LCP schedule delay and extra labour costs to attract as well as giving rise to reduction of quality of works, safety risks impact, etc.	T	Commercial	N/A: Umbrella		Extreme	> 360	Likely	50% - 90%	20	C1: R-43; C3: R-123; C4: R-124										
R173	LCP	Construction Labor Productivity - LCP	Due to a) features of the labour market in NL, b) issues with availability of skilled workers, c) labour agreement with Unions; d) inadequate organisation of construction works, the available construction manpower may have lower productivity than assumed in LCP base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Commercial	N/A: Umbrella		Extreme	> 360	Likely	50% - 90%	20	as ranges C1: R-127; C3: R-128; C4: R-129										
R175	LCP	Sensitive Areas -LCP	Due to exposure of C1, C3, C4 to sensitive areas (archeological sites, fish habitat, terrestrial habitat, bird nesting), delays may occur with permit's obtaining and start of construction works which leads to work stoppage and overall project delay	T	Regulatory	N/A: Umbrella		Major	90 - 360	Possible	1% - 50%	12	C1: R-10, R-19, R-20, R-21; C3: -; C4: R-105, R-106										
R176	LCP	Construction Permits -LCP	As several dozens of C1, C3, C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory	N/A: Umbrella		Extreme	> 360	Possible	1% - 50%	15	C1: R-36; C3: R-119; C4: R-120										
R177	LCP	Contractor's Availability - LCP	As several mega projects are planned in North America related to hydro power generation and transmission, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	T	Commercial	N/A: Umbrella		Extreme	> 360	Almost Certain	>90%	25	C1: R-44; C3: R-123; C4: R-85										
R178	LCP	Interfaces - LCP	As multiple complex hard & soft interfaces require inputs from project components and disciplines as well as external organisations (CFLco, SOBI, etc.), efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays, failures during commissioning, etc.	T	Interface	N/A: Umbrella		Extreme	> 360	Almost Certain	>90%	25	C1: R-64; C3: R-162; C4: R-163										
R179	LCP	Supplier's Availability - LCP	As there is limited number of qualified suppliers in a situation of a heated market it could be difficult to engage qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Commercial	N/A: Umbrella		Major	90 - 360	Possible	1% - 50%	12	C1: R-147; C3: R-115; C4: R-68										
R187	LCP	IT/ IS	Due to possible a) challenges to implement integrated IT/ IS in several project locations; b) requirements to effectively support construction management, project/ document control (including progress management); c) requirements to integrate vendors; d) differences in Nalcor and SLI corporate IT/IS; e) budget restrictions; adopted IT/ IS could be breached or have low efficiency, leading to loss of critical data, lower efficiency of project & document controls and construction management, lower level of vendor integration, schedule delay and project extra costs.	T	Organisational/ Enterprise	Ranges (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each engineering, supply & construction package C4										

Corporate Risk: Extreme impact along with rare probability (usually). If occurs it distroys baseline - that would be another project (if at all'
In case a risk has deterministic **score 1 - 5** after addressing it is considered acceptable with nearly zero residual impact after addressing (except for risks with extreme impacts and rare probabilities - corporate risks'
Ranges means there is no risk event - general uncertainty around durations of normal activities
Umbrellas used at LCP level to coordinate managing correpsonding risks at the component level - corresponding risks are taken in to account at the component level
Conditional branching points to possibility to be late to complete an activity during allowed seasonal construction window, so that the activity should be put off untill next construction window

DEFINITION								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING								
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS
															P10	ML	P90	Min	Max		

LCP SCHEDULE RISKS AFTER ADDRESSING																						
DEFINITION								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS	
																P10	ML	P90	Min	Max		
R5	C1	Accommodation Capacity	As starter camp for construction is designed for about 150 workers and accommodation for about 500 workers in Sep. 2012 will be needed, available accommodation in neighboring Goose Bay might not meet the accommodation requirements leading to initial lack of workers at the beginning of construction	T	Construction	Risk Event (Schedule)		Moderate	30 - 90	Likely	50% - 90%	12	early works									
R9	C1	Excavation vs. Water Contamination	As a result of excavation works and use of explosives, level of water contamination in stilling basin may exceed acceptable level (oil, sediment, explosive's residues, etc.) leading to extra costs and delays to comply with regulations.	T	Construction	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	excavation									
R10	C1	Archeological Sites (C1)	As the C1 construction area is known for archeological significance, delays may occur with permit's obtaining and start of excavation works which leads to work stoppage and overall project delay	T	Regulatory	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	civil works									
R12	C1	Riverside Cofferdam Options vs. Schedule	As cost effective option for the river side cofferdam is selected (concrete dam), the option under consideration may require more time to construct leading to delay of the cofferdam completion that causes overtopping and site flooding	T	Technical	Risk Event (Schedule)	Could be onditional branching	Extreme	> 360	Unlikely	0.1% - 1%	10	riverside cofferdam construction									
R13	C1	Safety vs. Heavy Equipment (C1)	Due to use of heavy equipment for civil works and road construction (and in constraint space in some areas), incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 -- 30	Unlikely	0.1% - 1%	4	each construction package C1									
R14	C1	Safety vs. Construction Hazards (C1)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, working close to moving water, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 -- 30	Unlikely	0.1% - 1%	4	each construction package C1									
R15	C1	Safety vs. Traffic Incidents (C1)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 -- 30	Unlikely	0.1% - 1%	4	each construction package C1									
R18	C1	Clearing Windows	As the reservoir clearing is not possible during ice forming (early winter) and ice breaking (late spring) any delay in preceding activities may lead to missing of the clearing windows resulting in overall project delay	T	Construction	Conditional Branching		Moderate	30 - 90	Possible	1% - 50%	9	CONSTRUCTION WINDOW: clearing package									
R19	C1	Fish Habitat (C1)	As requirements by DFO on fish habitat replacement are very likely and are not fully factored in to the base estimate, the requirement to replace the habitat may be significant by DFO leading to extra costs and schedule delays	T	Environmental	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	???									
R20	C1	Terrestrial Habitat (C1) (Loss of Wetlands)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs and schedule delays	T	Environmental	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	clearing package									
R22	C1	Safety vs. Schedule Acceleration (C1)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	T	HSS	Risk Event (Schedule)		Minor	7 -- 30	Possible	1% - 50%	6	each construction package C1									
R23	C1	Employment Expectations	As local people and truck owners/ drivers from neighbouring provinces have employment expectations associated with LCP, the construction site might get blocked at the beginning of construction which leads to construction delays, security issues and reputational impact	T	External	Risk Event (Schedule)		Insignigicant	< 7	Possible	1% - 50%	3	early works									
R24	C1	Contractor's Coordination/ Powerhouse	As construction of powerhouse is to be carried out by several contractors, lack of coordination and clear contractual responsibilities especially in case of unforeseen conditions may become a source of extra claims leading to schedule delays and capital overspending	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	powerhouse packages									
R26	C1	Spillway Construction Window	As A) construction of the spillway is to be fulfilled during an "ice-free" window, B) there is no float in schedule with predecessor activities (EA release, camp, road, etc.), any delay in previous activities may trigger missing of the window which results in schedule delay	T	Construction	Conditional Branching		Major	90 - 360	Possible	1% - 50%	12	CONSTRUCTION WINDOW: spillway construction									
R28	C1	Riverside Cofferdam Catastrophic Flooding	As certain flooding reliability design factors are used for cofferdam design (one in 20 years events), a flooding might happen that exceed the reliability design factors used leading to catastrophic failure of the cofferdam, injuries/ fatalities, loss of equipment and reputational damage	T	Technical	Corporate Risk		Extreme	> 360	Rare	<0.1%	5	EXCLUDED: no mapping									
R29	C1	Wild Fires (C1)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C1 camp & site evacuation, injuries/ fatalities or loss of equipment	T	HSS	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	each construction package C1									
R30	C1	Loss of Power Supply	As a switch from temporary 25 kV transmission line to permanent 315 kV line is planned before reservoir flooding, temporary loss of power supply to the site/ camp may occur during the switch that is not covered by emergency generators leading to interruption of construction and camp operations	T	Construction	Risk Event (Schedule)		Minor	7 -- 30	Unlikely	0.1% - 1%	4	?? To specify the moment									
R31	C1	T&G Late Design Changes	Some reasons for design changes during the T&G equipment manufacturing may be put forward by the customers leading to extra costs and schedule delays to accommodate the changes in design and civil works	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	T&G package									
R33	C1	Manufacturing Labour Availability (C1)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C1 costs and schedule delays	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C1									
R36	C1	Construction Permits (C1)	As several dozens of C1 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory	Risk Event (Schedule)		Extreme	> 360	Possible	1% - 50%	15	each construction package C1									
R37	C1	Logistics (C1)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C1 equipment & materials to the sites that leads to schedule delays and extra costs	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C1 except T&G (R-51)									

DEFINITION								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS	
															P10	ML	P90	Min	Max			
R38	C1	Riverside Cofferdam Height vs. Late Start & Construction Delays	Due to delays with predecessor's activities and various difficulties and delays with construction of the cofferdam (selected concrete option), there might be not enough time to construct high enough cofferdam on time (mid-January 2013) leading to a) overtopping the cofferdam, b) flooding the excavation area, c) loss of cofferdam and giving rise to safety and environmental impacts	T	Construction	Conditional Branching		Extreme	> 360	Unlikely	0.1% - 1%	10	CONSTRUCTION WINDOW: cofferdam construction									
R40	C1	River Closure Failure	a) As river closure and construction of the upstream cofferdam is planned for summer (when normally level of water is lowest); b) the main dam fill-in material compaction (clay in water) is possible only before freezing temperatures, unusually high level of water could occur that prevents river closure by the upstream cofferdam on time and leads to a) missed window (before October) to finish the cofferdam at level 20m; b) lower height of the cofferdam by spring flooding, its overflowing and loss	T	Construction	Conditional Branching	CORPORATE RISK if occurs	Extreme	> 360	Rare	<0.1%	5	CONSTRUCTION WINDOW: U/S cofferdam									
R41	C1	Spillway Operation Failure in Construction	Due to spillway gates obstruction by debris and failure of gates to operate, the spillway operation might be limited, leading to overtopping, site flooding and loss of the cofferdam as well as to environmental and safety consequences	T	Construction	Corporate Risk		Extreme	> 360	Rare	<0.1%	5	no mapping									
R43	C1	Construction Labour Availability (C1)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C1 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Construction	Risk Event (Schedule)		Extreme	> 360	Likely	50% - 90%	20	each construction package C1									
R44	C1	Contractors' Availability (C1)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/qualified on-site contractors that leads to premium costs to attract, inflated C1 construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	15	each construction package C1									
R45	C1	Reservoir Induced Seismic Activity	As sometimes flooding of a reservoir triggers seismic activity, the induced seismic activity during flooding may cause damage to dam structures, leading to extra cost to repair the damage or even catastrophic disruption of a dam	T	Technical	Corporate Risk		Extreme	> 360	Rare	<0.1%	5	no mapping									
R49	C1	T&G Quality Issues	Potential quality control issue in manufacturing of turbines and generators may lead to cost, schedule delay or in use operability or reliability issues	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	T&G supply package									
R51	C1	Major Equipment Delivery (C1): Planning	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones might not be met leading to overall C1 schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	T&G supply package only (other C1 packages: R-37)									
R56	C1	Powerhouse Flooding	Due to failure to identify the risks, inadequate procedures or not following procedures (including human errors and pump stoppage) powerhouse flooding may occur leading to loss of lives and equipment	T	Technical	Corporate Risk		Extreme	> 360	Rare	<0.1%	5	no mapping									
R57	C1	Commissioning Failures (C1)	As "stress" testing of C1 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	T	Commissioning & Start-up	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	commissioning C1									
R58	C1	Construction Debris vs. Commissioning	Due to presence of construction debris after the end of construction, these may cause problems during commissioning, leading to extra costs and schedule delays	T	Commissioning & Start-up	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	commissioning C1									
R59	C1	Contractor's Errors/ Omissions (C1)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C1 re-work, extra costs and schedule delay	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each construction package C1									
R60	C1	Design & Manufacturing Errors/ Omissions (C1)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each supply package C1									
R63	C1	Extra Cofferdam Work	As design of coffer dam foundation is done before the detail geotech study is done and a worst case scenario approach is used, additional works may be required in construction leading to extra time and schedule delay	T	Technical	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	cofferdam construction									
R64	C1	Interfaces (C1)	As multiple complex hard & soft C1interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Interface	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each engineering package C1									
R65	C1	Availability of Construction Management Personnel (C1)	Due to features of the labour market in NL and lack of qualified C1 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel by SLI may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Construction	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	each construction package C1									
R74	C1	Design Change (C1)	As final design is nearly frozen, some design elements could be transferred to/ from C1 in future even after project sanctioning, leading to re-design, re-definition of packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	T	Organisational/ Enterprise	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each engineering package C1									
R127	C1	Construction Labor Productivity (C1)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions the, available construction manpower may have lower productivity than assumed in C1 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Construction	Ranges (Schedule)		Extreme	> 360	Likely	50% - 90%	20	to take into account in all construction packages C1									
R147	C1	Supplier Availability (C1)	As there is limited number of qualified C1 suppliers in a situation of a heated market it could be difficult to engage at least one of qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C1									
R153	C1	Conservative Design (C1)	As conservative design approach ("worst case" scenarios) is used at C1 early design phases for all three components due to lack of design input data and multiple inputs (interfaces), it could be possible to optimise the design in the course of engineering development leading to cost reductions, accelerated schedules and better constructability	O	Technical	Risk Event (Schedule)	opportunity	Moderate	30 - 90	Likely	50% - 90%	12	each construction package C1									

DEFINITION							DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS
															P10	ML	P90	Min	Max		
R174	C1	T&G Package Bid Closing & Negotiations	As A) T&G bid closing is delayed for 1.5 mos (9-Dec-2011 => 27-Jan-2012); B) Bid closing is followed by negotiations; C) negotiations are followed by the T&G contract award (still the same date as planned before the bid closing delay) D) T&G award is followed by the civil works (bulk excavation & concrete) with a 1 month float, negotiations could not absorb the bid closing delay or might take more time than planned in master schedule, giving rise to delay of civil works and "domino effect" of delays down the line in the LCP master schedule	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	T&G supply package (procurement)								
R183	C1	Rollway Construction vs. Impoundment	As a) for stability purposes it is necessary to partially construct two rollways following the spring flood of 2016 up to elevation 10m before full impoundment to elevation 39.0m; b) The rollways will start at elevation 5m and will go up to elevation 15.7m when fully complete; c) It is anticipated that it will take approximately 45 days to partially construct the rollways to elevation 10m, delays in construction of the rollways could impact on the impoundment schedule leading to overall C1 construction delay	T	Construction	Conditional Branching		Moderate	30 - 90	Possible	1% - 50%	9	impoundment 2								
R185	C1	Main Camp Capacity	As a) current baseline is to build a main C1 camp for 1,500 people; b) comparison with other similar projects (comparable volume of concrete works, etc.) pointed to higher number of required workers due to safety requirements, lower productivity, rotation, etc., planned camp capacity could not satisfy project requirements at peak of works leading to schedule delay	T	Construction	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	concrete works C1								
R188	C1	Impoundment in Winter: Head Pond (12.5 - 25M)	Due to a need to carry out head pond impoundment in winter, increasing of water level from natural 12.5m to 25m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair).	T	Technical	Conditional Branching		Moderate	30 - 90	Unlikely	0.1% - 1%	6	impoundment 1								
R189	C1	Impoundment in Winter (25 - 39m)	In case of powerhouse late completion and, hence, due to the need to carry out impoundment in winter to prevent possible revenue loss, increasing of water level from 25m to 39m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair, delay of commissioning).	T	Technical	Conditional Branching		Moderate	30 - 90	Unlikely	0.1% - 1%	6	impoundment 2								
R21	C1	Bird Nesting (C1)	As the C1 construction site is located in the forest area used by birds for nesting, the nesting season (May - August) may preclude summer clearing activities as recommended by the EA panel leading to project delay	T	Environmental	Risk Event (Schedule)	could be conditional branching	Moderate	30 - 90	Possible	1% - 50%	9	clearing package								
R25	C1	Post-Award Drawings (C1)	As T&G tender drawings are not supposed to be the C1 construction drawings, late changes after the contract's award may occur leading to extra costs and schedule delays to start civil works	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	civil works C1								
R61	C1	Supplier's QA/QC (C1)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C1 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C1								
R83	C1	Site Safety Coordination (C1)	Due to involvement of multiple organizations at the C1 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C1								
R67	C3	Electrode vs. EA Release Special Condition	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, a special condition may be attached to EA release to use the metallic return leading to cost implications and critical delay	T	Regulatory	Corporate Risk		Extreme	> 360	Possible	1% - 50%	15	Another risk R-70 is about "normal" delay during hearings								
R70	C3	Electrode Return vs. Delay	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, the electrode use may be challenged during permitting process leading to schedule delay	T	Regulatory	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	Another risk R-67 is corporate risk if metal return is required								
R71	C3	CFLco - Nalcor Interface	Possibility of interface with CFLco (Hydro Quebec) not being managed well, could lead to non timely decision making	T	External	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	CF switchyard construction package								
R75	C3	Outage Planning	Due to features of the communication process and decision making, timely scheduling of outages during commissioning to switch power on may become challenging leading to schedule delay and late completion date as well as safety impact	T	Commissioning & Start-up	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each commissioning package C3								
R76	C3	Maritime Link Assumptions	Changes in reliability assumptions made for maritime link could change scope and may cause schedule delay and increase cost	T	Interface	Risk Event (Schedule)	relevant?	Major	90 – 360	Possible	1% - 50%	12	to discuss if risk is relevant any more								
R78	C3	System Integration and Commissioning	Due to need to coordinate commissioning at multiple sites between CFLco, NL Hydro and SNC, lack of experienced personnel may take place leading to schedule and cost impact	T	Commissioning & Start-up	Risk Event (Schedule)		Minor	7 – 30	Likely	50% - 90%	8	each commissioning package C3								
R79	C3	Transformer Testing	Due to possibility of transformer test failure at site, the failure could occur requiring transportation of the transformer back to workshop and causing schedule delay and increased cost	T	Commissioning & Start-up	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	transformer installation package								
R82	C3	Site Safety Coordination (C1)	Due to construction period of equipment in non-energized environment, risk exist when commissioning equipment	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each commissioning package C3								
R98	C3	Safety vs. Heavy Equipment (C3)	Due to use of heavy equipment by C3 for civil works incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C3								
R100	C3	Safety vs. Construction Hazards (C3)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C3								
R102	C3	Safety vs. Traffic Incidents (C3)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C3								
R107	C3	Safety vs. Schedule Acceleration (C3)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C3								
R109	C3	Post-Award Drawings (C3)	As tender drawings are not supposed to be the C3 construction drawings, late changes after the contract's award may occur leading to extra costs	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	each construction package C3								

DEFINITION								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS	
															P10	ML	P90	Min	Max			
R111	C3	Wild Fires (C3)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C3 camp & site evacuation, injuries/ fatalities or loss of equipment	T	HSS	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	each construction package C3									
R115	C3	Manufacturing Capacity & Availability (C3)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C3 costs and schedule delays	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each supply package C3									
R117	C3	Adverse Winter Weather (C3)	As several C3 construction activities are planned for winter, abnormal winter weather (low temperatures, snow storms, snow falls, etc.) may occur during the construction leading to lower productivity, construction delay and safety risks	T	Construction	Risk Event (Schedule)		Minor	7 – 30	Rare	<0.1%	2	each construction package C3 with winter exposure									
R119	C3	Construction Permits (C3)	As several dozens of C3 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each construction package C3									
R123	C3	Construction Labour Availability (C3)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C3 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Commercial	Risk Event (Schedule)		Extreme	> 360	Likely	50% - 90%	20	each construction package C3									
R125	C3	Contractors' Availability (C3)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C3 construction costs, lower productivity, less attractive contract terms for LCP, safety impact, etc.	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	each construction package C3									
R128	C3	Construction Labor Productivity (C3)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C3 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, etc.	T	Construction	Ranges (Schedule)		Major	90 - 360	Likely	50% - 90%	16	to take into account in all construction packages C3									
R130	C3	Major Equipment Delivery (C3) Planning	As a result of poor scheduling, logistics planning, schedule risks and interface management, major contract delivery milestones might not be met, leading to overall C3 schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C3									
R132	C3	Commissioning Failures (C3)	As "stress" testing of C3 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	T	Commissioning & Start-up	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	commissioning C3									
R134	C3	Contractor's Errors/ Omissions (C3)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C3 re-work, extra costs and schedule delay	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each construction package C3									
R136	C3	Design & Manufacturing Errors/ Omissions (C3)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C3 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each supply package C3									
R150	C3	Geotech vs. Claims (C3)	As detail geotech study data are not available during C3 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Commercial	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	civil works C3									
R152	C3	Fiber Optic Line (C3)	As the fiber optic line development is not part of the LCP project and is to be developed by Bell Aliant, timely availability of fiber optic communication might become problematic leading to issues with coordination of sites, crews, contractors, etc. and safety issues	T	Technical	Risk Event (Schedule)		Minor	7 – 30	Possible	1% - 50%	6	each construction package C3									
R158	C3	Supplier's QA/QC (C3)	Due to failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C3 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package c3									
R162	C3	Interfaces (C3)	As multiple complex hard & soft C3 interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Interface	Risk Event (Schedule)		Moderate	30 - 90	Likely	50% - 90%	12	each engineering, supply & construction package C3									
R164	C3	Availability of Construction Management Personnel (C3)	Due to features of the labour market in NL and lack of qualified C3 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Construction	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	each construction package C3									
R168	C3	Scope Change (C3)	As final scope is not frozen, some scope elements could be transferred to/ from C3 in future even after project sanctioning, leading to re-design, re-definition of corresponding packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	T	Organisational/ Enterprise	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each engineering, supply & construction package C3									
R170	C3	Site Safety Coordination (C3)	Due to involvement of multiple organizations at the C3 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C3									
R68	C4	Insulator Supplier Availability (hvdc) (C4)	As there is limited number of qualified C4 HVdc suppliers for insulators supply (2 suppliers only), in a situation of a heated market it could be difficult to engage at least one of them on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Unlikely	0.1% - 1%	6	insulator supply package									
R85	C4	HVdc & HVac Contractor Availability (C4)	As several other transmission line projects are planned in North America, it might become difficult to attract skilled on-site contractors that leads to higher construction costs, lower productivity and less attractive for LCP contracting terms	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	each construction package HVac & HVdc									
R87	C4	Weather and Pollution Design Data (C4)	As limited amount of historic data is available for transmission line design in NL, quality of the design may suffer resulting in suboptimal solutions, extra costs, re-work, schedule delays and reputational impact	T	Technical	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	engineeting C4									
R89	C4	RoW (C4)	Due to features of land registry in the province, it will be difficult to identify all land owners along route thay leads to surprises in land ownerships and claims from owners	T	External	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	permits after EA release C4									
R92	C4	Late Design Change (C4)	As late design criteria change initiated by customer for transmission line is possible, redesign may occur leading to re-definition of corresponding packages, schedule delay and extra costs	T	Technical	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each engineering, supply and construction package C4									

DEFINITION								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS	
															P10	ML	P90	Min	Max			
R93	C4	Remote Site Logistics (C4)	As construction of transmission lines is planned in several remote location (especially in Labrador) and delivery to these sites are possible only in certain season windows, logistics difficulties to deliver construction equipment, materials and crews may occur leading to extra logistics costs, schedule delay (including triggering delays till next window) and safety impact	T	Commercial	Conditional Branching		Moderate	30 - 90	Rare	< 0.1%	3	DELIVERY WINDOW to Labrador C4	"normal" logistics; R-122								
R94	C4	Helicopter Use in Labrador for HVac (C4)	In some remote areas of Labrador use of helicopter could be considered as opportunity to reduce labour numbers and accelerate the schedule	O	Construction	Risk Event (Schedule)		Moderate	30 - 90	Likely	50% - 90%	12	HVac construction packages									
R95	C4	EA Release for HVdc (C4)	Due to delay in EA release, start of early C4 construction activities may be delayed leading to missed construction windows in some cases and overall project delay	T	Regulatory	Risk Event (Schedule)		Major	90 - 360	Likely	50% - 90%	16	permits after EA release C4									
R99	C4	Safety vs. Heavy Equipment (C4)	Due to use of heavy equipment by C4 for civil works incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4									
R101	C4	Safety vs. Construction Hazards (C4)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4									
R103	C4	Safety vs. Traffic Incidents (C4)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4									
R105	C4	Terrestrial Habitat (HVac) (C4)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs and schedule delay	T	Environmental	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	after construction?									
R106	C4	Bird Nesting (HVac) (C4)	As the construction site is located in the forest area used by birds for nesting, the nesting season (May - August) may preclude summer clearing activities as recommended by the EA panel leading to project delay	T	Environmental	Risk Event (Schedule)	could be conditional branching	Moderate	30 - 90	Possible	1% - 50%	9	each C4 construction inpackage that includes May - August activities									
R108	C4	Safety vs. Schedule Acceleration (C4)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4									
R110	C4	Post-Award Drawings (C4)	As tender drawings are not supposed to be the C4 construction drawings, late changes after the contract's award may occur leading to extra costs and delays	T	Commercial	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4									
R112	C4	Wild Fires (C4)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C4 camp & site evacuation, injuries/ fatalities or loss of equipment, delays	T	HSS	Risk Event (Schedule)		Minor	7 – 30	Unlikely	0.1% - 1%	4	each construction package C4									
R118	C4	Adverse Weather (C4)	As several C4 construction activities are planned for winter, abnormal winter weather (low temperatures, snow storms, snow falls, etc.) may occur during the construction leading to lower productivity, construction delay and safety risks	T	Construction	Risk Event (Schedule)		Minor	7 – 30	Possible	1% - 50%	6	each construction package C4 that includes winter activities									
R120	C4	Construction Permits (C4)	As several dozens of C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory	Ranges & Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	permits after EA release C4									
R122	C4	Logistics (C4)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C4 equipment & materials to the sites that leads to schedule delays and extra costs	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	all supply packages except to remote locations (R-93)									
R124	C4	Construction Labour Availability (C4)	Due to a) features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.); b) planning of power line construction in various (remote) areas of NL, the lack of quantity of construction manpower may lead to C4 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Commercial	Risk Event (Schedule)		Extreme	> 360	Likely	50% - 90%	20	each construction package C4									
R129	C4	Construction Labour Productivity (C4)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C4 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Construction	Ranges (Schedule)		Major	90 - 360	Likely	50% - 90%	16	to take into account in all construction packages C4									
R131	C4	Major Material Delivery (C4): Planning for HVac	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones for HVac might not be met leading to overall C4 schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each major HVac package									
R135	C4	Contractor's Errors/ Omissions (C4)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C4 re-work, extra costs and schedule delay	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each construction package C4									
R137	C4	Design & Manufacturing Errors/ Omissions (C4)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C4 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Completeness	Risk Event (Schedule)		Major	90 - 360	Unlikely	0.1% - 1%	8	each supply package C4									
R159	C4	Supplier's QA/QC (C4)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C4 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each supply package C4									
R163	C4	Interfaces (C4)	As multiple complex hard & soft C4 interfaces require inputs from project components and disciplines and outputs to contractors, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Interface	Risk Event (Schedule)		Moderate	30 - 90	Likely	50% - 90%	12	each engineering, supply & construction package C4									
R165	C4	Availability of SLI Construction Management Personnel (C4)	Due to features of the labour market in NL and lack of qualified C4 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Construction	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each construction package C4									

DEFINITION								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING									
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS	
															P10	ML	P90	Min	Max			
R171	C4	Site Safety Coordination (C4)	Due to involvement of multiple organizations at the C4 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	T	HSS	Risk Event (Schedule)		Minor	7 -- 30	Unlikely	0.1% - 1%	4	each construction package C4									
R180	C4	Transmission Line River Crossing vs. TSS (CD0512)	As part of the Construction Power Supply package scope includes river crossing and clearing of the river bank area, these activities could disturb and contaminate the river giving rise to higher Total Suspended Solids (TSS) levels (Standard: TSS <30 p.p.m.) and leading to extra costs and delays to comply with regulations	T	Environmental	Risk Event (Schedule)		Minor	7 -- 30	Unlikely	0.1% - 1%	4	CD 0512									
R186	C4	Major Material Delivery (C4): Planning for HVdc	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones for HVdc might not be met leading to overall C4 schedule delay	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each major HVdc package									
R3	LCP	EA Release Special Conditions	Due to high interest of the government, general public and NGO's in the LCP, special conditions may be attached to the project permits (EA vs. Environmental Protection Plan) resulting in scope change, schedule delays and extra costs to comply	T	Regulatory	N/A: Umbrella		Major	90 - 360	Possible	1% - 50%	12	C3: R-67/ R-70; C4: R-95; C1: N/A									
R52	LCP	Contracting Strategy Adjustments	Due to heated market conditions or financing constraints, LCP may need to change contracting strategy, causing delays in schedule and increase in cost	T	Commercial	N/A: Umbrella		Major	90 - 360	Possible	1% - 50%	12	taken into account through contractor/ supplier availability at comp. level									
R54	LCP	RFP/ Contract Quality	As an intent to maintain project schedule when working under time crunch or due to incomplete contracting strategy, fast tracking approach towards RFP/ contracts development and deviation from established procurement/ contracting procedures might be adopted that lead to sub-standard, incomplete or inadequate package scopes and unclearly defined contractual obligations in terms of scope, cost, schedule, quality, safety	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	each procurement activity C1, C3, C4									
R72	LCP	Final Project Integration	Due to complexity, overall integration of all LCP components and activities plus external Island Link prior to project commissioning, may represent significant challenge leading to overall delay of commissioning	T	Organisational/ Enterprise	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	commissioning C1, C3, C4									
R80	LCP	Early Procurement	Due to volatility of equipment pricing, early procurement of equipment could result in lower cost and allow some float in the schedule	O	Commercial	Risk Event (Schedule)	opportunity	Major	90 - 360	Likely	50% - 90%	16	each procurement activity C1, C3, C4									
R81	LCP	Project Controls: Packages	Due to possible a) problems with delivery of packages (quality, labour availability, etc.), b) project/ document controls under-staffing, c) difficulties to measure progress and quantities of construction packages, d) late engineering changes, some packages could be delivered with delays and increased quantities, leading to overall schedule delays and extra costs	T	Commercial	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each procurement activity C1, C3, C4									
R141	LCP	Innu Involvement/ IBA	Due to intimate involvement of Innu people in delivery of the project (IBA), there might be instances of negative influence on LCP contracting, permitting, labour relations, that leads to narrower choices of contractors, suppliers and labour, issues with environmental monitoring and permitting (destruction of land and hunting areas during construction, etc.) leading to extra costs, schedule delays, safety issues, etc.	T	External	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	C3/ C4 EA release and construction permits									
R156	LCP	SLI - Nalcor Contract, Coordination and Alignment	As a) coordination between SLI and Nalcor reflects current contract between the organisations; b) different organisational approaches/ cultures exist as related to the contract interpretation and decision making; c) lack of staffing in both organisations takes place, the lack of alignment and decision-making efficiency could occur, leading to non timely decision making, lower quality of decisions, re-work, schedule delay and extra costs	T	Organisational/ Enterprise	Ranges (Schedule)		Major	90 - 360	Likely	50% - 90%	16	to take into account in all engineering packages									
R172	LCP	Construction Labour Availability -LCP	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may occur leading to LCP schedule delay and extra labour costs to attract as well as giving rise to reduction of quality of works, safety risks impact, etc.	T	Commercial	N/A: Umbrella		Extreme	> 360	Likely	50% - 90%	20	C1: R-43; C3: R-123; C4: R-124									
R173	LCP	Construction Labor Productivity - LCP	Due to a) features of the labour market in NL, b) issues with availability of skilled workers, c) labour agreement with Unions; d) inadequate organisation of construction works, the available construction manpower may have lower productivity than assumed in LCP base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Commercial	N/A: Umbrella		Extreme	> 360	Likely	50% - 90%	20	as ranges C1: R-127; C3: R-128; C4: R-129									
R175	LCP	Sensitive Areas -LCP	Due to exposure of C1, C3, C4 to sensitive areas (archeological sites, fish habitat, terrestrial habitat, bird nesting), delays may occur with permit's obtaining and start of construction works which leads to work stoppage and overall project delay	T	Regulatory	N/A: Umbrella		Major	90 - 360	Possible	1% - 50%	12	C1: R-10, R-19, R-20, R-21; C3: -; C4: R-105, R-106									
R176	LCP	Construction Permits -LCP	As several dozens of C1, C3, C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory	N/A: Umbrella		Extreme	> 360	Possible	1% - 50%	15	C1: R-36; C3: R-119; C4: R-120									
R177	LCP	Contractor's Availability - LCP	As several mega projects are planned in North America related to hydro power generation and transmission, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	T	Commercial	N/A: Umbrella		Extreme	> 360	Almost Certain	>90%	25	C1: R-44; C3: R-123; C4: R-85									
R178	LCP	Interfaces - LCP	As multiple complex hard & soft interfaces require inputs from project components and disciplines as well as external organisations (CFLco, SOBI, etc.), efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays, failures during commissioning, etc.	T	Interface	N/A: Umbrella		Extreme	> 360	Almost Certain	>90%	25	C1: R-64; C3: R-162; C4: R-163									
R179	LCP	Supplier's Availability - LCP	As there is limited number of qualified suppliers in a situation of a heated market it could be difficult to engage qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Commercial	N/A: Umbrella		Major	90 - 360	Possible	1% - 50%	12	C1: R-147; C3: R-115; C4: R-68									
R182	LCP	Opposition by 'non-IBA' First Nations Groups	As a) IBA agreement covers mostly economic aspects of Innu people benefits; b) some Innu people oppose to LCP due to environmental and cultural concerns; c) some other First Nation's people (e.g., Métis) seem to wish benefiting from LCP same way as Innu people, representatives of First Nations could block the construction sites to apply pressure on LCP and to promote their agendas leading to schedule delay, extra costs and reputational damage	T	External	Risk Event (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each construction package C1, C3, C4									

DEFINITION								DETERMINISTIC CUMMULATIVE ASSESSMENT AFTER ADDRESSING					PROBABILISTIC ASSESSMENT AFTER ADDRESSING vs. MAPPING								
ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Schedule: Rank	Schedule: Range, day	Probability: Rank	Probability: Range	Risk Score	MAPPING: General Comments	MAPPING: Activities	Schedule Impact, d			Probability, %		Correlations	COMMENTS
															P10	ML	P90	Min	Max		
R184	LCP	Unionised vs. Non-unionised Package Contracts	As a) non-unionised contracts are planned for several packages; b) significant enough difference in rates for unionised vs. non-unionised labour is expected; c) communication among unionised vs. non-unionised workers at various LCP sires is expected; e) no camp or basic camp is to be provided to non-unionised workers, strike/ unrest among non-unionised workers may occur, leading to disruption of clearing works, moving of workers to unionised contracts, schedule delays, safety and security impact, reputation damage	T	Commercial	Risk Event (Schedule)		Major	90 - 360	Possible	1% - 50%	12	clearing package C1								
R187	LCP	IT/ IS	Due to possible a) challenges to implement integrated IT/ IS in several project locations; b) requirements to effectively support construction management, project/ document control (including progress management); c) requirements to integrate vendors; d) differences in Nalcor and SLI corporate IT/IS; e) budget restrictions; adopted IT/ IS could be breached or have low efficiency, leading to loss of critical data, lower efficiency of project & document controls and construction management, lower level of vendor integration, schedule delay and project extra costs.	T	Organisational/ Enterprise	Ranges (Schedule)		Moderate	30 - 90	Possible	1% - 50%	9	each engineering, supply & construction package C4								

Corporate Risk: Extreme impact along with rare probability (usually). If occurs it distroys baseline - that would be another project (if at all'
In case a risk has deterministic **score 1 - 5** after addressing it is considered acceptable with nearly zero residual impact after addressing (except for risks with extreme impacts and rare probabilities - corporate risks'
Ranges means there is no risk event - general uncertainty around durations of normal activities
Umbrellas used at LCP level to coordinate managing correpsonding risks at the component level - corresponding risks are taken in to account at the component level
Conditional branching points to possibility to be late to complete an activity during allowed seasonal construction window, so that the activity should be put off untill next construction window

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R5	C1	Accommodation Capacity	As starter camp for construction is designed for about 150 workers and accommodation for about 500 workers in Sep. 2012 will be needed, available accommodation in neighboring Goose Bay might not meet the accommodation requirements leading to initial lack of workers at the beginning of construction	T	Construction				Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	Medium
R9	C1	Excavation vs. Water Contamination	As a result of excavation works and use of explosives, level of water contamination in stilling basin may exceed acceptable level (oil, sediment, explosive's residues, etc.) leading to extra costs and delays to comply with regulations.	T	Construction				Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R10	C1	Archeological Sites (C1)	As the C1 construction area is known for archeological significance, delays may occur with permit's obtaining and start of excavation works which leads to work stoppage and overall project delay	T	Regulatory				Major	90 - 360	Moderate	1,000 - 10,000	Likely	50% - 90%	High
R11	C1	Optimisation of Geotech vs. Upstream Cofferdam Design	As conservative approach is used for design of the main upstream cofferdam, the base estimate may turn out to be inflated leading to capital cost savings	O	Technical						Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY
R12	C1	Riverside Cofferdam Options vs. Schedule	As cost effective option for the river side cofferdam is selected (concrete dam), the option under consideration may require more time to construct leading to delay of the cofferdam completion that causes overtopping and site flooding	T	Technical				Extreme	> 360	Extreme	>100,000	Unlikely	0.1% - 1%	Medium
R13	C1	Safety vs. Heavy Equipment (C1)	Due to use of heavy equipment for civil works and road construction (and in constraint space in some areas), incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS				Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R14	C1	Safety vs. Construction Hazards (C1)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, working close to moving water, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	T	HSS				Minor	7 -- 30			Unlikely	0.1% - 1%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R15	C1	Safety vs. Traffic Incidents (C1)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS				Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R16	C1	River/ Reservoir Bank's Instability	As most of river and reservoir banks consist of clay soil, instability of them might occur during the reservoir flooding that gives rise to extra stabilisation costs to avoid/ address the instability (including stabilisation of some adjacent roads)	T	Technical						Extreme	>100,000	Rare	<0.1%	Low
R18	C1	Clearing Windows	As the reservoir clearing is not possible during ice forming (early winter) and ice breaking (late spring) any delay in preceding activities may lead to missing of the clearing windows resulting in overall project delay	T	Construction				Moderate	30 - 90			Possible	1% - 50%	Medium
R19	C1	Fish Habitat (C1)	As requirements by DFO on fish habitat replacement are very likely and are not fully factored in to the base estimate, the requirement to replace the habitat may be significant by DFO leading to extra costs	T	Environmental				Moderate	30 - 90	Minor	100 - 1,000	Possible	1% - 50%	Medium
R20	C1	Terrestrial Habitat (C1) (Loss of Wetlands)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs	T	Environmental				Moderate	30 - 90	Major	10,000-100,000	Possible	1% - 50%	Medium
R22	C1	Safety vs. Schedule Acceleration (C1)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	T	HSS				Minor	7 -- 30			Possible	1% - 50%	High
R23	C1	Employment Expectations	As local people and truck owners/ drivers from neighbouring provinces have employment expectations associated with LCP, the construction site might get blocked at the beginning of construction which leads to construction delays, security issues and reputational impact	T	External				Insignigicant				Possible	1% - 50%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R24	C1	Contractor's Coordination/ Powerhouse	As construction of powerhouse is to be carried out by several contractors, lack of coordination and clear contractual responsibilities especially in case of unforeseen conditions may become a source of extra claims leading to capital overspending	T	Commercial				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R26	C1	Spillway Construction Window	As A) construction of the spillway is to be fulfilled during an "ice-free" window, B) there is no float in schedule with predecessor activities (EA release, camp, road, etc.), any delay in previous activities may trigger missing of the window which results in schedule delay	T	Construction				Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R28	C1	Riverside Cofferdam Catastrophic Flooding	As certain flooding reliability design factors are used for cofferdam design (one in 20 years events), a flooding might happen that exceed the reliability design factors used leading to catastrophic failure of the cofferdam, injuries/ fatalities, loss of equipment and reputational damage	T	Technical				Extreme	> 360	Extreme	>100,000	Rare	<0.1%	Low
R29	C1	Wild Fires (C1)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C1 camp & site evacuation, injuries/ fatalities or loss of equipment	T	HSS				Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R30	C1	Loss of Power Supply	As a switch from temporary 25 kV transmission line to permanent 315 kV line is planned before reservoir flooding, temporary loss of power supply to the site/ camp may occur during the switch that is not covered by emergency generators leading to interruption of construction and camp operations	T	Construction				Minor	7 -- 30	Minor	100 - 1,000	Unlikely	0.1% - 1%	Low
R31	C1	T&G Late Design Changes	Some reasons for design changes during the T&G equipment manufacturing may be put forward by the customers leading to extra costs and schedule delays to accommodate the changes in design and civil works	T	Commercial				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R32	C1	Lower Level of Design and Supporting Information (C1)	Due to lower level of C1 engineering staffing or challenging timelines, lower level of details of design for development of the base estimate, higher uncertainties could lead to higher cost contingencies and drive extra uncertainties in adjacent disciplines (civil, electrical, etc.)	T	Technical						Moderate	1,000 - 10,000	Possible	1% - 50%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R33	C1	Manufacturing Labour Availability (C1)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C1 costs and schedule delays	T	Commercial				Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R36	C1	Construction Permits (C1)	As several dozens of C1 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory				Extreme	> 360	Moderate	1,000 - 10,000	Possible	1% - 50%	High
R37	C1	Logistics (C1)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C1 equipment & materials to the sites that leads to schedule delays and extra costs	T	Commercial				Major	90 - 360	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R38	C1	Riverside Cofferdam Height vs. Late Start & Construction Delays	Due to delays with predecessor's activities and various difficulties and delays with construction of the cofferdam (selected concrete option), there might be not enough time to construct high enough cofferdam on time (mid-January 2013) leading to a) overtopping the cofferdam, b) flooding the excavation area, c) loss of cofferdam and giving rise to safety and environmental impacts	T	Construction				Extreme	> 360	Extreme	>100,000	Unlikely	0.1% - 1%	Medium
R40	C1	River Closure Failure	a) As river closure and construction of the upstream cofferdam is planned for summer (when normally level of water is lowest); b) the main dam fill-in material compaction (clay in water) is possible only before freezing temperatures, unusually high level of water could occur that prevents river closure by the upstream cofferdam on time and leads to a) missed window (before October) to finish the cofferdam at level 20m; b) lower height of the cofferdam by spring flooding, its overflowing and loss	T	Construction				Extreme	> 360	Major	10,000-100,000	Rare	<0.1%	Low
R41	C1	Spillway Operation Failure in Construction	Due to spillway gates obstruction by debris and failure of gates to operate, the spillway operation might be limited, leading to overtopping, site flooding and loss of the cofferdam as well as to environmental and safety consequences	T	Construction				Extreme	> 360	Extreme	>100,000	Rare	<0.1%	Low

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R43	C1	Construction Labour Availability (C1)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C1 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Construction				Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High
R44	C1	Contractors' Availability (C1)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C1 construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	T	Commercial				Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R45	C1	Reservoir Induced Seismic Activity	As sometimes flooding of a reservoir triggers seismic activity, the induced seismic activity during flooding may cause damage to dam structures, leading to extra cost to repair the damage or even catastrophic disruption of a dam	T	Technical				Extreme	> 360	Extreme	>100,000	Rare	<0.1%	Low
R49	C1	T&G Quality Issues	Potential quality control issue in manufacturing of turbines and generators may lead to cost, schedule delay or in use operability or reliability issues	T	Commercial				Major	90 - 360	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R51	C1	Major Equipment Delivery (C1): Planning	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones might not be met leading to overall C1 schedule delay	T	Commercial				Major	90 - 360			Possible	1% - 50%	Medium
R53	C1	Debris and Trash Management at Intake in Operations	As a result of trash build up, energy output of the unit could be reduced, leading to loss of revenue and poorer OpEx	T	Technical						Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R56	C1	Powerhouse Flooding	Due to failure to identify the risks, inadequate procedures or not following procedures (including human errors and pump stoppage) powerhouse flooding may occur leading to loss of lives and equipment	T	Technical				Extreme	> 360	Extreme	>100,000	Rare	<0.1%	Low
R57	C1	Commissioning Failures (C1)	As "stress" testing of C1 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	T	Commissioning & Start-up				Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R58	C1	Construction Debris vs. Commissioning	Due to presence of construction debris after the end of construction, these may cause problems during commissioning, leading to extra costs and schedule delays	T	Commissioning & Start-up				Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R59	C1	Contractor's Errors/ Omissions (C1)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C1 re-work, extra costs and schedule delay	T	Completeness				Major	90 - 360	Major	10,000-100,000	Unlikely	0.1% - 1%	Medium
R60	C1	Design & Manufacturing Errors/ Omissions (C1)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Completeness				Major	90 - 360	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R63	C1	Extra Cofferdam Work	As design of coffer dam foundation is done before the detail geotech study is done and a worst case scenario approach is used, additional works may be required in construction leading to extra time and schedule delay	T	Technical				Major	90 - 360			Possible	1% - 50%	Medium
R64	C1	Interfaces (C1)	As multiple complex hard & soft C1interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Interface				Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R65	C1	Availability of Construction Management Personnel (C1)	Due to features of the labour market in NL and lack of qualified C1 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel by SLI may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Construction				Major	90 - 360	Moderate	1,000 - 10,000	Likely	50% - 90%	High
R74	C1	Design Change (C1)	As final design is nearly frozen, some design elements could be transferred to/ from C1 in future even after project sanctioning, leading to re-design, re-definition of packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	T	Organisational/ Enterprise				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R127	C1	Construction Labor Productivity (C1)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions the, available construction manpower may have lower productivity than assumed in C1 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Construction				Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High
R138	C1	Drug & Alcohol Abuse (C1)	As a result of labour shortage and deviation from standard hiring procedures, instances of drug/ alcohol abuse might take place at C1 construction sites and camps leading to security and safety risks including injuries and fatalities	T	HSS								Possible	1% - 50%	High
R147	C1	Supplier Availability (C1)	As there is limited number of qualified C1 suppliers in a situation of a heated market it could be difficult to engage at least one of qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Commercial				Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R149	C1	Geotech vs. Claims (C1)	As detail geotech study data are not available during C1 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Commercial						Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R153	C1	Conservative Design (C1)	As conservative design approach ("worst case" scenarios) is used at C1 early design phases for all three components due to lack of design input data and multiple inputs (interfaces), it could be possible to optimise the design in the course of engineering development leading to cost reductions, accelerated schedules and better constructability	O	Technical				Moderate	30 - 90	Major	10,000-100,000	Likely	50% - 90%	OPPORTUNITY
R174	C1	T&G Package Bid Closing & Negotiations	As A) T&G bid closing is delayed for 1.5 mos (9-Dec-2011 => 27-Jan-2012); B) Bid closing is followed by negotiations; C) negotiations are followed by the T&G contract award (still the same date as planned before the bid closing delay) D) T&G award is followed by the civil works (bulk excavation & concrete) with a 1 month float, negotiations could not absorb the bid closing delay or might take more time than planned in master schedule, giving rise to delay of civil works and "domino effect" of delays down the line in the LCP master schedule	T	Commercial				Moderate	30 - 90	Minor	100 - 1,000	Possible	1% - 50%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R183	C1	Rollway Construction vs. Impoundment	As a) for stability purposes it is necessary to partially construct two rollways following the spring flood of 2016 up to elevation 10m before full impoundment to elevation 39.0m; b) The rollways will start at elevation 5m and will go up to elevation 15.7m when fully complete; c) It is anticipated that it will take approximately 45 days to partially construct the rollways to elevation 10m, delays in construction of the rollways could impact on the impoundment schedule leading to overall C1 construction delay	T	Construction				Moderate	30 - 90	Minor	100 - 1,000	Possible	1% - 50%	Medium
R185	C1	Main Camp Capacity	As a) current baseline is to build a main C1 camp for 1,500 people; b) comparison with other similar projects (comparable volume of concrete works, etc.) pointed to higher number of required workers due to safety requirements, lower productivity, rotation, etc., planned camp capacity could not satisfy project requirements at peak of works leading to schedule delay	T	Construction				Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R188	C1	Impoundment in Winter: Head Pond (12.5 - 25M)	Due to a need to carry out head pond impoundment in winter, increasing of water level from natural 12.5m to 25m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair).	T	Technical				Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R189	C1	Impoundment in Winter (25 - 39m)	In case of powerhouse late completion and, hence, due to the need to carry out impoundment in winter to prevent possible revenue loss, increasing of water level from 25m to 39m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair, delay of commissioning).	T	Technical				Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R21	C1	Bird Nesting (C1)	As the C1 construction site is located in the forest area used by birds for nesting, the nesting season (May - August) may preclude summer clearing activities as recommended by the EA panel leading to project delay	T	Environmental				Moderate	30 - 90			Possible	1% - 50%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R25	C1	Post-Award Drawings (C1)	As T&G tender drawings are not supposed to be the C1 construction drawings, late changes after the contract's award may occur leading to extra costs and schedule delays to start civil works	T	Commercial				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R61	C1	Supplier's QA/QC (C1)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C1 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Commercial				Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R83	C1	Site Safety Coordination (C1)	Due to involvement of multiple organizations at the C1 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	T	HSS				Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R67	C3	Electrode vs. EA Release Special Condition	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, a special condition may be attached to EA release to use the metallic return leading to cost implications	T	Regulatory				Extreme	> 360	Extreme	>100,000	Possible	1% - 50%	High
R70	C3	Electrode Return vs. Delay	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, the electrode use may be challenged during permitting process leading to schedule delay	T	Regulatory				Major	90 - 360	Moderate	1,000 - 10,000	Likely	50% - 90%	High
R71	C3	CFLco - Nalcor Interface	Possibility of interface with CFLco (Hydro Quebec) not being managed well, could lead to non timely decision making	T	External				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R75	C3	Outage Planning	Due to features of the communication process and decision making, timely scheduling of outages during commissioning to switch power on may become challenging leading to schedule delay and late completion date as well as safety impact	T	Commissioning & Start-up				Minor	7 -- 30	Minor	100 - 1,000	Unlikely	0.1% - 1%	Medium
R76	C3	Maritime Link Assumptions	Changes in reliability assumptions made for maritime link could change scope and may cause schedule delay and increase cost	T	Interface				Major		Major	10,000-100,000	Possible	1% - 50%	Medium
R78	C3	System Integration and Commissioning	Due to need to coordinate commissioning at multiple sites between CFLco, NL Hydro and SNC, lack of experienced personnel may take place leading to schedule and cost impact	T	Commissioning & Start-up				Minor	7 -- 30	Minor	100 - 1,000	Likely	50% - 90%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R79	C3	Transformer Testing	Due to possibility of transformer test failure at site, the failure could occur requiring transportation of the transformer back to workshop and causing schedule delay and increased cost	T	Commissioning & Start-up				Major	90 - 360	Minor	100 - 1,000	Unlikely	0.1% - 1%	Medium
R82	C3	Site Safety Coordination (C1)	Due to construction period of equipment in non-energized environment, risk exist when commissioning equipment	T	HSS				Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R98	C3	Safety vs. Heavy Equipment (C3)	Due to use of heavy equipment by C3 for civil works incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS				Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R100	C3	Safety vs. Construction Hazards (C3)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	T	HSS				Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R102	C3	Safety vs. Traffic Incidents (C3)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS				Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R107	C3	Safety vs. Schedule Acceleration (C3)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	T	HSS				Minor	7 -- 30			Unlikely	0.1% - 1%	Low
R109	C3	Post-Award Drawings (C3)	As tender drawings are not supposed to be the C3 construction drawings, late changes after the contract's award may occur leading to extra costs	T	Commercial				Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R111	C3	Wild Fires (C3)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C3 camp & site evacuation, injuries/ fatalities or loss of equipment	T	HSS				Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R113	C3	Lower Level of Design (C3)	Due to C3 challenging engineering staffing or timelines, lower level of details of design for development of the base estimate, higher uncertainties could lead to higher cost contingencies and drive extra uncertainties in adjacent disciplines (civil, electrical, etc.)	T	Technical						Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R115	C3	Manufacturing Capacity & Availability (C3)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C3 costs and schedule delays	T	Commercial				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R117	C3	Adverse Winter Weather (C3)	As several C3 construction activities are planned for winter, abnormal winter weather (low temperatures, snow storms, snow falls, etc.) may occur during the construction leading to lower productivity, construction delay and safety risks	T	Construction				Minor	7 -- 30			Rare	<0.1%	Low
R119	C3	Construction Permits (C3)	As several dozens of C3 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R123	C3	Construction Labour Availability (C3)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C3 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Commercial				Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High
R125	C3	Contractors' Availability (C3)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C3 construction costs, lower productivity, less attractive contract terms for LCP, safety impact, etc.	T	Commercial				Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R128	C3	Construction Labor Productivity (C3)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C3 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, etc.	T	Construction				Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R130	C3	Major Equipment Delivery (C3) Planning	As a result of poor scheduling, logistics planning, schedule risks and interface management, major contract delivery milestones might not be met, leading to overall C3 schedule delay	T	Commercial				Major	90 - 360			Possible	1% - 50%	Medium
R132	C3	Commissioning Failures (C3)	As "stress" testing of C3 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	T	Commissioning & Start-up				Major	90 - 360	Major	10,000-100,000	Unlikely	0.1% - 1%	Medium
R134	C3	Contractor's Errors/ Omissions (C3)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C3 re-work, extra costs and schedule delay	T	Completeness				Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R136	C3	Design & Manufacturing Errors/ Omissions (C3)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C3 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Completeness				Major	90 - 360	Minor	100 - 1,000	Unlikely	0.1% - 1%	Medium
R139	C3	Drug & Alcohol Abuse (C3)	As a result of labour shortage and deviation from standard hiring procedures, instances of drug/ alcohol abuse might take place at C3 construction sites and camps leading to security and safety risks including injuries and fatalities	T	HSS								Unlikely	0.1% - 1%	Medium
R150	C3	Geotech vs. Claims (C3)	As detail geotech study data are not available during C3 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Commercial				Minor	7 -- 30	Minor	100 - 1,000	Unlikely	0.1% - 1%	Low
R152	C3	Fiber Optic Line (C3)	As the fiber optic line development is not part of the LCP project and is to be developed by Bell Aliant, timely availability of fiber optic communication might become problematic leading to issues with coordination of sites, crews, contractors, etc. and safety issues	T	Technical				Minor	7 -- 30	Moderate	1,000 - 10,000	Possible	1% - 50%	High
R158	C3	Supplier's QA/QC (C3)	Due to failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C3 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Commercial				Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R162	C3	Interfaces (C3)	As multiple complex hard & soft C3 interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Interface				Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	Medium
R164	C3	Availability of Construction Management Personnel (C3)	Due to features of the labour market in NL and lack of qualified C3 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Construction				Major	90 - 360	Minor	100 - 1,000	Likely	50% - 90%	High
R168	C3	Scope Change (C3)	As final scope is not frozen, some scope elements could be transferred to/ from C3 in future even after project sanctioning, leading to re-design, re-definition of corresponding packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	T	Organisational/ Enterprise				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R170	C3	Site Safety Coordination (C3)	Due to involvement of multiple organizations at the C3 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	T	HSS				Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R68	C4	Insulator Supplier Availability (hvdc) (C4)	As there is limited number of qualified C4 HVdc suppliers for insulators supply (2 suppliers only), in a situation of a heated market it could be difficult to engage at least one of them on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Commercial				Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R85	C4	HVdc & HVac Contractor Availability (C4)	As several other transmission line projects are planned in North America, it might become difficult to attract skilled on-site contractors that leads to higher construction costs, lower productivity and less attractive for LCP contracting terms	T	Commercial				Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R87	C4	Weather and Pollution Design Data (C4)	As limited amount of historic data is available for transmission line design in NL, quality of the design may suffer resulting in suboptimal solutions, extra costs, re-work, schedule delays and reputational impact	T	Technical				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R89	C4	RoW (C4)	Due to features of land registry in the province, it will be difficult to identify all land owners along route thay leads to surprises in land ownerships and claims from owners	T	External				Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R92	C4	Late Design Change (C4)	As late design criteria change initiated by customer for transmission line is possible, redesign may occur leading to re-definition of corresponding packages, schedule delay and extra costs	T	Technical				Major	90 - 360	Major	10,000-100,000	Unlikely	0.1% - 1%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R93	C4	Remote Site Logistics (C4)	As construction of transmission lines is planned in several remote location (especially in Labrador) and delivery to these sites are possible only in certain season windows, logistics difficulties to deliver construction equipment, materials and crews may occur leading to extra logistics costs, schedule delay (including triggering delays till next window) and safety impact	T	Commercial				Moderate	30 - 90	Moderate	1,000 - 10,000	Rare		Low
R94	C4	Helicopter Use in Labrador for HVac (C4)	In some remote areas of Labrador use of helicopter could be considered as opportunity to reduce labour numbers and accelerate the schedule	O	Construction				Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY
R95	C4	EA Release for HVdc (C4)	Due to delay in EA release, start of early C4 construction activities may be delayed leading to missed construction windows in some cases and overall project delay	T	Regulatory				Major	90 - 360	Moderate	1,000 - 10,000	Likely	50% - 90%	High
R99	C4	Safety vs. Heavy Equipment (C4)	Due to use of heavy equipment by C4 for civil works incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS								Unlikely	0.1% - 1%	Medium
R101	C4	Safety vs. Construction Hazards (C4)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	T	HSS								Unlikely	0.1% - 1%	Medium
R103	C4	Safety vs. Traffic Incidents (C4)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	T	HSS								Unlikely	0.1% - 1%	Medium
R105	C4	Terrestrial Habitat (HVac) (C4)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs and schedule delay	T	Environmental				Moderate	30 - 90	Minor	100 - 1,000	Possible	1% - 50%	Medium
R106	C4	Bird Nesting (HVac) (C4)	As the construction site is located in the forest area used by birds for nesting, the nesting season (May - August) may preclude summer clearing activities as recommended by the EA panel leading to project delay	T	Environmental				Moderate	30 - 90	Minor	100 - 1,000	Possible	1% - 50%	Medium
R108	C4	Safety vs. Schedule Acceleration (C4)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	T	HSS								Unlikely	0.1% - 1%	Medium
R110	C4	Post-Award Drawings (C4)	As tender drawings are not supposed to be the C4 construction drawings, late changes after the contract's award may occur leading to extra costs	T	Commercial				Minor	7 -- 30	Minor	100 - 1,000	Unlikely	0.1% - 1%	Low

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R112	C4	Wild Fires (C4)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C4 camp & site evacuation, injuries/fatalities or loss of equipment	T	HSS								Unlikely	0.1% - 1%	Medium
R118	C4	Adverse Weather (C4)	As several C4 construction activities are planned for winter, abnormal winter weather (low temperatures, snow storms, snow falls, etc.) may occur during the construction leading to lower productivity, construction delay and safety risks	T	Construction				Minor	7 -- 30	Minor	100 - 1,000	Possible	1% - 50%	High
R120	C4	Construction Permits (C4)	As several dozens of C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory				Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R122	C4	Logistics (C4)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C4 equipment & materials to the sites that leads to schedule delays and extra costs	T	Commercial				Major	90 - 360	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R124	C4	Construction Labour Availability (C4)	Due to a) features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.); b) planning of power line construction in various (remote) areas of NL, the lack of quantity of construction manpower may lead to C4 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	T	Commercial				Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High
R129	C4	Construction Labour Productivity (C4)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C4 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Construction				Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R131	C4	Major Material Delivery (C4): Planning for HVac	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones for HVac might not be met leading to overall C4 schedule delay	T	Commercial				Major	90 - 360			Possible	1% - 50%	Medium
R135	C4	Contractor's Errors/ Omissions (C4)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C4 re-work, extra costs and schedule delay	T	Completeness				Major	90 - 360	Minor	100 - 1,000	Unlikely	0.1% - 1%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R137	C4	Design & Manufacturing Errors/ Omissions (C4)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C4 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	T	Completeness				Major	90 - 360	Minor	100 - 1,000	Unlikely	0.1% - 1%	Medium
R140	C4	Drug & Alcohol Abuse (C4)	As a result of labour shortage and deviation from standard hiring procedures, instances of drug/ alcohol abuse might take place at C4 construction sites and camps leading to security and safety risks including injuries and fatalities	T	HSS								Possible	1% - 50%	High
R151	C4	Geotech vs. Claims (C4)	As detail geotech study data are not available during C4 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	T	Commercial						Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R155	C4	Optimisation of the Conservative Design (C4)	As conservative design approach ("worst case" scenarios) is used at C4 early design phases for all three components due to lack of design input data and multiple inputs (interfaces), it could be possible to optimise the design in the course of engineering development leading to cost reductions, accelerated schedules and better constructability	O	Technical						Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY
R159	C4	Supplier's QA/QC (C4)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C4 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	T	Commercial				Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R163	C4	Interfaces (C4)	As multiple complex hard & soft C4 interfaces require inputs from project components and disciplines and outputs to contractors, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	T	Interface				Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	Medium
R165	C4	Availability of SLI Construction Management Personnel (C4)	Due to features of the labour market in NL and lack of qualified C4 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	T	Construction				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R171	C4	Site Safety Coordination (C4)	Due to involvement of multiple organizations at the C4 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	T	HSS								Unlikely	0.1% - 1%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R180	C4	Transmission Line River Crossing vs. TSS (CD0512)	As part of the Construction Power Supply package scope includes river crossing and clearing of the river bank area, these activities could disturb and contaminate the river giving rise to higher Total Suspended Solids (TSS) levels (Standard: TSS <30 p.p.m.) and leading to extra costs and delays to comply with regulations	T	Environmental								Unlikely	0.1% - 1%	Low
R186	C4	Major Material Delivery (C4): Planning for HVdc	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones for HVdc might not be met leading to overall C4 schedule delay	T	Commercial				Major	90 - 360			Possible	1% - 50%	Medium
R3	LCP	EA Release Special Conditions	Due to high interest of the government, general public and NGO's in the LCP, special conditions may be attached to the project permits (EA vs. Environmental Protection Plan) resulting in scope change, schedule delays and extra costs to comply	T	Regulatory				Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R52	LCP	Contracting Strategy Adjustments	Due to heated market conditions or financing constraints, LCP may need to change contracting strategy, causing delays in schedule and increase in cost	T	Commercial				Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R54	LCP	RFP/ Contract Quality	As an intent to maintain project schedule when working under time crunch or due to incomplete contracting strategy, fast tracking approach towards RFP/ contracts development and deviation from established procurement/ contracting procedures might be adopted that lead to sub-standard, incomplete or inadequate package scopes and unclearly defined contractual obligations in terms of scope, cost, schedule, quality, safety	T	Commercial				Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R69	LCP	Knowledge Transfer	Due to maturity of owner and wealth of experience, opportunity exist for interfacing between Nalcor and SLI on existing system and hvdc system	O	Interface				Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY
R72	LCP	Final Project Integration	Due to complexity, overall integration of all LCP components and activities plus external Island Link prior to project commissioning, may represent significant challenge leading to overall delay of commissioning	T	Organisational/ Enterprise				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R77	LCP	Class of Estimate & Cost Escalation	Because the base estimate for DG3 is preliminary and done in money of the base period, the real pricing in the time of purchasing may be different due to market conditions then, leading to extra costs	T	Commercial						Major	10,000-100,000	Almost Certain	>90%	High
R80	LCP	Early Procurement	Due to volatility of equipment pricing, early procurement of equipment could result in lower cost and allow some float in the schedule	O	Commercial				Major	90 - 360	Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R81	LCP	Project Controls: Packages	Due to possible a) problems with delivery of packages (quality, labour availability, etc.), b) project/ document controls under-staffing, c) difficulties to measure progress and quantities of construction packages, d) late engineering changes, some packages could be delivered with delays and increased quantities, leading to overall schedule delays and extra costs	T	Commercial				Moderate	30 - 90	Minor		Possible	1% - 50%	Medium
R84	LCP	Operation Staff	Due to current limited number of operators within Nalcor, understaffing during commissioning and operations may occur, leading to commissioning delay, start of operations and lower acet productivity	T	Operations						Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R86	LCP	Sourcing Globally	Due to slow economy in some parts of the world, opportunity could be exploited to source services from markets all over the world giving rise to cost savings	O	Commercial						Major	10,000-100,000	Possible	1% - 50%	OPPORTUNITY
R141	LCP	Innu Involvement/ IBA	Due to intimate involvement of Innu people in delivery of the project (IBA), there might be instances of negative influence on LCP contracting, permitting, labour relations, that leads to narrower choices of contractors, suppliers and labour, issues with environmental monitoring and permitting (destruction of land and hunting areas during construction, etc.) leading to extra costs, schedule delays, safety issues, etc.	T	External				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R144	LCP	Spare Parts v. RAM	As RAM analysis for whole system has yet to be carried out according to declared level of availability, spare part requirements could be too conservative and become an additional OpEx cost that leads to poorer project economics and lower attractiveness for stakeholders	T	Operations				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R156	LCP	SLI - Nalcor Contract, Coordination and Alignment	As a) coordination between SLI and Nalcor reflects current contract between the organisations; b) different organisational approaches/ cultures exist as related to the contract interpretation and decision making; c) lack of staffing in both organisations takes place, the lack of alignment and decision-making efficiency could occur, leading to non timely decision making, lower quality of decisions, re-work, schedule delay and extra costs	T	Organisational/ Enterprise				Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R157	LCP	Facilities Sharing	As each component develops all required facilities independently (including accommodation), there could be an opportunity to share facilities and optimise their use among components, leading to overall CapEx reduction	O	Organisational/ Enterprise				Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R172	LCP	Construction Labour Availability -LCP	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may occur leading to LCP schedule delay and extra labour costs to attract as well as giving rise to reduction of quality of works, safety risks impact, etc.	T	Commercial				Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High
R173	LCP	Construction Labor Productivity - LCP	Due to a) features of the labour market in NL, b) issues with availability of skilled workers, c) labour agreement with Unions; d) inadequate organisation of construction works, the available construction manpower may have lower productivity than assumed in LCP base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	T	Commercial				Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High
R175	LCP	Sensitive Areas -LCP	Due to exposure of C1, C3, C4 to sensitive areas (archeological sites, fish habitat, terrestrial habitat, bird nesting), delays may occur with permit's obtaining and start of construction works which leads to work stoppage and overall project delay	T	Regulatory				Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R176	LCP	Construction Permits -LCP	As several dozens of C1, C3, C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	T	Regulatory				Extreme	> 360	Moderate	1,000 - 10,000	Possible	1% - 50%	High
R177	LCP	Contractor's Availability - LCP	As several mega projects are planned in North America related to hydro power generation and transmission, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	T	Commercial				Extreme	> 360	Extreme	>100,000	Almost Certain	>90%	High
R178	LCP	Interfaces - LCP	As multiple complex hard & soft interfaces require inputs from project components and disciplines as well as external organisations (CFLco, SOBI, etc.), efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays, failures during commissioning, etc.	T	Interface				Extreme	> 360	Extreme	>100,000	Almost Certain	>90%	High
R179	LCP	Supplier's Availability - LCP	As there is limited number of qualified suppliers in a situation of a heated market it could be difficult to engage qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	T	Commercial				Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium

LCP COST &
SCHEDULE RISK
TEMPLATE

ID	Comp	Risk Title	Risk Description	Risk	Category	Factor	Comments on Factor	Correlations	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R182	LCP	Opposition by 'non-IBA' First Nations Groups	As a) IBA agreement covers mostly economic aspects of Innu people benefits; b) some Innu people oppose to LCP due to environmental and cultural concerns; c) some other First Nation's people (e.g., Métis) seem to wish benefiting from LCP same way as Innu people, representatives of First Nations could block the construction sites to apply pressure on LCP and to promote their agendas leading to schedule delay, extra costs and reputational damage	T	External				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R184	LCP	Unionised vs. Non-unionised Package Contracts	As a) non-unionised contracts are planned for several packages; b) significant enough difference in rates for unionised vs. non-unionised labour is expected; c) communication among unionised vs. non-unionised workers at various LCP sires is expected; e) no camp or basic camp is to be provided to non-unionised workers, strike/ unrest among non-unionised workers may occur, leading to disruption of clearing works, moving of workers to unionised contracts, schedule delays, safety and security impact, reputation damage	T	Commercial				Major	90 - 360	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R187	LCP	IT/ IS	Due to possible a) challenges to implement integrated IT/ IS in several project locations; b) requirements to effectively support construction management, project/ document control (including progress management); c) requirements to integrate vendors; d) differences in Nalcor and SLI corporate IT/IS; e) budget restrictions; adopted IT/ IS could be breached or have low efficiency, leading to loss of critical data, lower efficiency of project & document controls and construction management, lower level of vendor integration, schedule delay and project extra costs.	T	Organisational/ Enterprise				Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R5	C1	Accommodation Capacity	As starter camp for construction is designed for about 150 workers and accommodation for about 500 workers in Sep. 2012 will be needed, available accommodation in neighboring Goose Bay might not meet the accommodation requirements leading to initial lack of workers at the beginning of construction	Risk ID'ed at Risk Workshop of 20-Sep-2011. The Sep 2012 date was relevant to Feb 2012 construction start date. the new date could be March 2012 due to construction start in summer 2012	T	Construction	Scott O'Brien (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	Medium
R9	C1	Excavation vs. Water Contamination	As a result of excavation works and use of explosives, level of water contamination in stilling basin may exceed acceptable level (oil, sediment, explosive's residues, etc.) leading to extra costs and delays to comply with regulations.	Risk ID'ed at Risk Workshop of 20-Sep-2011 Could happen most likely in case of heavy raining or snow melting	T	Construction	Michael Maeyens (SLI)	Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R10	C1	Archeological Sites (C1)	As the C1 construction area is known for archeological significance, delays may occur with permit's obtaining and start of excavation works which leads to work stoppage and overall project delay	Risk ID'ed at Risk Workshop of 20-Sep-2011 R-175 covers this at LCP level. This risk should be taken. Waiting for results of archeological study. Several areas of significance have been discovered and taken care of. This risk is mostly about currently unknown areas that could be discovered right before or upon start of construction. In case of occurrence very high level of schedule impact, moreover probability is Likely, level of manageability is low	T	Regulatory	Scott O'Brien (NE)	Major	90 - 360	Moderate	1,000 - 10,000	Likely	50% - 90%	High
R11	C1	Optimisation of Geotech vs. Upstream Cofferdam Design	As conservative approach is used for design of the main upstream cofferdam, the base estimate may turn out to be inflated leading to capital cost savings	Risk ID'ed at Risk Workshop of 20-Sep-2011	O	Technical	Scott O'Brien (NE)			Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY
R12	C1	Riverside Cofferdam Options vs. Schedule	As cost effective option for the river side cofferdam is selected (concrete dam), the option under consideration may require more time to construct leading to delay of the cofferdam completion that causes overtopping and site flooding	Risk ID'ed at Risk Workshop of 20-Sep-2011 A separate analysis of options on type of dam vs. material vs. schedule impact vs. risks is required. Longer timelines to construct the dam lead to higher probability of being late with completion of the dam (20m by mid-January 2013) and flooding as a dam could not be ready (high enough) when required. Should be considered along with risks 28 (catastrophic flooding) and 38 (delay during riverside dam construction). This risk becomes more severe due to change of the construction start to August 1st, 2012. Constructability review measures are aimed to accelerate construction. partial cofferdam flooding option is investigated	T	Technical	Scott O'Brien (NE)	Extreme	> 360	Extreme	>100,000	Unlikely	0.1% - 1%	Medium
R13	C1	Safety vs. Heavy Equipment (C1)	Due to use of heavy equipment for civil works and road construction (and in constraint space in some areas), incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	Risk ID'ed at Risk Workshop of 20-Sep-2011 This risk should be part of the HSE plan. R-98 & R-99 similar risks for C3 & C-4. This risk is managed by HSSE team. Impact on schedule is important for schedule risk analysis	T	HSS	Scott O'Brien (NE)	Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R14	C1	Safety vs. Construction Hazards (C1)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, working close to moving water, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	Risk ID'ed at Risk Workshop of 20-Sep-2011 This risk should be part of the HSE plan. Similar risks R-100 & R-101 for C3 & C4. This risk is managed by HSSE team. Impact on schedule is important for schedule risk analysis	T	HSS	Scott O'Brien (NE)	Minor	7 -- 30			Unlikely	0.1% - 1%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R15	C1	Safety vs. Traffic Incidents (C1)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	Risk ID'ed at Risk Workshop of 20-Sep-2011 This risk should be part of the HSE plan. This risk is managed by HSSE team. Impact on schedule is important for schedule risk analysis	T	HSS	Scott O'Brien (NE)	Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R16	C1	River/ Reservoir Bank's Instability	As most of river and reservoir banks consist of clay soil, instability of them might occur during the reservoir flooding that gives rise to extra stabilisation costs to avoid/ address the instability (including stabilisation of some adjacent roads)	Risk ID'ed at Risk Workshop of 20-Sep-2011	T	Technical	Ken Sparks (NE)			Extreme	>100,000	Rare	<0.1%	Low
R18	C1	Clearing Windows	As the reservoir clearing is not possible during ice forming (early winter) and ice breaking (late spring) any delay in preceding activities may lead to missing of the clearing windows resulting in overall project delay	Risk ID'ed at Risk Workshop of 20-Sep-2011 9 mos a year is budgeted for clearing. This risk is related to weather (R-1 related to weather in road and power construction). Another risk impacting the clearing windows are related to bird's nesting (R-21).	T	Construction	Wallace Piercey (SLI)	Moderate	30 - 90			Possible	1% - 50%	Medium
R19	C1	Fish Habitat (C1)	As requirements by DFO on fish habitat replacement are very likely and are not fully factored in to the base estimate, the requirement to replace the habitat may be significant by DFO leading to extra costs	Risk ID'ed at Risk Workshop of 20-Sep-2011 R-175 covers this at LCP level. Similar risk R-104 for C4, no such risk for C3. Fish habitat permit remains one of the main hurdles LCP should overcome after the EA release.	T	Environmental	Steve Pelerin(NE)	Moderate	30 - 90	Minor	100 - 1,000	Possible	1% - 50%	Medium
R20	C1	Terrestrial Habitat (C1) (Loss of Wetlands)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs	Risk ID'ed at Risk Workshop of 20-Sep-2011 R-175 covers this at LCP level. Similar risk R-105 for C4, no such risk for C3. This could be quite costly to comply in case the risk occurs	T	Environmental	Steve Pellerin(NE)	Moderate	30 - 90	Major	10,000-100,000	Possible	1% - 50%	Medium
R22	C1	Safety vs. Schedule Acceleration (C1)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	Risk ID'ed at Risk Workshop of 20-Sep-2011 This risk should be part of the HSE plan, managed by HSE team	T	HSS	Scott O'Brien (NE)	Minor	7 -- 30			Possible	1% - 50%	High
R23	C1	Employment Expectations	As local people and truck owners/ drivers from neighbouring provinces have employment expectations associated with LCP, the construction site might get blocked at the beginning of construction which leads to construction delays, security issues and reputational impact	Risk ID'ed at Risk Workshop of 20-Sep-2011 This risk should be part of the HSE plan in terms of security	T	External	Gervais Savard (SLI)	Insignigicant				Possible	1% - 50%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R24	C1	Contractor's Coordination/ Powerhouse	As construction of powerhouse is to be carried out by several contractors, lack of coordination and clear contractual responsibilities especially in case of unforeseen conditions may become a source of extra claims leading to capital overspending	Risk ID'ed at Risk Workshop of 20-Sep-2011 This is highly manageable risk if proper coordination/ scheduling/ interface management procedures are implemented	T	Commercial	Gervais Savard (SLI)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R26	C1	Spillway Construction Window	As A) construction of the spillway is to be fulfilled during an "ice-free" window, B) there is no float in schedule with predecessor activities (EA release, camp, road, etc.), any delay in previous activities may trigger missing of the window which results in schedule delay	Risk ID'ed at Risk Workshop of 21-Sep-2011 Should be considered along with R-31, R-63, R-92, R-95. Even if the schedule is OK, there is still technical risk to be unable to finish this work on time (inside of the window)	T	Construction	Scott O'Brien (NE)	Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R28	C1	Riverside Cofferdam Catastrophic Flooding	As certain flooding reliability design factors are used for cofferdam design (one in 20 years events), a flooding might happen that exceed the reliability design factors used leading to catastrophic failure of the cofferdam, injuries/ fatalities, loss of equipment and reputational damage	Risk ID'ed at Risk Workshop of 21-Sep-2011 THIS MAY BE CONSIDERED CORPORATE RISK. According to the schedule (May 2012) construction in spring - level of severity should be reduced (9-May-2012) . This risk should be considered along with risks 12, 38. This risk shows possibility of overflowing when construction (20m height) is finished on time (mid-January 2013). Probability is less than 5% (1 in 20 years) that level of water approaches 20m. So in case the cofferdam reaches 20m probability of overtopping is unlikely or slightly possible (1 - 5%). Investors may be. interested to evaluate the 1:50. If occurs schedule delay 1 - 2 years and total re-definition (If not cancelation) of the project.	T	Technical	Scott O'Brien (NE)	Extreme	> 360	Extreme	>100,000	Rare	<0.1%	Low
R29	C1	Wild Fires (C1)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C1 camp & site evacuation, injuries/ fatalities or loss of equipment	Risk ID'ed at Risk Workshop of 21-Sep-2011 Safety aspect should be managed by HSE team (not assessed here), but impact on cost and schedule represent the project risk; similar risks R-111 & R-112 for C3 & C4	T	HSS	Scott O'Brien (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R30	C1	Loss of Power Supply	As a switch from temporary 25 kV transmission line to permanent 315 kV line is planned before reservoir flooding, temporary loss of power supply to the site/ camp may occur during the switch that is not covered by emergency generators leading to interruption of construction and camp operations	Risk ID'ed at Risk Workshop of 21-Sep-2011 Fred Wilcox is developing business case on this and ways to address the risk	T	Construction	Wallace Piercey (SLI)	Minor	7 -- 30	Minor	100 - 1,000	Unlikely	0.1% - 1%	Low
R31	C1	T&G Late Design Changes	Some reasons for design changes during the T&G equipment manufacturing may be put forward by the customers leading to extra costs and schedule delays to accommodate the changes in design and civil works	Risk ID'ed at Risk Workshop of 21-Sep-2011 This is CH0030 package risk, kept in the LCP risk register having medium impact after addressing	T	Commercial	Luc Turcotte (SLI)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R32	C1	Lower Level of Design and Supporting Information (C1)	Due to lower level of C1 engineering staffing or challenging timelines, lower level of details of design for development of the base estimate, higher uncertainties could lead to higher cost contingencies and drive extra uncertainties in adjacent disciplines (civil, electrical, etc.)	Risk ID'ed at Risk Workshop of 21-Sep-2011 Similar risks R-113 & R-114 for C3 & C4. This is not a risk strictly speaking. This is uncertainty and should be reflected in the "Ranges" model, not through risk register.	T	Technical	Greg Snyder (SLI)			Moderate	1,000 - 10,000	Possible	1% - 50%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R33	C1	Manufacturing Labour Availability (C1)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C1 costs and schedule delays	Risk ID'ed at Risk Workshop of 21-Sep-2011 This is major supply package risk (any supply package) that covers labour availability in manufacturing. Presumably, in case of lump sum contracts cost impact would be very low, but schedule delay could be substantial. This is a summary risk for relevant packages of C1; similar risks R-115 & R-116 for C3 & C4	T	Commercial	Pat Hussey (NE)	Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R36	C1	Construction Permits (C1)	As several dozens of C1 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	Risk ID'ed at Risk Workshop of 21-Sep-2011 R-176 covers this at LCP level. this risk is different from EA permitting (risk 7). If several permits are late or missed, cumulative impact may be major to extreme for cost and schedule. When mapping this risk may be attached to several major construction activities with possible impact and moderate probability. Marion Organ (NE) is to support managing this risk	T	Regulatory	Scott O'Brien (NE)	Extreme	> 360	Moderate	1,000 - 10,000	Possible	1% - 50%	High
R37	C1	Logistics (C1)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C1 equipment & materials to the sites that leads to schedule delays and extra costs	Risk ID'ed at Risk Workshop of 21-Sep-2011 For C1 it is mostly about T&G delivery. this supply package risks is general for all components. However, impact on schedule for different components is different. Evaluation of the impacts would be required during the mapping of this risk to schedule activities. Different causes may be considered in detail during PEP-PER study. Presumably, in case of lump sum contracts cost impact would be very low due to LD, but schedule delay could be substantial	T	Commercial	Scott O'Brien (NE)	Major	90 - 360	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R38	C1	Riverside Cofferdam Height vs. Late Start & Construction Delays	Due to delays with predecessor's activities and various difficulties and delays with construction of the cofferdam (selected concrete option), there might be not enough time to construct high enough cofferdam on time (mid-January 2013) leading to a) overtopping the cofferdam, b) flooding the excavation area, c) loss of cofferdam and giving rise to safety and environmental impacts	Risk ID'ed at Risk Workshop of 21-Sep-2011 This risk is about delays in predecessor's activities (EA release, road and power construction, etc.) and any delays during construction (this might include stoppage of works due to safety incidents, severe weather, strikes, etc.). Should be considered along with risk 12 (construction option vs. schedule). Good news is that 75% of the river is regulated by the Upper Churchill. This allows regulation of the water level. However, if the risk occur, this may lead to one or two year delay, fatalities, extra costs and huge reputational impact.	T	Construction	Scott O'Brien (NE)	Extreme	> 360	Extreme	>100,000	Unlikely	0.1% - 1%	Medium
R40	C1	River Closure Failure	a) As river closure and construction of the upstream cofferdam is planned for summer (when normally level of water is lowest); b) the main dam fill-in material compaction (clay in water) is possible only before freezing temperatures, unusually high level of water could occur that prevents river closure by the upstream cofferdam on time and leads to a) missed window (before October) to finish the cofferdam at level 20m; b) lower height of the cofferdam by spring flooding, its overflowing and loss	1. Design factors for the river closure are based on water level that is twice of normal in summer. Hence, probability of this risk is low/ unlikely.2. If occurs (missed window), this risk might mean loss of the cofferdam and up to one year delay with completion of the main dam. Probability of loss of cofferdam depends on two factors; height of the cofferdam by spring and level of water flooding. Level 16m-17m means about 5% probability of overflowing and loss.Overall risk of two events simultaneously (proportional to products of two probabilities) is low	T	Construction	Scott O'Brien (NE)	Extreme	> 360	Major	10,000-100,000	Rare	<0.1%	Low
R41	C1	Spillway Operation Failure in Construction	Due to spillway gates obstruction by debris and failure of gates to operate, the spillway operation might be limited, leading to overtopping, site flooding and loss of the cofferdam as well as to environmental and safety consequences	Risk ID'ed at Risk Workshop of 21-Sep-2011 Supposedly, this risk may happen in Operations, however, it is kept here as CapEx risk during construction and start-up.	T	Construction	Scott O'Brien (NE)	Extreme	> 360	Extreme	>100,000	Rare	<0.1%	Low
R43	C1	Construction Labour Availability (C1)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C1 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	Risk ID'ed at Risk Workshop of 21-Sep-2011 R-172 covers this at LCP level. this risk doesn't take into account labour productivity (see R-127, R-128, R-129). The impact is different for different works. Especially is impacted concrete works of C1. Similar risks R-123, R-124 for C3 & C4. Both productivity risks and R-43, R-123, R-124 may be a subject of PEP-PER review	T	Construction	Scott O'Brien (NE)	Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R44	C1	Contractors' Availability (C1)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C1 construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	Risk ID'ed at Risk Workshop of 21-Sep-2011 R-177 covers this at the LCP level. this is general construction package risk for all components. Impacts are different for different components. They should be evaluated when mapping risks. This may become an opportunity if properly managed. Similar risks R-125 & R-126 for C3 & C4	T	Commercial	Scott O'Brien (NE)	Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R45	C1	Reservoir Induced Seismic Activity	As sometimes flooding of a reservoir triggers seismic activity, the induced seismic activity during flooding may cause damage to dam structures, leading to extra cost to repair the damage or even catastrophic disruption of a dam	Risk ID'ed at Risk Workshop of 21-Sep-2011 Seismic activity in the dam area is a bit higher than initially expected, however design is done for higher levels of the activity - this is mitigation in place. Assessment of the risk is done for catastrophic disruption.	T	Technical	Michael Maeyens (SLI)	Extreme	> 360	Extreme	>100,000	Rare	<0.1%	Low
R49	C1	T&G Quality Issues	Potential quality control issue in manufacturing of turbines and generators may lead to cost, schedule delay or in use operability or reliability issues	Risk ID'ed at Risk Workshop of 21-Sep-2011 This is CH0030 package risk that has medium level. According to Shipshaw lessons learned failure to pass the quality tests for blades led to several months of delay. Expected is delay up to one year. As this is lump sum contract - cost impact is minimal (maybe defined by LD cap), impact on schedule is all ours	T	Commercial	Luc Turcotte (SLI)	Major	90 - 360	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R51	C1	Major Equipment Delivery (C1): Planning	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones might not be met leading to overall C1 schedule delay	Risk ID'ed at Risk Workshop of 21-Sep-2011 This general risk for any supply package. This is a common risk for all components. Even in case of lump sum contracts monitoring of schedules and schedule risks is required. Similar risks R-130 & R-131 for C3 & C4	T	Commercial	Scott O'Brien (NE)	Major	90 - 360			Possible	1% - 50%	Medium
R53	C1	Debris and Trash Management at Intake in Operations	As a result of trash build up, energy output of the unit could be reduced, leading to loss of revenue and poorer OpEx	Risk ID'ed at Risk Workshop of 21-Sep-2011 Requires OpEx impact modeling during facility's lifetime. Depends on probability of higher water to mobilise the trash, required level of availability, cost of down-time in terms of revenue, etc. It was retired initially, but returned due to the Head Pond Clearing Variant Study. Both environmental and CapEx/ OpEx impact should be considered as part of the variant study	T	Technical	Randolph Koob (SLI)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R56	C1	Powerhouse Flooding	Due to failure to identify the risks, inadequate procedures or not following procedures (including human errors and pump stoppage) powerhouse flooding may occur leading to loss of lives and equipment	Risk ID'ed at Risk Workshop of 21-Sep-2011	T	Technical	Luc Turcotte (SLI)	Extreme	> 360	Extreme	>100,000	Rare	<0.1%	Low
R57	C1	Commissioning Failures (C1)	As "stress" testing of C1 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	Risk ID'ed at Risk Workshop of 21-Sep-2011 Similar risks R-132 & R-133 for C3 & C4	T	Commissioning & Start-up	Scott O'Brien (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R58	C1	Construction Debris vs. Commissioning	Due to presence of construction debris after the end of construction, these may cause problems during commissioning, leading to extra costs and schedule delays	Risk ID'ed at Risk Workshop of 21-Sep-2011 This is one of the risks that may lead to commissioning failure specific to C1 only. Also impact could be in Operations	T	Commissioning & Start-up	Gervais Savard (SLI)	Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE

ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R59	C1	Contractor's Errors/ Omissions (C1)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C1 re-work, extra costs and schedule delay	Risk ID'ed at Risk Workshop of 21-Sep-2011 This is general risk for all components, this may include contractors false work. In case of lump sum contract the cost impact presumed to be low. But schedule delay is still an issue	T	Completeness	Scott O'Brien (NE)	Major	90 - 360	Major	10,000-100,000	Unlikely	0.1% - 1%	Medium
R60	C1	Design & Manufacturing Errors/ Omissions (C1)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	Risk ID'ed at Risk Workshop of 21-Sep-2011 Similar risks R-136 & R-137 for C3 & C4	T	Completeness	Luc Turcotte (SLI)	Major	90 - 360	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R63	C1	Extra Cofferdam Work	As design of coffer dam foundation is done before the detail geotech study is done and a worst case scenario approach is used, additional works may be required in construction leading to extra time and schedule delay	Risk ID'ed at Risk Workshop of 21-Sep-2011 As a worst case scenario is used, cost should not be increased, only schedule (1 - 3 mos) to adopt the changes. However, this delay may trigger a construction window delay (conditional branching), which could be much worse. A detail review of schedule is required. Cost reduction may be considered as an opportunity	T	Technical	Michael Maeyens (SLI)	Major	90 - 360			Possible	1% - 50%	Medium
R64	C1	Interfaces (C1)	As multiple complex hard & soft C1interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	Risk ID'ed at Risk Workshop of 21-Sep-2011 R-178 covers this at LCP level. Similar risks R-162 & R-163 for components C3 & C4.	T	Interface	Scott O'Brien (NE)	Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R65	C1	Availability of Construction Management Personnel (C1)	Due to features of the labour market in NL and lack of qualified C1 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel by SLI may occur leading to negative impact on design and construction, lower productivity and higher labour costs	Risk ID'ed at Risk Workshop of 21-Sep-2011 R-172 covers this at the LCP level. this risk is a part of broader picture on labour availability and productivity, should be part of PEP-PER review. Similar risks R-164 & R-165 for C3 & C4. Second part of the risk related to contractor's management personnel is covered by R-43	T	Construction	Normand Bechard (SLI)	Major	90 - 360	Moderate	1,000 - 10,000	Likely	50% - 90%	High
R74	C1	Design Change (C1)	As final design is nearly frozen, some design elements could be transferred to/ from C1 in future even after project sanctioning, leading to re-design, re-definition of packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	Risk ID'ed at Risk Workshop of 21-Sep-2011 Initially this risk came from discussion on scope ownership to cut lines in Soldier Pond station. This risk doesn't cover EA driven scope changes (R-3)	T	Organisational/ Enterprise	Scott O'Brien (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R127	C1	Construction Labor Productivity (C1)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions the, available construction manpower may have lower productivity than assumed in C1 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-173 covers this at the LCP level. this risk should be considered along with R-43, R-123, R-124 (availability/ quantity). Both R-127 and R-43, R-123, R-124 may be subject of PEP-PER review	T	Construction	Scott O'Brien (NE)	Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R138	C1	Drug & Alcohol Abuse (C1)	As a result of labour shortage and deviation from standard hiring procedures, instances of drug/ alcohol abuse might take place at C1 construction sites and camps leading to security and safety risks including injuries and fatalities	Risk ID'ed at Risk Workshop of 9-Nov-2011 This risk should be evaluated by HSS team. Similar risks R-139 & R-140 for C3 & C4	T	HSS	Scott O'Brien (NE)					Possible	1% - 50%	High
R147	C1	Supplier Availability (C1)	As there is limited number of qualified C1 suppliers in a situation of a heated market it could be difficult to engage at least one of qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	Risk ID'ed at Risk Workshop of 9-Nov-2011 Similar risks R-68 for C4 and R-148 for C1	T	Commercial	Scott O'Brien (NE)	Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R149	C1	Geotech vs. Claims (C1)	As detail geotech study data are not available during C1 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	Risk ID'ed at Risk Workshop of 9-Nov-2011 Impacts on particular construction activities should be considered individually. If managed properly this may become an opportunity. Similar risks R-150 & R-151 for C3 & C4	T	Commercial	Michael Maeyens (SLI)			Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R153	C1	Conservative Design (C1)	As conservative design approach ("worst case" scenarios) is used at C1 early design phases for all three components due to lack of design input data and multiple inputs (interfaces), it could be possible to optimise the design in the course of engineering development leading to cost reductions, accelerated schedules and better constructability	Risk ID'ed at Risk Workshop of 9-Nov-2011 This is a general opportunity for all three components. Before addressing and focused activities this opportunity is assessed as prob=3, cost=3, schedule=3 as some optimisation will be done anyway. Focused activity should increase the probability/ impacts. Similar ops R-154 & R-155 for C3 & C4	O	Technical	Greg Snyder (SLI)	Moderate	30 - 90	Major	10,000-100,000	Likely	50% - 90%	OPPORTUNITY
R174	C1	T&G Package Bid Closing & Negotiations	As A) T&G bid closing is delayed for 1.5 mos (9-Dec-2011 => 27-Jan-2012); B) Bid closing is followed by negotiations; C) negotiations are followed by the T&G contract award (still the same date as planned before the bid closing delay) D) T&G award is followed by the civil works (bulk excavation & concrete) with a 1 month float, negotiations could not absorb the bid closing delay or might take more time than planned in master schedule, giving rise to delay of civil works and "domino effect" of delays down the line in the LCP master schedule	Risk ID'ed on 1-Dec-2011 Could be considered along with risk R-31 (T&G Late Design Changes). The cause of this risk belongs to package CH0030	T	Commercial	Scott O'Brien (NE)	Moderate	30 - 90	Minor	100 - 1,000	Possible	1% - 50%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R183	C1	Rollway Construction vs. Impoundment	As a) for stability purposes it is necessary to partially construct two rollways following the spring flood of 2016 up to elevation 10m before full impoundment to elevation 39.0m; b) The rollways will start at elevation 5m and will go up to elevation 15.7m when fully complete; c) It is anticipated that it will take approximately 45 days to partially construct the rollways to elevation 10m, delays in construction of the rollways could impact on the impoundment schedule leading to overall C1 construction delay	Risk ID'ed on 23-Jan-2011 discussion on January 23rd, 2012. Discussion on 23-Jan-12: baseline should be finalised first. Luc to come up proposal to Nalcor w/o 30-Jan-12 to set up assumptions and constraints in order to narrow options down.	T	Construction	Scott O'Brien (NE)	Moderate	30 - 90	Minor	100 - 1,000	Possible	1% - 50%	Medium
R185	C1	Main Camp Capacity	As a) current baseline is to build a main C1 camp for 1,500 people; b) comparison with other similar projects (comparable volume of concrete works, etc.) pointed to higher number of required workers due to safety requirements, lower productivity, rotation, etc., planned camp capacity could not satisfy project requirements at peak of works leading to schedule delay	Risk ID'ed at C1 constructability review session on 24-Feb-2012	T	Construction	Scott O'Brien (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R188	C1	Impoundment in Winter: Head Pond (12.5 - 25M)	Due to a need to carry out head pond impoundment in winter, increasing of water level from natural 12.5m to 25m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair).	Thei risk identified on April 4th, 2012 during preparation to head pond variant study. The risk was amended on April 23rd by request of Daniel Damov to have broader view of risk exposure. (Ice is not a differentiator for head pond study)	T	Technical	Scott O'Brien (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R189	C1	Impoundment in Winter (25 - 39m)	In case of powerhouse late completion and, hence, due to the need to carry out impoundment in winter to prevent possible revenue loss, increasing of water level from 25m to 39m could mobilise high amount of ice and T&D, leading to flushing of high volume of ice and T&D downstream (environmental impact) and damage of spillway equipment (extra cost and time to repair, delay of commissioning).	This risk was identified by Daniel damov at the head pond variant strudy session on April 20th, 2012.	T	Technical	Scott O'Brien (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R21	C1	Bird Nesting (C1)	As the C1 construction site is located in the forest area used by birds for nesting, the nesting season (May - August) may preclude summer clearing activities as recommended by the EA panel leading to project delay	Risk ID'ed at Risk Workshop of 20-Sep-2011 R-175 covers this at LCP level. Similar risk R-106 for C4, no such risk for C3	T	Environmental	Steve Pellerin (NE)	Moderate	30 - 90			Possible	1% - 50%	Medium
R25	C1	Post-Award Drawings (C1)	As T&G tender drawings are not supposed to be the C1 construction drawings, late changes after the contract's award may occur leading to extra costs and schedule delays to start civil works	Risk ID'ed at Risk Workshop of 21-Sep-2011 Similar risks R-109 & R-110 for C3 & C4. This risk is critical for timely start of powerhouse civil engineering works. It should be considered along with risk of delay of contract negotiations	T	Commercial	Luc Turcotte (SLI)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R61	C1	Supplier's QA/QC (C1)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C1 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	Risk ID'ed at Risk Workshop of 21-Sep-2011 This is a general risks for all components, especially important for T&G package CH0030 (Shipshaw lessons learned). Despite lump sum contracts and LD, schedule risks are still there and require monitoring	T	Commercial	Scott O'Brien (NE)	Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R83	C1	Site Safety Coordination (C1)	Due to involvement of multiple organizations at the C1 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	Risk ID'ed at Risk Workshop of 21-Sep-2011 Should be subject of HSE plan. Similar risks R-170 & R-171 for C3 & C4	T	HSS	Scott O'Brien (NE)	Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R67	C3	Electrode vs. EA Release Special Condition	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, a special condition may be attached to EA release to use the metallic return leading to cost implications	Risk ID'ed at Risk Workshop of 21-Sep-2011 R-3 covers this at the LCP level. This is leading to substantial extra costs. (If opposition leads to schedule delay - this is risk R-70.) Although this could be Nalcor risk, Satish Sud should be involved in the risk resolution	T	Regulatory	Darren Debourke (NE)	Extreme	> 360	Extreme	>100,000	Possible	1% - 50%	High
R70	C3	Electrode Return vs. Delay	Due to possible misunderstanding by general public and regulators of environmental impact of using electrodes instead of metallic return and opposition to the electrode use, the electrode use may be challenged during permitting process leading to schedule delay	Risk ID'ed at Risk Workshop of 21-Sep-2011 R-3 covers this at the LCP level. this is just a regular schedule risk. If recommended is metallic return - this is corporate risk R-67 leading to much lower attractiveness of the LCP	T	Regulatory	Darren Debourke (NE)	Major	90 - 360	Moderate	1,000 - 10,000	Likely	50% - 90%	High
R71	C3	CFLco - Nalcor Interface	Possibility of interface with CFLco (Hydro Quebec) not being managed well, could lead to non timely decision making	Risk ID'ed at Risk Workshop of 21-Sep-2011 R-178 covers this at the LCP level. this risk should be considered along with risk R-64 (internal interfaces). Although Nalcor is supposed to lead this, Satish Sud should be part of risk resolution team	T	External	Darren DeBourke (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R75	C3	Outage Planning	Due to features of the communication process and decision making, timely scheduling of outages during commissioning to switch power on may become challenging leading to schedule delay and late completion date as well as safety impact	Risk ID'ed at Risk Workshop of 21-Sep-2011 This risk is allocated to C3 although C1 & C4 could be exposed too. This is a role of Completions manager (To be hired), meantime Fred Wilcox is assigned	T	Commissioning & Start-up	Darren Debourke (NE)	Minor	7 -- 30	Minor	100 - 1,000	Unlikely	0.1% - 1%	Medium
R76	C3	Maritime Link Assumptions	Changes in reliability assumptions made for maritime link could change scope and may cause schedule delay and increase cost	Risk ID'ed at Risk Workshop of 21-Sep-2011 This risk is allocated to C3 although C4 could be exposed too	T	Interface	Darren DeBourke (Nalcor)	Major		Major	10,000-100,000	Possible	1% - 50%	Medium
R78	C3	System Integration and Commissioning	Due to need to coordinate commissioning at multiple sites between CFLco, NL Hydro and SNC, lack of experienced personnel may take place leading to schedule and cost impact	Risk ID'ed at Risk Workshop of 22-Sep-2011 This is part of Labour Availability family of risks. Should be part of PEP-PER review. This risk assigned to C3 although C1 & C4 could be impacted	T	Commissioning & Start-up	Darren Debourke (NE)	Minor	7 -- 30	Minor	100 - 1,000	Likely	50% - 90%	Medium
R79	C3	Transformer Testing	Due to possibility of transformer test failure at site, the failure could occur requiring transportation of the transformer back to workshop and causing schedule delay and increased cost	Risk ID'ed at Risk Workshop of 22-Sep-2011 This risk is part of commissioning family of risks. In case of a lump sum contract no much cost impact is expected, but schedule delay to fix the transformer might be major as may require bringing it back to the factory for overhaul	T	Commissioning & Start-up	Satish Sud (SLI)	Major	90 - 360	Minor	100 - 1,000	Unlikely	0.1% - 1%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R82	C3	Site Safety Coordination (C1)	Due to construction period of equipment in non-energized environment, risk exist when commissioning equipment	Risk ID'ed at Risk Workshop of 22-Sep-2011 Should be subject of HSE plan. This risk assigned to C3, although C1 & C4 could be impacted	T	HSS	Darren Debourke (NE)	Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R98	C3	Safety vs. Heavy Equipment (C3)	Due to use of heavy equipment by C3 for civil works incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	Risk ID'ed at Risk Workshop of 22-Sep-2011 This risk should be part of the HSE plan. R-13, R-99 are similar risks for C1 & C4	T	HSS	Darren Debourke (NE)	Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R100	C3	Safety vs. Construction Hazards (C3)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	Risk ID'ed at Risk Workshop of 22-Sep-2011 Similar risks R-14 & R101 for C1 & C4	T	HSS	Darren Debourke (NE)	Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R102	C3	Safety vs. Traffic Incidents (C3)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	Risk ID'ed at Risk Workshop of 22-Sep-2011 Similar risks R-15 & R-103 for C1 & C4	T	HSS	Darren Debourke (NE)	Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R107	C3	Safety vs. Schedule Acceleration (C3)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	Risk ID'ed at Risk Workshop of 22-Sep-2011 Similar risk R-22 & R-108 for C1 & C4. This risk requires taking intoaccount safety angle when required attempts to accelerate the project schedule are undertaken	T	HSS	Darren Debourke (NE)	Minor	7 -- 30			Unlikely	0.1% - 1%	Low
R109	C3	Post-Award Drawings (C3)	As tender drawings are not supposed to be the C3 construction drawings, late changes after the contract's award may occur leading to extra costs	Risk ID'ed at Risk Workshop of 22-Sep-2011 Similar risks R-25 & R-110 for C1 & C4. Satish Sud is to support managing this risk	T	Commercial	Fred Wilcox	Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R111	C3	Wild Fires (C3)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C3 camp & site evacuation, injuries/ fatalities or loss of equipment	Risk ID'ed at Risk Workshop of 22-Sep-2011	T	HSS	Darren Debourke (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium
R113	C3	Lower Level of Design (C3)	Due to C3 challenging engineering staffing or timelines, lower level of details of design for development of the base estimate, higher uncertainties could lead to higher cost contingencies and drive extra uncertainties in adjacent disciplines (civil, electrical, etc.)	Risk ID'ed at Risk Workshop of 22-Sep-2011 Similar risks R-32 & R-114 for C1 & C4. This is not a risk strictly speaking. This is uncertainty and should be reflected in the "Ranges" model, not through risk register.	T	Technical	Satish Sud (SLI)			Moderate	1,000 - 10,000	Possible	1% - 50%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE

ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R115	C3	Manufacturing Capacity & Availability (C3)	Due to heated market conditions in the supplier's industries, shortage of qualified workforce and longer supply timelines would take place leading to extra C3 costs and schedule delays	Risk ID'ed at Risk Workshop of 22-Sep-2011 This is major C3 supply package risk (any supply package) that covers labour availability in manufacturing. Presumably, in case of lump sum contracts cost impact would be very low, but schedule delay could be substantial. This is a summary risk for relevant packages of C3; similar risks R-33 & R-115 for C1 & C4 (Daniel became an owner by suggestion of Fabien/ 17-Feb-2012)	T	Commercial	Tousignant, Daniel (SLI)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R117	C3	Adverse Winter Weather (C3)	As several C3 construction activities are planned for winter, abnormal winter weather (low temperatures, snow storms, snow falls, etc.) may occur during the construction leading to lower productivity, construction delay and safety risks	Risk ID'ed at Risk Workshop of 22-Sep-2011 Impact on C3 is minimal. Mapping may be done to all winter construction activities but with individual impact (Real is PST - the risk will be re-assigned to a permanent construction manager when he is hired)	T	Construction	Real Mailhot (SLI)	Minor	7 -- 30			Rare	<0.1%	Low
R119	C3	Construction Permits (C3)	As several dozens of C3 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-176 covers this at the LCP level. this risk is different from EA/ EIS permitting (risk 7). If several permits are late or missed, cumulative impact may be major to extreme for cost and schedule. When mapping this risk may be attached to several major construction activities with possible impact and moderate probability. Similar risk R-36 & R-120 for C1 & C4	T	Regulatory	Darren Debourke (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R123	C3	Construction Labour Availability (C3)	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may lead to C3 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-172 covers this at the LCP level. this risk doesn't take into account labour productivity (see R-127, R-128, R-129). The impact is different for different works. Both labour productivity risks and R-43 may be a subject of PEP-PER review	T	Commercial	Darren Debourke (NE)	Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High
R125	C3	Contractors' Availability (C3)	As several mega projects are planned in North America, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated C3 construction costs, lower productivity, less attractive contract terms for LCP, safety impact, etc.	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-177 covers this risk at LCP level. this is general construction package risk for all components. Impacts are different for different components. They should be evaluated when mapping risks. This may become an opportunity if properly managed. Similar risk R-44 & R-126 of C1 & C4	T	Commercial	Darren Debourke (NE)	Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R128	C3	Construction Labor Productivity (C3)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C3 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, etc.	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-173 covers this at the LCP level. this risk should be considered along with R-43, R-123, R-124 (availability/ quantity). Both R-127 and R-43, R-123, R-124 may be subject of PEP-PER review	T	Construction	Darren Debourke (NE)	Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R130	C3	Major Equipment Delivery (C3) Planning	As a result of poor scheduling, logistics planning, schedule risks and interface management, major contract delivery milestones might not be met, leading to overall C3 schedule delay	Risk ID'ed at Risk Workshop of 22-Sep-2011 This general risk for any supply package. This is a common risk for all components. Even in case of lump sum contracts monitoring of schedules and schedule risks is required. Similar risks R-51 & R-131. Depending on package corresponding Area manager will be the owner: Fred Wilcox, S. Connacher, W. Diaz (info from Luc Chausse)	T	Commercial	Darren Debourke (NE)	Major	90 - 360			Possible	1% - 50%	Medium
R132	C3	Commissioning Failures (C3)	As "stress" testing of C3 equipment is part of commissioning, failure of some major equipment may occur during commissioning resulting in schedule delays, increased cost and HSE issues	Risk ID'ed at Risk Workshop of 22-Sep-2011 Similar risks R-57 & R-132 for C1 & C4. This is a role of Completion Manager. Until this position filled, Fred Wilcox is assigned	T	Commissioning & Start-up	Darren Debourke (NE)	Major	90 - 360	Major	10,000-100,000	Unlikely	0.1% - 1%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R134	C3	Contractor's Errors/ Omissions (C3)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C3 re-work, extra costs and schedule delay	Risk ID'ed at Risk Workshop of 22-Sep-2011 This general risk for any contract package. This is a common risk for all components. Even in case of lump sum contracts monitoring of schedules and schedule risks is required. Similar risks R-59 & R-135 for C1 & C4	T	Completeness	Real Mailhot (SLI)	Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R136	C3	Design & Manufacturing Errors/ Omissions (C3)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C3 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	Risk ID'ed at Risk Workshop of 22-Sep-2011 This general risk for any supply package. This is a common risk for all components. Even in case of lump sum contracts monitoring of schedules and schedule risks is required. Similar risks R-60 & R-137 for C1 & C4. Depending on package corresponding Area manager will be the owner: Fred Wilcox, S. Connacher, W. Diaz (info from Luc Chausse)	T	Completeness	Fred Wilcox (SLI)	Major	90 - 360	Minor	100 - 1,000	Unlikely	0.1% - 1%	Medium
R139	C3	Drug & Alcohol Abuse (C3)	As a result of labour shortage and deviation from standard hiring procedures, instances of drug/ alcohol abuse might take place at C3 construction sites and camps leading to security and safety risks including injuries and fatalities	Risk ID'ed at Risk Workshop of 4-Nov-2011 This risk should be evaluated by HSS team. Similar risks R-138 & R-140 for C1 & C4	T	HSS	Darren Debourke (NE)					Unlikely	0.1% - 1%	Medium
R150	C3	Geotech vs. Claims (C3)	As detail geotech study data are not available during C3 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	Risk ID'ed at Risk Workshop of 4-Nov-2011 According to LC: THIS IS MINOR RISK FOR C3. Impacts on particular construction activities should be considered individually. If managed properly this may become an opportunity. Similar risks R-150 & R-151 for C1 & C4 (Tony Villaraza assigned by request of Luc Chausse/ 17-Feb-2012)	T	Commercial	Tony Villaraza (SLI)	Minor	7 -- 30	Minor	100 - 1,000	Unlikely	0.1% - 1%	Low
R152	C3	Fiber Optic Line (C3)	As the fiber optic line development is not part of the LCP project and is to be developed by Bell Aliant, timely availability of fiber optic communication might become problematic leading to issues with coordination of sites, crews, contractors, etc. and safety issues	Risk ID'ed at Risk Workshop of 4-Nov-2011 This is external interface between Nalcor and Bell Aliant. Despite it is not part of the LCP scope to develop, usage of the optic line is included to baseline as a given	T	Technical	Darren Debourke (NE)	Minor	7 -- 30	Moderate	1,000 - 10,000	Possible	1% - 50%	High
R158	C3	Supplier's QA/QC (C3)	Due to failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C3 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	Risk ID'ed at Risk Workshop of 4-Nov-2011 This is a general risks for all component's supplier's packages. Despite lump sum contracts and LD, schedule risks are still there and require monitoring. Similar risks R-61 & R-159 for C1 & C4	T	Commercial	Darren Debourke (NE)	Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R162	C3	Interfaces (C3)	As multiple complex hard & soft C3 interfaces require inputs from project components and disciplines, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	Risk ID'ed at Risk Workshop of 4-Nov-2011 R-178 covers this at the LCP level. Similar risks R-64 & R-163 for components C1 & C4.	T	Interface	Darren Debourke (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	Medium
R164	C3	Availability of Construction Management Personnel (C3)	Due to features of the labour market in NL and lack of qualified C3 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	Risk ID'ed at Risk Workshop of 4-Nov-2011 R-172 covers this at the LCP level. this risk is a part of broader picture on labour availability and productivity, should be part of PEP-PER review. Similar risks R-65 & R-165 for C1 & C4. Real Mailhot is PST, when a C3 constrcxction manager is hired - he will take over (info from Luc Chausse/ 16-Feb-2012)	T	Construction	Darren Debourke (NE)	Major	90 - 360	Minor	100 - 1,000	Likely	50% - 90%	High
R168	C3	Scope Change (C3)	As final scope is not frozen, some scope elements could be transferred to/ from C3 in future even after project sanctioning, leading to re-design, re-definition of corresponding packages, late ordering of materials & services/ cancellations, extra costs and schedule delays	Risk ID'ed at Risk Workshop of 4-Nov-2011 Similar risks R-74 & R-169 for C1 & C4. This risk doesn't cover EA driven scope changes (R-3)	T	Organisational/ Enterprise	Darren Debourke (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R170	C3	Site Safety Coordination (C3)	Due to involvement of multiple organizations at the C3 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	Risk ID'ed at Risk Workshop of 4-Nov-2011 Similar risks R-83 & R-171 for C1 & C4	T	HSS	Darren Debourke (NE)	Minor	7 -- 30			Unlikely	0.1% - 1%	Medium
R68	C4	Insulator Supplier Availability (hvdc) (C4)	As there is limited number of qualified C4 HVdc suppliers for insulators supply (2 suppliers only), in a situation of a heated market it could be difficult to engage at least one of them on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	Risk ID'ed at Risk Workshop of 21-Sep-2011 These two suppliers are large international companies representing oligopoly. They have high bargaining power. They could dictate contract conditions to LCP. This should be considered as a part of broader discussion on supplier's availability. Similar risks R-147 & R-148 for C1 & C3 (Hartfield Stevens became owner 17-Feb-2012/ suggestion from Fabien)	T	Commercial	Keenan Healey (SLI)	Moderate	30 - 90	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R85	C4	HVdc & HVac Contractor Availability (C4)	As several other transmission line projects are planned in North America, it might become difficult to attract skilled on-site contractors that leads to higher construction costs, lower productivity and less attractive for LCP contracting terms	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-177 covers this at the LCP level. This risk should be part of more general risk on contractor's availability	T	Commercial	Kyle Tucker (NE)	Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R87	C4	Weather and Pollution Design Data (C4)	As limited amount of historic data is available for transmission line design in NL, quality of the design may suffer resulting in suboptimal solutions, extra costs, re-work, schedule delays and reputational impact	Risk ID'ed at Risk Workshop of 22-Sep-2011 Only two years of data available on pollution, observation data for another year expected that should improve quality of historic data significantly	T	Technical	Gokhan Saltan (SLI)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R89	C4	RoW (C4)	Due to features of land registry in the province, it will be difficult to identify all land owners along route thay leads to surprises in land ownerships and claims from owners	Risk ID'ed at Risk Workshop of 22-Sep-2011 Existing land registration system is not consistent and doesn't allow identify land owners reliably. This an issue especially in populated areas of Avalon peninsular. John Cooper (NE) is to support managing this risk	T	External	Kyle Tucker (NE)	Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R92	C4	Late Design Change (C4)	As late design criteria change initiated by customer for transmission line is possible, redesign may occur leading to re-definition of corresponding packages, schedule delay and extra costs	Risk ID'ed at Risk Workshop of 22-Sep-2011 This is linked to the general risk R-3, as well as with R-25, R-31, R-92, R-95	T	Technical	Gokhan Saltan (SLI)	Major	90 - 360	Major	10,000-100,000	Unlikely	0.1% - 1%	Medium
R93	C4	Remote Site Logistics (C4)	As construction of transmission lines is planned in several remote location (especially in Labrador) and delivery to these sites are possible only in certain season windows, logistics difficulties to deliver construction equipment, materials and crews may occur leading to extra logistics costs, schedule delay (including triggering delays till next window) and safety impact	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-122 is a general logistics risk for C4 but about delivery to some remote areas	T	Commercial	Claude Daneau (SLI)	Moderate	30 - 90	Moderate	1,000 - 10,000	Rare		Low
R94	C4	Helicopter Use in Labrador for HVac (C4)	In some remote areas of Labrador use of helicopter could be considered as opportunity to reduce labour numbers and accelerate the schedule	Risk ID'ed at Risk Workshop of 22-Sep-2011 1) Very good organisation of works is required to make helicopter use effective. Any delay could lead to high extra costs due to high helicopter hourly rates; 2) using helicopter represents high safety risks!!!	O	Construction	Kyle Tucker (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY
R95	C4	EA Release for HVdc (C4)	Due to delay in EA release, start of early C4 construction activities may be delayed leading to missed construction windows in some cases and overall project delay	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-3 covers this at the LCP level. AC has lower risk (application done, not approved yet), DC - higher risk	T	Regulatory	Steve Pelerin (NE)	Major	90 - 360	Moderate	1,000 - 10,000	Likely	50% - 90%	High
R99	C4	Safety vs. Heavy Equipment (C4)	Due to use of heavy equipment by C4 for civil works incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	Risk ID'ed at Risk Workshop of 22-Sep-2011 This risk should be part of the HSE plan.	T	HSS	Kyle Tucker (NE)					Unlikely	0.1% - 1%	Medium
R101	C4	Safety vs. Construction Hazards (C4)	As various hazards are expected during construction (using scaffolds, elevated platforms, explosives, severe weather, etc.), incidents may occur leading to injuries/ fatalities, work stoppage for investigations and reputational impact	Risk ID'ed at Risk Workshop of 22-Sep-2011 Similar risks R-14 & R100 for C1 & C3	T	HSS	Kyle Tucker (NE)					Unlikely	0.1% - 1%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE

ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R103	C4	Safety vs. Traffic Incidents (C4)	Due to requirements of cohabitation of personal and heavy equipment, traffic incidents might occur leading to injuries/ fatalities, work stoppage for investigation and reputational impact	Risk ID'ed at Risk Workshop of 22-Sep-2011 Similar risks R-15 and R-102 for C1 & C3	T	HSS	Kyle Tucker (NE)					Unlikely	0.1% - 1%	Medium
R105	C4	Terrestrial Habitat (HVac) (C4)	As requirements by Environment Canada (EC) on terrestrial habitat replacement is unclear (evolving) and are not factored in to the base estimate yet, the requirement to replace the terrestrial habitat may be eventually put forward by EC leading to extra costs and schedule delay	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-175 covers this at the LCP level. similar risk R-20 for C1, C3 doesn't have this risk	T	Environmental	Steve Pellerin (NE)	Moderate	30 - 90	Minor	100 - 1,000	Possible	1% - 50%	Medium
R106	C4	Bird Nesting (HVac) (C4)	As the construction site is located in the forest area used by birds for nesting, the nesting season (May - August) may preclude summer clearing activities as recommended by the EA panel leading to project delay	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-175 covers this at the LCP level. similar risk R-21 for C1, C3 doesn't have this risk	T	Environmental	Claude Daneau (SLI)	Moderate	30 - 90	Minor	100 - 1,000	Possible	1% - 50%	Medium
R108	C4	Safety vs. Schedule Acceleration (C4)	Due to high profile of the LCP and pressure to complete the project on time, a requirement to accelerate/ 'crash' the construction schedule may be put forward in case of major delays that leads to lower safety standards and injuries/ fatalities, correspondingly	Risk ID'ed at Risk Workshop of 22-Sep-2011 Similar risk R-22 & R-107 for C1 & C3	T	HSS	Kyle Tucker (NE)					Unlikely	0.1% - 1%	Medium
R110	C4	Post-Award Drawings (C4)	As tender drawings are not supposed to be the C4 construction drawings, late changes after the contract's award may occur leading to extra costs	Risk ID'ed at Risk Workshop of 22-Sep-2011 Similar risks R-25 & R-109 for C1 & C4	T	Commercial	Gokhan Saltan (SLI)	Minor	7 -- 30	Minor	100 - 1,000	Unlikely	0.1% - 1%	Low
R112	C4	Wild Fires (C4)	Due to possibility of wild fires ignited by natural (lighting) or human-related events (equipment, camp, smoking, etc.), forest fires might be started leading to the C4 camp & site evacuation, injuries/ fatalities or loss of equipment	Risk ID'ed at Risk Workshop of 22-Sep-2011	T	HSS	Kyle Tucker (NE)					Unlikely	0.1% - 1%	Medium
R118	C4	Adverse Weather (C4)	As several C4 construction activities are planned for winter, abnormal winter weather (low temperatures, snow storms, snow falls, etc.) may occur during the construction leading to lower productivity, construction delay and safety risks	Risk ID'ed at Risk Workshop of 22-Sep-2011 This is generic risk for whole project different impact for different components: Mapping may be done to all winter construction activities but with individual impacts. This could impact use of helicopters (R-94)	T	Construction	Kyle Tucker (NE)	Minor	7 -- 30	Minor	100 - 1,000	Possible	1% - 50%	High
R120	C4	Construction Permits (C4)	As several dozens of C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-176 covers this at the LCP level. this risk is different from EA/ EIS permitting (risk 7). If several permits are late or missed, cumulative impact may be major to extreme for cost and schedule. When mapping this risk may be attached to several major construction activities with possible impact and moderate probability. Similar risk R-119 & R-120 for C3 & C4	T	Regulatory	Kyle Tucker (NE)	Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R122	C4	Logistics (C4)	Due to less than optimal logistics plan, some transportation aspects (weather/ season's delivery window, size of equipment, road conditions, availability of lifting equipment in ports, etc.) might impede timely delivery of C4 equipment & materials to the sites that leads to schedule delays and extra costs	Risk ID'ed at Risk Workshop of 22-Sep-2011 For C4 it is mostly about tower parts delivery. This supply package risks is general for all components. However, impact on schedule for different components is different. Evaluation of the impacts would be required during the mapping of this risk to schedule activities. Different causes may be considered in detail during PEP-PER study. Presumably, in case of lump sum contracts cost impact would be very low due to LD, but schedule delay could be substantial	T	Commercial	Ed Over (SLI)	Major	90 - 360	Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R124	C4	Construction Labour Availability (C4)	Due to a) features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.); b) planning of power line construction in various (remote) areas of NL, the lack of quantity of construction manpower may lead to C4 schedule delay and extra labour costs to attract as well as quality of works, safety risks, etc.	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-172 covers this at the LCP level. Labour Availability risk should be LCP general risk, Hilary is to coordinate this activity for three components. This risk doesn't take into account labour productivity (see R-98). The impact is different for different works. Both R-98 and R-43 may be a subject of PEP-PER review. This risk could be considered as strategic and subject to risk resolution led by Nalcor	T	Commercial	Kyle Tucker (NE)	Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High
R129	C4	Construction Labour Productivity (C4)	Due to features of the labour market in NL, issues with availability of skilled workers and labour agreement with Unions, the available construction manpower may have lower productivity than assumed in C4 base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	Risk ID'ed at Risk Workshop of 22-Sep-2011 R-173 covers this at the LCP level. This risk should be considered general LCP risk. Ron Power and Normand Bechard are to own this at the project level. This risk should be considered along with R-43, R-123, R-124 (availability/ quantity). Both R-127 and R-43, R-123, R-124 may be subject of PEP-PER review	T	Construction	Kyle Tucker (NE)	Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R131	C4	Major Material Delivery (C4): Planning for HVac	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones for HVac might not be met leading to overall C4 schedule delay	Risk ID'ed at Risk Workshop of 22-Sep-2011 This general risk for any supply package. This is a common risk for all components. Even in case of lump sum contracts monitoring of schedules and schedule risks is required. Similar risks R-51 & R-130. This is risk for HVac; Risk R186 is for HVdc	T	Commercial	Kumar Kandaswamy (SLI)	Major	90 - 360			Possible	1% - 50%	Medium
R135	C4	Contractor's Errors/ Omissions (C4)	Due to lack of control over contractor's construction activities or poor interface management, contractor(s) might make errors/ omissions (including false works) leading to C4 re-work, extra costs and schedule delay	Risk ID'ed at Risk Workshop of 22-Sep-2011 This general risk for any contract package. This is a common risk for all components. Even in case of lump sum contracts monitoring of schedules and schedule risks is required. Similar risks R-59 & R-134 for C1 & C3	T	Completeness	Claude Daneau (SLI)	Major	90 - 360	Minor	100 - 1,000	Unlikely	0.1% - 1%	Medium
R137	C4	Design & Manufacturing Errors/ Omissions (C4)	Due to lack of control over supplier's design activities, poor interface management or lack of technological readiness to produce, supplier(s) might produce design with errors/ omissions so that the final products do not meet C4 spec/ quality requirements and give rise to a need to re-design/ re-work, extra costs and schedule delays	Risk ID'ed at Risk Workshop of 22-Sep-2011 This general risk for any supply package. This is a common risk for all components. Even in case of lump sum contracts monitoring of schedules and schedule risks is required. Similar risks R-60 & R-136 for C1 & C3	T	Completeness	Kumar Kandaswamy (SLI)	Major	90 - 360	Minor	100 - 1,000	Unlikely	0.1% - 1%	Medium
R140	C4	Drug & Alcohol Abuse (C4)	As a result of labour shortage and deviation from standard hiring procedures, instances of drug/ alcohol abuse might take place at C4 construction sites and camps leading to security and safety risks including injuries and fatalities	Risk ID'ed at Risk Workshop of 10-Nov-2011 This risk should be evaluated by HSS team. Similar risks R-139 & R-139 for C1 & C4	T	HSS	Kyle Tucker (NE)					Possible	1% - 50%	High
R151	C4	Geotech vs. Claims (C4)	As detail geotech study data are not available during C4 design phase and if contractual obligations are not clearly stated, unforeseen soil conditions (real or imaginary) could be discovered by contractors leading to claims and extra costs	Risk ID'ed at Risk Workshop of 10-Nov-2011 Impacts on particular construction activities should be considered individually. If managed properly this may become an opportunity. Similar risks R-149 & R-151 for C1 & C3. Drilling program for DC is acceptable even before the EA release, for AC is not possible	T	Commercial	Afzal Hussain (SLI)			Moderate	1,000 - 10,000	Unlikely	0.1% - 1%	Low
R155	C4	Optimisation of the Conservative Design (C4)	As conservative design approach ("worst case" scenarios) is used at C4 early design phases for all three components due to lack of design input data and multiple inputs (interfaces), it could be possible to optimise the design in the course of engineering development leading to cost reductions, accelerated schedules and better constructability	Risk ID'ed at Risk Workshop of 10-Nov-2011 This is a general opportunity for all three components. Before addressing and focused activities this opportunity is assessed as prob=3, cost=3, schedule=3 as some optimisation will be done anyway. Focused activity should increase the probability/ impacts	O	Technical	Gokhan Saltan (SLI)			Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R159	C4	Supplier's QA/QC (C4)	Due to poor definition of required product quality, failure by supplier to implement effective QA/QC system and lack of control over sub-vendor quality system, final C4 product(s) could not pass the quality tests, leading to re-work, extra costs and schedule delay	Risk ID'ed at Risk Workshop of 10-Nov-2011 This is a general risks for all component's supplier's packages. Despite lump sum contracts and LD, schedule risks are still there and require monitoring. Similar risks R-61 & R-158 for C1 & C3	T	Commercial	Kyle Tucker (NE)	Major	90 - 360	Minor	100 - 1,000	Possible	1% - 50%	Medium
R163	C4	Interfaces (C4)	As multiple complex hard & soft C4 interfaces require inputs from project components and disciplines and outputs to contractors, efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays	Risk ID'ed at Risk Workshop of 10-Nov-2011 R-178 covers this at the LCP level. Solder Pond: interface with Nalcor and C3. Similar risks R-64 & R-162 for components C1 & C3.	T	Interface	Kyle Tucker (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	Medium
R165	C4	Availability of SLI Construction Management Personnel (C4)	Due to features of the labour market in NL and lack of qualified C4 construction management personnel, difficulties with attracting and retaining of right engineering and management personnel may occur leading to negative impact on design and construction, lower productivity and higher labour costs	Risk ID'ed at Risk Workshop of 10-Nov-2011 R-172 covers this at the LCP level on labour availability and productivity, should be part of PEP-PER review. Similar risks R-65 & R-164 for C3 & C4. This risk is about LCP not contractor's personnel.	T	Construction	Kyle Tucker (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R171	C4	Site Safety Coordination (C4)	Due to involvement of multiple organizations at the C4 construction sites, safety codes and operators (including union) mistakes may occur leading to injury and potential fatalities	Risk ID'ed at Risk Workshop of 10-Nov-2011 Similar risks R-83 & R-171 for C1 & C4	T	HSS	Kyle Tucker (NE)					Unlikely	0.1% - 1%	Medium
R180	C4	Transmission Line River Crossing vs. TSS (CD0512)	As part of the Construction Power Supply package scope includes river crossing and clearing of the river bank area, these activities could disturb and contaminate the river giving rise to higher Total Suspended Solids (TSS) levels (Standard: TSS <30 p.p.m.) and leading to extra costs and delays to comply with regulations	Risk ID'ed on 15-Dec-2011 this risk came from package inventory CD0512 - Construction Power Supply (package risk 4). Formally this risk belongs to C3 but managed by C4.	T	Environmental	Kumar Kandaswamy (SLI)					Unlikely	0.1% - 1%	Low
R186	C4	Major Material Delivery (C4): Planning for HVdc	As a result of poor scheduling, schedule risks and interface management, major contract delivery milestones for HVdc might not be met leading to overall C4 schedule delay	Risk ID'ed at Risk Workshop of 22-Sep-2011 This general risk for any supply package. This is a common risk for all components. Even in case of lump sum contracts monitoring of schedules and schedule risks is required. Similar risks R-51 & R-130. This is risk for HVdc; Risk R131 is for HVac	T	Commercial	Keenan Healey (SLI)	Major	90 - 360			Possible	1% - 50%	Medium
R3	LCP	EA Release Special Conditions	Due to high interest of the government, general public and NGO's in the LCP, special conditions may be attached to the project permits (EA vs. Environmental Protection Plan) resulting in scope change, schedule delays and extra costs to comply	Risk ID'ed at Risk Workshop of 20-Sep-2011 This is a risk that covers at LCP level corresponding component's risks R-9, R-67, R-70, R-95. Purpose: coordination and support at LCP level. This particular risk doesn't take part in probabilistic risk assessment as the component's risks will instead. EA release for C1 was done in March 2012. EA release for HVdc and C3 will be done later separately. After EA release issued for MF and HVac line in March 2012, this risks is about HVdc, marine link and converter stations and can be downgraded	T	Regulatory	Ron Power (NE)	Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R52	LCP	Contracting Strategy Adjustments	Due to heated market conditions or financing constraints, LCP may need to change contracting strategy, causing delays in schedule and increase in cost	Risk ID'ed at Risk Workshop of 21-Sep-2011 This risk is closely related to contractor's & supplier's (qualified) availability: R-44, R-68, R-125, R-126, R-147, R-148. These risks could be causes for this risk. Moreover, risks R-177 and R-179 drive this risk at LCP level	T	Commercial	Ron Power (NE)	Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R54	LCP	RFP/ Contract Quality	As an intent to maintain project schedule when working under time crunch or due to incomplete contracting strategy, fast tracking approach towards RFP/ contracts development and deviation from established procurement/ contracting procedures might be adopted that lead to sub-standard, incomplete or inadequate package scopes and unclearly defined contractual obligations in terms of scope, cost, schedule, quality, safety	Risk ID'ed at Risk Workshop of 21-Sep-2011 This is a general risk for all components/ packages. It might be a subject of PEP-PER study	T	Commercial	Pat Hussey (NE)	Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R69	LCP	Knowledge Transfer	Due to maturity of owner and wealth of experience, opportunity exist for interfacing between Nalcor and SLI on existing system and hvdc system	Risk ID'ed at Risk Workshop of 21-Sep-2011 Real positive impact is in operations - when results of interfaces and training could be visible. Although Nalcor could lead this, Nick Gillis should be part of the opportunity resolution team	O	Interface	Bob Barns (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY
R72	LCP	Final Project Integration	Due to complexity, overall integration of all LCP components and activities plus external Island Link prior to project commissioning, may represent significant challenge leading to overall delay of commissioning	Risk ID'ed at Risk Workshop of 21-Sep-2011 This risk comes from C3 that is integrating component for the other components. This risk is also linked with the external interfaces risk R-71	T	Organisational/ Enterprise	Ron Power (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R77	LCP	Class of Estimate & Cost Escalation	Because the base estimate for DG3 is preliminary and done in money of the base period, the real pricing in the time of purchasing may be different due to market conditions then, leading to extra costs	Risk ID'ed at Risk Workshop of 21-Sep-2011 This is quite certain (issue) to happen and should be managed outside of risk register model: 1) in "ranges" model for uncertainties around cost estimate accounts and 2) in cost escalation model. This should be considered as opportunity (cost de-escalation) if time of purchasing is properly used to minimise pricing	T	Commercial	Jason Kean (NE)			Major	10,000-100,000	Almost Certain	>90%	High
R80	LCP	Early Procurement	Due to volatility of equipment pricing, early procurement of equipment could result in lower cost and allow some float in the schedule	Risk ID'ed at Risk Workshop of 22-Sep-2011 This opportunity depends on owner's policy on purchasing before final investment decision. Time of purchasing may be defined using macro economic data from Global Insight	O	Commercial	Normand Bechard (SLI)	Major	90 - 360	Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY
R81	LCP	Project Controls: Packages	Due to possible a) problems with delivery of packages (quality, labour availability, etc.), b) project/ document controls under-staffing, c) difficulties to measure progress and quantities of construction packages, d) late engineering changes, some packages could be delivered with delays and increased quantities, leading to overall schedule delays and extra costs	Risk ID'ed at Risk Workshop of 22-Sep-2011 This is part of risk inventory for (almost) any package both supply and construct ones. Due to LD cost impact is not high but schedule delays are still there.	T	Commercial	Normand Bechard (SLI)	Moderate	30 - 90	Minor		Possible	1% - 50%	Medium
R84	LCP	Operation Staff	Due to current limited number of operators within Nalcor, understaffing during commissioning and operations may occur, leading to commissioning delay, start of operations and lower acetct productivity	Risk ID'ed at Risk Workshop of 21-Sep-2011 Could be considered along with R-69 (knowledge transfer), R-72 (intergration) and R-78 (commissioning)	T	Operations	John Mallam (NE)			Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R86	LCP	Sourcing Globally	Due to slow economy in some parts of the world, opportunity could be exploited to source services from markets all over the world giving rise to cost savings	Risk ID'ed at Risk Workshop of 22-Sep-2011 That opportunity may be split to three for C1, C3, C4 if required. Savings should not be overridden by low quality and schedule delays. Close overlapping with R-96 - may be combined	O	Commercial	Normand Bechard (SLI)			Major	10,000-100,000	Possible	1% - 50%	OPPORTUNITY
R141	LCP	Innu Involvement/ IBA	Due to intimate involvement of Innu people in delivery of the project (IBA), there might be instances of negative influence on LCP contracting, permitting, labour relations, that leads to narrower choices of contractors, suppliers and labour, issues with environmental monitoring and permitting (destruction of land and hunting areas during construction, etc.) leading to extra costs, schedule delays, safety issues, etc.	Risk ID'ed at Risk Workshop of 9-Nov-2011 This risks should be considered along with labour and contractor's availability, labour productivity and permitting risks	T	External	Pat Hussey (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE														
ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R144	LCP	Spare Parts v. RAM	As RAM analysis for whole system has yet to be carried out according to declared level of availability, spare part requirements could be too conservative and become an additional OpEx cost that leads to poorer project economics and lower attractiveness for stakeholders	Risk ID'ed at Risk Workshop of 9-Nov-2011 This is not exactly a project risk. But it makes impact on the LCP economic model through OpEx and hence important for competitiveness of LCP. Corresponding RAM modeling should be done during project development by operations people. Potentially, that may be an opportunity to optimise the level of spare part and redundant equipment stock as well as demonstrate investor's structured approach towards OpEx and economic model development.	T	Operations	John Mallam (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R156	LCP	SLI - Nalcor Contract, Coordination and Alignment	As a) coordination between SLI and Nalcor reflects current contract between the organisations; b) different organisational approaches/ cultures exist as related to the contract interpretation and decision making; c) lack of staffing in both organisations takes place, the lack of alignment and decision-making efficiency could occur, leading to non timely decision making, lower quality of decisions, re-work, schedule delay and extra costs	Risk ID'ed at Risk Workshop of 9-Nov-2011 a) Different approaches and experience towards various EPCM activities should be married based on the Contract; b) people from various SLI divisions are seconded to the LCP that have variations of procedures inside of SLI. c) Existing cost+ contract (Consultancy type) between Nalcor and SLI assumes no room for changes and key decision making by SLI. d) This risk should be considered along with risk R-64 (internal interfaces), and R-69 (opportunity to train and coach). Good progress is done on coordination streamlining recently. But still it is top organisational risk	T	Organisational/ Enterprise	Ron Power (NE)	Major	90 - 360	Major	10,000-100,000	Likely	50% - 90%	High
R157	LCP	Facilities Sharing	As each component develops all required facilities independently (including accommodation), there could be an opportunity to share facilities and optimise their use among components, leading to overall CapEx reduction	Risk ID'ed at Risk Workshop of 9-Nov-2011 Engineering from all three components should review this opportunity, compare requirements (including timing) and make adjustments in project execution plan and base estimates. Moderate probability and impacts are selected, focused activities could increase these. Nick Gillis assigned to manage internal interfaces among three component engineering managers	O	Organisational/ Enterprise	Normand Bechard (SLI)	Moderate	30 - 90	Moderate	1,000 - 10,000	Likely	50% - 90%	OPPORTUNITY
R172	LCP	Construction Labour Availability -LCP	Due to features of the labour market in NL (several major projects, low supply, tendency for labour to migrate to Western Canada, etc.) the lack of quantity of construction manpower may occur leading to LCP schedule delay and extra labour costs to attract as well as giving rise to reduction of quality of works, safety risks impact, etc.	Risk ID'ed on 1-Dec-2011 This risk is considered a general LCP risks managed at the project level. Same time, C1, C3 and C4 have the same risks at the component levels to assure proper management of the risk at component level: R-43 (for C1), R-123 (for C3) and R-124 (for C4). Also covered are risks R-65, R-164, R-165 (construction management availability). Hilary Hynes is to coordinate this risk with corresponding component's risk owners, SLI and Nalcor management. This particular risk doesn't take part in probabilistic risk assessment as the component's risks will instead.	T	Commercial	Ron Power (NE)	Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High
R173	LCP	Construction Labor Productivity - LCP	Due to a) features of the labour market in NL, b) issues with availability of skilled workers, c) labour agreement with Unions; d) inadequate organisation of construction works, the available construction manpower may have lower productivity than assumed in LCP base estimate/ schedule, leading to higher construction costs, schedule delays as well as quality of works, safety risks, etc.	Risk ID'ed on 1-Dec-2011 This risk is considered a general LCP risks managed at the project level. Same time, C1, C3 and C4 have the same risks at the component levels to assure proper management of the risk at component level: R-127 (for C1), R-128 (for C3) and R-129 (for C4). Normand Bechard & Ron Power are to coordinate this risk with corresponding component's risk owners, SLI and Nalcor management. This is rather issue (given) that should be taken into account in "ranges" model of base estimate not risk register model. This particular risk doesn't take part in probabilistic risk assessment as the component's risks will instead.	T	Commercial	Ron Power (NE)	Extreme	> 360	Extreme	>100,000	Likely	50% - 90%	High
R175	LCP	Sensitive Areas -LCP	Due to exposure of C1, C3, C4 to sensitive areas (archeological sites, fish habitat, terrestrial habitat, bird nesting), delays may occur with permit's obtaining and start of construction works which leads to work stoppage and overall project delay	Risk ID'ed on 1-Dec-2011 This is a risk that covers at LCP level corresponding component's risks R-10, R-19, R-104, R-20, R-105, R-21, R-106. Purpose: coordination and support at LCP. This particular risk doesn't take part in probabilistic risk assessment as the component's risks will instead.	T	Regulatory	Steve Pellerin (NE)	Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R176	LCP	Construction Permits -LCP	As several dozens of C1, C3, C4 construction permits are required to start and continue construction, late permits for some of them (or some missed ones) may delay several construction activities leading to schedule impacts and increasing cost	Risk ID'ed on 1-Dec-2011 This is a risk that covers at LCP level corresponding component's risks R-36, R-119, R-120. Purpose: coordination and support at LCP. This particular risk doesn't take part in probabilistic risk assessment as the component's risks will instead.	T	Regulatory	Ron Power (NE)	Extreme	> 360	Moderate	1,000 - 10,000	Possible	1% - 50%	High

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE

ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R177	LCP	Contractor's Availability - LCP	As several mega projects are planned in North America related to hydro power generation and transmission, it might become difficult to timely attract skilled/ qualified on-site contractors that leads to premium costs to attract, inflated construction costs, lower productivity, less attractive contract terms for LCP, safety risks, etc.	Risk ID'ed on 1-Dec-2011 This is a risk that covers at LCP level corresponding component's risks R-44, R-125, R-85. Purpose: coordination and support at LCP. This particular risk doesn't take part in probabilistic risk assessment as the component's risks will instead. This risk could drive R-52 (adjustment of LCP contracting strategy). Ron Power is to support managing this risk	T	Commercial	Ron Power (NE)	Extreme	> 360	Extreme	>100,000	Almost Certain	>90%	High
R178	LCP	Interfaces - LCP	As multiple complex hard & soft interfaces require inputs from project components and disciplines as well as external organisations (CFLco, SOBI, etc.), efficiency of the interface management might turn out to be less efficient than planned in the baseline, leading to use of conservative assumptions, late changes, re-work, extra costs, schedule delays, failures during commissioning, etc.	Risk ID'ed on 1-Dec-2011 This is a risk that covers at LCP level corresponding component's risks R-64, R-162, R-163, R-71, R-75, R-76, R-78, R-156, R-157 . Purpose: coordination and support at LCP. This particular risk doesn't take part in probabilistic risk assessment as the component's risks will instead.	T	Interface	Ron Power (NE)	Extreme	> 360	Extreme	>100,000	Almost Certain	>90%	High
R179	LCP	Supplier's Availability - LCP	As there is limited number of qualified suppliers in a situation of a heated market it could be difficult to engage qualified suppliers on LCP terms without increase of contract price that gives rise to inflated project costs and schedule delays	Risk ID'ed on 1-Dec-2011 This is a risk that covers at LCP level corresponding component's risks R-33, R-68, R-115, R-147.. Purpose: coordination and support at LCP. This particular risk doesn't take part in probabilistic risk assessment as the component's risks will instead. This risk could drive R-52 (adjustment of LCP contracting strategy). Ron Power is to support managing this risk. Ron Power is to support managing this risk	T	Commercial	Ron Power (NE)	Major	90 - 360	Major	10,000-100,000	Possible	1% - 50%	Medium
R182	LCP	Opposition by 'non-IBA' First Nations Groups	As a) IBA agreement covers mostly economic aspects of Innu people benefits; b) some Innu people oppose to LCP due to environmental and cultural concerns; c) some other First Nation's people (e.g., Métis) seem to wish benefiting from LCP same way as Innu people, representatives of First Nations could block the construction sites to apply pressure on LCP and to promote their agendas leading to schedule delay, extra costs and reputational damage	Risk ID'ed on 15-Dec-2011	T	External	Jason Kean (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium
R184	LCP	Unionised vs. Non-unionised Package Contracts	As a) non-unionised contracts are planned for several packages; b) significant enough difference in rates for unionised vs. non-unionised labour is expected; c) communication among unionised vs. non-unionised workers at various LCP sites is expected; e) no camp or basic camp is to be provided to non-unionised workers, strike/ unrest among non-unionised workers may occur, leading to disruption of clearing works, moving of workers to unionised contracts, schedule delays, safety and security impact, reputation damage	Risk ID'ed on 23-Jan-2011 comes from Reservoir clearing package, could be applicable for other construction packages. Poaching could be a case among unionised or among non-unionised packages too.	T	Commercial	Jason Kean (NE)	Major	90 - 360	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium

LCP COST & SCHEDULE RISKS RETRIEVED FROM STATURE

ID	Comp	Risk Title	Risk Description	Comment	Risk	Category	Owner	Schedule: Rank	Schedule: Range, day	Cost: Rank	Cost: Range	Probability: Rank	Probability: Range	Risk Level
R187	LCP	IT/ IS	Due to possible a) challenges to implement integrated IT/ IS in several project locations; b) requirements to effectively support construction management, project/ document control (including progress management); c) requirements to integrate vendors; d) differences in Nalcor and SLI corporate IT/IS; e) budget restrictions; adopted IT/ IS could be breached or have low efficiency, leading to loss of critical data, lower efficiency of project & document controls and construction management, lower level of vendor integration, schedule delay and project extra costs.	Risk identified on April 18th, 2012 as a result of preps for LL session and creating of the IT/ IS task force	T	Organisational/ Enterprise	Ron Power (NE)	Moderate	30 - 90	Moderate	1,000 - 10,000	Possible	1% - 50%	Medium