Q. Please provide the independent engineer's report for the Maritime Transmission Link.

A. The independent engineer's report as filed with the Nova Scotia Utility and Review Board on April 15, 2014 for the Maritime Link is provided as CA-NLH-122 Attachment 1.

INTERIM INDEPENDENT ENGINEER'S REPORT THE MARITIME LINK PROJECT

FEBRUARY 18, 2014

Prepared for:

Government of Canada

Prepared by:

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LIST OF ACRONYMS AND ABBREVIATIONS

AACEI	Association for the Advancement of Cost Engineering International
AC	alternating current
AFUDC	Allowance for Funds Used During Construction
AIA	Asset Interconnection Agreement
Board	Board of Directors
DC	direct current
DG3	Decision Gate 3
DSCR	Debt Service Coverage Ratio
ENL	Emera Newfoundland and Labrador
ENL DB	Emera Newfoundland and Labrador Decision Board
EPC	Engineering, Procurement, and Construction
FLG	Federal Loan Guarantee
Government	federal government of Canada
GUP	Good Utility Practice
Hatch	Hatch, Ltd.
HDD	Horizontal Directional Drilling
HSSE	Health Safety, Security Environment
HVAC	high voltage alternating current
HVDC	high voltage direct current
IE	Independent Engineer
IER	Independent Engineer's Report
Km	kilometer(s)
kV	kilovolt
kVac	kilovolt alternating current
LCP	Lower Churchill Project
LIL	Labrador-Island Link
LNTP	Limited Notice to Proceed
LTA	Labrador Transmission Assets
masl	meters above sea level
MF	Muskrat Falls
MFGS	Muskrat Falls Generating Station
ML	Maritime Link
ML Project	Maritime Link Project
MOC	Management of Change
MW	megawatt(s)
MWH	MWH Canada, Inc.
MVar	megavolt ampere reactive
Nalcor	Nalcor Energy
NL	Newfoundland and Labrador
NLH	Newfoundland and Labrador Hydro
NS	Nova Scotia
NSPI	Nova Scotia Power Incorporated
NSPML	Nova Scotia Power Maritime Link
NSPSO	Nova Scotia Power System Operator
O&M	Operations and Maintenance
PM	project manager
PMI	Project Management Institute
PMT	Project Management Team
POP	Preliminary Operations Philosophy

LIST OF ACRONYMS AND ABBREVIATIONS (cont'd)

PPS	Project Phasing Schedule
pu	per unit
QA/QC	Quality Assurance/Quality Control
RFP	Request for Proposal
ROW	right-of-way
SLI	SNC-Lavalin, Inc.
SOBI	Strait of Belle Isle
SPS	Special Protection Systems
TBD	to be determined
TWh/year	terawatt hours per year
UARB	Nova Scotia Utility and Review Board
UFLS	Under-Frequency Load Shedding
WBS	work breakdown structure
WMA	Water Management Agreement

SECTION 1

OVERVIEW OF THE MARITIME LINK PROJECT

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SECTION 1

OVERVIEW OF THE MARITIME LINK PROJECT

1.1 INTRODUCTION

The Lower Churchill Project (LCP) is a large, important energy generating and transmission facility of regional and national significance to Newfoundland and Labrador, Nova Scotia, and the federal government of Canada (Government). When completed, the LCP will have a capacity to generate and transmit more than 824 megawatts (MW) of electricity at an initial capital cost of approximately $7.7B.

Figure 1-1 shows the general layout of the individual projects comprising the Lower Churchill Project, which include the following to be developed during Phase 1: Muskrat Falls (MF); Labrador Transmission Assets (LTA); Labrador-Island Link (LIL); and Maritime Link (ML). Phase 2 will include the final LCP to be developed by Nalcor Energy (Nalcor), the Gull Island project. Only the Emera Newfoundland and Labrador (ENL) project, ML, is discussed in this report. Those other projects have previously been evaluated and the results of MWH's review are documented in *Independent Engineer's Report – Lower Churchill Project – Phase I Muskrat Falls Generation, Labrador Transmission Assets, Labrador-Island Transmission Link,* dated December 2013.

In November 2012, the Government of Canada, through Her Majesty the Queen in Right of Canada entered into a Federal Loan Guarantee (FLG) with Nalcor, ENL, the Province of Newfoundland and Labrador, and the Province of Nova Scotia to guarantee the Guaranteed Debt of each project (i.e., the MF Generation Facility, LTA, and LIL for Nalcor as the Borrower; and the ML for ENL as the Borrower) to enhance the credit quality of project financing. This FLG Agreement constitutes an absolute, continuing, unconditional, and irrevocable guarantee of payment when due of the Guaranteed Debt of each Borrower to the Lenders. Under the terms of the FLG Agreement, an Independent Engineer (IE) is to be appointed to assist each Lender and the Guarantor to complete its due diligence and to ensure compliance with the FLG Agreement and other documentation required in order to effect financial closing. Section 8.3 of this IER provides information regarding some of the significant terms of the FLG Agreement related to its applicability to the projects' financial pro forma. A full copy of the FLG Agreement is included herein in Appendix A.

ENL selected MWH Canada, Inc. (MWH) as their IE in fulfillment of the above requirement, and also to perform additional review and reporting services pertaining to both construction monitoring, and potentially long-term operation monitoring after the LCP has been placed into commercial operation. A Reliance Agreement was entered into by ENL, MWH, and Government which allows Government to be a party to the ENL/MWH Agreement under the same terms and conditions. MWH has no financial ties to ENL or Government aside from the agreement to

prepare this report (ENL/MWH Agreement). MWH has no fiduciary relationship with other firms involved with the LCP or interest in the sale of bonds to finance the LCP.

The purpose of this report (referred to herein as the IER or Independent Engineer's Report) is to provide the IE's opinions to support the financing of ENL's portion of the LCP using long-term bonds that will be guaranteed by Canada's best-in-the-world credit worthiness, rated AAA. To that end, this report presents professional opinions based on information supplied by ENL and studies performed by them and their consultants, which were reviewed by the IE, that the design is satisfactory, estimated construction and operations costs are reasonable, that the estimated construction schedule is reasonable, and that projected financial results of operations will generate sufficient net revenues to repay the debt, including revenues to meet debt service coverage requirements as well as to properly operate and maintain the ML facilities.

Figure 1-1 Lower Churchill Project – Phase 1 Development

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1.2 PROJECT DATA AND COMMUNICATIONS PROTOCOLS

1.2.1 Contract Signing Date and Contacts

MWH was retained by ENL to initiate work in May 2013 and was given a Limited Notice to Proceed with the IE review. The NSP Maritime Link Inc./MWH Canada Inc. Agreement, E13-123 Independent Engineering Services – Phase 1 and 2, was signed on December 2, 2013, and included the Reliance Agreement signed by NSP Maritime Link, Inc., MWH Canada, Inc. and Her Majesty the Queen in Right of Canada as represented by The Minister of Natural Resources. A kickoff meeting was held on May 9, 2013 in St. John's. ENL selected Ms. Lois Smith, Senior Director, Regulatory and Risk, to be MWH's principal contact during the duration of the IE's review and preparation of the IER. For all issues pertaining to the ENL/MWH Agreement, Mr. Nikolay Argirov, MWH Vice President, has been the principal ENL contact. Rey Hokenson is MWH's day-to-day contact and is the project manager (PM) for this assignment. Helen Iosfin is MWH's project engineer and is responsible for all technical electrical engineering aspects of the project.

1.2.2 Project Schedule

The Project Milestone Schedule for the preparation and award of the numerous contracts that will be prepared by ENL and the Owner's Engineer, Hatch Ltd. (Hatch) is given in Appendix B.

1.3 PROJECT DESCRIPTION

The history of the LCP dates to the early 20th century when it was envisioned that a series of hydroelectric projects would be developed on the Hamilton River (now the Churchill River). During the mid-1960s an earnest effort was made to plan for the development of this valuable resource when Labrador and Newfoundland were in need of power. At that time, electricity demand was growing by more than 10 percent per year. The plan was to construct the first project, Churchill Falls, on the Churchill River upstream of the LCP for supplying power to Newfoundland Island in 1972, and then to construct the LCP following completion of the 5,428 megawatt (MW) Churchill Falls Generating Station. The Churchill Falls Project commissioned its first unit in 1971 to feed power to Quebec. The Churchill Falls Project provides about 65 percent of the power available from the Churchill River, with the remaining 35 percent coming from two proposed power stations, Gull Island and Muskrat Falls. Muskrat Falls has been sized to provide 824 MW, while Gull Island has been sized to provide 2250 MW.

The first phase of the LCP is currently under construction. It includes a new dam and power station in Labrador at Muskrat Falls; a new 350 kilovolt (kV) high voltage direct current (HVDC) transmission line between the Muskrat Falls switchyard and Soldiers Pond converter station located West of St. John's, which includes a submarine crossing of the Strait of Belle Isle (SOBI). Additionally, the Muskrat Falls switchyard will be connected to the Churchill Falls switchyard through an extension of the Churchill Falls yard. All of this work is being undertaken

by Nalcor and is not part of the ML Project, which is also part of the first phase of the development of the LCP.

The ML Project includes new land-based assets consisting of the following components:

- 230 kV alternating current (kVac) overhead transmission line connecting Bottom Brook transmission line to Granite Canal Switchyard and a new +/-200 kV, 500 MW HVDC Bottom Brook to Cape Ray transmission Line (in Newfoundland);
- the Granite Canal Switchyard;
- the 230 kV Bottom Brook Switchyard;
- Woodbine Substation Expansion;
- a +/-200 kV, 500 MW HVDC Point Aconi to Woodbine Transmission Line (Nova Scotia);
- HVDC Converter Stations located at Bottom Brook, NL and Woodbine, NS;
- Transition compounds at Cape Ray and Point Aconi;
- Grounding Sites at Big Lorraine (NS) and Indian Head (NL) and grounding lines from the converter stations to the grounding sites, and
- Maritime Link Telecommunication Systems.

Connecting the Cape Ray to Point Aconi transition facilities is a submarine +/-200 kV direct current (DC) transmission cable(s), about 180 kilometers (km) long, under the Cabot Strait.

See Appendices C, D, and E for location maps and a bathymetry profile. A complete description of the assets can be found in the Basis of Design – Land-Based Assets (MLP-EL-RPT-0103 Final) and Basis of Design – Marine Assets (MLP-EM-RPT-0004). This description is included, in part, in Appendix F of this IER.

1.4 REVIEW OF CONSTRUCTION PROGRESS

Presently, ENL has conducted only field engineering investigations, surveying (both terrestrial and LiDAR), and geotechnical exploratory work for the project. Currently, the ML Project is at Decision Gate 3 (DG3) level of development and has not actively entered the construction phase. ENL anticipates that construction activities will commence in February 2014 with tree clearing for the facilities' complexes and the transmission lines.

The following Table 1-1 lists the program developed by ENL to issue Requests for Proposal (RFPs) and select contractors. MWH has reviewed several of these RFPs and contracts as part

of their scope of work and has included their observations in tables for contracts found in Section 4.

Tables pertaining to RFPs have not been included in the IER since they were used to help MWH familiarize itself with contracts yet-to-be-issued by ENL and were not specifically requested to be included by Government. Table 4-1 is a list of these RFPs and anticipated issue date for contract.

Of the 11 material contracts originally identified by MWH to be reviewed, four contracts were determined by Government not to be reviewed (E13-102, E13-103, E13-107, and E13-137). Three signed contracts (E12-62, E12-79, and E11-18) and four RFPs (E13-85, E13-95, E12-51, and E12-74) were reviewed by MWH.

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Table 1-1

SCHEDULE OF RFPS AND CONTRACTS FOR MARITIME LINK AND

MWH REVIEW STATUS

ITEM NO	CONTRACT NUMBER	CONTRACT NAME	RFP ISSUED TARGET DATES (Available to MWH)	CONTRACT ISSUE TARGET DATES (Available to MWH)	CONTRACT TARGET SIGN DATE	REMARKS
1	E11-18	CABOT STRAIT SUBMARINE CABLE DESIGN, SUPPLY, AND INSTALL	RFP CLOSED June 2013	December 3, 2013	January 30, 2014	RFP review complete, Contract comments received and responses provided by ENL January 1, 2014.
2	E12-62	ENGINEERING SERVICES FOR DETAILED DESIGN AND PROCUREMENT	FURNISHED	UNKNOWN 2013	April 30, 2013	Contract sent September 6, 2013. MWH comments to be included in IER under Section 4.2.
3	E12-79	GEOTECH STUDY-TRANSMISSION LINE	RFP CLOSED		March 27, 2013	Contract sent September 24, 2013, comments received and responses provided by ENL November 12, 2013.
4	E13-85	TRANSMISSION LINE STRUCTURES AND GRILLAGE	August 28, 2013 Close November 1, 2013	March 2014	March 2014	RFP sent September 24, 2013; comments received and responses provided by ENL October 15, 2013. RFP table is not included in IER.
5	E13-95	CONSTRUCTION LINE CONSTRUCTION SERVICES (NS & NL)	January 8, 2014	July-August 2014	August 2014	RFP sent December 23, 2013. Under review by MWH. RFP table is not included in IER.
6	E12-51	HDD GEOTECH AND DETAIL DESIGN PROGRAM	RFP CLOSED	February 2014	February 2014	Sent September 24, 2013, comments received and responses provided by ENL October 10, 2013. RFP table is not included in IER.
7	E12-74	CONVERTER STATIONS EPC 2	RFP CLOSED June 2013	March-April 2014	March-April 2014	RFP review complete, comments received and final responses provided by ENL November 6, 2013. RFP table is not included in IER.

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SECTION 2

SITE VISIT

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SITE VISIT

2.1 GENERAL

Three members of the IE team participated in a site visit for the ML Project in Nova Scotia on January 21, 2014, and in Newfoundland on January 22-23, 2014. Three members of the ENL project team, along with a representative from Natural Resources Canada accompanied the IE.

During the site visit, the IE made observations of the potential Horizontal Directional Drilling (HDD) and grounding sites, transition compounds, existing substations where system expansion is proposed, and new and existing right-of-ways (ROWs) for transmission lines.

On January 24, 2014, the IE team attended a meeting with ENL and Government in ENL's office in St. John's, NL. ENL emphasized the importance of safety throughout the project site visit and discussed the following topics:

- Execution Confidence - Environmental and Aboriginal Engagement;
- Marine Scope of Work - Procurement Plan and Time Frame;
- Land-based Assets Overview
- Status of Design for Transmission Lines, Converter Stations, Transition Compounds, Substations, Near-shore Grounding Sites, and Grounding Lines;
- Status of Transmission Line Construction Activities; and
- Status of Site Preparation Work and Temporary Accommodations.

Principal observations and comments on the active geotechnical and civil construction and design work are presented in the following subsections. All photographs and figures referenced in this section are provided in Appendix H.

2.2 SUMMARY OBSERVATIONS

2.2.1 Nova Scotia Sites

2.2.1.1 Proposed Point Aconi HDD and Transition Compound Sites

The proposed Point Aconi HDD and transition sites were not readily accessible. The area was viewed from a nearby location.

Bedrock is exposed along the shoreline at the proposed site (Photo 1). Bedrock consists of limestone rock. The proposed transition compound is about 700 meters from the HDD site. Approximately two 1100-meter-long HDD-lined boreholes will be advanced with a submarine exit at about 12 meters water depth. Based on the site preparation plan provided during the site visit (Figure 1), an Archeology High Potential area may be encountered at the proposed HDD

site which will be addressed in an Environmental Assessment (EA) study. The recent geotechnical investigations completed by AMEC did not include the HDD and transition compound sites. ENL is planning to commence tree clearing and carry out geotechnical field and laboratory investigations to collect the required design information at these proposed sites during Q1 2014.

2.2.1.2 Transmission Line Between Point Aconi and Woodbine

The proposed HVDC transmission line between Point Aconi and Woodbine transition compounds (Figure 2) will be extended within the existing ROW, which will reduce environmental impacts and site preparation costs. The Little Bras d'Or River Crossing (Photo 2), and a few other road crossings, were visited along the existing and proposed transmission lines between the two sites. Ground elevations are generally low (below 50 meters above sea level [masl]) for the majority of the proposed route. Higher elevations (about 100 masl) occur at a couple of areas along the line route. Based on regional geology, the surficial ground condition consists of till along the proposed route. Areas of exposed bedrock and localized soft ground/bog are also expected to be encountered along the proposed route.

2.2.1.3 Existing Woodbine Substation and Proposed Site for a New Converter Station and Transition Compound

The proposed site for the new Woodbine converter station and transition compound is generally flat and large enough for the proposed expansion (Figure 3 and Photo 3). Access to the site is readily available through a gated road. The site was covered with snow at the time of the site visit (Photo 4).

2.2.1.4 Proposed Big Lorraine Grounding Site

Figure 4 shows the general site location for the proposed Big Lorraine grounding station. Direct access to the site was not possible at this time since no road was constructed. The site was viewed from a nearby location (Photo 5).

2.2.2 Newfoundland Sites

2.2.2.1 Proposed Cape Ray HDD and Transition Compound Sites

The general location of the proposed Cape Ray HDD and transition compound sites are shown in Figure 5. The proposed Cape Ray HDD site was readily accessible by an existing paved road. Granitic gneiss is outcropped all over the site and along the shoreline (Photo 6). The proposed transition compound site is about 2 km from the HDD site. Based on the information provided by ENL during the site visit, MWH understands that the proposed transition compound site is located on a very soft ground/bog. Approximately two 430-meter-long HDD-lined boreholes will be advanced with a submarine exit at about 23 meters water depth. Based on the site preparation plan provided during the site visit (Figure 5), an Archeology High Potential area may be encountered at the proposed HDD site, which will be addressed in an EA study. The

geotechnical investigations completed by AMEC in 2013 did not include the HDD and transition compound sites. ENL is planning to carry out geotechnical field and laboratory investigations to collect the required design information at the proposed sites.

2.2.2.2 Transmission Line Between Bottom Brook Converter Station and Cape Ray Transition Compound

The existing ROW from Cape Ray to Bottom Brook substation will be used for the new DC transmission line. It was noticed that there are easy access roads from the existing highway to the transmission ROW. The general line route is shown in Figure 6.

Ground elevations between the Bottom Brook converter station and the Cape Ray transition compound range from 11 masl to 230 masl. Based on the regional geology, it is expected that the surficial ground condition is dominated by glacial till or glaciofluvial sand and gravel with occasional areas of exposed bedrock. Areas of localized very soft ground/bog are expected to be encountered along the route.

2.2.2.3 Existing and Proposed Bottom Brook Substations

Bottom Brook is located at the mouth of the St. George's River to the east of Stephenville. Access to the proposed Bottom Brook substation site was by a paved road. The general location of the existing substation and transmission lines (Photos 7, 8 and 9) and the proposed substation (Photo 10) is shown in Figure 7. Based on the information provided during the site visit, we understand that tree clearing around Bottom Brook substation will start in February 2014.

2.2.2.4 Indian Head Grounding Site

Direct access to the proposed Indian Head grounding site was not possible. The site was viewed from the highway (Photo 11). The general location of the proposed grounding site is shown in Figure 8.

2.2.2.5 Bottom Brook to River Crossing on Burgeo Highway

The proposed transmission line route from Bottom Brook substation was viewed from the Burgeo Highway, which runs east-southeast from the Trans-Canada Highway. The route was followed to the Southwest Brook and Burgeo Highway crossings where the proposed and existing transmission lines will merge. Advancing along the highway was not recommended by ENL due to the winter conditions. ENL confirmed that only 30-40 km of the transmission line will require new ROW. The existing ROW will be used for the rest of the line.

General topography along the transmission line is steep and the ground elevation could be as high as approximately 425 masl. Based on the regional geology, it is expected that the surficial ground condition is dominated by glacial till and bedrock along the proposed route. Areas of localized soft ground/bog are also expected to be encountered along the route.

2.3 CONCLUSIONS

In the IE's opinion, based on the proposed project schedule, no major obstacles exist to proceeding with the project detail design and construction.

The IE observed that the existing sites have generally good road access. MWH was also informed that field investigation for new access roads has been performed, where required, and road alignments were already marked (flagged) on the ground. No difficult access was observed that would present a future issue to building a service or temporary construction road.

ENL advised that contractors are responsible for furnishing power during construction, which may be provided by generators or by tapping into the local distribution network. The IE team noticed that distribution lines are located in proximity to most of the proposed construction sites.

The IE noted that there are numerous lodging accommodations near the construction sites that can be used by the crews that will be working at the project sites. The main construction camp, with a capacity of 100 people, will be located at the Granite Canal site. However, due to the relative remoteness of this camp site from the island's west coast, local lodging facilities and/or rentals will be used for most of the construction activities associated with the west coast construction sites.

During the site visit MWH, as well as all who attended the site visit, experienced severe winter conditions. ENL's health and safety (H&S) plan should carefully consider and address driving safety and cold weather exposure while performing construction activities during the winter months.

SECTION 3

PROJECT DESIGN AND PROJECTED PERFORMANCE

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PROJECT DESIGN AND PROJECTED PERFORMANCE

3.1 PROJECTED PROJECT PERFORMANCE

In the following subsections of this section, we have included our comments, summarizing our observations to date (February 2014), based on review of the information furnished to MWH. Although MWH must wait for award of contracts to complete its review, which is usual for mega-projects at the current stage of development, in our opinion, the expected project performance of a stable transmission system with a useful design life of 50 years will be achieved assuming that ENL will closely manage the project and continues to use tier-one suppliers of equipment and construction services.

3.2 TECHNICAL CRITERIA CONSISTENCY

Within the scope of RFPs and contracts available for MWH review at the current stage of the project, we find that the contracts/RFPs are well-written and similar in content as far as the business provisions are concerned. The technical criteria appear to provide for a well-defined scope of work and supply. MWH was required to review and comment on the technical criteria of the RFPs for each of the selected contracts identified in the ENL/MWH Agreement. MWH provided summary tables listing our observations and questions for consideration by ENL, which have all been answered as of the current time (February 2014). MWH was also required to review the preliminary contract as well as the final contract for the submarine cable (Contract E11-18), which provided ENL with MWH's opinions pertaining to the technical aspects of the specifications prior to final contract negotiations. Based on MWH's reviews of contracts and RFPs, we can find no instance within these documents that we have identified that would appear to lead to a technical inconsistency, and therefore, judge that the technical criteria consistency is satisfactory.

3.3 EXPECTED PERFORMANCE OF MAJOR SYSTEMS

Based on MWH's current understanding of the LCP and ENL's contracting philosophy, which we have observed in reviewing the RFPs and the contracts reviewed to date (February 2014), only tier-one fabricators, suppliers, and installers of equipment and systems, along with tier-one contractors are being solicited to propose on the work. Tier-one companies are assumed to be top-level and among the largest and most well-known companies of their type and are among the most important members of the supply chain to supply to an original equipment manufacturer. This philosophy in turn generates competitive responses from these firms who supply the utility-grade equipment required of the specifications. This equipment and systems meet, in our opinion, the intent of the contract's quality requirements and the technical conditions. MWH, therefore, is currently of the opinion, and with our scheduled monitoring of

the work during Phase 2, that the performance of the major systems and sub-systems will be satisfactory and achieve the desired design life of 50 years.

3.4 MAJOR SYSTEMS COMPATIBILITY AND COMPLETENESS

Based on MWH's current review of RFPs and contracts that are required to be reviewed per the ENL/MWH Agreement, we find that the contracts have been written to provide a complete system by a supplier or Engineering, Procurement, and Construction (EPC) contractor. We anticipate that once the systems have been installed, adjusted, tested, and commissioned that they will perform as designed. Since the more critical systems are being fabricated and supplied under an EPC contract, the likelihood of compatibility issues is greatly diminished, in our opinion. Additionally, since the contracting work breakdown structure as presented in Figure 3-1 clearly defines work and the parties' responsible for performing the work at each stage of the work, with ENL, NLH, and NSPI ultimately responsible for a fully complete and functional project, the ENL organization is prepared to deal with challenges throughout the promulgation of the work. We anticipate that performance will be satisfactory.

3.5 OPERATING HISTORY OF MAJOR EQUIPMENT

As noted previously, ENL has only invited tier-one suppliers/manufacturers to submit bids on the equipment required for the ML Project. To date (February 2014), only one contract has been awarded for equipment, Contract E11-18. This contract was awarded on January 30, 2014. We anticipate that, because of the limited number of bids from the select group of suppliers which, in aggregate, have the most experience in manufacturing equipment with very good operating history and relatively low maintenance costs, the operating history of the equipment selected will be satisfactory and will deliver a service life of 50 years with proper maintenance and refurbishment in accordance with the manufacturers' recommendations.

Contracting Work Breakdown Structure

Components / Process	Marine Assets			Land Assets								
	Landfall	Subsea Cables	Anchor Sites	Converter Stations and Substations		Transmission Lines			Transmission Line Towers	Conductors	Transmission Compounds	Grounding Sites	Other
	HDD NS and NL	Subsea Cables (Cables and Installation)	Anchor Site / UG Lines (Cape Ray, Pt Aconia)	DC Converter Stations (Bottom Brook & Woodbine)	Sub-stations (G Canal, B Break, Woodbine)	AC Transmission Line (Granite Canello Bottom Brook)	DC Transmission Line (Bottom Brook-Cape Ray Pt Aconi-Woodbine)	Grounding Lines (Woodbine to Big Lorraine Bottom Brook to Indian Head)	Structures and Grillage (DC lines and others)	DC, AC, GRD, fibre, other conductors	Transition Compounds (Cape Ray, Pt Aconia)	NS and NL Big Lorraine, NS and Indian Head, NL	Support Accommodations, Telecom, other
Project Management	ENL												
FEED	Nalcor-ENL Marine			ENL									
Concept/Detailed Engineering	HDD Eng Contractor	EPC		EPC		Land Based Engineering Contractor							
Procurement	HDD Contractor					Contractors			Contractors	Cable Suppliers	Contractors	Contractors	Contractors
Manufacturing – Fabrication													
Installation													
Hook-up & Testing													
Static & Dynamic Commissioning	ENL with EPC1, EPC2, NSPI, and NL Hydro Support												
Start-up & Operations	ENL/NSPI/												

Figure 3-1 Contracting Work Breakdown Structure

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3.6 ELECTRICAL INTERCONNECTION BETWEEN THE NLH SYSTEM, NSPI SYSTEM AND THE MARITIME LINK PROJECT

3.6.1 General

MWH reviewed the power system study report, *Emera Newfoundland and Labrador (ENL) – Maritime Link Project, Control and System Performance - PSSE Studies* (MLP-EL-RPT-0056), H342652-0000-70-124-0003, Rev. 4, dated May 22, 2013, to ascertain that the interconnected system between Newfoundland and Labrador Hydro (NLH) and Nova Scotia Power Incorporated (NSPI) will perform as required by the basis of design and Good Utility Practice (GUP). The power system study report included load flow, short-circuit, and stability studies. In addition, MWH reviewed a set of ENL-furnished one-line diagrams to determine that the electrical transmission network is complete.

3.6.2 Load Flow, Short-circuit, and Stability Studies

ENL engaged Hatch to perform power system studies for the project. The studies were carried out by Hatch to assess performance of the AC and DC systems of NLH and NSPI.

The focus of these studies was to assess performance of two HVDC links under both normal conditions and during system disturbances: LIL between Newfoundland and Labrador, and the ML between NLH and NSPI. In addition, system studies included validation of the existing system models for the respective NSPI and NLH systems, and development and validation of the integrated system models, as well as development and validation of reduced equivalent models.

The previous power system studies performed by Nalcor included evaluation of system performance, including interconnections between the NLH power system and the NSPI system. For the LIL, Nalcor used a DC voltage level of +/- 350 kV and a nominal bipole rating of 900 MW. For the ML, a DC voltage level of +/- 200 kV and a nominal bipole rating of 500 MW were used. The ML study includes both the forward (NLH to NSPI) or reverse (NSPI to NLH) power flows.

It was found that results from the studies performed by Hatch are comparable to results in the previous study reports by the Nova Scotia Power System Operator (NSPSO) and SNC Lavalin, Inc./Nalcor (SLI/Nalcor).

Transient stability simulations assessed the performance of the integrated system models with respect to control and runback requirements for both of the HVDC links. The simulation results confirm that the interconnected system can operate satisfactorily through a wide range of faults resulting in outages of transmission elements.

Three reverse power flow (NSPI-NLH export) base cases for the NLH system were reviewed for sanity, modified as required in agreement with ENL, and merged with appropriate NSPI base cases to develop integrated reverse power flow (NSPI-NLH export) base cases.

While the reverse power flow is a realistic operating configuration, it should be noted that NLH does not consider reverse power flow to be a normal operating mode, and for the most part, reverse power flow will only be implemented during emergency or contingency conditions.

In the study report provided by ENL, three NSPI base cases were simulated and 14 cases for system disturbances were simulated. Four NLH base cases and nine disturbance cases were evaluated. The system models developed during these studies can be used by the potential HVDC converter station vendors for further studies.

The report presented by ENL concluded the following main findings:

- The simulation results confirm that the interconnected system can operate satisfactorily through a wide range of faults and outages of transmission elements; and

- The NSPI system remains stable and post-disturbance oscillations are well damped for all the contingencies and base cases studied. Also, the existing Special Protection Systems (SPS) now configured to trip generation in Cape Breton, can be redirected to perform equivalent levels of runback on ML.

In MWH's opinion, the scope of the Hatch studies aligns with standard engineering practice in North America. The results appear to satisfactorily achieve the study objectives, and limits and exclusions are clearly defined.

It is noted that the Hatch report recommended further studies for specific contingencies, as listed in Table 3-1. MWH requested ENL to furnish their remarks concerning these items that are also included in Table 3-1. Based on ENL's remarks, MWH believes that ENL will promulgate a design and the "chosen technology" that is necessary to meet GUP standards. MWH plans to review future studies that will be performed by the converter manufacturers after the contract has been awarded.

Table 3-1

HATCH POWER STUDY RECOMMENDATIONS

RECOMMENDATION No.	HATCH RECOMMENDATION	ENL'S ACCEPTANCE / REJECTION / REMARKS
1	A close coordination between the LIL and ML HVDC controls is essential. Therefore, the controls of both systems must be able to communicate with each other.	Agreed.
2	For faults in the NLH system, the LIL controls should lead and direct ML controls for runback or blocking, as required during most of the contingency and adverse system conditions. At the same time, ML may initiate runback for the faults at Bay d'Espoir or Bottom Brook.	Conditional acceptance – additional study required. Runback of the ML link is also subject to NERC and NPCC Reliability criteria. This may dictate operating protocols and procedures to best ensure reliability for the Interconnected Electric System. A working group with members from both NSPI and NLH Control Centres are reviewing the control protocols for both HVDC projects.
3	Both HVDC links should respond in a coordinated manner to contingencies in the NLH system and ML should not respond independently to frequency decline at BBK. Instead it should follow LIL and provide support to control frequency. Otherwise, it may respond to all faults in the NLH system.	Agreed.
4	Faults on either terminals of LIL may require runback, which will be reflected to ML. Therefore, based on the commands from LIL, the ML controls shall initiate runback to a predetermined level.	Agreed, however, “Commands” may also include automatic system corrections (voltage at Bottom Brook) by the ML due to changes on the Island System and runback on the LIL. Also, the runback may not be to a predetermined level but to a calculated level at the time of the fault to best ensure stability for the Island System.
5	Vendors should further verify critical simulation results to establish the blocking/runback requirements in the PSS®E and PSCAD platforms.	Agreed.
6	Certain critical faults in the NSPI system will require ML to respond and block or initiate a runback to a predetermined level. ML should also be able to ride through faults which do not require any action. ML may be required to accept external control signals for runback. "Emera Newfoundland & Labrador (ENL) - Maritime Link Project Control and System Performance - PSSE Studies (MLP-EL-RPT-0056) H342652-0000-70-124-0003, Rev. 4," page 12.	Agreed, however, the chosen technology may allow for runback to be calculated to the optimal level for the conditions at the time of the fault. This will reduce the level of runback required. The ML will accept external signal for runback from Special Protection Systems in NL and NS.

Table 3-1 (cont'd)

HATCH POWER STUDY RECOMMENDATIONS

RECOMMENDATION No.	HATCH RECOMMENDATION	ENL'S ACCEPTANCE / REJECTION / REMARKS
7	Within strict limits, ML should be able to undergo reversal of power flow – export to import conditions between NLH and NSPI.	Agreed.
8.	All the available Under-Frequency Load Shedding models (UFLS) should be enabled in the models for further studies.	Agreed.

3.6.3 One-Line Diagrams

MWH reviewed the one-line diagrams furnished by ENL to assess the general arrangements of the electrical systems associated with the projects and to determine if the entire network would be able to function as required by the design criteria.

The following one-line diagrams were reviewed:

- Granite Canal Switchyard;
- 230 kV Bottom Brook Terminal Station Modifications for Maritime Link; and
- Woodbine Substation.

In addition, MWH reviewed the ENL/NLH Assets-HVAC Interface Schematic that is also included with the one-line diagrams.

These one-line diagrams are included in Appendix I.

Based on our general review, the one-line diagrams indicate the electrical configuration and the intended protective elements in a clear fashion, and are believed to be satisfactory to meet the design requirements.

3.7 EXPERIENCE AND CAPABILITY OF MAJOR PROJECT PARTICIPANTS

3.7.1 General

ENL has advised MWH that for all of the major contracts that are currently under design or for which RFPs have been issued, a careful screening process was conducted to allow only tier-one contracting groups and suppliers the opportunity to propose on the work. Of the RFPs and the three contracts that MWH has reviewed, by means of which MWH has been apprised of the bidders who proposed on the work, we are of the opinion that careful consideration and due diligence to screen prospective bidders has been conducted by ENL, and that the due diligence conducted supports ENL's philosophy and statements made to the IE.

3.7.2 Emera Newfoundland and Labrador (ENL)

Emera, Inc. is an energy and services company with $8.0 billion in assets and 2012 revenues of $2.1 billion. The company invests in electricity generation, transmission and distribution, as well as gas transmission and utility energy services. Emera's strategy is focused on the transformation of the electricity industry to cleaner generation and the delivery of that clean energy to market. Emera has investments throughout northeastern North America, and in four Caribbean countries. More than 80 percent of the company's earnings come from regulated investments. Emera common and preferred shares are listed on the Toronto Stock Exchange. Figure 3-2, The Martime Link Integrated Management Team Organization Chart, sets forth the ENL project organization for the ML Project.

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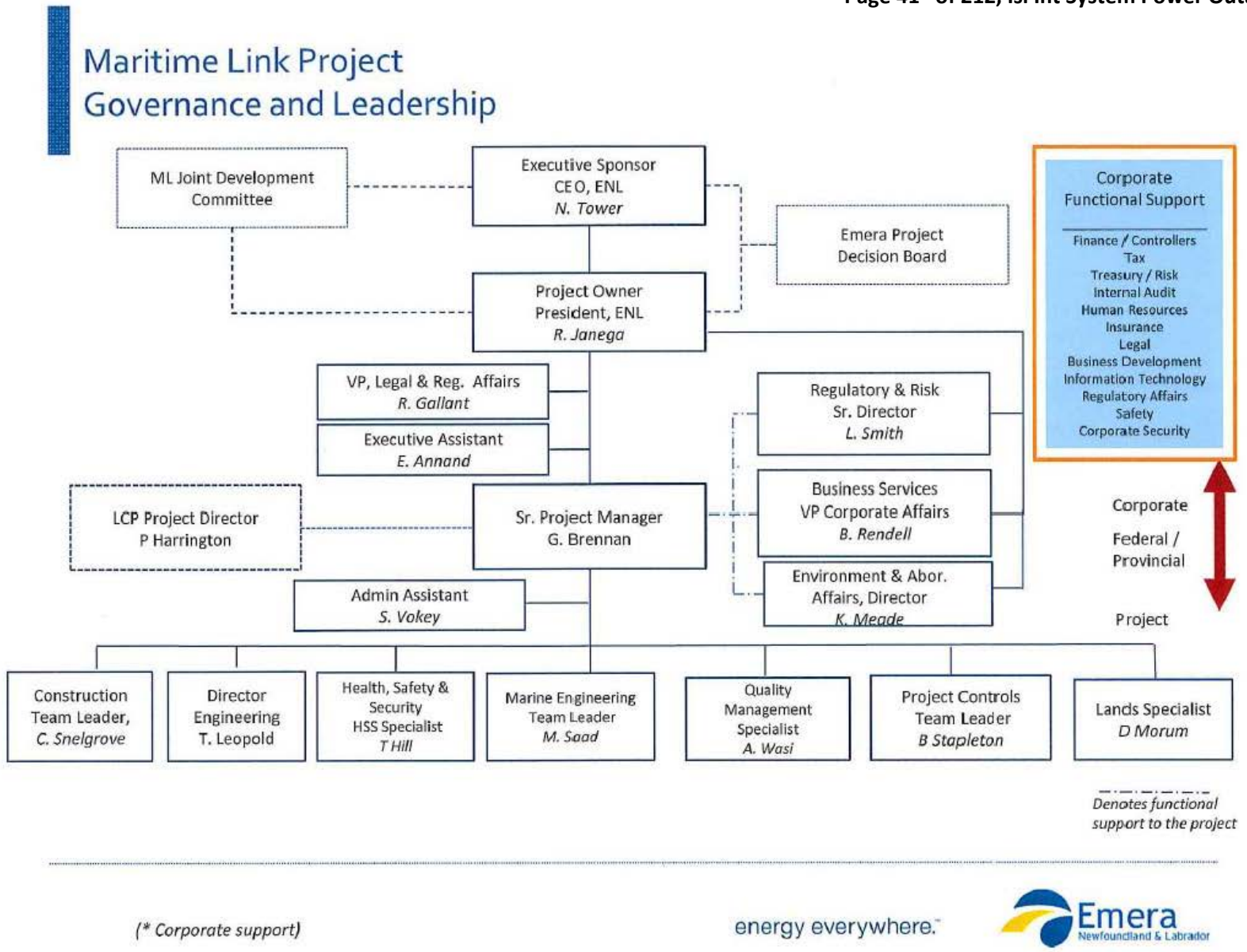

Figure 3-2 Maritime Link Integrated Management Team Organization Chart

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3.7.3 Hatch, Ltd.

ENL has selected a Canadian engineering firm, Hatch Ltd. (Hatch), that has prepared numerous designs for hydroelectric projects and other projects not only in Canada, but worldwide to prepare design, for RFPs, and technical portions of contracts for the ML. Following ENL's philosophy of project development and management, ENL shortlisted only tier-one engineering firms to propose on engineering services that were awarded to Hatch. Work is currently ongoing, with Hatch fully engaged in the work of preparing the designs and RFPs for the project. Work is principally being performed in Halifax, Nova Scotia, according to ENL.

3.7.4 Consultants and Advisor Board

3.7.4.1 General

ENL has engaged special consultants and an advisory board to assist the ENL Project Team with matters pertaining to the project that cover not only technical matters, but legal, financial, and environmental issues as well.

3.7.4.2 Advisory Board

ENL has an internal advisory board (called the ENL Decision Board [ENL DB]) which includes senior leadership and technical experts from ENL, Inc. and affiliates. The following observations pertain to this board:

- Privileged and confidential ENL DB meetings are held weekly.
- Decision Gate project methodology requires ENL DB review and approval, which is a recognized best practice for major capital projects in many industries. The approach uses project phases and Decision Gates at which completed work is reviewed before the project is allowed to progress to the next stage of development.
- The activities of each project phase provide the necessary deliverables and information to support management decision to proceed through to the next phase of work.
- Consultation and governance of the ENL DB is scheduled to continue throughout the project.
- ENL also has a formal Board of Directors (Board) which includes senior leadership and external directors.
- Privileged and confidential Board meetings are held each quarter and include project updates on safety, environmental, communications, labor, cost, and schedule as well as any specific authority approvals.
- Board approval is required for any commitment or investment greater than $2M.

3.7.4.3 Special Consultants

ENL has engaged the following special consultants to assist them in addressing project-related issues and matters:

- Intertec Metoc - cable installation consultancy;
- IntecSea (Worley Parsons), JP Kenny – subsea construction;
- Allen MacPhail (Cabletricity) - cable expert consultant;
- Ray Awad - cable expert consultant;
- Parsons Brinkerhoff - cable and converter consultancy;
- Gordon Beanlands – environmental consultant;
- Gordon Fader (Atlantic Marine Geotechnical) - geotechnical consultant and Cabot Strait expert;
- Skadden LLP – legal;
- Westney Consulting – schedule and risk assessment;
- TGS - converter specialist consultancy;
- RBJ Engineering Corporation - converter specialist consultancy;
- Derek Owen - independent project management consultant;
- Robert Reed (Lummus) - independent transmission project consultant (Lummus);
- Cem Anil (Hatch) - Planning and Scheduling expert;
- Jacques Guinge (Acoustic Zoom) - geotechnical/ocean sub-bottom profiling expertise; and
- Other experts will be engaged throughout the project schedule as needed for specific topics, challenges, or risks, according to ENL.

3.7.5 Nexans Norway AS

Nexans Norway AS was selected to perform the EPC work pertaining to the submarine cable under Contract E11-18. The Contract was signed on January 30, 2014. Nexans is a tier-one designer, fabricator, supplier, and installer of submarine cables. They are recognized as one of the top three suppliers of submarine cables in the world and are supported by subcontractors who have worked together on similar projects. Nexans also was awarded EPC Contract LC-SB-003 for the submarine cable for the Strait of Belle Isle by Nalcor, after a robust screening and contract negotiations process was conducted by the Nalcor Integrated Project Team. MWH would expect Nexans' work to be entirely satisfactory.

SECTION 4

CONSTRUCTION PLAN AND SCHEDULE

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SECTION 4

CONSTRUCTION PLAN AND SCHEDULE

4.1 GENERAL

In accordance with the ENL/MWH Agreement, the IE is required to review several key engineering design and construction contracts associated with the ML, including the following (collectively, "Agreements" and individually, "Agreement"):

- Submarine Cables E11-18, an EPC contract
- Detailed Design Engineering Services E12-62
- Geotechnical Study-TL E12-79, a supply contract
- Transmission Structures and Grillage E13-85, a supply contract
- Converter Stations E12-74, an EPC contract
- Transmission Line Construction Services E13-95, a construction contract
- HDD Geotechnical and Detail Design Program E12-51
- GS-Grounding Site Civil Construction Services E13-102, a construction contract
- GS-Grounding Site Tech Supply and Install E13-103, a supply contract
- Transmission Compound Construction Services E13-107, a construction contract
- HDD Construction Program E13-137, a construction contract

Subsequently, MWH was advised by Government that Contracts E13-102, E13-103, E13-107, and E13-137 would not be ready for review, and thus no review of any material was performed for these contracts. (See also Table 1-1.)

Government has also requested that because many of the contracts will not be available before financial close, MWH is to review RFPs for the contracts and report on its findings with respect to the ENL/MWH Agreement scope of services, where possible. Initially, Government requested that details of the RFP reviews be included in the IER, but decided to include only the tables associated with the contracts available at the time of IER completion (Contract E11-18 and Contract E12-79). The RFPs reviewed by MWH and the opinion of the IE on each RFP are summarized in Table 4-1 below.

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Table 4-1

LIST OF RFPs REVIEWED BY INDEPENDENT ENGINEER[1]

FOR CONTRACTS TO BE ISSUED BY EMERA NEWFOUNDLAND AND LABRADOR

MARITIME LINK PROJECT

CONTRACT NUMBER	CONTRACT NAME	RFP ISSUED TARGET DATES	ANTICIPATED ISSUE DATE FOR CONTRACT	OPINION OF INDEPENDENT ENGINEER ON RFP
E13-85	TRANSMISSION LINE STRUCTURES AND GRILLAGE SUPPLY	August 28, 2013, Close November 1, 2013	March 2014	Satisfactory for RFP evaluation purposes in term of completeness and use of good utility practice
E13-95	TRANSMISSION LINE CONSTRUCTION	January 8, 2014	July-August 2014	Satisfactory for RFP evaluation purposes in term of completeness and use of good utility practice
E12-51	HDD GEOTECHNICAL PROGRAM AND DESIGN ENGINEERING	RFP closed	February 2014	Satisfactory for RFP evaluation purposes in term of completeness and use of good utility practice
E12-74	CONVERTER STATIONS ENGINEER, PROCURE, CONSTRUCT	RFP closed June 2013	March-April 2014	Satisfactory for RFP evaluation purposes in term of completeness and use of good utility practice

[1] The contracts listed in this table were not yet issued or available for review by the IE as of the date of this report; therefore, the IE reviewed the RFPs for these contracts.

REDACTED (CONFIDENTIAL INFORMATION REMOVED)

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4.2 DETAILED DESIGN ENGINEERING SERVICES (Contract E12-62)

On April 30, 2013, Emera Inc., through their company, NSP Maritime Link Inc., signed an agreement with Hatch Ltd., a Canadian corporation, to perform detailed engineering services for the ML Project. Work by Hatch is currently being performed mainly in their office in Halifax for the project, according to ENL.

4.2.1 Scope of Work Requirements

The following is a listing of the scope of work items being performed by Hatch for the following project components of the ML Project:

Transmission Lines

- Prepare technical specifications for Steel Towers RFP
- Prepare technical specifications for Line Construction RFP
- Prepare final design package

Substations

- Prepare technical specifications for Site Preparation RFP
- Prepare final design package

Transition Compounds

- Prepare technical specifications for Site Preparation RFP
- Prepare technical specifications for Building and Services RFP/Final Design Package

Grounding Sites

- Prepare technical specifications for Construction RFP
- Prepare final design package

Accommodation Facilities

- Prepare technical specifications for Construction RFP
- Prepare final design package

Telecommunication System

- Prepare Final Design Package/Specification for RFP

The E12-62 Agreement, Article 2, Scope of Services; Commencement of Services, provides more details of the particular requirements. Of note is the fact that the services are to be performed on a lump sum/fixed price basis to achieve each deliverable milestone, and that the

Construction Related Services are on a cost-reimbursable basis. A Limited Notice to Proceed (LNTP), dated March 29, 2013, was issued to Hatch for the work for the project. The final contract was signed on April 30, 2013.

4.2.2 Liability

Article 24 of the E12-62 Agreement, Liability and Indemnification, lists the liability requirements of the Agreement. The liability provisions are extensive and clearly stated in the Agreement, in MWH's opinion.

4.2.3 Communication and Interface Requirements

The E12-62 Agreement, in several of the articles, includes the communications and interface requirements. Article 8, Coordination prescribes the principal communications protocol; Article 31, Public Communications, prohibits Hatch from making comments about the project with ENL being solely responsible for this matter; Article 32 lists the requirements on confidentiality that must be upheld by Hatch (which also apply to MWH); and Article 39, Notices, lists the protocol for giving notice between the parties. The articles for communication and interface requirements are very clear as to the respective responsibilities and expectations of the parties and are well-written, and appear to be complete in MWH's opinion.

4.2.4 Dispute Resolution Provisions

Article 43, Dispute Resolution of the Agreement contains the provisions under which disputes will be resolved between the parties. The article is in general, typical for similar dispute resolution provisions that MWH has viewed, and clearly delineates the procedure and timelines under which disagreements should be resolved between the parties, if necessary.

4.2.5 Ability to Integrate Each Contract with Other Contracts

To date (February 2014), MWH has reviewed several RFPs and contracts wherein we find that the general conditions are nearly identical for most of the agreements we have perused. We also find that the technical provisions of their design engineering services for which Hatch is primarily responsible to prepare are also similar in format and general content to the EPC contracts/RFPs. MWH believes this will allow, in general, smooth integrating of the contracts by ENL who is responsible for overall integration of the design and integration of the work packages for construction of the ML Project. ENL will be entirely responsible for the successful integration of constructed components of the project. The Governance and Leadership organization chart for the project designates ENL individuals who have the primary responsibilities to ensure that the design engineering work products of Hatch are well integrated into construction activities. Figure 4-1 shows this organization chart.

The ML Project will have two EPC contractors and approximately ten other major contractors delivering services and materials during the construction phase of this project. The Interface Management Plan provides a structured approach supported by an online system which is to be

followed by all contracting parties and the ENL Project Management Team (PMT). The Interface Management Plan establishes a framework where two or more organizations (i.e., contractors, NSPI, and Affiliates, Nalcor, etc.) must collaborate and cooperate in the design, construction, and commissioning of components and sub-components of the ML when they each have separated contract scopes of work that must align with each other.

In general, the ENL Engineering Director has accountability for contract management on all material, procurement, and design contracts (which would include Hatch) for land-based assets; the Marine Engineering Team Leader has accountability for contract management of all marine-related contracts; and the Construction Team Leader has accountability for all land-based construction-related contracts, according to ENL. Furthermore, ENL notes that

> Ultimately, as the Senior Project Manager, Mr. Gerry Brennan has accountability for all contracts related to the project. In addition, all functional leads (i.e., Environment, Quality, Safety, and Project Controls) provide support for and have responsibility for their respective functional areas within each contract.

Hatch reports to Mr. Tim Leopold, Engineering Director, and for other contracts ENL has assigned a member of the PMT to interface with the contractors' representatives, as noted above.

The ML Project involves multiple contractors delivering products and services at several sites. In order to deliver all subsystems and interconnect them into one functional system fully-equipped and integrated to the adjacent installations, the project management office needs to implement a rigorous process that will ensure coordination of all activities and clearly define the scope of responsibilities.

To support this objective, ENL's PMT provides a structured process, supported by an online system, to be followed by all contracting parties. This Interface Management Plan (IMP) describes the scope, procedures, roles, and responsibilities associated with technical interface management. The Interface Management Plan will remain in effect during the design, construction and commissioning phases. In order to ensure clear lines of communication and define individual responsibilities, each Contractor is required to appoint an Interface Manager who will be the single point of contact with sufficient authority to make binding decisions on behalf of the Contractor. In addition, the Contractor is required to assign several Technical Contacts to support the Interface Manager and provide input on the technical issues.

When joint activities are required at the interface points, the Contractors is required to enter into Interface agreements that would be subject to ENL’s review and endorsement. Any dispute will be resolved by the dispute resolution process described in the Contracts.

A formal Administrator will be selected and is responsible for management and administration of the Interface Management Plan. The IMP has several layers of access, a feature for tracking of the simpler ‘action items’ as well as an online progress reporting tool.

ENL assumes that if the IMP is used effectively, it should promote communication between the contracting parties as well as aid the successful integration of the individual ML systems into the respective electrical grids.

4.3 CABOT STRAIT SUBMARINE CABLE DESIGN, SUPPLY AND INSTALL (Contract E11-18)

The Cabot Strait Submarine Cable Design, Supply and Install EPC exclusivity letter was signed on December 3, 2013. Article 2 of the contract, Scope of Work; Commencement of Work details the general scope of this EPC contract. The following items are included in the scope of work for the contractor, Nexans Norway AS:

- Laying of underground HVDC cables that may be up to 2-km-long from the transition compound to the jointing bay/anchoring structure at landfall point;
- Construction of underground jointing bay/anchoring structure to house the transition joint between submarine and underground cables at landfall point in Point Aconi, Nova Scotia;
- Construction of approximately two 1,100-meter-long HDD lined boreholes at Point Aconi landfall with a submarine exit at 12 meters water depth;
- Pulling of submarine HVDC cable through HDD lined boreholes at Point Aconi, Nova Scotia up to jointing bay/anchoring structure;
- Construction of underground jointing bay/anchoring structure to house the transition joint between submarine and underground cables at landfall point at Point Aconi, Nova Scotia;
- Laying of approximately two 2-km-long underground HVDC cables from transition compound at Point Aconi, Nova Scotia to the jointing bay/anchoring structure;
- Laying of approximately two 170-km-long submarine HVDC cables across the Cabot Strait from Point Aconi, Nova Scotia to Cape Ray, Newfoundland and Labrador;
- Protection of submarine cable up to 400 meters water depth by jetting and/or ploughing (or use of rock placing as a remedial means of protection where jetting does not achieve required burial depth);
- Pulling of submarine HVDC cable through HDD lined boreholes at Cape Ray, Newfoundland and Labrador up to jointing bay/anchoring structure;
- Construction of underground jointing bay/anchoring structure to house the transition joint between submarine and underground cables at landfall point in Cape Ray, Newfoundland and Labrador; and

- Laying of approximately two 2-km-long underground HVDC cables from transition compound at Cape Ray, Newfoundland and Labrador to the jointing bay/anchoring structure.

The Basis of Design gives the particular details for the design of the submarine cable system for the ML Project, as found in Appendix F.

MWH was asked to provide a technical review report on the Nexans' proposed design. This report was submitted to ENL on December 11, 2013 with many of the technical observations contained within this IER. The report is not included in the Appendix since it is regarded as a draft for the purpose of relaying preliminary observations that were known at that time.

Based on its review of Contract E11-18, MWH has prepared the following table to aid the reader in its assessment of what the IE has been able to conclude to date (February 2014).

Table 4-2

CABOT STRAIT SUBMARINE CABLE DESIGN, SUPPLY AND INSTALL

(CONTRACT E11-18)

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
1	QUALIFICATIONS OF CONTRACTOR	Nexans Norway AS – primary contractor for submarine cables to design, supply, install and commission		Satisfactory
2	QUALIFICATIONS OF SUB-CONTRACTORS	Article 7 discusses subcontractors; list of approved subcontractors presented in Exhibit 3.	After contract execution, audit is required to verify that all conditions of contract are met and are satisfactory according to Article 7.	Emera advised that any auditing will be completed according to the contract arrangements which are to be executed by January 30, 2014. MWH has not been furnished the results of the audit at this time. Therefore, no opinion will be given.

Table 4-2 (cont'd)

CABOT STRAIT SUBMARINE CABLE DESIGN, SUPPLY AND INSTALL

(CONTRACT E11-18)

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
3	COMPLETENESS	No construction drawings were provided in Exhibit 5; list of studies and reports are provided in Exhibit 6	Drawings are required to have contract completed.	MWH will review drawings when ENL will provide them according to the MDR schedule.
4	CONTRACTS PERFORMED INDEPENDENTLY	Nexans will be working closely with ENL and subcontractors. Coordination procedures included in Article 8 and Exhibit 4	Integration with offshore system needs to be clearly identified and shown in the schedule	Satisfactory
5	CONTRACTOR'S AND OWNER'S RESPONSIBILITIES	Nexans and ENL responsibilities are defined in Articles 2-6 of contract		Satisfactory
6	GUARANTEES, WARRANTIES	Article 18 includes all warranty information. 36 months after substantial completion guarantee and possible extensions. Article 28 includes warranties of timely completion	In conformance with Industry standards. It is expected that useful life of the cable is 50 years with maintenance.	Satisfactory

Table 4-2 (cont'd)

CABOT STRAIT SUBMARINE CABLE DESIGN, SUPPLY AND INSTALL

(CONTRACT E11-18)

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
7	CHANGE ORDERS	Article 30 covers procedures for work scope changes and change orders		Satisfactory
8	TRANSPORTATION PLAN	Not included in the contract	Comments were received from ENL that the transportation plan will be developed in due time, as defined by contract and furnished by Nexans and will be reviewed and approved by ENL.	MWH does not need to provide an opinion on transportation plans at this time.
9	LOGISTICS/STORAGE OF MATERIALS	Exhibit 1A Scope of Work, Section 7 includes requirements for storage, preservation and preparation.	ENL clarified that storage pre-construction is at manufacture facility; storage of spare parts will be at local facility (NS or NL) area provided by ENL.	Tentative: Satisfactory. More information needs to be provided when Execution Plan will be ready for review.
10	CONFORMS TO INDUSTRY STANDARDS	Contract appears to be generally complete. Warranty of 60 months exceeds industry standard period.		Satisfactory

Table 4-2 (cont'd)

CABOT STRAIT SUBMARINE CABLE DESIGN, SUPPLY AND INSTALL

(CONTRACT E11-18)

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
11	COMPENSATION TERMS	Article 13 and Exhibit 2 covers compensation and terms of payments. ENL has the right, two years after expiration of contract termination, to protest or question.	ENL advised that this section is being negotiated during contract finalization.	Satisfactory
12	GUARANTEES & LIQUIDATED DAMAGES	Included in Exhibit 2, Section 6. Liquidated Damages rates are included in Table 6.0.	ENL advised that this Section is being negotiated during contract finalization. Requirements for liquidated damages are clearly identified	Satisfactory
13	PERFORMANCE BOND, LDS, BONUS, BUYDOWN/OUT	Performance Bond covered in Article 18; Performance Bond is 10% of contract price; LC of 15% of contract price provided; Parent Company Guarantee of 100% of contract price	To be specified in contract. [Restated per ENL.]	Satisfactory

Table 4-2 (cont'd)

CABOT STRAIT SUBMARINE CABLE DESIGN, SUPPLY AND INSTALL

(CONTRACT E11-18)

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
14	COMPLIANCE CONTRACTS, PERMITS, PERFORMANCE	Exhibit 1A, Section 2.2 states that contractor needs to obtain and maintain all permits, licenses, certificates except ones that need to be obtained by ENL.	List of permits and licenses were provided to MWH as a separate file.	Satisfactory
15	GUARANTEE OF EQUIPMENT	Exhibit 1B, 4.25 Design Life is 50 years; Article 18—useful life 50-years; Parent Guarantee of 100% of contract price. Value will be provided after contract execution.	MWH required complete contract; percent for Parent Guarantee.	Satisfactory
16	CONSTRUCTION SCHEDULE	See Exhibit 19 for the Schedule prepared by Nexans		Satisfactory
17	SCHEDULE REVIEW; ADEQUATE PROVISIONS	Need to have Contractor's CPM final contract schedule for review		Tentative: Satisfactory
18	CRITICAL PATHS	Need to have Contractor's CPM final contract schedule for review		Tentative: Satisfactory

Table 4-2 (cont'd)

CABOT STRAIT SUBMARINE CABLE DESIGN, SUPPLY AND INSTALL

(CONTRACT E11-18)

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
19	LIKELIHOOD OF ACHIEVING MILESTONES	Opinion can be provided in the later stage when all contracts will be in place.		No opinion at this point can be provided until project schedule is reviewed.

CONTRACT START DATE: January 30, 2014

CONTRACT COMPLETION DATE: September 23, 2017

4.4 TRANSMISSION LINE STRUCTURES AND GRILLAGE SUPPLY (CONTRACT E13-85) (RFP REVIEWED)

The main purpose of RFP E13-85 Transmission Line Structures and Grillages Supply is to provide detailed requirements for proposal for the design, fabrication and delivery of the transmission line structures and grillages for the transmission project between the island of Newfoundland and Nova Scotia, including a 170-km submarine cable (the ML Project).

As detailed in the RFP, the Contractor shall be responsible for the

> supply of all labour, supervision, material, tools, equipment, services, documentation, permitting, coordination, transportation, port clearances and all operations necessary to complete the detailed design, obtain [ENL's] approval, manufacture, test, pack and deliver the galvanized lattice steel towers, foundation setting templates and galvanized steel grillages to project site.

Upon award of contract, the Contractor is expected to submit the Project Execution Plan, Project Quality Assurance/Quality Control (QA/QC) Plan, project schedule, outline drawings, etc., along with RFP-requested data for ENL's review.

After a thorough review of the RFP, MWH deemed the RFP satisfactory for the majority of the review criteria (See Table 4-1). Several items may require additional clarification or need to be submitted for review at a later stage of the project.

4.5 GEOTECHNICAL TRANSMISSION AND GROUNDING ROUTE INVESTIGATION (CONTRACT E12-79)

The primary purpose of the geotechnical studies, reports and work is to establish background criteria in which detailed design of the ML Project is founded. The contract for the transmission and grounding line route transmission investigations, Contract E12-79, was awarded to AMEC Environmental & Infrastructure on March 27, 2013. The scope of work in the contract includes geotechnical investigations for four portions of transmission line routes in both Newfoundland and Nova Scotia and is presented in Schedule A. These include transmission line routes Granite Canal to Burgeo Highway; Burgeo Highway to Bottom Brook, and Bottom Brook to Cape Ray in Newfoundland; and Point Aconi to Woodbine in Nova Scotia as well as laydown areas, construction accommodation camps, and temporary and permanent access roads. The scope of work consists of conducting a geological desktop study, a detailed field program and preparation of a geotechnical report.

The contractor was required to assess the structures and bridges owned by NLH. The Contractor will need to traverse the structures and bridges with its equipment in order to execute the program and include the assessment of these facilities in its Execution Plan, which was subject to review by NLH prior to commencement of the field work.

The majority of testing and observation by the contractor involved execution of test pits, drilling of several boreholes, extracting soil and rock samples, measuring groundwater table levels, and testing rock anchors. The proposed approximate transmission routes with proposed approximate test pits and borehole locations were presented in Schedule A-1 of Contract E12-79. The proposed depth for test pits was 4.0 meters to 6.0 meters or practical refusal on bedrock if encountered at shallower depth. The Contract required a maximum depth of 10 meters and a minimum depth of 3 meters into competent soil or bedrock or an additional 5 meters into the weak bedrock.

The contractor is required to prepare a report that included thickness of the various stratum encountered, soil and bedrock classifications, soil consistency, grain size distribution, moisture content, plasticity, unit weight, moisture density relationship, strength parameters, bedrock quality designation and strength parameters.

The work, according to ENL, was completed in September 30, 2013.

Schedules A-2 and A-3 of the report included Ground Resistivity Testing Procedures and Project Controls Coordination Procedures.

The Contract conforms to general industry standards. MWH submitted comments to ENL on the technical and commercial aspects of the Contract and ENL responded satisfactorily to the observations made by MWH. A summary of MWH comments is tabulated below:

Table 4-3

GEOTECHNICAL TRANSMISSION AND GROUNDING ROUTE INVESTIGATION

(CONTRACT E12-79)

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
1	QUALIFICATIONS OF CONTRACTOR	AMEC Environmental & Infrastructure is the primary contractor selected to perform geotechnical investigative work for four portions of transmission line routes in both Newfoundland and Nova Scotia.	Work was completed prior to MWH review	Satisfactory
2	QUALIFICATIONS OF SUB-CONTRACTOR			Not applicable
3	COMPLETENESS	In general, the contract included the required components.	MWH submitted comments to ENL on the technical aspects in separate correspondence. ENL responded to the observations made.	Satisfactory
4	CONTRACTS PERFORMED INDEPENDENTLY			Not applicable
5	CONTRACTOR'S AND OWNER'S RESPONSIBILITIES	Contractor's and Owner's responsibilities are covered in the Contract.	MWH submitted comments to ENL on the technical aspects in separate correspondence. ENL responded to the observations made.	Satisfactory

Table 4-3 (cont'd)

GEOTECHNICAL TRANSMISSION AND GROUNDING ROUTE INVESTIGATION

(CONTRACT E12-79)

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
6	GUARANTEES, WARRANTIES			Not applicable
7	CHANGE ORDERS	Schedule “A-3” includes Project Controls Coordination Procedures	MWH submitted comments to ENL on the technical aspects in separate correspondence. ENL responded to the observations made.	Satisfactory
8	TRANSPORTATION PLAN	Section 5.3 of Schedule “A” – Scope of Work discusses site access.	As per agreement with the Government and ENL, MWH didn’t review transportation plan.	N/A
9	LOGISTICS/STORAGE OF MATERIALS	Section 5.3 includes site access and accommodation.		Satisfactory
10	CONFORMS TO INDUSTRY STANDARDS	In general, the contract conforms to the industry standards.	MWH submitted comments to ENL on the technical aspects in separate correspondence. ENL responded to the observations made.	Satisfactory

Table 4-3 (cont'd)

GEOTECHNICAL TRANSMISSION AND GROUNDING ROUTE INVESTIGATION

(CONTRACT E12-79)

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
11	COMPENSATION TERMS	Section 6 of Schedule "A" includes the Payment and Retention Terms	MWH submitted comments to ENL in separate correspondence. ENL responded to the observations made.	Satisfactory
12	CONSTRUCTION SCHEDULE	No construction work was involved. SOW: geotechnical field investigations and preparation of a report.	Work was completed prior to MWH review	Satisfactory
13	SCHEDULE REVIEW; ADEQUATE PROVISIONS	Proposed schedule was June 1, 2013 to September 30, 2013.	Work was completed prior to MWH review	Satisfactory
14	CRITICAL PATHS	No critical path was identified.	Work was completed prior to MWH review	Satisfactory
15	LIKELIHOOD OF ACHIEVING MILESTONES	Milestones were achievable.	Work was completed prior to MWH review	Satisfactory

Table 4-3 (cont'd)

GEOTECHNICAL TRANSMISSION AND GROUNDING ROUTE INVESTIGATION

(CONTRACT E12-79)

ITEM NO.	DESCRIPTION	OBSERVATIONS; SOURCE IN CONTRACT	REMARKS; QUESTIONS?	OPINION OF INDEPENDENT ENGINEER
16	TECHNICAL ISSUES	MWH submitted comments to ENL on the technical aspects in separate correspondence.	ENL responded to the observations made.	Satisfactory

CONTRACT START DATE: March 27, 2013

CONTRACT COMPLETION DATE: October 2013

A geotechnical field and laboratory investigation program was planned in early 2013. The purpose of the program was to evaluate the foundation characteristics and conditions related with constructing the transmission line in both Newfoundland and Nova Scotia. To accomplish this assignment, contract E12-79 was awarded to AMEC Environmental & Infrastructure (AMEC) to assess and investigate the geological and geotechnical conditions and develop an understanding of the overall geological characteristics along the proposed transmission corridor between Granite Canal to Cape Ray in NL and Point Aconi to Woodbine in NS.

The geotechnical work by AMEC for this portion of the ML Project included investigations along four sections of the proposed transmission route:

- HVAC transmission line from Granite Canal to Burgeo Highway;
- HVAC transmission line from Burgeo Highway to Bottom Brook;
- HVDC transmission line from Bottom Brook to Cape Ray; and
- HVDC transmission line from Point Aconi to Woodbine.

Field work was completed in summer 2013. During the investigations several test pits were excavated, a limited number of boreholes were advanced, rock anchor pull tests were performed, and resistivity tests were conducted. Test pits and boreholes were logged and observations documented by the site inspectors. Disturbed soil samples were collected and analyzed. Laboratory tests included grain size distribution, water content, and Standard Proctors.

The following study reports were made available for review:

- Draft Report – Transmission Line Route Geotechnical Investigation for Maritime Link Project, Granite Canal to Burgeo highway – Report No. D-000ED-8-300-00-018, September 2013.

- Final Report – Transmission Line Route Geotechnical Investigation for Maritime Link Project, Burgeo Highway to Bottom Brook – Report No. D-000ED-8-300-00-019, November 2013.

- Final Report – Transmission Line Route Geotechnical Investigation for Maritime Link Project, Bottom Brook to Cape Ray – Report No. D-000ED-8-300-00-020, November 2013.

- Final Report – Transmission Line Route Geotechnical Investigation for Maritime Link Project, Point Aconi to Woodbine – Report No. D-000ED-8-300-00-021, November 2013.

- Final Report – Transmission Line Route Geotechnical Investigation for Maritime Link Project Temporary Accommodation Camps/Laydown Areas – Report No. D-000ED-8-300-00-022, October 2013.

- Final Report – Transmission Line Route Geotechnical Investigation for Maritime Link Project, Granite Canal, NL to Woodbine, NS (Resistivity Testing) – Report No. TF1384201/RT/001, October 2013.

The reports summarize the general geology of the project area and report the field operations, the data collected during the field and laboratory investigation program, interpretation of the ground and groundwater conditions, and provide foundation recommendations.

The design recommendations include foundation options, bearing capacity and settlement, uplift capacity and lateral resistance of the proposed foundations, frost depth, excavations, site seismic classifications, and geological hazards such as Karst.

The reports conform to general industry standards and are considered satisfactory. Further investigations are to be carried out to collect required design information at the proposed HDD sites and transition compounds at Point Aconi and Cape Ray and the grounding sites at Big Lorraine and Indian Head.

4.6 HDD GEOTECHNICAL PROGRAM AND DESIGN ENGINEERING (CONTRACT E12-51) (RFP REVIEWED)

The scope of work of the HDD geotechnical and final engineering program as defined in RFP E12-51 will consist of two major phases, with an optional third phase as follows:

The Phase 1 Geotechnical Program involves the design, execution and reporting of a geotechnical program along the preliminary HDD drill path design, both on-land and offshore, as required, to complete final HDD design. Phase 1 must be completed in a manner that ensures

sufficient information for HDD design (Phase 2b) and release to HDD construction RFP proponents to adequately mitigate construction risk.

Phase 2a involves the design of all civil and related works required for HDD construction site development, including final design of access roads, laydown areas, mud pits, containment berms, anchors, noise abatement and any other site development and environmental protection measures that will be required to undertake the HDD construction in a manner that complies with ENL's safety and environment standards. Phase 2b involves the final design engineering of the HDD program for Cape Ray and Point Aconi.

Phase 3 is optional at the discretion of ENL and consists of engineering support for HDD procurement and drilling activities

The RFP for Contract E12-51 conforms to general industry standards. MWH submitted comments to ENL on the technical aspects of the RFP and ENL responded satisfactorily to the observations made. Proposals were received by ENL in late 2012, but as of February 2014, the contract for the proposed work had not been awarded. After a thorough review of the RFP, MWH deemed the RFP satisfactory for the majority of the review criteria (See Table 4-1.).

Based on key dates provided in the RFP, the contract for the work was to have been awarded in late Q4 2012, Phase 1 was to have been completed by Q2 2013, and Phase 2 work was to have been completed by Q2 2014. This schedule is now delayed by at least one year. ENL advises that this change in schedule will not have any effect on the successor project activities that require this information.

Several items may require additional clarification or need to be submitted for review at a later stage of the project.

4.7 TRANSMISSION LINE CONSTRUCTION (CONTRACT E13-95) (RFP REVIEWED)

The main objective of the RFP Contract E13-95 Transmission Line Construction is to specify detailed requirements for proposal for the construction of the transmission line (HVAC, HVDC, and grounding) between the island of Newfoundland and Cape Breton, Nova Scotia. As described in the RFP, the contractor shall be responsible for the supply of all labor, supervision, permanent material (excluding ENL-supplied material), temporary installed material, tools, equipment, services, documentation, permitting, coordination, transportation, dismantling (where required), and all operations necessary to complete the overhead transmission lines (230 kVac, +/- 200 kV HVDC and grounding lines) of the ML Project.

It is MWH's understanding that following contract award, but before the successful Contractor starts on site, the successful Contractor shall submit to ENL and receive ENL's approval of the site safety plan and hazard assessment, environmental protection plan, access plan, quality management plan, detailed execution plan, detailed schedule, and diversity plan.

Based on a thorough review of the RFP, MWH has concluded that the RFP is deemed satisfactory in terms of accuracy and completeness (See Table 4-1.).

4.8 GS-GROUNDING SITE CIVIL CONSTRUCTION SERVICES (RFP CONTRACT E13-102)

No comment was to be furnished by MWH since the contract is not available for review due to timing of this work on the project schedule. ENL has not reached the RFP stage for this contract; therefore, there is nothing available to review.

4.9 HDD CONSTRUCTION PROGRAM (RFP CONTRACT E13-137)

No comment was to be furnished by MWH since the contract is not available for review due to timing of this work on the project schedule. ENL has not reached the RFP stage for this contract; therefore, there is nothing available to review.

4.10 CONVERTER STATIONS ENGINEER, PROCURE, CONSTRUCT (CONTRACT E12-74) (RFP REVIEWED)

HVDC mini-specifications were prepared by RBJ and Teshmont Consultants for ENL and were issued to three firms for technical and budgetary proposals. The firms that received the mini-specifications were: ABB, Alstom-Grid, and Siemens. All of these firms are considered by the utility industry to be tier-one firms in converter station technology. Hatch, under the E12-62 Engineering Services Agreement, prepared the detailed technical specifications and the RFP for the EPC 2 contract that was issued by ENL to these same firms on March 28, 2013, and which closed on July 15, 2013. The scope of the RFP included the following items:

- Design, supply and install Bottom Brook Converter Station;
- Design, supply and install Woodbine Converter Station;
- Design, supply and install 230 kV New Switchyard at Granite Canal, NL;
- Design, supply and install 230 kV Switchyard at Bottom Brook, NL;
- Design, supply and install expansions of 345 kV Substation at Woodbine, NS; and
- Design, supply and install of the primary equipment at the Point Aconi and Cape Ray. Transition Compounds.

The principal technical performance requirements of the converter stations are as follows:

- 500 MW (250 MW per pole) rated capacity (bi-directional);
- 125 mega volt ampere reactive (MVar) reactive capability per pole minimum;
- Reduced operation mode capability to 0.8 per unit (pu) voltage;
- Ability to operate in STATCOM Mode;
- Black start capable;
- Automatic recovery after AC faults;
- Automatic recovery (5-10 sec delay) after DC fault (except cable);

- Equipment enters STATCOM< mode on a permanent fault;
- Forced Energy Unavailability less than 1.0 percent;
- Scheduled Energy Unavailability less than 1.5 percent;
- Number of pole outages a year less than 4; and
- Number of bi-pole outages a year less than 0.1.

The technical specification of the RFP includes the following items:

- Technical specifications for all primary equipment which includes full redundancy of protection, control, and communications systems;
- Routine and type testing requirements;
- Civil, structural and building specifications including back-up station service, amenities, and fire protection systems;
- Training program requirements;
- Documentation, maintenance and spare parts requirements;
- Operating and control requirements; and
- Project control and performance guarantees.

Exhibit 1.1 - Scope of Work for Converter Stations indicates in several sections that the Contractor needs to test the converter stations at 500MW.

In the IE's opinion, whether it is called testing at full current and voltage, full-rated current, or at nominal (i.e., theoretical or designed) power, it is testing at 500MW. Exhibit 1.1 requires the following full-load tests:

- Heat run on the transformers and converter valves and proving capability of the cooling system;

- Converters produce chopped voltage that causes harmonics that will increase with the load. It is important to verify that the harmonics do not saturate the transformers and other reactive equipment like harmonic filter reactors; and

- Verify there is no undue interference with the adjacent telecommunication equipment.

After a thorough review of the RFP, MWH deemed the RFP satisfactory for the majority of the review criteria (See Table 4-1.).

4.11 CONSTRUCTION SCHEDULE

MWH has reviewed the Project Phasing Schedule (PPS) (dated January 9, 2014) that provides the timeline for completion of the ML Project system components. A copy of the latest PPS is attached in Appendix J. The IE has also reviewed the Project and Schedule Estimate Basis document (MLP-PC-RPT-0001-(20-Sept-13)) to understand the scheduling methodology.

4.11.1 Schedule Overview

Utilizing P6 as the scheduling tool, ENL's programmatic (i.e., planning and construction) PPS incorporates a six-level work breakdown structure (WBS) to organize the detailed project activity definition around a chart accounts that is shared with the cost estimate. The top level of the WBS decomposes the project into 30 high-level scope elements which are considered to be all-inclusive from initial planning/design through final system commissioning. Secondary and lower WBS levels further differentiate the project scope into defined categories and work tasks that can be tracked against the established baseline to monitor future progress. Multiple calendars are used to apply holiday and work day constraints to the listed activities. As noted, these calendars assume the risk for weather-related delays without added constraint. Milestones are used to bracket the established DG3 and DG4 start/finish timeframes with the noted absence of interim milestones that will be added based on future contractor input once a contract is awarded. With the provision that ENL will add interim milestones to the baseline schedule to monitor and manage progress, MWH provides the opinion that ENL's PPS development is considered consistent with GUP.

4.11.2 Schedule Achievability

To account for uncertainty in the project's projected completion, stakeholders should be aware that a range of probable outcomes is possible. MWH's global experience with similar power transmission projects of this scale fall within a range of approximately four to six (4-6) years to complete. ENL's estimated 4.75-year build-out and commissioning period is observed to be within that range. While there is probability that the projects' schedule objectives, as defined by ENL, can be achieved, MWH's opinion is that there is also a probability that the target in-service dates for initial and full-power transmission (Q3 2017) will remain under pressure for extension, as known and unknown field execution challenges, and interface issues are encountered, as well as craft labor peaking is managed to benefit the overall project budget. Relative to criteria 27R-03 established by the Association for the Advancement of Cost Engineering International (AACEI), the Class 3 schedule is assumed to have an accuracy range of -10% to +25% for listed dates. The IE confirms that the PPS does not incorporate unique buffer-type activities as contingency and that the listed ENL activity durations represent the expected durations to complete each task as envisioned by the project team without buffer.

4.11.3 Schedule Risk Discussion

ENL carried out a Schedule Risk Analysis (e.g., Westney 2012) at the DG3 project phase level and identified construction of the AC/DC lines, converter detailed design and manufacturing, and converter station construction as being the main schedule protraction risks for Ready for Available Power, Ready for Full Power, and System Commissioning Complete milestones. Subsequent to the DG3 risk analysis, ENL developed mitigation measures to reduce the impact of the Westney-identified schedule risks.

To elaborate on the full load commissioning risk which is contingent on completion of all four units at Muskrat Falls Generating Station (MFGS), MWH's opinion is that ENL's transmission scope (i.e., the ML Project) has float relative to Nalcor's generation scope (i.e., Muskrat Falls and associated transmission). An earlier ENL finish relative to Nalcor and the resulting power shortfall could be problematic with regard to both ENL's revenues and system commissioning concerns. This risk points out the need for continual coordination with Nalcor for possible protracted ENL procurement and the potential need for establishment of alternative system commissioning protocols.

To reduce the schedule overrun risk, MWH understands that ENL has undertaken the following mitigations:

- To deal with rock-type uncertainty and resulting delays for HDD, ENL has endeavored to accelerate or keep the HDD off the critical path.

- To mitigate potential supply chain issues with the transmission towers, ENL has endeavored to time when they go to market to obtain the transmission towers to eliminate manufacturing delays that could impact schedule.

- For the submarine cable element, ENL's selection of Nexans speaks to Nexans' dual manufacturing capacity residing at different locations to reduce materials supply issues for a primary critical path element. The converter stations have been packaged into EPC contracts to place all responsibility for the design, procurement and shipping, assembly/construction of the equipment, and installation and testing on a single contractor so as to lessen the chance for additional interfacing of contractors and potential schedule interface issues. Use of outside consultants, including MWH, to provide reviews of their RFPs to provide supplemental input and opinions to uncover uncertainties that may lead to schedule delays

The IE understands ENL is not, as a general policy, providing monetary incentives to promote schedule acceleration and milestone achievement. However, the IE understand that there is an overarching procurement strategy to mitigate schedule delays by applying monetary penalties (i.e., liquidated damages) to discourage or be compensated by the contractor for late project delivery or milestone delays. The IE understands that the application of liquidated damages for schedule delays is reviewed and adjusted on a project-by-project basis. ENL has informed the IE that there are several other initiatives underway to mitigate schedule protraction risk. First, there is an integrated schedule planning process underway with Nalcor as well as Interface Management plans and strategy. Second, there is a risk management philosophy and process which was explained in the UARB application and IRs. Third, there is also a Project Execution Risk Plan which outlines strategy. Finally, there is a Governance strategy geared at mitigating schedule risks.

4.11.4 Critical Path Discussion

From a review perspective, the ML Project is defined by a primary critical path running from the start to the finish of the submarine cable (account 61000) subproject. In addition, multiple concurrent secondary critical paths dominate the schedule when accuracy limitations are applied at approximately 100 days of float. As such, the schedule reports simultaneous completion of the following secondary accounts: 11000, 21100, 21200, 41000, and 42000 in mid- to late 2017. While the schedule indicates some float for the transmission/converter assets relative to the submarine cable element, the subcritical elements come online just ahead of the primary submarine link project relative to the first power milestone. Consequently, the indicated float component for the secondary critical path element is not considered significant to offset critical path implications for delivery of a system as opposed to an individual project element. ENL has provided the opinion that the non-transmission line assets should finish off the final primary critical path.

Schedules that are characterized by multiple major concurrent critical paths are generally considered risky by industry standards. That is, statistically there is a greater potential or probability for overall schedule protraction by slippage in any one of the five secondary concurrent critical paths and the primary critical path versus a schedule that entailed a singular linear critical path for a singular project. The mega-project status of the ML Project (i.e., simultaneous completion of multiple large-scale standalone projects) combined with the geographic spread of the project, impacting weather conditions, and resource constraints emphasizes the need to maintain vigorous scheduling controls to mitigate and manage overall schedule protraction.

4.11.5 General Schedule Comments/Observations

While the project is basically just commencing, a review of the detailed PPS Gantt chart (version January 9, 2014) documenting planned versus actual progress of activities for the ML sub-projects provides the following observations:

- Generally, the start and finish milestones indicate an as-planned execution to date.
- Design work is reported to be 68 percent complete (February 2014).
- ENL has provided assurances that Account 61000 (Design/Construction of the Submarine Cable) will be under contract in the immediate future.
- Other major procurement efforts and contract signings are noted to be concluded during Q1/Q2 of 2014.

With the project just commencing, MWH confirms that the as-planned completion milestones, as presented in the current PPS, appear to be consistent with ENL's project objectives for an on-time completion in Q3 2107. As such, potential project execution

constraints and challenges will influence future schedule iterations and require the PPS to be refined with actual contractor input as well as final system interface coordination with Nalcor.

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SECTION 5

CAPITAL BUDGET

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CAPITAL BUDGET

5.1 CAPITAL COST ESTIMATE

The IE has reviewed the DG3 Project and Schedule Estimate document (MLP-PC-RPT-0001, dated 20 Sept 2013), the Cost and Schedule Risk Assessment for the Maritime Link Project (Westney, 2012) and the DG3 Master Estimate WBS by Functional Activities (Appendix K), dated 19 Dec 2013) and other supporting documentation as input materials describing the capital budget for the ML Project scope elements. Table 5-1 provides a summary of ENL's most recent (DG3) Capital Cost Estimate.

Table 5-1

DG3 CAPITAL COST ESTIMATE SUMMARY

Description	Code	Budget (DG3)
230 kV AC Transmission Line from GC to BB	11000	[redacted]
200 kV HVDC Transmission Line from BB to CR	12000	
200 kV HVDC Transmission Line from PA to WCS	13000	
Grounding Line from BBCS to NL Grounding Site	14100	
Grounding Line from Woodbine CS to NS GS	14200	
230 kV New Switchyard at GC	21100	
Modifications for P&C, Communications, etc. at GC	21200	
230 kV Switchyard at BB	22000	
Cost of Power to Supply Customers During Change	22100	
Connect 345 kV Substation at Woodbine to CS	23100	
Extension of 345 kV Substation at Woodbine	23200	
NSPI Control Center Modifications, NS	23300	
NHL Control Center, NL	23400	

Table 5-1 (cont'd)

DG3 CAPITAL COST ESTIMATE SUMMARY

Description	Code	Budget (DG3)
Grounding Site Newfoundland & Labrador	31000	[redacted]
Ground Site Nova Scotia	32000	
200 kV HVDC BB CS	41000	
200 kV HVDC Woodbine CS	42000	
Overhead to Underground Transition at Cape Bay	51000	
Overhead to Underground Transition at PA	52000	
Overhead to Underground Transition at Woodbine	53000	
Telecommunication Links	55000	$8,170,000
Control Center Data Link	56000	$819,000
Improvements of Road Infrastructure	58000	$3,980,000
Submarine Cable and Terminations	61000	[redacted]
Landfall HDD Point Aconi	62100	
Landfall HDD Cape Ray	62200	
Submarine Cable and Terminations	63000	
Project Management Team	90100	
External Project Costs	90200	$57,192,000
Other NLH System Upgrades	90500	$10,916,000
Insurance	90600	[redacted]
Environmental	93000	$19,751,000
Land Acquisition	94000	[redacted]
	Subtotal	$1,403,000,000
Escalation (2.52% of Subtotal)		$35,354,000
Contingency (9.91% of Subtotal)		$139,000,000
	Total	**$1,577,354,000**

Note: Based on data furnished MWH which includes eight contracts, of which five are lump sum and three are unit price or a combination, we find that approximately 76 percent are lump sum (fixed price) and the remaining 24 percent are unit price or a combination. Of the lump sum contracts, 44 percent have been awarded according to ENL.

5.1.1 DG3 Capital Cost Estimating Methodology

The cost estimating methodology employed by ENL utilizes a deterministic approach to calculate the project's direct and indirect costs, and a risk-adjusted analytical technique to develop a contingency allocation for defined "tactile" risks as opposed to "strategic" risks. Westney describes tactile risks as risks that can be managed by the project team and typically are related to project definition and contractor performance. On the other hand, strategic risks are defined as uncertainties that are outside of the project team's control and require separate funding beyond the project budget. Finally, a separate escalation analysis has been developed to calculate and fund anticipated changes in forward price levels. The IE notes that ENL follows standard estimating practices as put forward by the AACEI, including 69R-12, 58R-10, 18R-97, and 17R-97.

The IE's review of the above-noted cost estimating documentation indicates that GUP was followed by ENL to develop the DG3 capital cost budget. Generally, the cost estimate methodology can be described as utilizing a combination of a "bottom-up" approach for selected capital scope elements and a "top-down" approach for certain allowances and undefined scope elements.

The methodology applied to the risk analysis is also considered to meet GUP expectations for quantifying pricing uncertainties utilizing range modeling against group subtotals with standard statistical techniques. As noted, the project's extensive risk register is not mapped specifically to the cost estimate or schedule to quantify cost or schedule uncertainties, but remains as a separate document that can be referenced during the project execution phase for constraint and opportunity awareness. As observed, the risk register, compiled by the outside consultant (Westney), is stand-alone document that is not electronically linked to either the schedule or cost estimate. As such, the IE notes that the MLP went under a risk assessment process. The elected risk methodology does not directly translate the risk element values ($ or time, + or -, and presently unquantified) into the cost estimate or schedule. Instead, risk is modeled by putting range brackets around summary cost buckets and schedule activity dates. GUP considers this approach to be a reasonable treatment to address estimating accuracy issues, but it is not considered to be a solution to translate identified scope/execution risks into the project budget or timeline.

Assuming 76 percent is representative of the final total of lump sum work awarded on the ML Project (Table 5-1, Note), the IE opines that the significant portion of fixed price work relative to unit price scope helps to isolate ENL from potential cost overruns as cost risk is transferred to the contractor teams via the procurement terms. Contractor teams will accept the increase in cost risk via inclusion of additional contingency, but the incremental provision for contingency appears to be currently captured in ENL's DG3 capital budget.

5.1.2 Parametric Cost Validation

The IE focused the capital budget review to the cost drivers (e.g., transmission, converters, etc.) and used historical parametric data and recent awarded Nalcor pricing to validate the DG3 cost basis. As a high-level validation the technical, parametric methods can be misleading, and thus, statistically cannot be considered to be robust since they make more assumptions than non-parametric methods. (Note: The submarine cable budget (Account 61000) was accepted as actual and reasonable pricing based on the presumption that the competitively bid budget will be awarded in the near future without deviation from the current DG3 budget placeholder.)

Public domain information from different sources was used for the cost evaluation: ABB press release for ABB EiGRiD HVDC project as the most similar to ENL's project and ABB's Baltic Energy USD 580M 700MW/ 300kV 400km long link. Report from B&V, dated August 2012, and CIGRE report "Voltage Source converter (VSC) HVDC for Power Transmission - Economic Aspects and Comparison with other AC and DC Technology", dated April 2012 were used as a guideline for cost evaluation and estimate for transmission lines. Information from the Nalcor project 900MW/+-350kV DC link was used for cost comparison as well.

Comparison with other projects shows the following:

Converter station cost evaluation:

a. ABB's EiGRID 500MW/200kV link between Ireland and the United Kingdom (UK) is a project similar in size and with nearly the same submarine cable length as the ML (6 km more cable for the EiGRID project). The EiGRID project also includes a 70 km underground land cable that the ML Project does not employ. Using appropriate cost escalation factors for costs estimated in year 2009 increased to year 2012 values to be compatible with the DG3 estimate and deducting the costs of the underground cable and accounting for the slight difference in cable length, not applicable to the ML Project, benchmark costs for the converter stations and submarine were established to assess the adequacy of the ML funding.

b. Cost for Nalcor converter stations cannot be compared with the cost for the ML Project because Nalcor is using different technology than the ML Project, and is almost twice the capacity and voltage as ML. The Baltic link cost information package did not provide separate converter, undersea and underground cable costs. Due to the technology differences and insufficient data, neither Nalcor nor Baltic was considered to be useful benchmarks for the ML Project.

It was concluded that the cost for the converter station that ENL used at the RFP stage is close to the industry usual costs for similar projects.

Transmission line cost evaluation:

a. MWH noticed that price/km is different for two portions of DC lines: from Bottom Brook to Cape Ray [redacted] and from Point Aconi to Woodbine [redacted] The cost needs to be verified when the contract has been awarded. Additionally, ENL provided wider ROW, more robust towers because of high wind conditions expected, a more elaborate grounding system and enhanced construction accessibility for the Bottom Brook to Cape Ray segment, which increased cost/km.

b. MWH was informed by ENL that the Nova Scotia Power Maritime Link (NSPML) cost estimates for the transmission lines were prepared by Hatch during the FBoD phase and were based on budgetary estimates for major equipment and installation and Hatch's company data base. Several potential vendors were also requested to provide budgetary pricing for the transmission line construction. Two budgetary pricing responses were received with a very wide range of costs, so they were not incorporated in the estimate.

c. Information from four transmission contract projects was available to MWH for comparison purposes: two execution stage projects over 220kV and two pre-feasibility level estimates involving 230kV and above systems in North America were used as references to validate the overall costs. The pre-feasibility estimates were prepared with input from historical actual project costs provided by ENL and a subconsultant retained by Hatch. Consideration was given to voltage levels, terrain conditions, and design configurations in the process. The two execution-stage projects were completed in 2011/2012, and the pre-feasibility stage estimates were prepared in 2011/2012.

d. During the DG3 budget phase, Hatch was requested to review their estimates based on advancement of design or geotechnical information. The general basis of estimate remained the same.

e. Cost estimates were also validated by an independent consultant. Fall 2013 estimate numbers were extensively reviewed by ENL and then discussed with Nalcor and agreed upon.

MWH concluded from its review that the cost for AC transmission line is in a general range of costs with other similar transmission projects and price/km is close to the industry cost.

5.1.3 Defined DG3 Cost Escalation Allowance

Estimated capital costs included in the DG3 cost model are based on 2012 values. With the exclusion of costs that were incurred in 2011, 2012, and 2013, the remainder costs were escalated in ENL's financial models to reflect expected future fluctuations in pricing levels occurring during the years of construction. It should be pointed out that an escalation allowance

is not considered a contingency by either the Project Management Institute (PMI) or the AACEI, as escalation is considered to be a known expense, as opposed to an unknown item or project constraint that requires a contingency offset.

With the assistance of external consultants who specialize in providing cost indices for commodity and resource input, ENL has projected cost escalation through project completion taking into account how each sector of the economy, e.g., commodity, labor market or global economic factors, will impact the project budget differently. In our opinion, the escalation strategy adopted by ENL permits a realistic estimate of forward price risk and is considered to meet GUP criteria.

Escalation assumptions input into the project spreadsheets in the financial models reflect the detailed estimates prepared, and appear consistent with the trends projected for the provinces. Table 5-2 summarizes the annual escalation rates as put forward by ENL through 2018.

As noted in Table 5-2, the developed escalation analysis utilizing the defined annual rates allocates a total of $35M to the project budget allocated against the entire budget. As a function of the total project budget ($1.577B), the escalation allowance represents approximately 2.52 percent.

5.1.4 Defined DG3 Contingency Analysis

As defined by the PMI and the AACEI, a scope or tactile contingency is used to offset known project risks and/or market conditions. While ENL adopted a theoretical P50 contingency for “tactile” type risks based on analytical statistical modeling (i.e., range uncertainty) of the project’s sub-element summary budgets, the IE is of the opinion that the calculated overall 9.91 percent scope contingency representing an adder of $139M to the project budget is somewhat low relative to our legacy experience with similar remote heavy-civil construction endeavors. The IE typically sees scope or tactile contingency allowances in the range of 10 percent to 15 percent at comparable DG3 stage gates. A mitigating circumstance for the current ML budget is the fact that a degree of cost certainty has been achieved for the soon-to-be-awarded and to-date work (see Table 1-1 and Table 4-1) that provides a rationale to carry a slightly reduced contingency allowance.

Under the FLG, ENL is permitted $1.3B and additional non-guaranteed debt provided it meets the FLG's conditions. If incremental capital costs are forecasted to be incurred, ENL can make a request to the UARB that such costs be included in rate base. If approved, ENL will finance such cost with a combination of debt and equity as approved by the UARB and consistent with the terms of the FLG. If the UARB denied such costs be included in rate base, such costs would be funded by equity as outlined in the Maritime Link Joint Development Agreement.

Typically, a separate allowance for unknown project risks, known as the management reserve is provided as additional backstop to mitigate untheorized risks, changed field conditions, or strategic risks that the conventional scope contingency doesn’t cover. The management reserve

is usually controlled by the owner or entity sanctioning the project which represents ENL. As per AACEI standard practice, the scope contingency is assumed to be spent during project execution while the management reserve is considered to be unspent in entirety during project execution.

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Table 5-2

ANNUAL COST ESCALATION

			Resulting Annual Escalators		
			P10	P50	P90
Engineering & Mgt	Professional Svcs	AHE, (Incl. Overtime) Prof Scientific and Technical Services, Units: Canadian $/Hr (Quebec)	-2.82%	2.96%	6.96%
	Expenses	Consumer Price Index, Units: 2005=100 (Canada)	0.93%	2.54%	6.54%
	Salaried Labour	Consumer Price Index, Units: 2005=100 (Canada)	0.93%	2.54%	6.54%
Mat'l & Fabrication	Purchased Aggregates	PPI, Sand Gravel and Crushed Stone, Units: 1982=100 (USA)	1.10%	2.71%	6.71%
	Travel/Expenses	Consumer Price Index, Units: 2005=100 (Canada)	0.93%	2.54%	6.54%
	Cement	PPI, Cement Products, Units: 2002=100 (Canada)	0.63%	2.33%	6.33%
	Equipment Rental	PPI, Construction Machinery and Equipment, Units: 2002=100 (Canada)	0.86%	2.25%	6.25%
	Lead	Lead Spot, Units: $/Metric Ton (LME)	-8.93%	0.85%	25.80%
	Steel	PPI, Iron and Steel Products, Units: 2002=100 (Canada)	-1.24%	0.03%	7.49%
	Aluminum	Primary Aluminum Spot, Units: $/Metric Ton (LME)	-7.94%	1.50%	16.15%
	Copper	Copper Spot, Units: $/Metric Ton (LME)	-10.18%	2.49%	18.83%
	Professional Services	AHE, (Incl. Overtime) Prof Scientific and Technical Services, Units: Canadian $/Hr (Quebec)	-2.82%	2.96%	6.96%
	Labour	Consumer Price Index, Units: 2005=100 (Canada)	0.9%	2.5%	6.5%
	Fuel	PPI, Diesel Fuel, Units: 2002=100 (Quebec)	-7.08%	1.93%	18.16%
	Wood Products	PPI, Lumber Softwood, Units: 2002=100 (Canada)	-6.85%	2.06%	6.06%
	Electrical Equipment (includ	PPI, Industrial Electrical Equipment, Units: 2002=100 (Canada)	0.44%	2.43%	6.43%
Construction	Labour	Emera Supplied Assumption			
	Expenses	Consumer Price Index, Units: 2005=100 (Canada)	0.93%	2.54%	6.54%
	Fuel	PPI, Diesel Fuel, Units: 2002=100 (Quebec)	-7.08%	1.93%	18.16%
	Equipment	PPI, Construction Machinery and Equipment, Units: 2002=100 (Canada)	0.86%	2.25%	6.25%

Construction - Labour - Effective May 1 of any given year

2014	2015	2016	2017
8%	4%	5%	4%

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5.1.5 Reconciliation of the DG3 Capital Cost Estimate to Actual

To account for uncertainty in the project's cost opinion, stakeholders should be aware that a range of probable outcomes is possible. Reconciliation of the project's DG3 capital cost estimate to actual tendered amounts up to the end of January 2014 provides a means for interested parties to trend the current budget and understand variance relative to DG3 metrics. Table 5-3 provides a comparison of the DG3 capital budget to actual expenditures made by ENL to date.

Table 5-3

EXPENDITURES THROUGH JANUARY 2014

VERSUS THE DG3 CAPITAL COST ESTIMATE[1]

Description	Amount ($CDN)	Metric
Awarded Work through January 2014	[redacted]	[redacted] of total original budget less Program costs ($1.403B)
Net Variance on Awarded Work through January 2014 Relative to DG3	[redacted]	[redacted] of awarded work to construction budget ($1.403B)
Soon to be Awarded Work (within +2 Quarters)	$Undefined at this time	TBD% of total original budget less Program costs ($1.403B)
Estimated Net Variance on Soon to be Awarded Work	$Undefined at this time	0% of soon to be awarded work to budget ($1.403B)
Overall Net Variance on Awarded and Soon to be Awarded Work Relative to DG3	[redacted]	TBD% of awarded and soon to be Awarded costs ($X.XB[2])
Overall Positive to Negative Variance on Awarded and Soon to be Awarded Work Relative to DG3		Ratio of 0 times positive to negative variance
Unreconciled (Unawarded) Work		[redacted] of total construction budget
Contingency Reduction Post DG3	($0)	0% reduction
Remainder Contingency	$139,000,000	9.9% of project total
Escalation Allowance Reduction Post DG3	($0)	0% reduction
Remainder Escalation Allowance	$35,354,000	2.5% of project total
Contingent Equity Provision Required for Overruns	Undefined at this time	n/a

Note:
1. Table includes E11-18, awarded January 30, 2014.
2. $X.XB – amount is not yet known.

The metrics indicate that only one material contract has been awarded through January 2014. As such, there is only a small, negative deviation from the DG3 budget. There currently is no information to suggest that the soon-to-be-awarded work (by Q2 2014) is expected to deviate positively (over budget) from the established DG3 budget. Overall, the analysis indicates a combined 0.4 percent negative estimating variance for the awarded and soon-to-be awarded work based on cost information recently provided by ENL. This interim budget reconciliation should be updated by ENL in the near future based on actual costs received from contractors for work to be awarded soon.

As the project moves into full-scale field execution with the award of Contract E11-18 (Submarine Cable), the IE would advocate for adjustment of the project contingency/escalation fund. The IE believes the drivers on contingency will be varied and not entirely predictable as the project unfolds over the next several years.

Forward contingency drivers include:

- budget estimate accuracy;
- baseline schedule accuracy;
- uncompetitive market conditions;
- directed scope changes;
- changed field conditions;
- claims;
- weather impacts;
- resource shortages;
- directed schedule acceleration;
- potential contractor defaults;
- incremental owner project support costs; and
- required labor peaking.

In addition, contingency is required for other unknowns that engineering experience indicate will consume reserve funds on a remote, large-scale, heavy-civil engineering project.

ENL has advised MWH that ENL's project execution objective is to complete analysis of optimization opportunities (guy towers in CB and transition compounds to start), then to use the Management of Change (MOC) approval processes along with close monitoring of contingency needs before any contingency is allocated, when their forecast shows contingency consumption potential.

The difference in these approaches and professional opinions to providing adequate contingency/escalation allowance clearly shows that MWH's opinion is more conservative in advocating a contingency/escalation fund, since both approaches rely on ENL carefully managing the project and the promulgation of the MOC process established by ENL, along with the willingness of ENL to adopt "optimization opportunities," where prudent to do so.

The IE would urge due diligence by ENL concerning potential schedule overruns that may be incurred by Nalcor for constructing the system's generation assets. A Nalcor late finish may impact ENL revenues and construction debt repayment. Accordingly, a proactive approach to investigating and managing potential schedule impacts incurred by Nalcor will best serve Emera to minimize potential interface risks to the ML Project.

5.1.6 Capital Cost Estimate Classification

AACEI Standard Practice 69R-12 (Cost Estimate Classification for the Hydropower Industry) provides the criteria or guidelines to classify the DG3 capital cost estimate and communicate an appropriate accuracy range to stakeholders. The estimate accuracy range is driven by many other variables and risks, so the maturity and quality of the scope inputs available at the time of the estimate is not the sole determinate of estimate accuracy; risk analysis is required to determine an appropriate contingency. The AACEI's criteria are noted as a general guideline and serve as a starting point for cost estimate accuracy discussion. Some important aspects of the AACEI criteria are:

- The guidelines apply to EPC type project delivery;
- An appropriate contingency (i.e., 50 percent confidence level) is assumed to be established;
- Range limits are applied to point value of the estimate inclusive of contingency; and
- The range limits assume a triangular vs. a uniform probability distribution.

Table 5-4 provides a comparison of the DG3 cost estimate by estimate characteristic as established by the AACEI for a Class 3 cost estimate:

Table 5-4

DG3 CAPITAL COST ESTIMATE CLASSIFICATION

Characteristic	AACEI Class 3 Criteria	DG3 Classification by IE
Maturity Level of Project Definition Deliverables (Expressed as % of complete definition)	10%-40%	60-70% (November 2013)
End Usage (Typical purpose of estimate)	Budget authorization or control	Sanction Budget
Methodology (Typical estimating method)	Semi-detailed unit cost with assembly level line items	Bottom-up with allowance factoring
Expected Accuracy Range (Typical variation in low and high ranges)	L: -10% to 20% H: +10% to +30%	-10% to +20%

While the AACEI considers the maturity level of the engineering inputs as the primary classification characteristic for determining estimate class, secondary classification criteria and identified contingency drivers (Section 5.1.4) determine the accuracy range of the Class 3 cost estimate. While we agree that the engineering definition is relatively advanced and enhances cost certainty for the DG3 cost estimate, the IE expresses the opinion that expansion of the high range limit for positive variance from the estimated DG3 budget is warranted due the status of procurement (i.e., major awards still pending) somewhat aggressive contingency allocation and identified known project constraints and theorized unknown project risks.

SECTION 6

COMMERCIAL OPERATION AND MAINTENANCE SERVICES

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COMMERCIAL OPERATION AND MAINTENANCE SERVICES

6.1 OPERATIONS AND MAINTENANCE PLAN

6.1.1 Commercial Operation Services

In accordance with the information furnished MWH to date pertaining to operations of the ML system (Maritime Link Project, Preliminary Operations Philosophy [POP], May 31, 2012), Section 2, subsection 2.1, g. sets forth the requirements for ENL and the other utilities to follow with respect to operational control for each of the sections of the ML project. The sections of the ML Project are defined below.

The POP requires the establishment of a Control Authority for each of the three sections of the ML which will be responsible for operation of the Maritime Link sections. The following Control Authorities will provide the operation control and would, therefore provide the associated operation and maintenance services for each of the sections, as follows:

a. For the 230 kV AC section of the ML, Newfoundland and Labrador Hydro (NLH) will retain operational control as defined in the agreements, and, therefore, will be designated the Control Authority for this section of the ML. The agreements referred to in the POP were not titled but are assumed to be agreements between the parties that will be reviewed by Government's legal advisors.

b. For the ML from the NLH interconnection of the 230 kV AC bus in NL to the 345 kV AC bus in Woodbine, ENL will be responsible for operational and maintenance control and will designate Control Authority for this section to NSPI.

c. For the 345 kV AC bus and any interconnections in NS, NSPI will retain operational control and will be the designated Control Authority.

To date, no commercial service providers have been identified that would provide operation services to the Control Authorities that would supplement their respective company staffs. Conversations held with ENL representatives indicate that currently, they plan to perform all operation and maintenance services of their designated section of the ML, as defined above, with staff, specialty consultants and contractors. A more defined Operations and Maintenance Plan has not as yet been developed, according to ENL.

6.1.2 Adequacy of Start-Up and Long-Term Procedures

No comments will be furnished by MWH prior to Financial Close. The program for the operation services is currently under development and will not be available for review until later next year.

6.1.3 Reasonableness of Annual Operations and Maintenance Budget (Sustaining Capital)

In Table 8-3 of the IER, ENL has provided the estimate of O&M annual budget for the years listed therein. These estimates were used to develop the ENL ML project pro forma. MWH was provided further information on the details used to develop the budgets by ENL, and this information is included in Table 6-1 below, which succinctly lists the major items considered in the derivation of the budget estimate.

Table 6-1

MARITIME LINK PROJECT

OPERATING + SUSTAINING CAPITAL SUMMARY BY MAJOR ACTIVITY

	$ Million				
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Escalated Costs (Operating + Sustaining Capital) per Financial Model	$ 18.3	$ 22.2	$ 24.1	$ 20.2	$ 18.6
Non-Escalated Costs (Operating + Sustaining Capital) (Base Year 2012)	$ 15.8	$ 18.6	$ 19.8	$ 16.1	$ 14.6
Total Major Intermittent Occurrences (Operating + Sustaining Capital) – *see details below)* Non-Escalated (Base Year 2012)	$ 7.0	$ 9.6	$ 10.7	$ 7.3	$ 5.5
Operational Budget (Consistent Operating Expenses with Minor Cyclical Costs) Non-Escalated (Base Year 2012)	$ 8.8	$ 9.0	$ 9.1	$ 8.8	$ 9.1

						% Material	**% Labour**
Major Intermittent Occurrences – Operating Costs Breakdown							
Regulatory Filings (every 4 years)	$ -	$ -	$ -	$ 2.0	$ -	0	100
Environmental Effects Monitoring	[redacted]					25	75
Converter Service Agreement [redacted]	[redacted]					75	25
Valve Maintenance [redacted]						75	25
ROV Inspections [redacted]						75	25

Table 6-1 (cont'd)

MARITIME LINK PROJECT

OPERATING + SUSTAINING CAPITAL SUMMARY BY MAJOR ACTIVITY

Independent Engineer	[redacted]					0	100
Vegetation Management [redacted]	$ -	$ -	$ -	$ -	$ -		
Major Intermittent Occurrences – Sustaining Capital Costs Breakdown							
Cable Subse [redacted]	$ -	$ -	$ -	$ -	[redacted]	75	25
Total Major Intermittent Occurrences (Operating + Sustaining Capital) – see above	**$ 7.0**	**$ 9.6**	**$ 10.7**	**$ 7.3**	**$ 5.5**		

Major Intermittent Occurrences – Sustaining Capital Costs Breakdown – Future, Beyond Year 5
Pole Replacements [redacted]
Electrode Replacements [redacted]
Control System Upgrades [redacted]
Differential Sensor Replacement [redacted]

Note: Table was prepared and furnished by Emera Newfoundland & Labrador.

Based on MWH's experience on other projects involving similar systems and the requirement for similar services pertaining to operations and maintenance of the facilities, the ENL estimate appears to be reasonable, in MWH's opinion.

6.1.4 Proposed Training Budget

No specific information is yet available for MWH's review. ENL advises that this information will not be available until late 2014; however, ENL notes it is included in the values given in Table 8-3 and Table 6-1.

6.2 OPERATIONS AND MAINTENANCE COST ESTIMATE

6.2.1 Completeness

Based on the estimate provided by ENL, major items associated with operations and maintenance (O&M) of the ML have been included in the cost estimate. Refer to Table 6-1 for those major items that have been specifically listed by ENL as to frequency of occurrence.

6.2.2 Assumptions

Table 6-1 includes the general assumptions used to develop the O&M estimate.

6.2.3 Reasonableness of Assumptions

Based on the information furnished to MWH by ENL, which includes detailed estimates for O&M services to develop the O&M cost estimate, ENL's assumptions are reasonable in MWH's opinion.

6.2.4 Staffing

ENL advises the O&M estimate includes staffing and contractors, including those services listed in Table 6-2. An outline of the assumptions used to derive O&M costs furnished to MWH by ENL is included in Appendix L.

MWH was recently furnished details pertaining to the number of ENL staff and others ENL plans to engage to provide O&M services. A facility manager, an engineer technical specialist, two operators for the NL converter station, and two operators for the NS converter station for a total of six new hires.

Table 6-2

CONTRACTORS AND CONSULTANTS

SERVICE	SPECIFICALLY MENTIONED/ CONSIDERED BY ENL
SNOW CLEARING	Yes
ROAD MAINTENANCE	
SUPPLY OF CONSUMABLES	Yes
PEST CONTROL	
VEGETATION MANAGEMENT	Yes
VEHICLE MAINTENANCE	
JANITORIAL/CLEANING	Yes
GROUNDING SYSTEM/ELECTRICAL	Yes
SITE INSPECTIONS	Yes
HELICOPTER SERVICES	Yes
TRUCKING AND OTHER TRANSPORTATION	
DIVING/ROV CABLE INSPECTION	Yes

Table 6-2 (cont'd)

CONTRACTORS AND CONSULTANTS

SERVICE	SPECIFICALLY MENTIONED/ CONSIDERED BY ENL
FIRE ALARM AND SUPPRESSION SYSTEMS MAINTENANCE	Yes
PRESSURE VESSEL INSPECTIONS	
HVAC MAINTENANCE	Yes
EQUIPMENT MAINTENANCE	Yes

ENL has specifically mentioned repairs to fencing and roof replacement, but did not specifically mention maintenance for roads and vehicles, or allowances for pest control and transportation/trucking which may be considered to be incidental items covered by contingency in their preliminary estimate. MWH advises that these items should be considered to be specifically mentioned when the O&M budgets are refined.

Additionally, MWH has identified specialized technical support for the following equipment and systems as given in Table 6-3. ENL has furnished to MWH an outline of the assumptions used to derive O&M costs, which cover the items listed in Table 6-3 (see Appendix L).

Table 6-3

TECHNICAL SUPPORT

SERVICE, EQUIPMENT OR SYSTEM	CONSIDERED BY ENL
CONVERTER STATION EQUIPMENT (VALVES)	Yes
CONTROL SYSTEMS	Yes
SWITCHGEAR	Yes
TRANSFORMERS	Yes
SUBMARINE CABLE	Yes
ENVIRONMENTAL CONSULTANTS(1)	Yes

NOTE (1): Environmental Consultants and sub-contractor fees, according to ENL are included in the O&M project estimate given under Environmental Effects Monitoring.

6.2.5 Maintenance Provisions

Maintenance provisions are listed in Table 6-1, which includes the following items: valve maintenance, pole replacement, electrical replacement, control system upgrades, and differential sensor replacement. costs are covered in the O&M estimate (Appendix L).

6.2.6 Administrative Costs

ENL has only provided an estimate of the labor component of the cost for O&M services that is included in Table 6-1. MWH's experience is that General and Administrative costs are about 40 percent of O&M based on other projects of similar size and complexity. ENL has not specifically designated administrative costs in their table; however, ENL advises that the administrative costs are covered in the O&M estimate (Appendix L).

6.2.7 Management Fees

No specific information is currently available for MWH's review. ENL advised information will be available next year, and that these costs are covered in their O&M estimate (Appendix L).

6.2.8 Consumables

No information is currently available for MWH's review other than diesel fuel was included. ENL advised that the costs associated with consumables are included in the O&M estimate (Appendix L).

SECTION 7

PROJECT AGREEMENTS

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PROJECT AGREEMENTS

As required by the Reliance Agreement among ENL, MWH, and Government, and subsequent conversations with Government and ENL representatives, requirements were set forth for MWH to review only the following Project Agreement from a technical/engineering perspective:

- Asset Interconnection Agreement (AIA)

All of the other agreements necessary for the successful promulgation of the project between the parties will be reviewed by Government's legal, environmental, and financial advisors.

7.1 MARITIME LINK ASSET INTERCONNECTION AGREEMENT (AIA)

MWH reviewed the draft Maritime Link AIA, dated August 19, 2013, between NLH and ENL for the ML Project.

The purpose of the AIA is to set forth terms and conditions providing for the following:

- The safe and reliable interconnection of the ML to the Island Interconnected System; and

- The parties' respective obligations regarding the construction, operation and maintenance of the NL Connection Facilities and Upgrades.

MWH was asked by ENL to review only technical/engineering parts of the AIA since legal aspects will be reviewed by other Government advisors and specialists. Our general observation is the technical part of the AIA is based on provisions for using applicable utility reliability standards for construction of the new facilities and for making modifications to the existing assets that would require interconnections of two power systems to be performing in a safe and reliable way.

The AIA includes requirements for metering equipment that will be installed at the point of the interconnections. The metering equipment is required to be adequate to provide data to the NLSO to ensure the reliability of the Newfoundland transmission system. Metering equipment is required to be tested (metering verification) as required by Measurement Canada.

Schedule 1 of the AIA provides a description of all interconnection facilities that will be constructed or modified. The interconnection points of the ML NL AC facilities to the Island Interconnected System are outlined on the one-line diagrams for the Bottom Brook 230 kV Terminal Station and the Granite Canal 230 kV Switchyard. There are seven interconnection points in total; five located at the Bottom Brook 230 kV Terminal Station, and two located at the Granite Canal 230 kV Switchyard. One-line diagrams are included in Appendix I.

MWH believes the AIA to be a significant document since system integration is very important factor for the safe and reliable operation of interconnected systems and special attention needs to be paid to the management of system integration during the project duration. This responsibility is outlined in the AIA.

Based on the requirements of the AIA, which calls for current Canadian Utility reliability standards to be followed (as well as NA standards); the need for particular requirements pertaining to the metering of the power which includes the following: metering at point of interconnection adequate to provide data to the NLSO; and testing of metering equipment by Measurement Canada (verification), it is MWH's opinion that with close management of the system integration by ENL, the technical requirements of the AIA will be achieved.

SECTION 8

EMERA'S
PROJECT FINANCIAL PRO FORMA

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EMERA'S PROJECT FINANCIAL PRO FORMA

The purpose of this section is to provide a review of ENL's financial planning and projections for the ML Project as represented in ENL's financial models.

8.1 INTRODUCTION

As discussed previously, the LCP includes four component projects. The MF, LTA, and LIL projects are being developed by Nalcor in the Province of Newfoundland and Labrador. The fourth component, the ML, is being developed conterminously by ENL, in the Province of Newfoundland and Labrador, and in the Province of Nova Scotia. Due to infrastructure and agreement ties, ENL coordinates with Nalcor.

ENL is developing and will finance and manage the ML Project in accordance with provisions of the FLG and will be subject to regulation of the Nova Scotia Utility and Review Board (UARB) and other regulators. The ML Project was approved by the UARB, with conditions, on July 22, 2013. The Compliance Filing, which confirmed achievement of the conditions, was approved by the Board on November 29, 2013.

ENL has produced an extensive and comprehensive computer model of projected costs, revenues and financing, including worksheets that detail:

- Modeling assumptions and parametric values;
- Project financials (projected income and balance sheet schedules);
- Capital costs;
- Operations and maintenance costs;
- Tax schedule;
- Debt schedule; and
- Depreciation schedule.

The source of all data reported in tables or narrative in this section, unless otherwise indicated, is ENL Excel workbook entitled "NSP Maritime Link Financial Projection" as indicated on its Title Page worksheet. The file name is "Maritime Link – locked – version as of Jan 13 2014 Distributed.xls." Tables and graphs in this section are source labeled. If the source is the above referenced workbook, the source note will state *Source: ENL Financial Projection* and the worksheet name.

8.2 CAPITAL COSTS

A principal feature of the development of the ML Project is preparation of estimates of construction and ancillary costs, collectively known as Capital Costs. Section 5 of this IER addresses in detail the ML Project construction cost estimate and Section 4 addresses the ML Project construction schedule. Total costs of construction are estimated by ENL to be approximately $1,555.5M.This figure includes [redacted] for land acquisition.

In Table 5-1, the DG3 capital cost estimate totals $1,577.4M, which differs from the value presented in Table 8-1. According to the formal agreements with Nalcor, NSPML will pay 20 percent of the total DG cost estimate ($6.2B Nalcor-led projects plus $1.577B for ML); this amounts to $1,555.5B. The approximate difference between Table 5-1 and Table 8-1 is $22M. This amount is modeled as a payment from Nalcor to NSPML at the end of the construction phase in the pro forma. During the construction period additional ancillary capital costs may be incurred, the largest of which is Allowance for Funds Used During Construction (AFUDC). AFUDC is estimated to cost approximately $226M. Total estimated capital cost, including land acquisition and AFUDC, is $1,781.9M.

Table 8-1 shows a summary of the annual costs of capital construction (labeled “CAPEX”) and AFUDC over the projected 7-year construction period.

Table 8-1

CAPITAL EXPENDITURE SUMMARY

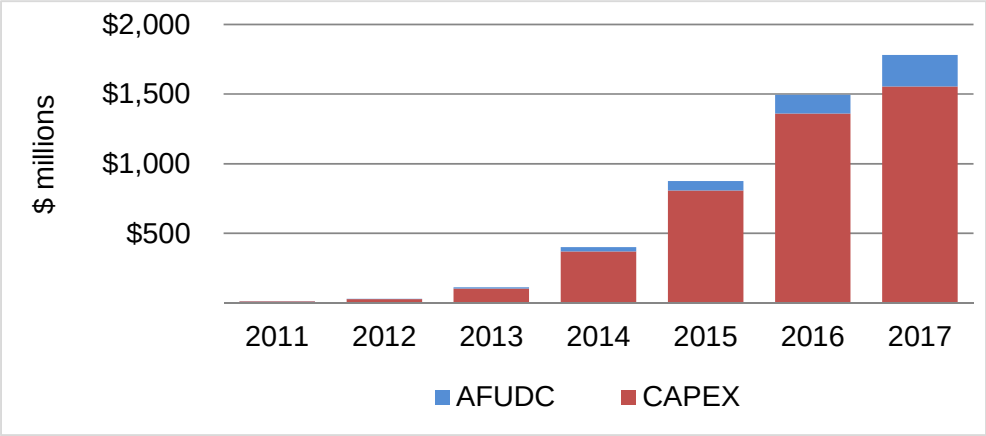
($millions)

Year	CAPEX	AFUDC	Total
2011	$ 9.9	$ 0.3	$ 10.2
2012	16.9	1.7	18.6
2013	77.6	4.5	82.1
2014	264.9	24.2	289.1
2015	437.8	37.0	474.8
2016	553.5	65.9	619.4
2017	194.9	92.9	287.7
Totals	$ 1,555.5	$ 226.4	$ 1,781.9
Included Value of Land			[redacted]
Depreciable Capital			$[redacted]

Source: *Emera Financial Projection*, V. Capital Costs Schedule

The CAPEX figures reflect the content of Section 5 of this IER. MWH checked the AFUDC figures and is of the opinion that they are reasonable.

Figure 8.1 is a graphical representation of the data included in Table 8-1.



Source: *Emera Financial Projection*, V. Capital Costs Schedule

Figure 8-1 Cumulated CAPEX and AFUDC

8.3 FINANCIAL PLANNING

ENL's plan of finance for the ML Project is consistent with the requirements specified in the FLG, including both debt and equity capital sources. Regarding the debt portion, at the time of this writing ENL had not decided between a single bond sale with reinvestment earnings or a series of bond sale tranches on an annual, biennial or other frequency basis. For financial planning purposes, the differences might be insignificant in terms of impact on project economics and revenue requirements.

Regarding capital formation, the FLG specifies:

- that the Project Debt Cap for the ML Project shall be $1.3B or less [§3.1.i.c];
- that the debt to total capital ratio shall be less than 70 percent, or less, if so required by the UARB [§3.1.ii.c];
- that the Debt Service Coverage Ratio (DSCR), discussed below, shall be a minimum 1.40x [§3.1.iii][1]

[1] DSCR is the ratio of annual net revenue (total revenue minus O&M cost) to total debt service. DSCR is expressed with an "x" meaning "times". Thus, a DSCR of 1.40x means that in a given year, annual net revenue equals 1.4 times annual debt principal and interest payments

- that the rate of interest be "no greater than that which would be offered by Lenders to an entity with a 'AAA' credit rating", i.e., that of Government of Canada credit [§3.1.B.i];

- that principal amortization shall be level and end no later than 40 years [§3.3]; and

- other financial specifications.

ENL's financing plan assumes that debt undertaken for the ML Project will bear an interest rate of 4.0 percent and full repayment over a 35-year maturity period.

Table 8-2 shows the first five years and the 10th, 20th and 35th year of ENL's debt service projection. The debt service schedule complies with the FLG stipulation. It includes level principal payments of $35.1M per year throughout the pro forma aside from minor production adjustments in the first two years and the last three years. As expected, annual interest payments gradually but steadily decline over the 35 years.

Table 8-2

DEBT SERVICE PROJECTION

($millions)

Calendar year	2018	2019	2020	2021	2022	2027	2037	2052	35-year
Operation year	1	2	3	4	5	10	20	35	Total
Principal	$ 28.8	$ 35.2	$ 35.1	$ 35.1	$ 35.1	$ 35.2	$ 35.2	$ 42.1	$ 1,229.2
Interest	49.4	47.4	46.0	44.6	43.2	36.2	22.1	0.9	873.3
Total Debt Service	$ 78.2	$ 82.6	$ 81.1	$ 79.7	$ 78.3	$ 71.3	$ 57.4	$ 43.0	$ 2,102.5

Source: *Emera Financial Projection*, VIII. Debt Schedule

The FLG constrains debt capital to be no greater than 70 percent of the total capital requirement. Table 8-2 shows total debt principal to be $1,229.2M. Table 8-1 shows total capital requirement to be $1,781.9M. Projected debt capital divided by total capital is 68.98 percent, in compliance with the FLG stipulation.

Table 8-2 includes the interest component of the projected debt service schedule. ENL has used a planning value of 4.0 percent interest on debt. Market conditions on the day of sale may result in large AAA/Aaa credits priced below 4.0 percent interest, so that figure is conservative. But the capital requirement shown in Table 8-1 does not include transactions costs that may be capitalized into the bond sale, such as underwriters' discount, bond and underwriters' counsellors, and printing and issuance costs. There is no requirement that MWH is aware of that requires such costs to be included in the bond sale or paid from equity. Notwithstanding the effect of these "soft" financing costs, MWH is of the opinion that the 4.0 percent interest figure is appropriate for planning purposes.

8.4 PROJECTED OPERATIONS AND MAINTENANCE EXPENSE

Projected O&M costs for the ML have been estimated by ENL to be approximately $15M to $20M per year in the first ten years. Subsequently, costs continue to rise with cost escalation/inflation. Table 8-3 shows the projected figures for the same years as in Table 8-2.

Table 8-3

PROJECTED O&M SUMMARY

($millions)

Calendar year	2018	2019	2020	2021	2022	2027	2037	2052
Operation year	1	2	3	4	5	10	20	35
O&M expense	$ 18.3	$ 22.2	$ 24.1	$ 20.2	$ 18.6	$ 21.8	$ 33.3	$ 45.2
O&M index		100.0	108.8	91.2	84.1	98.4	150.4	204.1

Source: *Emera Financial Projection*, VI. O&M Forecast

Table 8-3 includes the ENL projections of O&M costs and index values associated with O&M costs. The index data indicate how O&M costs are expected to change with reference to the 2019 (second) year. The second year is chosen for an indexing benchmark due to O&M irregularities that may occur in the first year of operations. For example, O&M in 2022 (fifth year) is projected to be about 16 percent lower than the cost projected for 2019. O&M in 2052 is expected to be slightly more than double the cost in 2019.

Costs included in Table 8-3 are mostly direct O&M expenditures. Certain major maintenance costs are also included in the tabulation. Although some major maintenance might be considered “capital” in accordance with ENL’s capital accounting rules (characterized by cost and/or service life thresholds), if such costs should be fully paid on a pay-as-you-go basis in the year of incurrence, then they are shown as O&M in the financial model. This is done as a planning convenience to indicate such costs would be paid with current year operating revenue and not be debt or equity funded, as is the practice of many utilities.

Table 6-1 identifies the major operating and sustaining capital costs that are included in the O&M cost tabulation shown in Table 8-3. The estimated cost frequencies and cost value estimates are subject to Emera system asset management decision-making and, thus, may be more or less expensive than the values shown in the table.

8.5 REVENUE PROJECTION

Planned revenue requirements equal the planned costs for which revenue must be earned in order for the utility to remain a solvent and prudent business enterprise. With the rate regulated method, the project owner is expected to provide the assets needed by the enterprise to perform its utility service (e.g., deliver electric power). To compensate the utility for its equity

contribution, the regulated utility is allowed to earn a return on invested equity assets throughout the useful lives of those assets. Thus, under the rate regulated method, revenue requirements include O&M costs, interest expense, depreciation allowance (which serves to fund the principal portion of debt service payments and return of shareholder equity), and tax expense, less deferred revenue, plus a return on used and useful equity-funded capital asset value.

For long-term financial planning purposes, utilities assume that projected revenue requirements will be approved by the provincial regulator and that the approved rates will generate the revenue needed. Table 8-4 shows the ENL projection of revenue for the 35 years of project operation, as indicated in the ENL financial model. Projected revenues are based on all of the aforementioned revenue requirement components, assuming that NS-UARB approves the corresponding rate applications.

Table 8-4

PROJECTED REVENUE

($millions)

Calendar year	2018	2019	2020	2021	2022	2027	2037	2052
Operation year	1	2	3	4	5	10	20	35
O&M expense	$ 18.3	$ 22.2	$ 24.1	$ 20.2	$ 18.6	$ 21.8	$ 33.3	$ 45.2
Interest exp.	49.4	47.4	46.0	44.6	43.2	36.2	22.1	0.9
Depreciation	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7
Return on equity	47.5	45.7	44.3	43.0	41.6	34.9	21.4	0.9
Tax	0.0	0.0	0.0	0.0	0.0	0.0	20.1	19.4
Total	$165.9	$165.9	$165.1	$158.5	$154.1	$143.5	$147.6	$117.2

Source: *ENL Financial Projection*, III. Financials - Project

In Table 8-4 the O&M data are the same as in Table 8-3. The FLG stipulates that the capital requirement may be no more than 70 percent funded by debt, and therefore, 30 percent or more by equity. ENL's cost of equity is estimated in the Emera Financial Projection (IV Input Tab) to be 9.0 percent. As such, the total project capital value shown in Table 8-1 times 30 percent equity times 9 percent annual return on equity yields the return on equity figures shown in Table 8-4. Each year the value of equity is reduced by an allowance for depreciation[2], and thus, the return on equity figures in Table 8-4 decrease over time. Tax expense is included as a revenue requirement in Table 8-4. Tax is estimated to commence in 2028 (the eleventh year of operation). Before that time, there is no anticipated tax expense. Subsequent years are projected to include tax expense of about $20M per year, totaling almost $0.5B over the 35-year pro forma.

8.6 PRO FORMA RESULTS OF OPERATIONS

ENL's financial projections are summarized in Table 8-5.

Table 8-5

ENL PRO FORMA RESULTS OF OPERATIONS

($millions)

Calendar year	2018	2019	2020	2021	2022	2027	2037	2052
Operation year	1	2	3	4	5	10	20	35
Projected Revenue								
O&M expense	$ 18.3	$ 22.2	$ 24.1	$ 20.2	$ 18.6	$ 21.8	$ 33.3	$ 45.2
Interest exp.	49.4	47.4	46.0	44.6	43.2	36.2	22.1	0.9
Depreciation	50.7	50.7	50.7	50.7	50.7	50.7	50.7	50.7
Return on equity	47.5	45.7	44.3	43.0	41.6	34.9	21.4	0.9
Tax	0.0	0.0	0.0	0.0	0.0	0.0	20.1	19.4
Total	$165.9	$165.9	$165.1	$158.5	$154.1	$143.5	$147.6	$117.2
Net Revenue for Coverage								
Revenue	$165.9	$165.9	$165.1	$158.5	$154.1	$143.5	$147.6	$117.2
O&M	(18.3)	(22.2)	(24.1)	(20.2)	(18.6)	(21.8)	(33.3)	(45.2)
Net revenue	$147.6	$143.8	$141.0	$138.3	$135.5	$121.7	$114.3	$ 71.9
Debt Service								
Principal	$ 28.8	$ 35.2	$ 35.1	$ 35.1	$ 35.1	$ 35.2	$ 35.2	$ 42.1
Interest	49.4	47.4	46.0	44.6	43.2	36.2	22.1	0.9
Total debt service	$ 78.2	$ 82.6	$ 81.1	$ 79.7	$ 78.3	$ 71.3	$ 57.4	$ 43.0
Debt Service Coverage Ratio	1.89x	1.74x	1.74x	1.74x	1.73x	1.71x	1.99x	1.67x

Source: *Emera Financial Projection*, III. Financials – Project and other tabs

An important financial performance parameter in debt transactions is the DSCR. To determine debt service coverage, O&M expense is subtracted from total revenues to determine net income for coverage computation, as shown in the table under the subheading Net Revenue for Coverage.

Total debt service data are then compared with the net revenue data to determine the debt service coverage ratio figures shown in the table.

The minimum DSCR stipulation in the FLG is 1.40x. DSCR in the first year of operation is estimated to be 1.89x. The average DSCR in the 35-year projection is 1.91x. The ratio remains above 1.70x throughout the pro forma except in year 35. In 2052 (35th year) it is 1.67x. The next minimum DSCR is 1.71x which occurs in 2035. Maximum DSCR during the 35 years is 2.03x, which occurs in 2043 (the 26th year of operations). Although the DSCR figures are

projected based on forecast revenue and expense data, MWH is of the opinion that the figures are reasonable and that the FLG requirement for DSCR greater than 1.4x consistently will be met.

MWH is of the opinion that the pro forma projections are reasonable and conforming with the FLG.

SECTION 9

CONCLUSIONS AND INDEPENDENT ENGINEER'S OPINIONS

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SECTION 9

CONCLUSIONS AND INDEPENDENT ENGINEER'S OPINIONS AND RECOMMENDATIONS

The following section lists our principal conclusions and recommendations as of February 18, 2014, based on data, RFPs, and contracts furnished by ENL, the Borrower for the ML Project, and the project site visit conducted during the week of January 20, 2014.

9.1 CONCLUSIONS AND INDEPENDENT ENGINEER OPINIONS

9.1.1 General Assumptions

MWH's review was performed within our scope of services and in accordance with generally accepted engineering practices. Our review includes such observations and analyses as we, in our professional capacity, deemed necessary for this review.

As an IE, we have made no determination as to the validity and enforceability of any contract, agreement, rule or regulation applicable to the ML Project. For the purposes of this IER, we have assumed that all contracts, agreements, rules and regulations will be fully enforceable in accordance with the contractual terms. Moreover, it is assumed that all parties will comply with and fulfill the provisions of the contracts and agreements.

In the preparation of this IER and the opinions presented in this IER, MWH has made certain assumptions with respect to conditions which may exist or events which may occur in the future. While we believe these assumptions to be reasonable for the purpose of this IER, they are dependent upon future events, and actual conditions may differ from those assumed. In addition, for projections and studies, we have used and relied upon certain information provided to us by others. While we believe the use of such information and assumptions to be reasonable for the purposes of this IER, we offer no other assurances with respect thereto, and some assumptions may vary significantly due to unanticipated events and circumstances. To the extent that the actual future conditions differ from those assumed herein or provided to us by others, the actual results will vary from those projected herein. This IER summarizes our work up to the date of this IER. Thus, changed conditions occurring or becoming known after such date could affect the material presented to the extent of such changes.

Evaluation by MWH of the actual security of the components of the projects, as well as other entities with which ENL has business or operational relations, relative to security issues, is not in MWH's scope of work. We have not been engaged to conduct, and in fact have not conducted, any independent evaluations or onsite review in any way to ascertain the effectiveness of the measures ENL has undertaken to address security issues. In the event that currently unknown shortcomings in security should arise which lead to significant construction or operational problems, such problems could have an adverse impact on the projects.

9.1.2 Qualifications of Participants

In our opinion, and based on past experience, ENL (the Borrower) is qualified to design, contract, manage, commission, operate and maintain the ML Project currently under design for the LCP.

9.1.3 Project Design and Performance

Hydrological risk in terms of generation capability is well understood as documented in the studies conducted for the project by Nalcor and as reported by MWH in its December 2013 IER prepared for Nalcor. With average annual energy of 4.93 terawatt hours per year (TWh/year) established by using long-term flow records, the ML Joint Development Agreement with Nalcor allowed ENL to receive 20 percent of the power for 35 years with the commitment to build the transmission system to Nova Scotia, and Nalcor and their special purpose companies to use the rest of the power in the Newfoundland and Labrador system. Long-term generation is assured by the Water Management Agreement (WMA) that provides storage at Churchill Falls and a means of operating the Churchill River to near-optimize the power production.

MWH was able to view most of the ML critical sites where work is planned for HDD, grounding, transition compounds, existing substations where expansion is planned, and new and existing ROW for the transmission line. MWH further observed that road access, using existing roads or planned roads, will facilitate the planned work, and that adequate lodging is located in the general proximity of most of the proposed construction sites. ENL advised that contractors will be responsible for supplying construction power that would be available from on-site generators or from local distribution lines. MWH further noted to ENL that during severe winter conditions, special attention must be paid to safe driving by contractors, which is in accordance with ENL's key principle: "safety first." Based on this preliminary review of site conditions and discussions with ENL, in MWH's opinion there are no issues or obstacles to proceeding with the project detailed design and construction.

MWH understands that, based on ENL's evaluation, the engineering work is at 68 percent completion level, which involves the services of Hatch Ltd. We have not independently verified that this is true, but based on the contracts we have reviewed and the RFPs that we have been asked to furnish comments on, this estimate pertaining to percent completion is reasonable to assume (and could possibly even be higher) for the IER at the present time (February 2014). With solid progress being made already by ENL and their consultants and Hatch in preparing design, estimates, and schedules, and contract documents it is MWH's opinion that the engineering services required to complete the contract technical documents and designs should be achieved as scheduled by ENL.

The engineering design and the use of technical standards in contract documents and RFPs that MWH has reviewed, in MWH's opinion, meet current GPU standards and applications and should allow construction of the ML facilities and systems to achieve the performance specified by ENL.

MWH understands that ENL has complied with the UARB conditions with a tentative approval granted by the UARB after environmental conditions were met and a final approval was given by UARB to proceed with the ML. MWH understands from conversations with ENL, that no further conditions need to be met by ENL pertaining to technical issues for the ML or further approvals by the UARB.

9.1.4 Construction Plan and Schedule

Construction safety requires contractors to supply their Health, Safety and Security Plans as part of their required submittals. They must follow the generally-high standards established by ENL which follows a "safety first" philosophy. We understand that ENL intends to strictly monitor these plans to ensure these requirements are met.

The risk of problems associated with transportation of materials, equipment, and supplies to the project facilities is the responsibility of the contractors. Risk exists using overseas suppliers; however, these shipments will be closely monitored by ENL.

RFPs and Contracts reviewed to date are generally satisfactorily written and similar with respect to terms and conditions imposed on the suppliers and contractors. The contracts convey to the parties the clear responsibilities of the contractor as well as ENL, with no ambiguities detectable by MWH in the documents we have reviewed to date. ENL has established a system wherein they weigh the bid amount with the security provided (performance bond amount, letters of credit, and parent-company guarantees) to arrive at a satisfactory level of risk and to keep the price as low as practical.

A detailed CPM network conforming to GUP criteria has been developed by ENL to support and promote the ML Project execution over the next several years. The developed Project Phasing Schedule (PPS) coordinates multiple standalone subprojects under a common WBS that is shared with the capital budget. The schedule's primary critical path is the submarine cable work element. However, as a mega-project, the ML is characterized by the requirement to complete multiple independent project elements (i.e., transmission lines and converter facilities) more or less simultaneously to achieve an on-time finish. Accordingly, secondary critical path issues are noted as potentially impacting ML Project completion requiring monitoring and constraint mitigation by ENL. As the project is just commencing, the ability to assess the trend of the current progress against the baseline is not available at this time as a means to form conclusions as to the final system delivery timeframe. However, the listed activity durations and task linking of the CPM network appear robust and reasonable for use as an initial baseline schedule subject to final contractor input and ENL interface coordination with Nalcor.

9.1.5 Capital Budget

Based on the limited number of large contracts we have reviewed, it is our opinion that the DG3 cost estimate was robustly prepared, following the general procedures outlined in the AACEI for

a Class 3 estimate. The level of accuracy of the estimate as recommended by AACEI is a -20% to a + 30% allowance.

Construction to-date pertaining to the contracts that MWH was required to review is limited to completion of a geotechnical exploration contract, E12-79. No issues were encountered, according to ENL, for the processing of this contract or in findings reported in the technical report, which was furnished to MWH in November 2013 and reported in Table 4-3.

9.1.6 ENL's Financial Pro Forma

ENL's financial project pro forma approximately reflects the most recent DG3 cost estimate, estimated operations and maintenance costs, FLG requirements, and the DG3 project critical path schedule, in MWH's opinion. Careful monitoring of contractors and suppliers by the ENL's project team and diligent project management should allow the work to be accomplished within the project schedule and financial goals established by ENL and Government. Close management coordination of ENL's project team and Nalcor's project team is paramount to achieve timely commercial operation established dates that will mutually satisfy the parties' financial goals.

9.2 RECOMMENDATIONS

1. ENL is requested to furnish to the IE the Contractor schedules to enable the IE to fulfill its obligations under the Project Financing Agreements.

2. In accordance with the Project Financing Agreements, updated cost estimates are required to be prepared and provided as stipulated in said Agreements.

3. MWH proposed several additional scenarios to model in the ENL financial model (pro forma). MWH has not received a response to their proposal which could help MWH better understand the sensitivity of the financial model to the parameters proposed to be tested. We desire that these tests be conducted and MWH furnished the results for review.

4. MWH has indicated that, based on their knowledge of completion targets for MF and when ENL intends to fully commission the ML Project, full power of 500 MW will not be available to complete the testing of the ML. Based on the requirements for full load testing, see Section 4.10, MWH's opinion is that the ML system has to be tested at full load, 500 MW, in order to obtain certification of full commissioning and acceptance. If the MF Project is not ready to deliver 500 MW, Emera may be able to obtain this amount of power from other sources; MWH desires to review the Emera plan to accommodate the technical requirements established for the ML Project to test at full power.

INDEPENDENT ENGINEER'S REPORT

THE MARITIME LINK PROJECT

APPENDICES

APPENDIX A

Federal Loan Guarantee Agreement (FLG)

Agreement Providing Key Terms and Conditions For the

FEDERAL LOAN GUARANTEE BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA

FOR THE DEBT FINANCING OF THE LOWER CHURCHILL RIVER PROJECTS

PREAMBLE

Nalcor Energy ("Nalcor"), Emera Inc. ("Emera"), the Province of Newfoundland and Labrador ("NL"), and the Province of Nova Scotia ("NS") have informed Her Majesty the Queen in Right of Canada ("Canada") (all collectively called the "Parties") that Nalcor and Emera or their affiliates intend to develop, construct and operate, with the support of NL and NS, the Muskrat Falls Generation Facility, Labrador Transmission Assets, Labrador Island Link, and Maritime Link Projects (the "Projects"). Canada, NL, and NS subsequently signed a Memorandum of Agreement to support the Projects on August 19, 2011 (the "MOA").

It is essential to Canada that the Projects have national and regional significance, economic and financial merit, and significantly reduce greenhouse gas emissions. Canada's Guarantee of the Guaranteed Debt of each Project will significantly enhance the credit quality of the Financing of each Project. Canada hereby agrees to guarantee the Guaranteed Debt of each Project and will provide the Guarantees for the Projects as more fully described, and subject to the terms and conditions described herein.

The agreements of Canada hereunder are made solely for the benefit of Nalcor, Emera, and their affiliates including the Borrowers, and for the benefit of the Lenders ultimately selected by them to make the Financing available for the Projects and may be relied upon by all such persons but may only be enforced by Nalcor and Emera and affiliates including the Borrowers.

Once it has been accepted by all the Parties, this agreement may be disclosed publicly by or on behalf of any of Canada, Nalcor, Emera, their affiliates, NL and NS.

As regards the MF, LTA and LIL Projects, MFCo, LTACo, LILCo, LIL Opco,Nalcor, NL and Canada, this agreement shall be governed by, and construed in accordance with, the laws of the Province of Newfoundland and Labrador and the federal laws of Canada applicable therein and all actions, suits and proceedings arising will be brought in the courts of competent jurisdiction of NL. subject to any right of appeal to the Federal Court of Appeal or to the Supreme Court of Canada. As regards the ML, MLCo, Emera, NS and Canada, this agreement shall be governed by and construed in accordance with the laws of the Province of Nova Scotia and the federal laws of Canada applicable therein and all actions, suits and proceedings arising will be brought in the courts of competent jurisdiction of NS, subject to any right of appeal to the Federal Court of Appeal or the Supreme Court of Canada. This agreement sets forth the entire agreement among the Parties with respect to the matters addressed herein as regards the Projects and supersedes all prior communications, written or oral, with respect thereto including MOA. This agreement may be executed in any number of counterparts, each of which, when so executed, shall be deemed to be an original and all of which, taken together, shall constitute one and the same agreement. Delivery of an executed counterpart of this agreement by telecopier or electronically shall be as effective as delivery of a manually executed counterpart of this agreement.

Canada understands that Nalcor and Emera, or their affiliates, will be soliciting offers for the Financings from a range of Lenders. Given the importance of a Federal Loan Guarantee to the Financing for each Project, Canada hereby acknowledges and agrees that upon request by Nalcor or Emera within a reasonable period of time prior to any proposed meeting, it shall make available senior representatives of Canada, and its legal advisors and financial consultants as appropriate, responsible for the provision and oversight of the Federal Loan Guarantee, for participation in meetings with credit rating agencies and potential Lenders to respond to queries concerning the Federal Loan Guarantee.

TERMS AND CONDITIONS

1. THE PROJECTS AND THE TRANSACTION PARTIES	
1.1 Projects:	The Muskrat Falls Generation Facility ("MF"), the Labrador Transmission Assets ("LTA"), the Labrador-Island Link ("LIL") and the Maritime Link ("ML"), each as more fully described as follows: MF: an 824-MW hydro-electric generation facility in the vicinity of Muskrat Falls, Labrador, which Nalcor will develop. LTA: a 345-kV HVac transmission interconnection between Muskrat Falls and Churchill Falls, which Nalcor will develop. LIL: a HVDC transmission line connecting the Island of Newfoundland to generation facilities in Labrador which Nalcor will develop but in which Emera Inc., via a Newfoundland and Labrador corporate entity, will have an opportunity to invest. ML: a transmission line connecting the Island of Newfoundland to the Province of Nova Scotia, which will be developed by Emera. Each of (i) MF and LTA together; (ii) LIL; and (iii) ML is referred to herein as a "Project" and together as the "Projects".
1.2 Guarantor:	Her Majesty the Queen in Right of Canada ("Canada" or "Guarantor").
1.3 Proponents:	Nalcor Energy ("Nalcor"), acting on its own behalf and not as agent of the Province of Newfoundland and Labrador ("NL Crown"), and Emera Inc. ("Emera.
1.4 Borrowers:	MFCo: a special purpose wholly-owned subsidiary of Nalcor.

	LTACo: a special purpose wholly-owned subsidiary of Nalcor. LILCo: a special purpose limited partnership controlled by Nalcor and held by it alone or together with Emera ("LILCo"). The obligations of LILCo will be guaranteed by LIL OpCo, a special purpose wholly-owned subsidiary of Nalcor ("LIL OpCo"). MLCo: a special purpose wholly-owned subsidiary of Emera. Each a "Borrower" and collectively, the "Borrowers".
1.5 Lenders:	Subject to the form of Financing Structure selected by the Borrower, with respect to each Borrower, a financial institution or a group of financial institutions or financiers that will purchase debt securities to be issued by such Borrower or make credit facilities available to such Borrower, which will be guaranteed by Canada pursuant to the Federal Loan Guarantee, defined herein (the "Lender" or "Lenders"). Lenders shall include a Guarantee Agent and Collateral Trustee for the benefit of the Lender, where applicable.
2. TRANSACTIONS	
2.1 Federal Loan Guarantee:	The Federal Loan Guarantee ("FLG") shall, in respect of each Project, be an absolute, continuing, unconditional and irrevocable guarantee of payment (not collection) when due of the Guaranteed Debt of the relevant Borrower to the Lenders. The Lenders shall not be bound to pursue or exhaust their recourses against the relevant Borrower or any security held by them before demanding payment from the Guarantor. Subrogation - Canada shall be subrogated in the rights of the Lenders for any Project in respect of and at the time of each and every particular payment made by the Guarantor. Acceleration - It shall be a term of any Financing Document for any Project that in the event of default by a Borrower thereunder, the Lenders shall not accelerate the loan. With respect to MF, LTA and LIL, "FLG Agreement" means the agreement among the Guarantor, MFCo, LTACo, LILCo and Nalcor containing their respective rights and obligations as contained in this Term Sheet. With respect to ML, "FLG Agreement" means the agreement among the Guarantor, ML and Emera containing their respective rights and obligations as contained in this Term Sheet.
2.2 Transaction Structure:	Canada, the Borrowers and the Proponents will work to agree on a Transaction Structure that in conjunction with the FLG Agreement will result in the Project debt achieving Canada's AAA credit rating. The parties agree that the credit rating agencies will be asked to confirm that the FLG Agreement and Transaction Structure would achieve this objective. The Parties agree that they will work together to finalize the Transaction Structure and form of

	Guarantee, including obtaining confirmation from the credit rating agencies, by January 31, 2013 in order to facilitate the start of the financing process.
2.3 Financing Structure:	Following the execution and delivery of all Financing Documents (defined in Section 3.5), ("Financial Close"), the Borrowers intend to pay for Project costs which would include construction costs, interest, fees and other related costs, using a combination of equity to be provided by the Proponents and debt to be made available by the relevant Lenders. The Parties agree that Financial Close for ML must occur by the later of 90 days after the Nalcor Projects, or December 31, 2013. The Financing Structure will be flexible enough to allow each Borrower to raise debt , by way of: (i) bank credit facilities; (ii) a commercial paper program; (iii) a single bond or a series of bonds with staggered short-term maturity dates or a single maturity date issued and maturing within the Construction Period (the period between Financial Close and Commercial Operations Date (defined herein)); (iv) a single long-term bond or a series of long-term bonds issued during the Construction Period; or (v) a combination of one or more of the foregoing options, together with any related hedging instruments. The Guaranteed Debt incurred during the Construction Period for each Project may be refinanced by way of loans, bonds or a combination thereof, provided that: (a) the principal amount of such refinancing does not exceed the then outstanding principal amount of the Guaranteed Debt; and (b) the term thereof does not extend beyond the end of the FLG Term, it being expressly agreed that any loan or bond that matures on or after the earlier of: (i) 2 years after COD; or (ii) 7 years after Financial Close, may not be further refinanced. All of the foregoing is hereinafter collectively referred to as the "Financing". As may be required by the nature of the Financing, a hedging program shall be put in place for each Borrower at Financial Close. In order to ensure certainty in the cost of the Financing for each of the Projects, any interest expense risk will be hedged. The Project hedging principles will be agreed to with the Guarantor prior to Financial Close. Canada, the Borrowers and the Proponents will work to agree on a Financing Structure for the Projects, it being acknowledged that a range of financing structures may be considered. "Commercial Operations Date" ("COD"), in respect of each Project, shall be the date upon which construction is certified by the Borrowers' Engineer to be complete and confirmed by the Independent Engineer, which is currently expected to be July, 2017.

3. FLG TERMS

3.1 Guaranteed Debt:	A. The total maximum amount of borrowing and hedging obligations (including principal, interest, fees, and costs) under the Financing to be guaranteed by Canada ("Guaranteed Debt") shall be the lesser of the following for each of the Projects: i. A fixed dollar-based cap of $6.3 billion, allocated among the Projects as follows: a. MF/LTA: up to $2.6 billion, b. LIL: up to $2.4 billion; and c. ML: up to $1.3 billion; herein called "Individual Project Debt Caps". ii. The amount of debt implied by the maximum Debt to Equity Ratios ("DER") for each Project as follows: a. MF/LTA: 65:35 b. LIL: 75:25 c. ML: lower of Nova Scotia Utility and Review Board (UARB) approval or 70: higher of UARB approval or 30; or iii. The amount of debt that provides a minimum Debt Service Coverage Ratio ("DSCR") of 1.40x for each Project throughout the Term of the FLG. B. The terms and conditions of the Guaranteed Debt shall be those commonly used in similar commercial transactions, shall be subject to Canada's approval, acting reasonably, and shall include the following: (i) Rate of Interest that is no greater than that which would be offered by Lenders to an entity with a "AAA" credit rating; (ii) The proceeds from the Guaranteed Debt and the Additional Debt shall be used for the sole purpose of the Project; and (iii) Any long-term bond issued in connection with the Guaranteed Debt may carry a call feature.
3.2 Term of the FLG:	The FLG Term shall begin on Financial Close and shall terminate on the earlier of: (a) payment in full of the Guaranteed Debt; or (b) the Maximum Term for each Project, as follows: (i) MF/LTA: 35 years after Financial Close; (ii) LIL: 40 years after Financial Close; and (iii) ML: 40 years after Financial Close.
3.3 FLG Amortization Profile:	The Guaranteed Debt shall be repaid in accordance with the following amortization profile: MF/ LTA : simple mortgage-style amortization, ending no later than 35 years after Financial Close; LIL : level amortization, ending no later than 55 Years after Financial Close; and

	ML : level amortization, ending no later than 40 years after Financial Close. The Amortization period is to begin on the earlier of: (i) Commercial Operations Date, and (ii) seven (7) years after Financial Close. The Amortization Profile shall be such that there is no principal outstanding at the end of each amortization period for each Project. In each case, save if bullet maturity bonds are used, there shall be at least one payment a year. Bullet maturity bonds may be used instead of amortizing bonds. Bullet maturities will be matched as closely as possible to the relevant FLG Amortization Profile.
3.4 FLG Maximum Exposure:	The maximum exposure to the Guarantor under the FLG at any given time shall be the actual amount outstanding on the Guaranteed Debt at such time based on the FLG Amortization Profile.
3.5 FLG Conditions Precedent:	A. The following conditions precedent (the "FLG Conditions Precedent") must be satisfied in form and substance acceptable to the Guarantor prior to the execution and delivery of the FLG for all Projects: (i) Confirmation by Credit Rating Agencies of indicative credit ratings for each of MF, LTA, and LIL (prepared on a non-guaranteed basis) equal to or higher than investment grade; (ii) Provision by Credit Rating Agencies of indicative credit ratings for the ML (prepared on a non-guaranteed basis and based on information provided in the application to the UARB) equal to or higher than investment grade; (iii) Enactment of legislation, and execution of formal agreements between the NL Crown and Nalcor (or related entities), which put into legally binding effect the commitments made by the NL Crown as outlined in Schedule "A", both the legislation and the agreements being to the Guarantor's satisfaction.; (iv) The formalization of a regulatory framework by the Province of Nova Scotia ("NS") in legislation and/or regulations; (v) Execution of an inter-governmental agreement (the "IGA") between Canada and the NL Crown in which NL Crown: (a) makes the commitments outlined in Schedule "A" to Canada; (b) indemnifies Canada for any costs that it may incur under the FLG as a result of a regulatory decision or regulatory change (including through legislation or policy) that prevents a Borrower from recovering Project costs and fully servicing the Guaranteed Debt; and (c) guarantees completion of the MF, LTA and LIL Projects to COD such that, where non-completion is due to NL Crown's failure to comply with the commitments outlined in Schedule "A", NL Crown shall indemnify Canada for any costs Canada may incur as a result of those Projects not achieving COD. (vi) Execution of an agreement between Canada and NS in which NS

	(viii) Execution and delivery of the indemnity referred to in Section 4.9; (ix) Review of technical aspects of the Projects, including engineering, water resource and any other required due diligence by the Independent Engineer (as defined herein), and preparation and finalization (as confirmed by the Guarantor and Lenders, acting reasonably) of a technical due diligence report (the "IE DD Report") confirming that the Project execution plans are commercially reasonable, and consistent with Good Utility Practice; and (x) Other Conditions Precedent customarily included in commercial project financing transactions.
Date: _____ 3.6 Costs Incurred by Guarantor:	All reasonable third-party costs incurred by the Guarantor in relation to an FLG shall be at the expense of the Borrower for the benefit of which such FLG has been issued.
3.7 Guarantee Fee:	No fees shall be payable to the Guarantor in respect of the provision of any FLG.
3.8. Commitment Fees:	Any fees paid to the Lenders under the Project Financing, such as commitment fees or up-front fees, shall be commercially reasonable.
4. PROJECT DEBT	
4.1 Debt Service Coverage Ratio Definition and Test:	Definition: The Debt Service Coverage Ratio ("DSCR") in respect of any Borrower, and in respect of any 12-month period shall be calculated as follows: DSCR = Base Cash Flow / Debt Service, where: Base Cash Flow = Liquidity Reserves plus Contracted Revenues less Cash Operating Costs Debt Service = Amortization plus Interest Expense Amortization = The amortization amount corresponding to the FLG Amortization profile in respect of each Borrower Interest Expense = The interest expense for the period Contracted Revenues: (i) MF: (a) For purposes of Initial Debt Sizing, DSCR shall include only the Base Block Revenue plus Liquidity Reserve; and (b) For all other purposes, DSCR shall include the Base Block Revenue plus Liquidity Reserve, plus revenue from power purchase agreements with investment grade parties, based on total annual energy sales not to exceed (P50) energy production for MF. (ii) LTA: For all purposes, DSCR shall include LTA Tariff Revenue plus Liquidity Reserve. (iii) LIL: For all purposes, DSCR shall include revenue from NL Hydro under

	indemnifies Canada for any costs it may incur under the FLG as a result of a regulatory decision or regulatory change (including through legislation or policy) that prevents a Borrower from recovering Project costs and fully servicing Guaranteed Debt; (vii) Sanction of all Projects, including ML; (viii) Execution of an agreement (the "Emera Guarantee Agreement") between Canada and Emera, wherein Emera shall guarantee: (a) the payment of $60 million to the Guarantor in the event that Financial Close is not achieved by the date set out herein or funds are not drawn from Guaranteed Debt within a reasonable time after Financial Close; and (b) following the first draw of Guaranteed Debt, Emera will guarantee to complete the ML or to provide required funds to complete the ML; (ix) That all necessary environmental legal and policy authorities have been complied with to the satisfaction of the Guarantor; and (x) That all necessary aboriginal consultation obligations have been complied with to the satisfaction of the Guarantor. B. The following conditions precedent (the "FLG Conditions Precedent") must be satisfied by the applicable Borrower in form and substance acceptable to the Guarantor prior to the execution and delivery of the FLG for each Project of such Borrower: (i) Execution of the FLG Agreements and all other relevant documents necessary to effect Financial Close ("Financing Documents"); (ii) Provision by Credit Rating Agencies of indicative credit ratings for the ML (prepared on a non-guaranteed basis) equal to or higher than investment grade in the event that the UARB decision differs from the application submitted by MLCo; (iii) Satisfaction, in the sole discretion of the Guarantor, of any and all Project-related due diligence deemed necessary by the Guarantor, including satisfactory review of all required revenue-producing agreements and other agreements including the MF PPA, TFA, LIL Assets Agreement; (iv) Approval by the Guarantor, acting reasonably, of the Financing, Financing Structure, Financing Documents, and the Transaction Structure; (v) A report provided by an independent expert that the Projects have sufficient insurance coverage in place that is customary in projects of this nature and size; (vi) As required by the nature of the Financing, an interest rate hedging program be in place to hedge expected interest expense with respect to the Guaranteed Debt; (vii) All necessary permits, approvals, land-use agreements and other authorizations required at Financial Close have been obtained;

	the LIL Assets Agreement plus any Liquidity Reserve. (iv) ML: For all purposes, DSCR shall include revenues collected from ratepayers under the cost-recovery framework imposed by the Nova Scotia Utility and Review Board plus any Liquidity Reserve. Cash Operating Costs includes all cash costs of the Borrower, excluding interest and principal on any Guaranteed Debt. . Test: The DSCR Test shall apply both prospectively and retrospectively except as follows: (a) The DSCR Test shall apply prospectively in the context of the maximum Guaranteed Debt as defined in 3.1; and (b) The DSCR Test shall apply prospectively in the context of the Additional Debt. For purposes of the ML, the prospective calculation of the DSCR shall be based on the UARB-approved return on equity. DSCR will be calculated monthly on a rolling 12-month basis. "Base Block Revenue" means amounts paid by NL Hydro to MF in respect of the Base Block Energy purchase commitments as set out in the MF power purchase agreement and as described in the Memorandum of Principles.
4.2 Debt Service Coverage Ratio:	The DSCR for each Project shall be a minimum of 1.40x.
	If the DSCR falls below 1.40x, then a 30-day consultation process between the Guarantor and the relevant Borrower is triggered during which time information shall be provided to Canada to advise it of the reasons for such a decline and how the Borrower proposes to increase the DSCR. If it falls below 1.20x, then there shall be no distribution to equity holders. If it falls below 1.10x, it shall constitute an Event of Default.
4.3 Cross-Default Provisions:	MF, LTA, and LIL will have cross-default provisions such that an event of default of any one Borrower will represent an event of default of each of the other two Borrowers. There shall be no cross-default provisions in respect of Maritime Link.
4.4 FLG Events of Default:	The following is a non-exhaustive list of Events of Default in respect of each Project for purposes of the FLG: (i) Failure to satisfy any covenants in the Financing Documents or FLG Agreement, and to cure same within 30 days of notice of default; (ii) Misrepresentation, fraud, or breach of material representation; (iii) Bankruptcy, restructuring, and insolvency of a Proponent or a Borrower; (iv) Termination (other than a scheduled termination), invalidity, unenforceability or default (by any party to such agreement) of any key project agreement (eg. the MF PPA, TFA, LIL Assets Agreement, ML revenue collection agreement) that is not cured within any applicable grace period in that agreement (or within 30 days of the date of occurrence of such event if there is no applicable grace period), or replaced by an equivalent agreement within 30 days. This will be an Event of Default for the defaulting Party only; (v) Sale or Change of Control of Nalcor or the Borrowers, other than

	among the Parties, or non-permitted assignment of any key contracts; (vi) Insufficient funding of Cost Overruns or Cost Escalations that continues for 90 days after being identified by the Independent Engineer; (vii) Abandonment of a Project by the owner of the Project; (viii) Breach or termination of any contract of the Borrowers, including the commercial agreements between Nalcor and Emera, that is not cured within any applicable grace period in that agreement, (or within 30 days of the date of occurrence of such event if there is no applicable grace period) or replaced by an equivalent agreement within 30 days. This will be an Event of Default for the defaulting Party only; (ix) Unauthorized sale of any material Project assets; (x) Failure to provide certificate of the Independent Engineer confirming that budgeting and maintenance of the Project is being conducted in conformity with Good Utility Practice and such failure is not cured within 30 days; (xi) The DSCR falls below 1.10x; (xii) Failure to fund or maintain the Debt Service Reserves or the Liquidity Reserves as required in Section 4.16 and to cure same within 5 business days of payment therefrom; (xiii) Failure to pay principal or interest within 5 business days of due date; and (xiv) Other Events of Default customarily included in commercial financing documents.
4.5 Lenders' Events of Default:	The only Lenders' Event of Default in respect of the Guaranteed Debt shall be the failure by a Borrower and the Guarantor to pay a scheduled principal and interest payment. Upon the occurrence of a Lender's Event of Default, Lenders shall have all available remedies.
4.6 Security:	The security for the Guaranteed Debt shall include the following: (i) the assets of the Borrowers (including Liquidity and Debt Service Reserves); (ii) all contracts of the Borrowers, including key project agreements, as identified by the Guarantor; and (iii) the shares of the Borrowers provided that the shares of MFCo, LTACo and LILCo, may only be pledged to Canada or an agent of Canada. For greater certainty, the priorities of Security taken by the Guarantor shall be determined by the Financing Structure agreed upon, and in any event shall be subject in priority only to Security taken by a Lender, if any. The Borrowers shall take all actions necessary, in the opinion of the Guarantor, to maintain the validity, enforceability, and priority of the Guarantor's security.
4.7 Permitted Liens:	The Borrowers shall not be permitted to create or suffer to exist any lien on their assets except liens that are customary in project financing transactions including, without limitation: (i) liens for assessments or governmental charges or levies which are not delinquent (taking into account any relevant grace periods) or, if overdue, the

	validity or amount of which is being contested diligently and in good faith by appropriate proceedings and in respect of which adequate reserves in accordance with the accounting standard that has been adopted by the Borrower, that is, International Financial Reporting Standards, US GAAP or another recognized reporting standard, have been recorded on the balance sheet of such Borrower; (ii) construction, mechanics', carriers', warehousemen's, storage, repairers' and materialmen's liens but only if the obligations secured by such liens are not due and delinquent and no lien has been registered against title to any assets of such Borrower, or if a lien has been registered, same does not affect the Guarantor's priority in the Security and is being defended diligently and in good faith by appropriate proceedings and in respect of which adequate reserves in the amount of the lien plus 20% have been recorded on the balance sheet of such Borrower; (iii) easements, encroachments, rights of way, licences, reservations, covenants, restrictive covenants or other similar rights in land granted to or reserved by other persons provided that they are reasonable and have been complied with and can be assigned to the Guarantor; (iv) any lien securing purchase money obligations permitted to be outstanding, provided that each such lien affects only the property with respect to which the purchase money obligation it secures was incurred; and (v) any lien securing Additional Debt (defined in Section 4.8) permitted to be outstanding.
4.8 Permitted Debt:	The Borrowers shall not incur debt during the Construction Period and the FLG Term except for: (i) Guaranteed Debt (also known as "Project Debt"); (ii) Additional Debt (as described in 4.8(a)); (iii) Debt secured by a lien which is a Permitted Lien (other than a lien securing purchase money obligations); (iv) Trade payables or similar debt incurred in the ordinary course of business and for the purpose of carrying on same, representing the deferred purchase price of property or services; (v) Debt under purchase money obligations provided, however, that the aggregate principal amount of purchase money obligations outstanding at any time shall not exceed at any time: (i) for MF/LTA $15 million; (ii) for LIL $15 million; and (iii) for ML $15 million.
4.8(a) Additional Debt:	No additional debt may be incurred by the Borrowers during the term of the FLG, other than: (i) for an operating line of credit to a maximum of $10 million for MF/LTA, for LIL, and for ML; and (ii) additional debt to finance cost increases from the DG3 capital cost estimates provided to the Guarantor and the final estimates at Financial Close ("Cost Escalations"), to finance cost increases after Financial Close ("Cost Overruns"), and to finance costs associated with major repairs and refurbishments after COD, (collectively called "Additional Debt").

	Additional Debt shall be subject to the following conditions: (a) It shall not be covered by the FLG; (b) It may be secured provided that it is subordinate to the Guaranteed Debt; and (c) It must satisfy the Debt Equity Ratios and DSCR-based tests on a prospective, aggregate basis (taking into account the Guaranteed Debt and the Additional Debt) throughout the term of the Additional Debt. Additional Debt with bullet maturities will be subject to a deemed periodic amortization profile in order to preserve the validity of the DSCR-based test.
4.9 Independent Engineer:	An engineer (the "Independent Engineer" or "IE") shall have been appointed to permit each Lender and the Guarantor to complete their due diligence and to ensure compliance with the terms of the FLG Agreements and all Financing Documents required to effect Financial Close. The Independent Engineer will represent the Guarantor and the Lenders. The Borrowers shall provide written confirmation, that has been confirmed in writing by the IE, that they have no contractual or other relationship with the IE other than the obligation to pay the fees of the IE. The IE shall review the Project documents and any information provided in support of any drawdown requested by a Borrower and shall make a recommendation to the Lender by way of an IE certificate. The Independent Engineer shall be assigned a scope of responsibility designed to ensure the Projects are developed, maintained, and operated in a manner which is consistent with Good Utility Practice (as defined herein). The Independent Engineer shall have full access to all information related to the Projects and access to management and employees of the Proponents or Borrowers as required. The cost of the Independent Engineer shall be borne by the Borrowers. The Borrowers shall indemnify and save the Guarantor harmless from and against any liability that the Guarantor incurs solely by virtue of being found, in respect of the Projects, liable as a partner or joint venturer.
4.10 Expected Costs to Complete:	Cost Overruns for a Project must be funded with Equity and/or Additional Debt (subject to the provisions of section 4.8(a)) as follows: (i) Equal annual amounts calculated by dividing such Cost Overrun amount by the number of years remaining until COD. Each annual payment shall be funded no later than the date of the first advance of Guaranteed Debt in each year prior to COD, and the first annual amount shall be funded prior to the first advance under Guaranteed Debt after such calculation is made; (ii) The Independent Engineer will confirm the Borrower's revised estimates of Expected Costs to Complete and any related changes to the construction schedule, all by way of an IE certificate; and (iii) Adjustments may be made to such funding requirements from time to time as estimates of Expected Costs to Complete (and related date at which COD is expected to be achieved) are updated or

	revised, all as confirmed by the Independent Engineer. The foregoing shall not in any way limit the enforceability of the provisions of Sections 3.1 or 4.8. The expected costs to complete ("Expected Costs to Complete") in respect of any Borrower at any given time shall be determined by the Borrowers and reviewed and confirmed by the IE by way of an IE certificate to be provided in connection with any drawdown requests prior to COD. The DG3 Capital Cost Estimates shall form the basis for the Independent Engineer's review of and confirmation of any proposed changes to such estimates on an ongoing basis as construction proceeds. Expected Costs to Complete shall include contingencies and escalation. Expected Costs to Complete shall also include any interest during construction and costs associated with the Financing prior to COD, calculated on a pro forma basis.
4.11 Change of Control:	There shall be,no sale or change of control of any Borrower or subsidiaries, except as among the Parties, and no sale of any material Project assets. There shall be no sale or change of control of Nalcor.
4.12 Independent Engineer Certificate post COD::	On each anniversary following COD, and until the end of the FLG Term, the Borrower or the IE shall provide an Independent Engineer's certificate, in form and substance acceptable to the Guarantor, acting reasonably, confirming that budgeting and maintenance of the Project are being conducted in conformity with Good Utility Practice. Failure of the Borrower to budget and maintain in accordance with Good Utility Practice that results in the IE being unable to provide such certification shall constitute an Event of Default subject to a 30-day cure period.
4.13 Good Utility Practice:	"Good Utility Practice" means those project management design, procurement, construction, operation, maintenance, repair, removal and disposal practices, methods and acts that are engaged in by a significant portion of the electric utility industry in Canada during the relevant time period, or any other practices, methods or acts that, in the exercise of reasonable judgment in light of the facts known at the time a decision is made, could have been expected to accomplish a desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be the optimum practice, method or act to the exclusion of others, but rather to be a spectrum of acceptable practices, methods or acts generally accepted in such electric utility industry for the project management, design, procurement, construction, operation, maintenance, repair, removal and disposal of electric utility facilities in Canada. Notwithstanding the foregoing references to the electric utility industry in Canada, in respect solely of Good Utility Practice regarding subsea HVdc transmission cables, the standards referenced shall be the internationally recognized standards for such practices, methods and acts generally accepted with respect to subsea HVdc transmission cables. Good Utility Practice shall not be determined after the fact in light of the results achieved by the practices, methods or acts undertaken but rather shall be determined based upon the consistency of the practices, methods or acts when undertaken with the standard set forth in the first two sentences of this definition at such time.

4.14 Debt-Equity Contributions:	Construction costs shall be funded only with equity prior to Financial Close. Subject to the conditions provided herein (including, without limitation, the Individual Project Debt Caps in respect of any Guaranteed Debt, and the funding of Cost Overruns), following Financial Close, debt and equity funds shall be invested as follows: (i) 100% debt until such time as the target Debt Equity Ratio is achieved; and (ii) thereafter, debt and equity shall be invested on a *pro rata* basis in accordance with the targeted Debt Equity Ratio for each Project.
4.15 Distributions:	There shall be no distribution to shareholders by the Borrowers: (i) Where the DSCR is below 1.20x; (ii) During the Construction Period; and (iii) Where an Event of Default has occurred which has not been cured during the cure period if same has been provided.
4.16 Debt Service Reserves and Liquidity Reserves:	Each Borrower shall at all times maintain Debt Service Reserves in a dedicated reserve account. The Debt Service Reserves will, at all times, be funded in an amount at least equal to the debt service (principal and interest) obligations of such Borrower for the forward-looking 6-month period. The Debt Service Reserve is for the benefit of the Guarantor and in the event that the Guarantor is required to make payment to the Lenders under the FLG, then it shall be entitled to immediate reimbursement of such amount from the Debt Service Reserve. MFCo and LTACo shall, for the MF/LTA Project, also fund with equity and maintain a Liquidity Reserve in a dedicated reserve account that permits MFCo and LTACo to maintain a DSCR of no less than 1.40x for a period of ten (10) years after COD. LIL and ML may each establish a Liquidity Reserve in connection with the DSCR.
4.17 Prepaid Rent Reserve for LIL:	During the Construction Period all prepaid rent received by LILCo from LIL Opco under the LIL Assets Agreement shall be kept in a reserve account and upon completion and receipt of the first rental payment from LIL Opco the amounts in the prepaid rent reserve shall be released and applied in accordance with the waterfall established under the LIL Project Financing Documents. During the Construction Period, distributions equal to the investment returns on the capital invested in the prepaid rent reserve account may be made to the Nalcor LIL limited partner provided no default or Event of Default exists.

4.18 Reports:	The Guarantor shall be entitled to regular financial and operational reports for the Projects at the expense of the Borrowers. This will include all customary reports and all rights to access and audit as are provided to the Lenders.
4.19 Covenants:	Customary affirmative and negative covenants to be provided by the Borrowers.
4.20 Representations and Warranties:	Customary Representations and Warranties are to be provided by the Borrowers.

SCHEDULE "A"

NL Crown commits to do the following:

1. Approve the creation of those subsidiaries or entities controlled by Nalcor which are required in order to facilitate the development and operation of MF, the LIL and the LTA, and to ensure Nalcor and existing and new subsidiaries or entities have the authorized borrowing powers required to implement the Projects and meet any related contractual or reliability obligations.

2. Provide the base level and contingent equity support that will be required by Nalcor to support successful achievement of in-service for MF, the LTA and the LIL, in cases with and without the participation of Emera.

3. Ensure that, upon MF achieving in-service, the regulated rates for Newfoundland and Labrador Hydro ("NLH") will allow it to collect sufficient revenue in each year to enable NLH to recover those amounts incurred for the purchase and delivery of energy from MF, including those costs incurred by NLH pursuant to any applicable power purchase agreement ("PPA") between NLH and the relevant Nalcor subsidiary or entity controlled by Nalcor that will provide for a recovery of costs over the term of the PPA and relate to:

    a) initial and sustaining capital costs and related financing costs (on both debt and equity), including all debt service costs and a defined internal rate of return on equity over the term of the PPA;

    b) operating and maintenance costs, including those costs associated with transmission service for delivery of MF power over the LTA (as described further in 5 below);

    c) applicable taxes and fees;

    d) payments pursuant to any applicable Impact & Benefit agreements;

    e) payments pursuant to the water lease and water management agreements; and

    f) extraordinary or emergency repairs.

4. Ensure that, upon the LIL achieving in-service, the regulated rates for NLH will allow it to collect sufficient revenue in each year to enable NLH to recover those amounts incurred for transmission services, including those costs incurred by NLH pursuant to any applicable agreements between NLH, the LIL operating entity and/or the entity holding ownership in the LIL assets, that will provide for a recovery of costs over the service life of the LIL and relate to:

    a) initial and sustaining capital costs of the LIL and related financing and debt service costs, including a specific capital structure and regulated rate of return on equity equal to, at least, a minimum value required to achieve the debt service coverage ratio agreed to in lending agreements by the LIL borrowing entity;

b) operating and maintenance costs;

c) applicable taxes and fees; and

d) extraordinary or emergency repairs;

5. Ensure that, upon LTA achieving in-service, the regulated rates for the provision of transmission service over the LTA will provide for a recovery of costs over the service life of the LTA including initial and sustaining capital costs, operating and maintenance costs, extraordinary or emergency repairs, applicable taxes and fees and financing costs (on both debt and equity), including all debt service costs and a defined internal rate of return on equity over the term of any applicable agreement.

This agreement shall ensure to the benefit of Nalcor and Emera and their affiliates including the Borrowers and their respective permitted successors and assigns and shall be binding on the Parties. The Parties represent and warrant that once this agreement is accepted by the Parties as herein provided, it shall constitute the irrevocable, legal, valid and binding obligation of the Parties, enforceable in accordance with its terms.

IN WITNESS WHEREOF each of the Parties has executed this agreement as of the date set forth below.

HER MAJESTY THE QUEEN IN RIGHT OF CANADA, as represented by The Right Honourable Prime Minister of Canada,

Per: _____

The Honourable Stephen Harper

Date: _____

HER MAJESTY IN RIGHT OF NEWFOUNDLAND AND LABRADOR, as represented by the Premier

Per: _____

The Honourable Kathy Dunderdale

Date: _____

HER MAJESTY IN RIGHT OF NOVA SCOTIA, as represented by The Premier

Per: _____

The Honourable Darrell Dexter

Date: _____

NALCOR ENERGY

Per: _____

Name:

Title:

Date:

I / we have authority to bind the Corporation

EMERA INC.

Per: _____

Name:

Title:

Date:

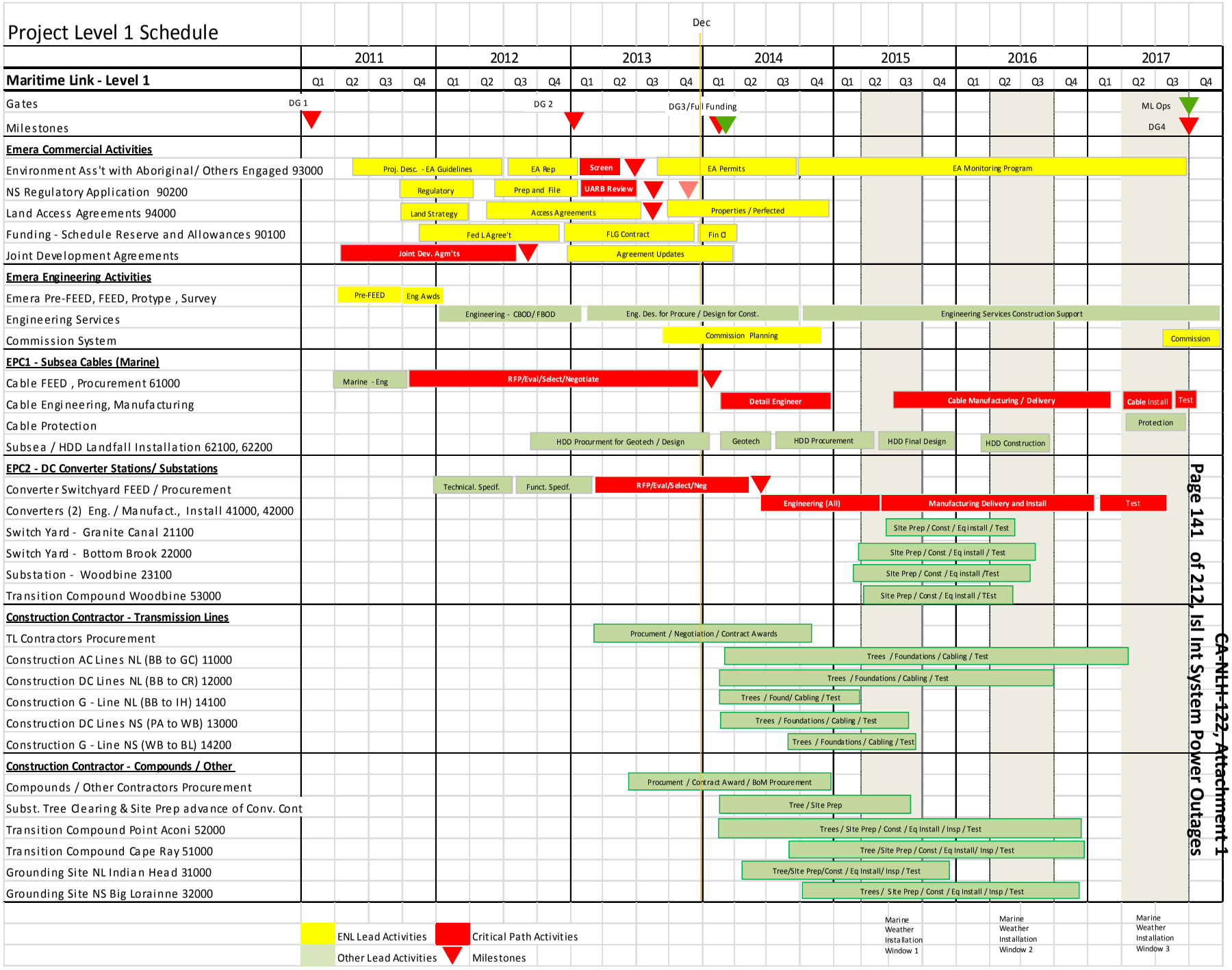
I/we have authority to bind the Corporation

NOV 30 2012

APPENDIX B

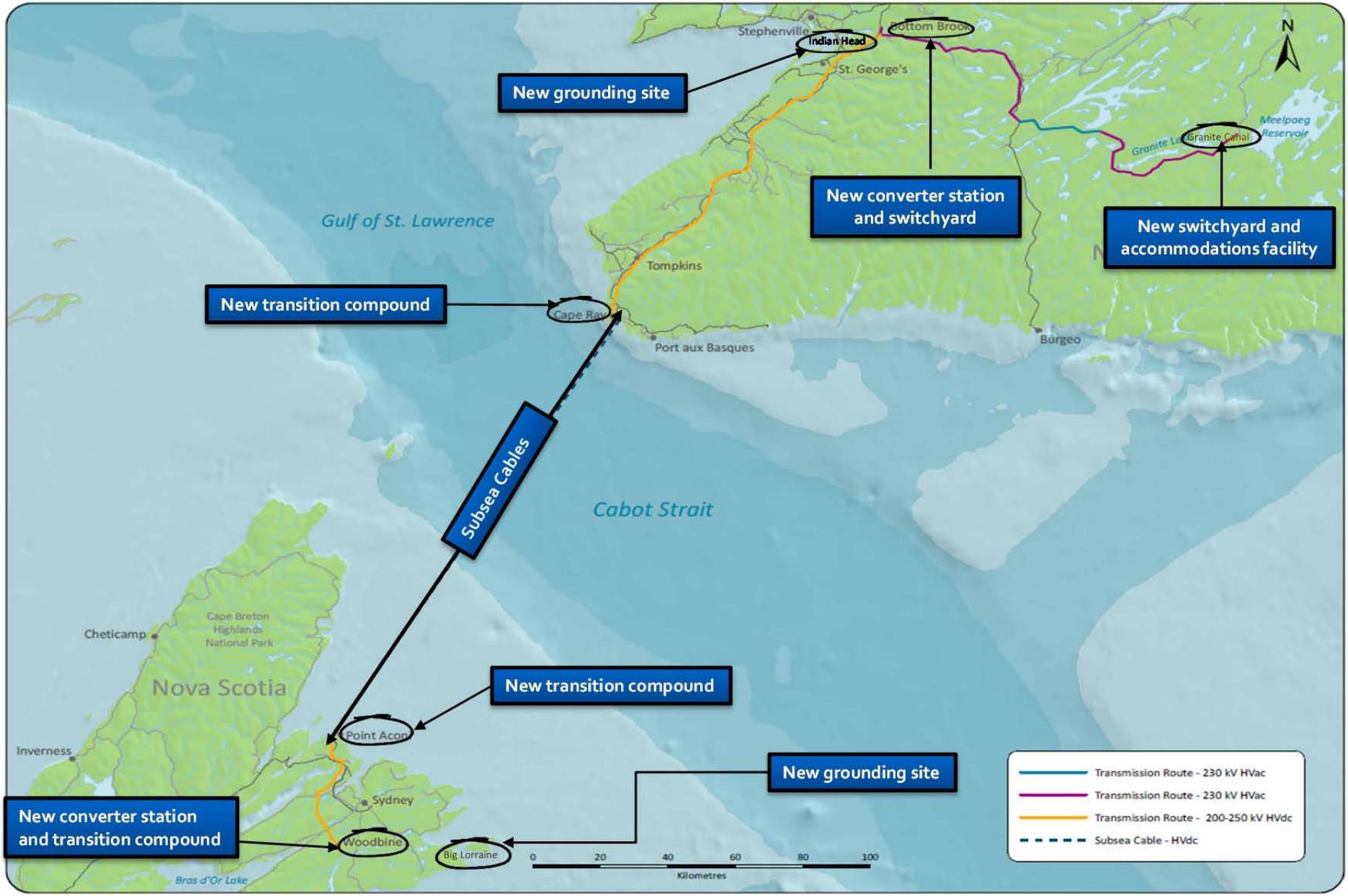
Milestone Schedule and Major Contract Packages

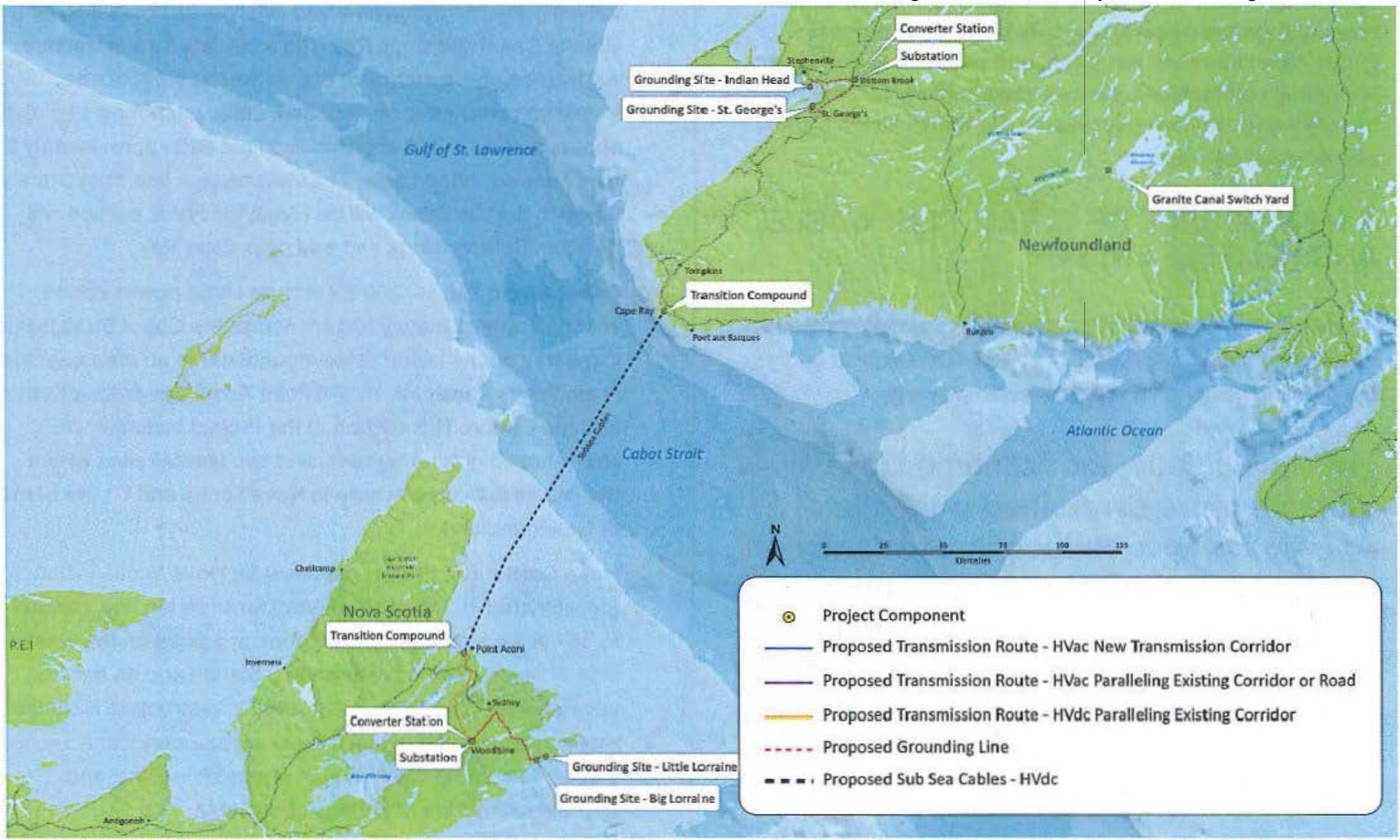
As of December 2013



APPENDIX C

Location Map


New grounding site
New converter station and switchyard
New switchyard and accommodations facility
New transition compound
Subsea Cables
New transition compound
New grounding site
New converter station and transition compound
Gulf of St. Lawrence
Cabot Strait
Nova Scotia
Stephenville
Indian Head
Bottom Brook
St. George's
Tompkins
Cape Ray
Port aux Basques
Burgeo
Granite Canal
Meelpaeg Reservoir
Cheticamp
Cape Breton Highlands National Park
Inverness
Point Aconi
Sydney
Woodbine
Big Lorraine
Bras d'Or Lake
N
0 20 40 60 80 100
Kilometres
Transmission Route - 230 kV HVac
Transmission Route - 230 kV HVac
Transmission Route - 200-250 kV HVdc
Subsea Cable - HVdc


Converter Station
Substation
Grounding Site - Indian Head
Grounding Site - St. George's
Gulf of St. Lawrence
Granite Canal Switch Yard
Newfoundland
Transition Compound
Cape Ray
Port aux Basques
Atlantic Ocean
Cabot Strait
Nova Scotia
Transition Compound
Point Aconi
Converter Station
Substation
Grounding Site - Little Lorraine
Grounding Site - Big Lorraine
P.E.I
N
Project Component
Proposed Transmission Route - HVac New Transmission Corridor
Proposed Transmission Route - HVac Paralleling Existing Corridor or Road
Proposed Transmission Route - HVdc Paralleling Existing Corridor
Proposed Grounding Line
Proposed Sub Sea Cables - HVdc

APPENDIX D

Transmission Line Routes

Emera Newfoundland & Labrador Maritime Link

Gulf of St. Lawrence

Stephenville

Bottom Brook

230 kV HVac

St. George's

200-250 kV HVdc

Tompkins

Cape Ray

Port aux Basques

200-250 kV HVac

Granite Canal

230 kV HVac

Meelpaeg Reservoir

Newfoundland

Burgeo

Subsea Cable

Cabot Strait

Cheticamp

Cape Breton Highlands National Park

Nova Scotia

P.E.I

Inverness

Point Aconi

Sydney

Woodbine

Bras d'Or Lake

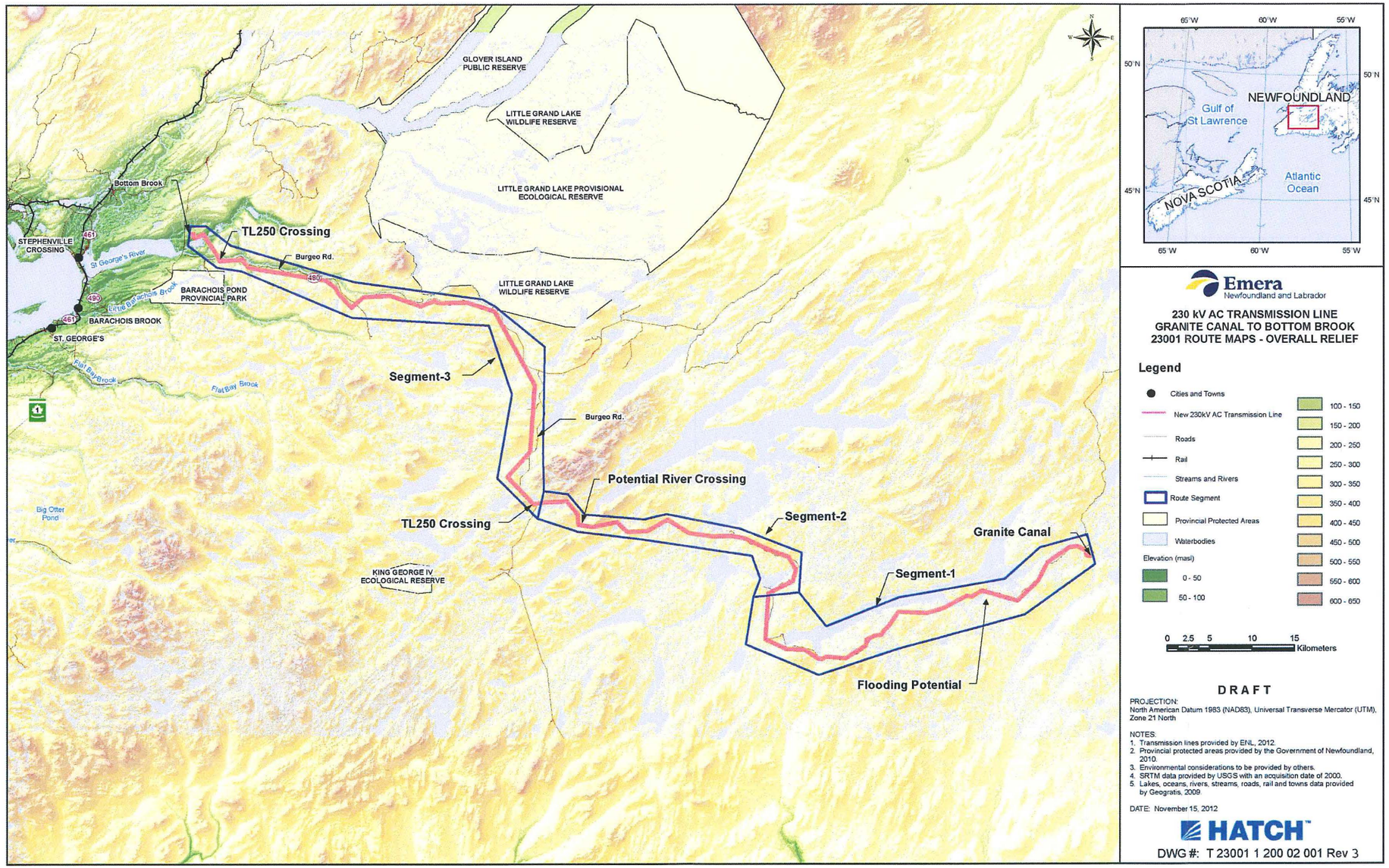
Antigonish

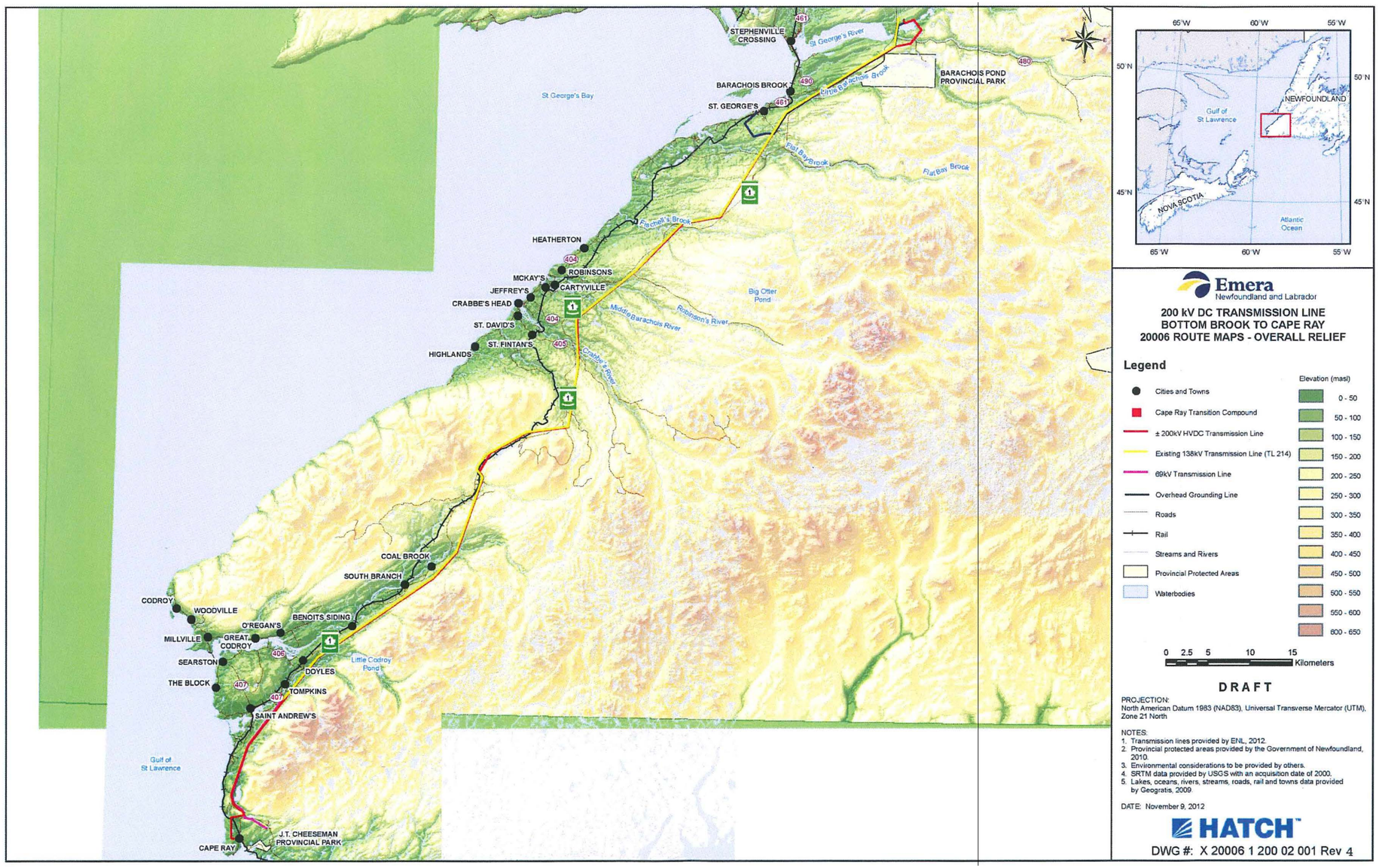
Atlantic Ocean

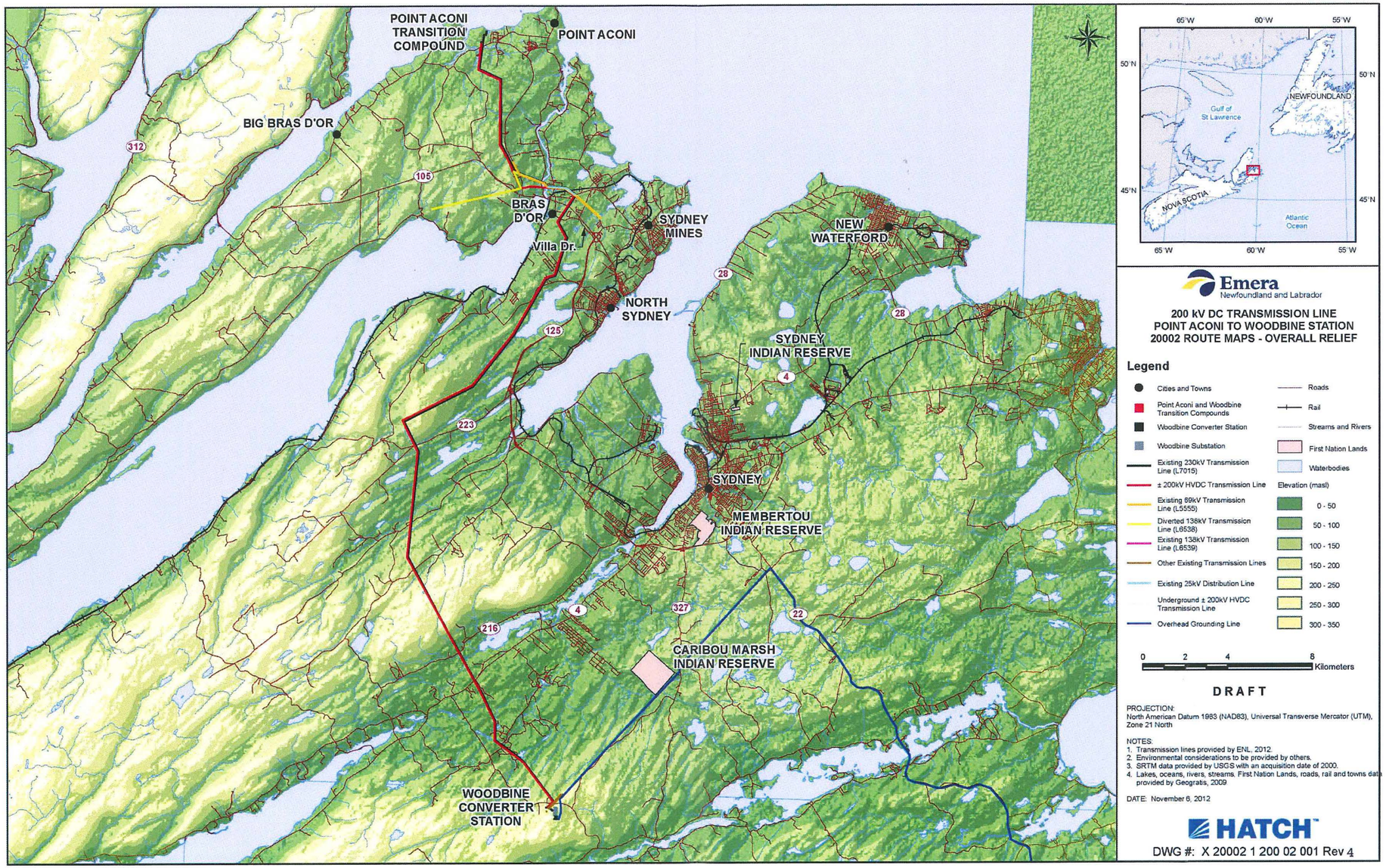
0 25 50 75 100 125

Kilometres

- Transmission Route - 200-250 kV HVac
- Transmission Route - 230 kV HVac
- Transmission Route - 200-250 kV HVdc
- Subsea Cable - HVdc

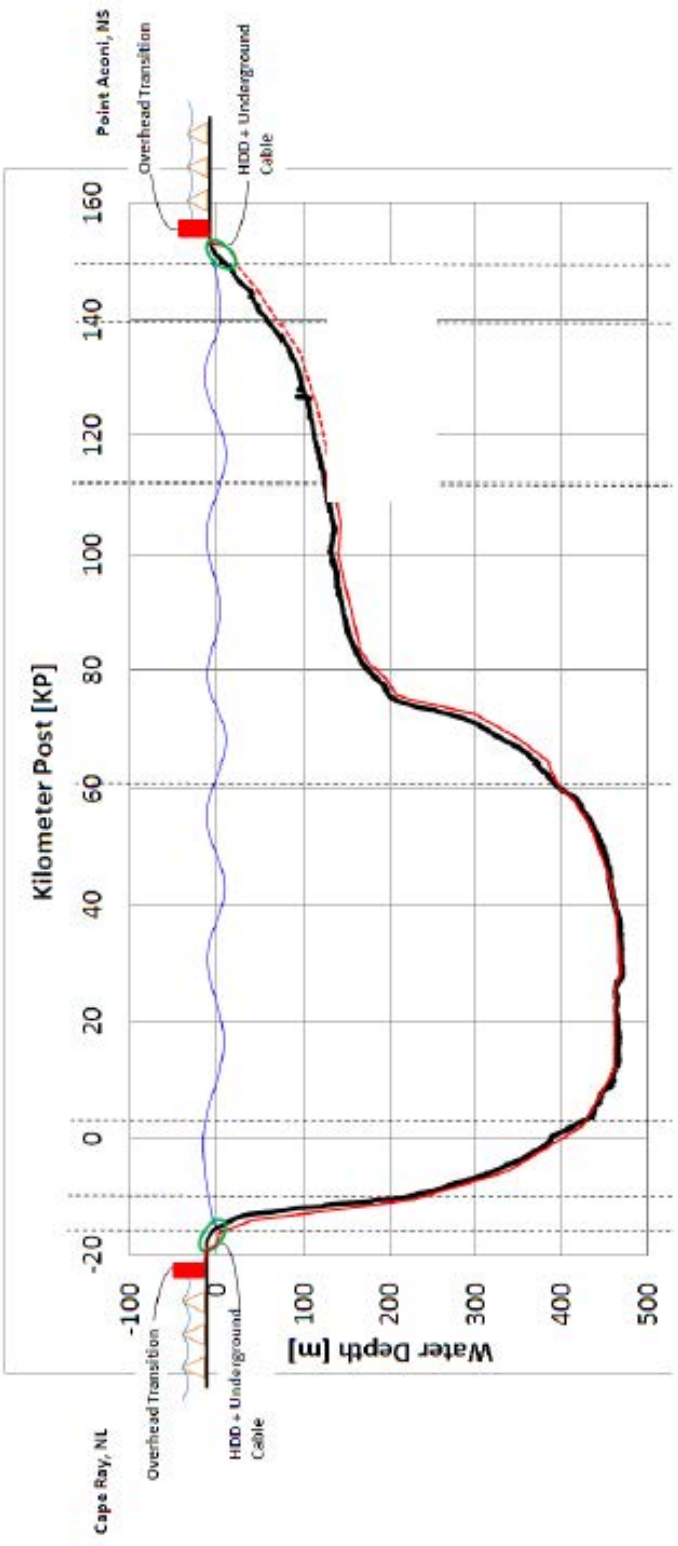

GLOVER ISLAND PUBLIC RESERVE
LITTLE GRAND LAKE WILDLIFE RESERVE
LITTLE GRAND LAKE PROVISIONAL ECOLOGICAL RESERVE
LITTLE GRAND LAKE WILDLIFE RESERVE
Bottom Brook
STEPHENVILLE CROSSING
461
St George's River
490
Little Barachois Brook
BARACHOIS POND PROVINCIAL PARK
BARACHOIS BROOK
461
ST. GEORGE'S
Flat Bay Brook
Flat Bay Brook
TL250 Crossing
Burgeo Rd.
480
Segment-3
Burgeo Rd.
Potential River Crossing
TL250 Crossing
Segment-2
Granite Canal
Segment-1
Flooding Potential
Big Otter Pond
KING GEORGE IV ECOLOGICAL RESERVE
65°W
60°W
55°W
50°N
45°N
NEWFOUNDLAND
Gulf of St Lawrence
Atlantic Ocean
NOVA SCOTIA
Emera
Newfoundland and Labrador
230 kV AC TRANSMISSION LINE
GRANITE CANAL TO BOTTOM BROOK
23001 ROUTE MAPS - OVERALL RELIEF
Legend
Cities and Towns
New 230kV AC Transmission Line
Roads
Rail
Streams and Rivers
Route Segment
Provincial Protected Areas
Waterbodies
Elevation (masl)
0 - 50
50 - 100
100 - 150
150 - 200
200 - 250
250 - 300
300 - 350
350 - 400
400 - 450
450 - 500
500 - 550
550 - 600
600 - 650
0 2.5 5 10 15
Kilometers
DRAFT
PROJECTION:
North American Datum 1983 (NAD83), Universal Transverse Mercator (UTM), Zone 21 North
NOTES:
1. Transmission lines provided by ENL, 2012.
2. Provincial protected areas provided by the Government of Newfoundland, 2010.
3. Environmental considerations to be provided by others.
4. SRTM data provided by USGS with an acquisition date of 2000.
5. Lakes, oceans, rivers, streams, roads, rail and towns data provided by Geogratis, 2009.
DATE: November 15, 2012
HATCH
DWG #: T 23001 1 200 02 001 Rev 3


STEPHENVILLE CROSSING
St George's River
BARACHOIS BROOK
BARACHOIS POND PROVINCIAL PARK
Little Barachois Brook
St George's Bay
ST. GEORGE'S
Flat Bay Brook
Flat Bay Brook
Fischell's Brook
HEATHERTON
ROBINSONS
MCKAY'S
CARTYVILLE
JEFFREY'S
CRABBE'S HEAD
Big Otter Pond
Middle Barachois River
Robinson's River
ST. DAVID'S
ST. FINTAN'S
HIGHLANDS
Crabbe's River
COAL BROOK
SOUTH BRANCH
CODROY
WOODVILLE
BENOITS SIDING
O'REGAN'S
MILLVILLE
GREAT CODROY
SEARSTON
Little Codroy Pond
DOYLES
THE BLOCK
TOMPKINS
SAINT ANDREW'S
Gulf of St Lawrence
J.T. CHEESEMAN PROVINCIAL PARK
CAPE RAY
65°W
60°W
55°W
50°N
45°N
NEWFOUNDLAND
Gulf of St Lawrence
NOVA SCOTIA
Atlantic Ocean
Emera
Newfoundland and Labrador
200 kV DC TRANSMISSION LINE
BOTTOM BROOK TO CAPE RAY
20006 ROUTE MAPS - OVERALL RELIEF
Legend
Cities and Towns
Cape Ray Transition Compound
± 200kV HVDC Transmission Line
Existing 138kV Transmission Line (TL 214)
69kV Transmission Line
Overhead Grounding Line
Roads
Rail
Streams and Rivers
Provincial Protected Areas
Waterbodies
Elevation (masl)
0 - 50
50 - 100
100 - 150
150 - 200
200 - 250
250 - 300
300 - 350
350 - 400
400 - 450
450 - 500
500 - 550
550 - 600
600 - 650
0 2.5 5 10 15
Kilometers
DRAFT
PROJECTION:
North American Datum 1983 (NAD83), Universal Transverse Mercator (UTM), Zone 21 North
NOTES:
1. Transmission lines provided by ENL, 2012.
2. Provincial protected areas provided by the Government of Newfoundland, 2010.
3. Environmental considerations to be provided by others.
4. SRTM data provided by USGS with an acquisition date of 2000.
5. Lakes, oceans, rivers, streams, roads, rail and towns data provided by Geogratis, 2009
DATE: November 9, 2012
HATCH
DWG #: X 20006 1 200 02 001 Rev 4


POINT ACONI TRANSITION COMPOUND
POINT ACONI
BIG BRAS D'OR
312
105
BRAS D'OR
SYDNEY MINES
Villa Dr.
NORTH SYDNEY
125
223
NEW WATERFORD
28
28
SYDNEY INDIAN RESERVE
4
SYDNEY
MEMBERTOU INDIAN RESERVE
4
216
327
22
CARIBOU MARSH INDIAN RESERVE
WOODBINE CONVERTER STATION
65°W
60°W
55°W
50°N
45°N
Gulf of St Lawrence
NEWFOUNDLAND
NOVA SCOTIA
Atlantic Ocean
Emera
Newfoundland and Labrador
200 kV DC TRANSMISSION LINE
POINT ACONI TO WOODBINE STATION
20002 ROUTE MAPS - OVERALL RELIEF
Legend
Cities and Towns
Point Aconi and Woodbine Transition Compounds
Woodbine Converter Station
Woodbine Substation
Existing 230kV Transmission Line (L7015)
± 200kV HVDC Transmission Line
Existing 69kV Transmission Line (L5555)
Diverted 138kV Transmission Line (L6538)
Existing 138kV Transmission Line (L6539)
Other Existing Transmission Lines
Existing 25kV Distribution Line
Underground ± 200kV HVDC Transmission Line
Overhead Grounding Line
Roads
Rail
Streams and Rivers
First Nation Lands
Waterbodies
Elevation (masl)
0 - 50
50 - 100
100 - 150
150 - 200
200 - 250
250 - 300
300 - 350
0 2 4 8
Kilometers
DRAFT
PROJECTION:
North American Datum 1983 (NAD83), Universal Transverse Mercator (UTM), Zone 21 North
NOTES:
1. Transmission lines provided by ENL, 2012.
2. Environmental considerations to be provided by others.
3. SRTM data provided by USGS with an acquisition date of 2000.
4. Lakes, oceans, rivers, streams, First Nation Lands, roads, rail and towns data provided by Geogratis, 2009
DATE: November 6, 2012
HATCH
DWG #: X 20002 1 200 02 001 Rev 4

APPENDIX E

Bathymetry Profile of Submarine Cables for Maritime Transmission Link


Point Aconi, NS
Overhead Transition
HDD + Underground Cable
Kilometer Post [KP]
160
140
120
100
80
60
40
20
0
-20
-100
0
100
200
300
400
500
Water Depth [m]
Cape Ray, NL
Overhead Transition
HDD + Underground Cable

APPENDIX F

Project Descriptions Based Upon Basis of Design

SECTION 1 – INTRODUCTION

1.1 Background

The Maritime Link project was launched in 2011 following partnership discussions between Emera and Nalcor and the Provinces of Nova Scotia and Newfoundland and Labrador. The scope of the project includes the design, construction and commissioning of the Maritime Link with the appropriate Environmental, Regulatory, Aboriginal and other Stakeholders support and appropriate approvals. The objective of the project schedule is to commission the system in preparation for turnover and start up in Q4/2017.

1.2 Document Purpose

The purpose of the document is to document the Project Scope for the land based assets as part Maritime Link (ML) Project.

This document primarily reflects Phase 3 activities to document the Basis of Design to meet the requirements of Decision Gate 3 (DG3).

1.3 Scope / Requirements

The scope/requirements of this deliverable is to describe the main Land Based components of the Maritime Link Project.

1.4 Out of Scope

The following are outside the scope of this document:

- The Muskrat Falls (MF) with the Labrador Transmission Assets
- The Labrador Island Link (LIL)
- The Newfoundland System Upgrades outside of Granite Canal
- Modifications to the NSPI transmission System outside Woodbine Substation
- The upgrades to the NSPI Special Protection systems.
- The Marine based assets of the of the Maritime Link project as described in MLP-EM-RPT-0004.

1.5 Acceptance Process

This deliverable will be subject to the review and approval by only those names listed on the cover page title block and the authorization page as required.

SECTION 2 – INITIAL BASIS OF DESIGN

The Maritime Link shall be comprised of the components described in this Section and shall be designed, engineered and constructed in accordance with the specifications set out below for a minimum of 50 year asset life.

2.1 103NL: Granite Canal Switchyard

- The Switchyard will be configured as a four breaker ring, energized at 230kV.
- A new switchyard will be constructed just southwest of the existing Granite Canal Terminal Station.
- The new switchyard will provide terminations for the existing TL 263 transmission line, the new 230kV line (T23001) to Bottom Brook, the Granite Canal Hydro Station, and a 15Mvar Shunt Reactor for voltage support.
- The installation will include all concrete foundations and galvanized steel structures to support the electrical equipment and switchgear.
- A control building will house control, protection, monitoring, and communication equipment for the new site.
- The control building will be connected to the existing Granite Canal Hydro station via control cable and communication trench.
- The station will be grounded in accordance with IEEE Standards
- This site will be built with complete protection and control redundancy and separation
- The station service will be supplied off the incoming transmission line.
- A preliminary station layout drawing can be found in Appendix 3 – Station Layouts
- A station one line can be found in Appendix 4 – One Lines

2.2 T23001: HVac Overhead Transmission – Granite Canal to Bottom Brook

- A 230kV HVac overhead transmission line will be constructed to connect the Granite Canal Switch yard to Bottom Brook Switch Yard.
- The line will be built using the NLH 230kV standard H-Frame structure, with Drake (795 ACSR) conductor. See Appendix 2 – Structure drawing
- The Transmission Line will be equipped with two lightning shielding wires.

  - One of the lightning shielding wires will have fibre optic cable integrated into it to provide communications between Granite Canal and Bottom Brook.
- The line will be sufficiently grounded to achieve a footing resistance of 25 ohms. Counterpoise will be installed if required.
- The line structures will be wood pole construction with steel cross arms and cross braces. Deadends and angles will be 3 pole structures with self-supporting steel lattice towers used for major crossings.

2.3 101NL: Bottom Brook Switchyard

- The yard will be configured as a four rung, 12 breaker, breaker and a half 230kV switchyard used to replace the existing 230kV portion of the Bottom Brook Terminal station, with the additional connections:
  - Connections for the new 230kV line from Granite Canal
  - Two 230kV connections for the new Bottom Brook Converter Station via rigid bus.
- The Switchyard will be situated just to the east of the existing Bottom Brook Terminal Station in a separately fenced site.
- The installation will include all concrete foundations and galvanized steel structures to support the electrical equipment and switchgear.
- A separate control building will house control, protection, and monitoring and communication equipment for the new site.
- This site will be connected to both the existing Bottom Brook terminal station as well as the new Bottom Brook converter station via control cable trenches.
- This site will be built with complete protection and control redundancy and separation.
- The station services will be supplied off existing transformers located in the current Bottom Brook Terminal Station.
- The station will be grounded in accordance with IEEE Standards
- A preliminary station layout drawing can be found in Appendix 3 – Station Layouts
- A station one line can be found in Appendix 4 – One Lines

2.4 301NL: Bottom Brook Converter Station

- 500 MW, ±200 kV asymmetrical bi-pole, VSC Converter Station capable of operating in mono-pole mode at 250 MW continuous operations.
- Situated east of the Bottom Brook Terminal Station in a separately fenced site.
- Installation includes all concrete foundations and galvanized steel structures to support the electrical equipment and switchgear.
- The converter building will house the AC/DC converter valves
- The DC yard will have the switching capability to use the out of service pole as a metallic return for mono-pole operation.
- The station services will be supplied off existing transformers located in the current Bottom Brook Terminal Station.
- Switching, control, protection, monitoring and communication equipment installed as required.
- Integration into a special protection system that will communicate with the converter station located at Soldiers Pond as part of the LIL project.
- A preliminary station layout drawing can be found in Appendix 3 – Station Layouts
- The line route can be found in Appendix 1 – Line Routing

2.5 E00502: Grounding Line – Bottom Brook to Indian Head

- A 35 km grounding line, with two current carrying conductors and one lightning shield wire, will join the Bottom Brook Converter Station to the Indian Head near shore grounding site.
- The grounding line will be built with twin Goldenrod (954 ACSR) conductor.
- The lightning shielding wire will have fibre optic cable integrated into it to provide communications between the near shore grounding site and Bottom Brook Converter Station.
- The line will be primarily Wood pole construction, with the use of steel structures at major crossings. See Appendix 2 – Structure drawing
- The grounding line will have lightning arrestors installed every 500 meters.
- The line route can be found in Appendix 1 – Line Routing

2.6 901NL: Indian Head Grounding Site

- A near shore grounding site will be located off Indian Head in St George's Bay on the west coast of Newfoundland near Stephenville Crossing.
- The grounding site will be designed with sufficient size and capacity to limit the voltage gradient from increasing beyond 1.25V/m during a mono-pole operation.
- The station services will be supplied by existing distribution lines.
- The grounding site will be designed to be capable of supporting continuous monopole ground current return (1250A).
- The line route can be found in Appendix 1 – Line Routing

2.7 X20005 & X20006: HVdc Overhead Transmission – Bottom Brook to Cape Ray

- A HVdc overhead transmission line, ±200 kV, will be constructed to connect the Bottom Brook Converter Station to the Cape Ray Transition Compound.
- The transmission line will be built to carry both poles, each one being comprised of a single Bluebird (2156 ACSS) conductor.
- The transmission line will be equipped with two lightning shielding wires.
    - One of the lightning shielding wires will have fibre optic cable integrated into it to provide communications between Cape Ray and Bottom Brook.
- The line will be sufficiently grounded to achieve a footing resistance of 25 ohms with counterpoise installed if required.
- Each conductor will be able to sustain 250 MW continuously, with a combined capacity of 500MW.
- Towers are to be galvanized lattice steel, self-supported angles and deadends, and guyed tangent towers. See Appendix 2 – Structure drawing
- The line route can be found in Appendix 1 – Line Routing

2.8 701NL: Cape Ray Transition Compound

- The Cape Ray transition compound will be housed in a building on a fenced site.
- The building will have provision for the underground cable entrance and other associated Primary equipment requirements.
- Installation will include the concrete foundation for the building and steel structures to support the electrical equipment and switchgear.
- A roof mounted "wall bushing" will be installed to transition to the overhead transmission line.

- A steel lattice dead end structure will be mounted on top of the building for transmission conductor connection.
- Switching, control, protection, monitoring and communication equipment will be installed.
- The station services will be supplied by existing distribution lines.
- The station will be grounded in accordance with IEEE Standards
- A station layout drawing can be found in Appendix 3 – Station Layouts

2.9 701NS: Point Aconi Transition Compound

- The Point Aconi transition compound will be housed in a building on a fenced site.
- The building will have provision for the underground cable entrance and other associated Primary equipment requirements.
- Installation will include the concrete foundation for the building and steel structures to support the electrical equipment and switchgear.
- A roof mounted "wall bushing" will be installed to transition to the overhead transmission line.
- A steel lattice dead end structure will be mounted on top of the building for transmission conductor connection.
- Switching, control, protection, monitoring and communication equipment will be installed.
- The station services will be supplied by existing distribution lines.
- The station will be grounded in accordance with IEEE Standards
- A station layout drawing can be found in Appendix 3 – Station Layouts

2.10 X20001 & X20002: HVdc Overhead Transmission – Point Aconi to Woodbine

- A +/- 200kV HVdc overhead transmission line will be constructed to connect the Point Aconi Transition Compound to the Woodbine Transition Compound.
- The transmission line will be built to carry both poles, each one being comprised of a single Bluebird (2156 ACSS) conductor.
- The transmission line will be equipped with two lightning shielding wires.

  - One of the lightning shielding wires will have fibre optic cable integrated into it to provide communications between Point Aconi and Woodbine.
- The line will be sufficiently grounded to achieve a footing resistance of 25 ohms with counterpoise installed if required.
- Each conductor will be able to sustain 250 MW continuously, with a combined capacity of 500MW.
- Towers are to be galvanized lattice steel, self-supported angles, deadends, and tangent towers. See Appendix 2 – Structure drawing
- The line route can be found in Appendix 1 – Line Routing
-

2.11 702NS: Woodbine Transition Compound

- This facility will be needed to facilitate connection of the DC line into the converter station at woodbine to reduce the number of overhead transmission line crossings of the DC line.
- The Woodbine transition compound will consist of an outdoor cable transition on a fenced site with provision for the underground cable entrance and other associated primary equipment. Installation will include the concrete foundations and steel structures to support the electrical equipment and switchgear.
- The overhead HVdc line will terminate on a steel line termination structure.
- Connection from this facility to nearby Converter Station will be via underground primary cable, control cable and communications cable.
- Switching, control, protection, monitoring and communication equipment shall be incorporated into nearby Converter Station.
- The station will contain a visual barrier to hide the terminators from view
- A station layout drawing can be found in Appendix 3 – Station Layouts

2.12 301NS: Woodbine Converter Station

- 500 MW, ±200 kV asymmetrical bi-pole, VSC Converter Station capable of operating in mono-pole mode at 250 MW continuous operations.
- The Woodbine Converter Station will be situated west of the Woodbine Substation in a separately fenced site.
- Installation will include concrete foundations and galvanized steel structures to support the electrical equipment and switchgear.
- The converter building will house the AC/DC converter valves.

- The DC yard will have the switching capability to use the out of service pole as a metallic return for mono-pole operation.
- The station services will be supplied off the transformers located at the Woodbine substation.
- Switching, control, protection, monitoring and communication equipment installed as required.
- A station layout drawing can be found in Appendix 3 – Station Layouts

2.13 E00501: Grounding Line – Woodbine to Big Lorraine

- A 48 km grounding line carrying two current carrying conductors and one lightning shield wire, will join the Woodbine Converter Station to the Big Lorraine near shore grounding site.
- The grounding line will be built with twin Goldenrod (954 ACSR) conductor.
- The lightning shielding wire will have fibre optic cable integrated into it to provide communications between the near shore grounding site and Woodbine Converter Station.
- The line will be primarily Wood pole construction, with the use of steel structures at major crossings.
- The grounding line will have lightning arrestors installed every 500 meters.
- The line route can be found in Appendix 1 – Line Routing

2.14 901NS: Big Lorraine Grounding Site

- A near shore grounding site will be located at the mouth of Big Lorraine Harbour on the east coast of Cape Breton.
- The grounding site will be designed with sufficient size and capacity to limit the voltage gradient from increasing beyond 1.25V/m during a mono-pole operation.
- The station services will be supplied by existing distribution lines.
- The grounding site will be designed to be capable of supporting continuous monopole ground current return (1250A).

2.15 101S: Woodbine Substation Expansion

- The Woodbine345kV substation will be expanded to a 4 breaker, two rung, breaker and a half scheme.
- The Woodbine 230kV substation will be expanded to a 9 breaker, three rung, breaker and a half scheme.
- The yard will be expanded to incorporate the following additional connections:

  - L7012 and L7011 will be turned into the station and connect into the new 230kV bus.
  - Two 345kV connections for the new Woodbine Converter Station.
  - A new Transformer 345kV/230kV/26.4kV, GrdWye/GrdWye/Delta, 340/453.3/566.7 MVA.
- Installation will include concrete foundations and galvanized steel structures to support the electrical equipment and switchgear.
- Control, protection, monitoring and communication equipment for the new site will be installed in the existing control building.
- This site will be connected to the new Woodbine converter station via control cable trenches.
- This site will be built with protection, control and communication redundancy.
- A preliminary station layout drawing can be found in Appendix 3 – Station Layouts
- A station one line can be found in Appendix 4 – One Lines

2.16 Maritime Link Telecommunication Systems

- Permanent control, teleprotection, SCADA and voice circuits will be designed to NERC equivalent standards.
- The system will be comprised of a combination of the NSPI infrastructure, NLH infrastructure, newly installed infrastructure and utilizing the government of Newfoundland fibre network that connects Newfoundland to Nova Scotia via underwater fibres.
- This system will be built with complete redundancy and separation (Primary and Secondary Paths)
- Primary Path
  - A fibre line of approximately 15km will be constructed along an existing right of way connecting Lingan Power Plant with GNL fibre assets on Victoria Road.
  - A fibre line of approximately 14km will be constructed adjacent to the Trans-Canada Highway connecting the GNL fibre assets near Port-aux-Basques to the Cape Ray Transition Compound.
  - An Optical Ground Wire (OPGW) will be constructed with the HVdc and HVac transmission lines which will bring the telecommunications line into Granite Canal (302km).
  - From Granite Canal the telecommunications from the new Switch yard 103NL will connect into the existing NLH microwave communication systems at Granite Canal Hydro station, which is currently connected back to the ECC at St. John's.

- Secondary Path
  - A fibre line of approximately 8km will be constructed along Morley Road connecting Woodbine substation to GNL fibre assets on King's Road.
  - The communication link into Bottom Brook will utilize the OPGW of the grounding line in Newfoundland. The connection point for this will be the intersection of the grounding line with GNL fibre assets.
  - A fibre line less than 1 km will be constructed connecting the GNL fibre assets near Deer Lake to the Deer Lake Terminal Station.
  - A fibre line less than 4 km will be constructed connecting the GNL fibre assets near Stony Brook to the Stony Brook Terminal Station.
  - The communication path will splice into the LIL telecommunication system from Stony Brook to the ECC at St. John's.

APPENDIX G

List of Contracts Planned to be Issued by Emera Newfoundland and Labrador

LIST OF CONTRACTS TO BE ISSUED BY EMERA NEWFOUNDLAND LABRADOR

MARITIME LINK PROJECT

ITEM NO.	CONTRACT NUMBER	CONTRACT NAME	CONTRACT DATE (OR ANTICIPATED ISSUE DATE)
1	E12-62	ENGINEERING DESIGN SERVICES AGREEMENT	APRIL 30, 2013
2	E13-85	TRANSMISSION LINE STRUCTURES AND GRILLAGE SUPPLY	MARCH 2014
3	E13-95	TRANSMISSION LINE CONSTRUCTION	JULY-AUGUST 2014
4	E13-107	TRANSMISSION COMPOUND CONSTRUCTION SERVICES	MAY 2014
5	E13-102	GS-GROUNDING SITE CIVIL CONSTRUCTION SERVICES	SEPTEMBER 2014
6	E12-79	GEOTECHNICAL TRANSMISSION AND GROUNDING LINE ROUTE INVESTIGATIONS CONTRACT	MARCH 27, 2013
7	E13-103	GS-GROUNDING SITE TECHNICAL SUPPLY AND INSTALL	APRIL 2014
8	E12-51	HDD GEOTECHNICAL PROGRAM AND DESIGN ENGINEERING	FEBRUARY 2014
9	E13-137	HDD CONSTRUCTION PROGRAM	MAY-JUNE 2015
10	E11-18	CABOT STRAIT SUBMARINE CABLE DESIGN, SUPPLY AND INSTALL	FEBRUARY 6, 2014
11	E12-74	CONVERTER STATIONS ENGINEER, PROCURE, CONSTRUCT	MARCH-APRIL 2014

APPENDIX H

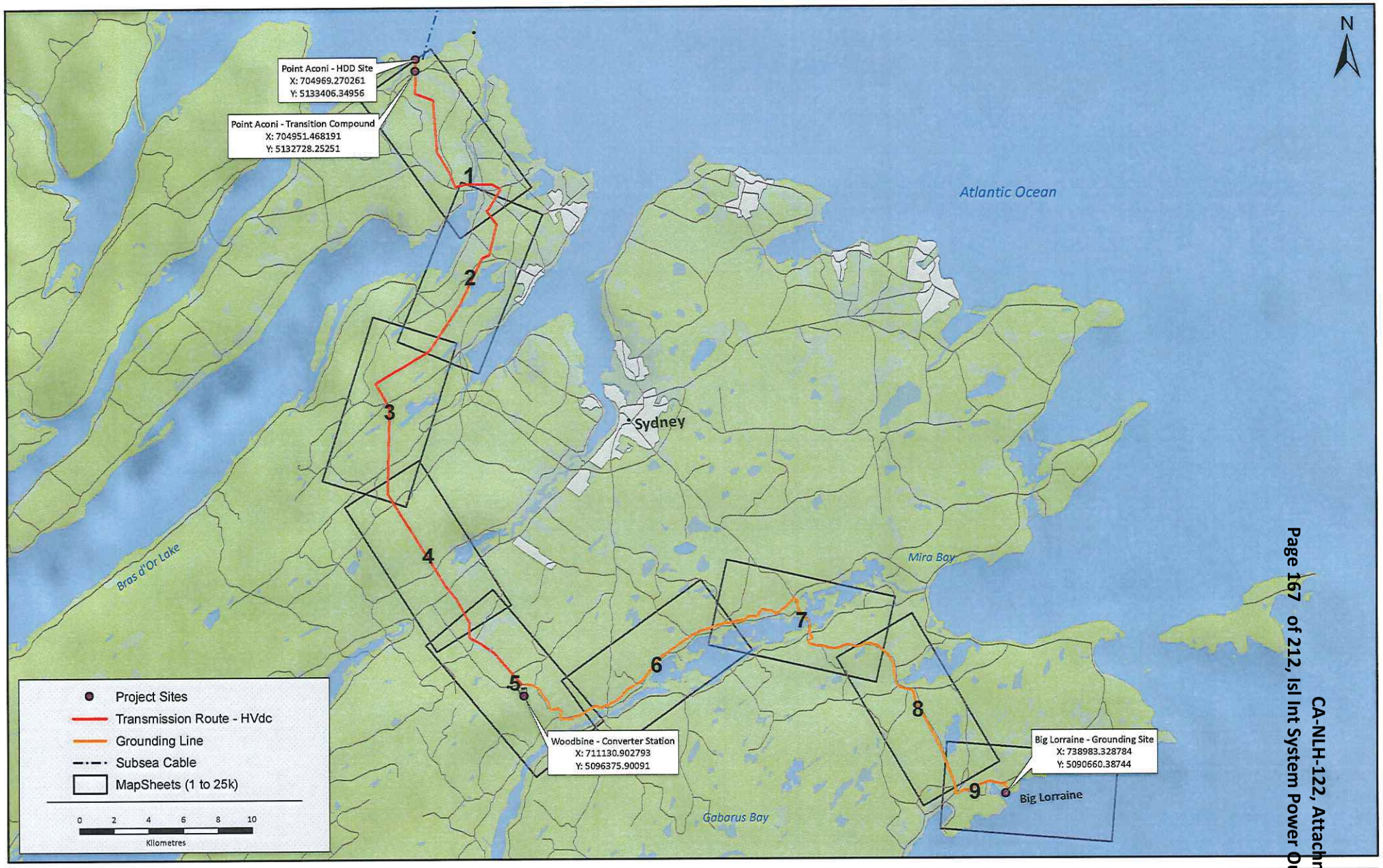
Figures and Photographs

Emera
Newfoundland & Labrador

Coordinate System:	Data Sources:
UTM NAD 83 Zone 20	Stream Crossings: Sikumiut 2011
Date: 11/01/13	Archaeology High Potential: CRM
Scale: 1:5,000	Delineated Wetlands: CBCL
	Water/Wetlands: NSTDB 1:10k

Site Preparation
Point Aconi, Nova Scotia

FIGURE 1



Emera Newfoundland & Labrador

Coordinate System: UTM NAD 83 Zone 20

Data Sources: Geobase - Road Network; Geogratis - National Atlas

Scale: 1:300,000

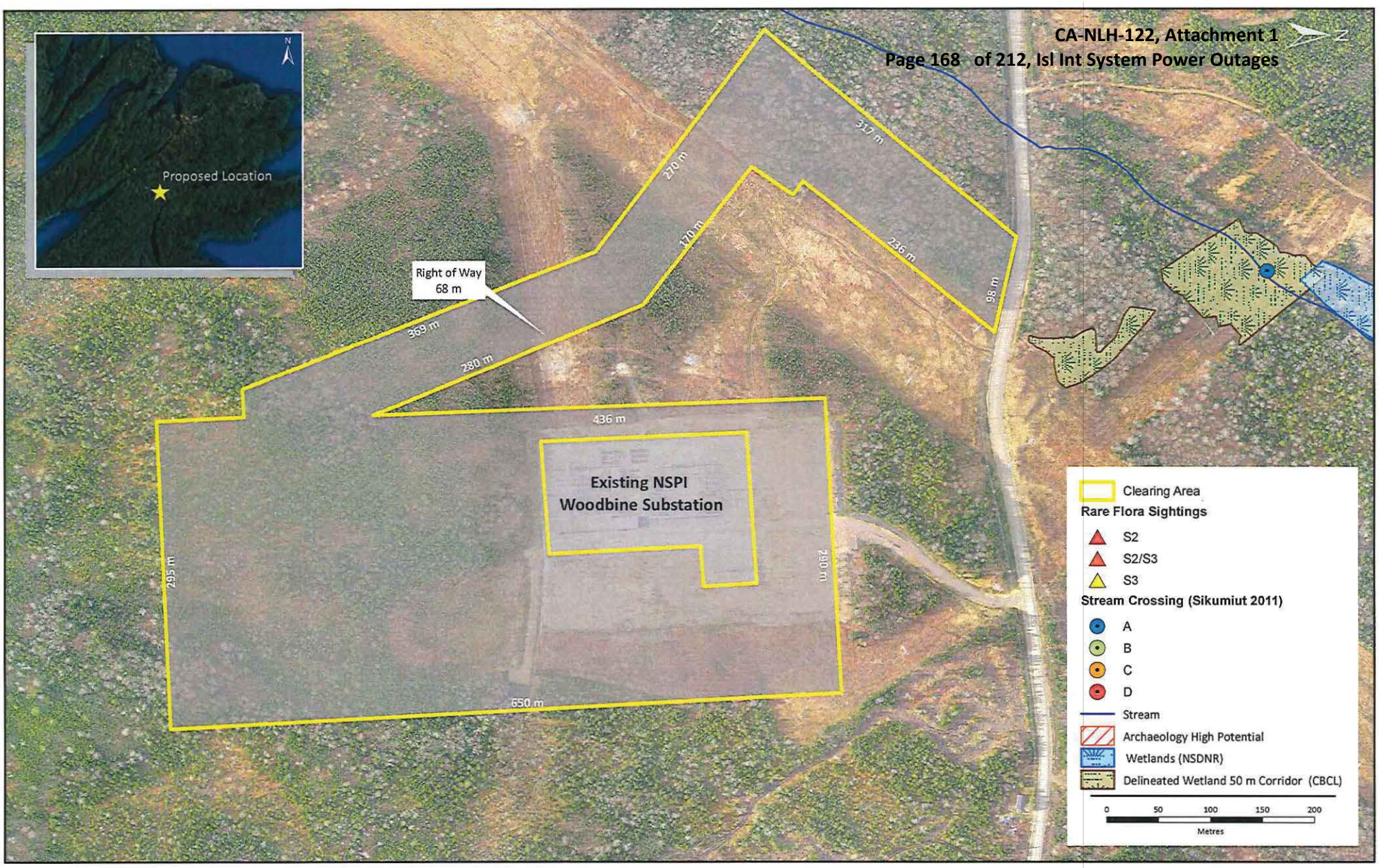
Date: 1/20/2014

Overview of the Maritime Link Project
Cape Breton, Nova Scotia

FIGURE 2

ENL0334

CA-NLH-122, Attachment 1
Page 167 of 212, Isl Int System Power Outages

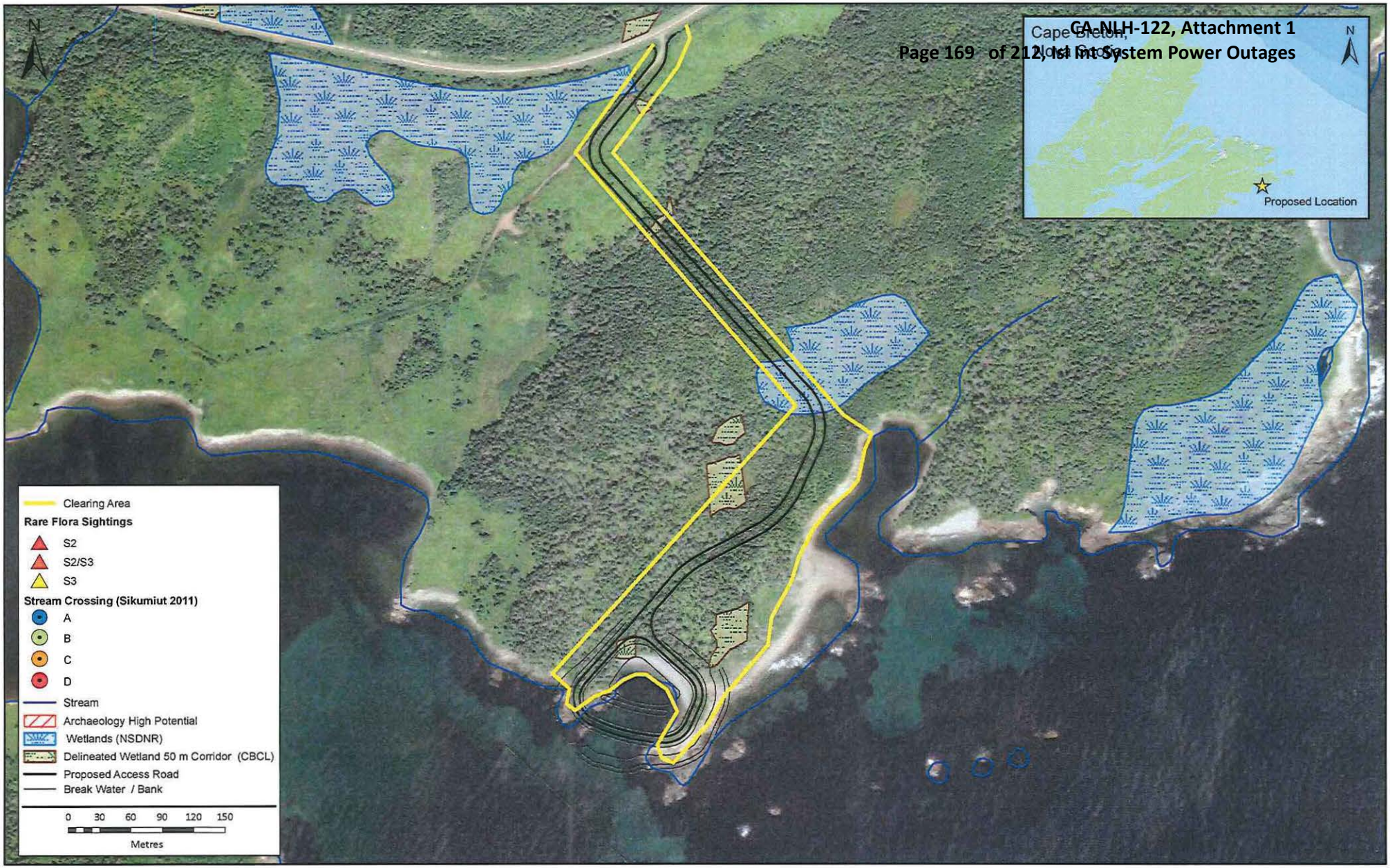


Emera Newfoundland & Labrador

Coordinate System: UTM NAD 83 Zone 21	**Data Sources:** Stream Crossings: Sikumiut 2011	Clearing Area: ENL
	Archaeology High Potential: CRM	Rare Flora: CBCL
	Delineated Wetlands: CBCL	Slope: CBCL
Scale: 1:5,000	Water/Wetlands: NSTDB 1:10k	
Date: 11/01/13		

Site Preparation
Woodbine, Nova Scotia

FIGURE 3



Emera Newfoundland & Labrador

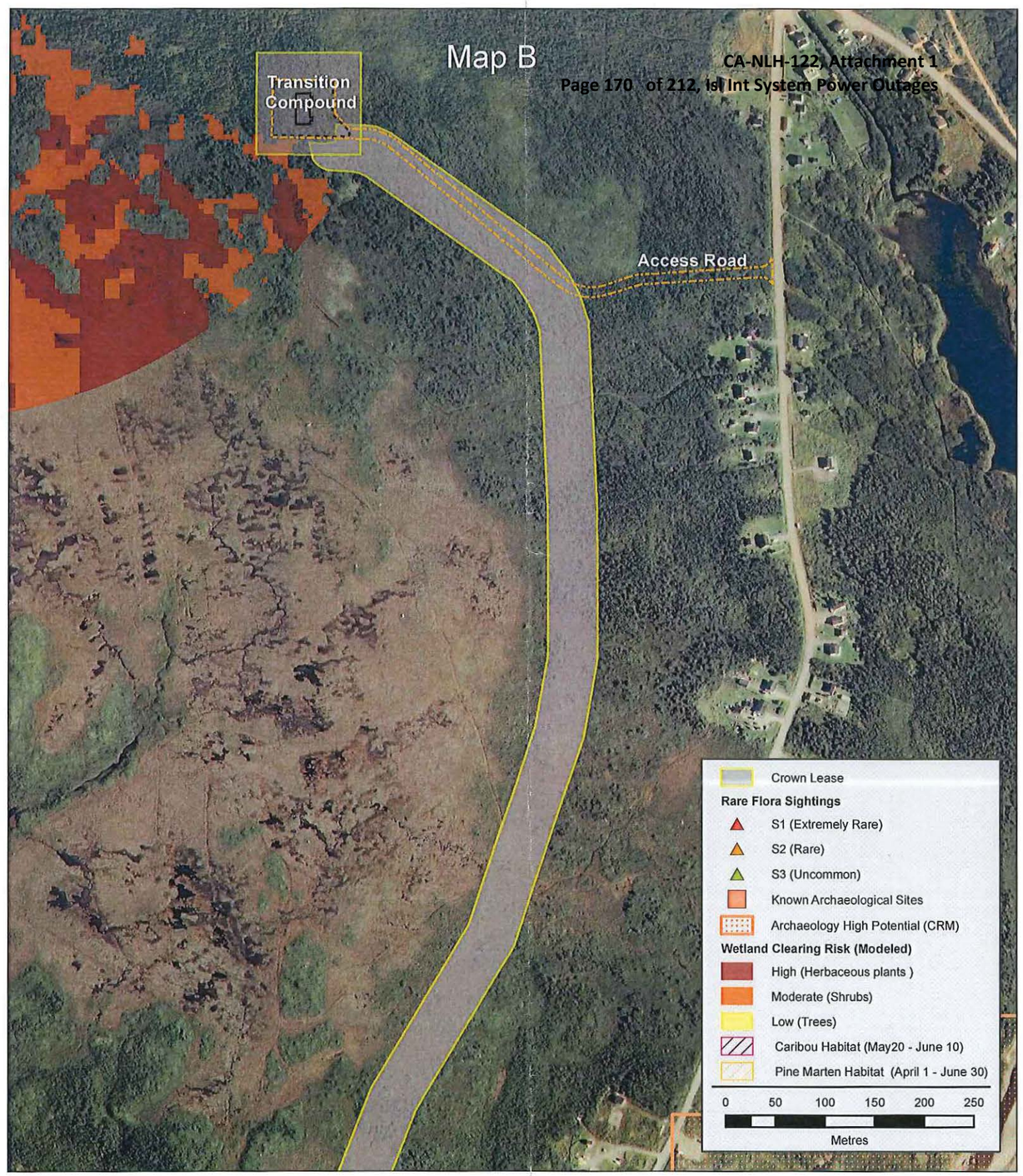
Coordinate System:
UTM NAD 83 Zone 20
Scale:1:5,000
Date:2013-10-29

Data Sources:
Geobase - Road Network
Geogratis - National Atlas

Site Preparation
Big Lorraine, Nova Scotia

FIGURE 4

ENL0397



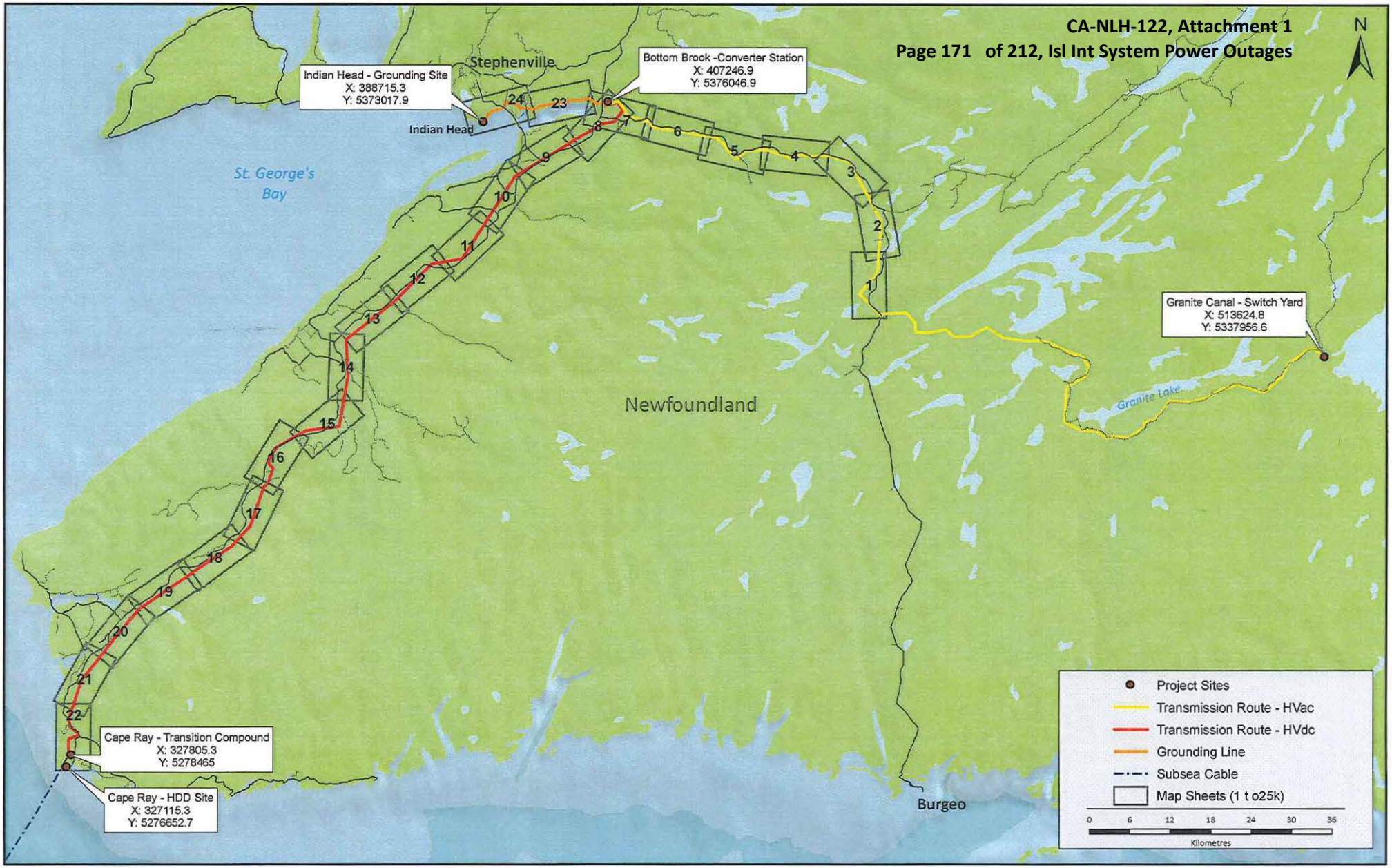
Emera Newfoundland & Labrador

Coordinate System: UTM NAD 83 CSRS Zone 21
Date: 11/01/13
Scale: 1:25,000

Data Sources:
Clearing Area: ENL
Wetlands / Rareflora: CBCL
Caribou / Pine Marten: Stantec
Archaeology: CRM

Site Preperation
Indian Head, Newfoundland & Labrador

FIGURE 5



Emera Newfoundland & Labrador

Coordinate System: UTM NAD 83 Zone 21

Data Sources: Geobase - Road Network; Geogratis - National Atlas

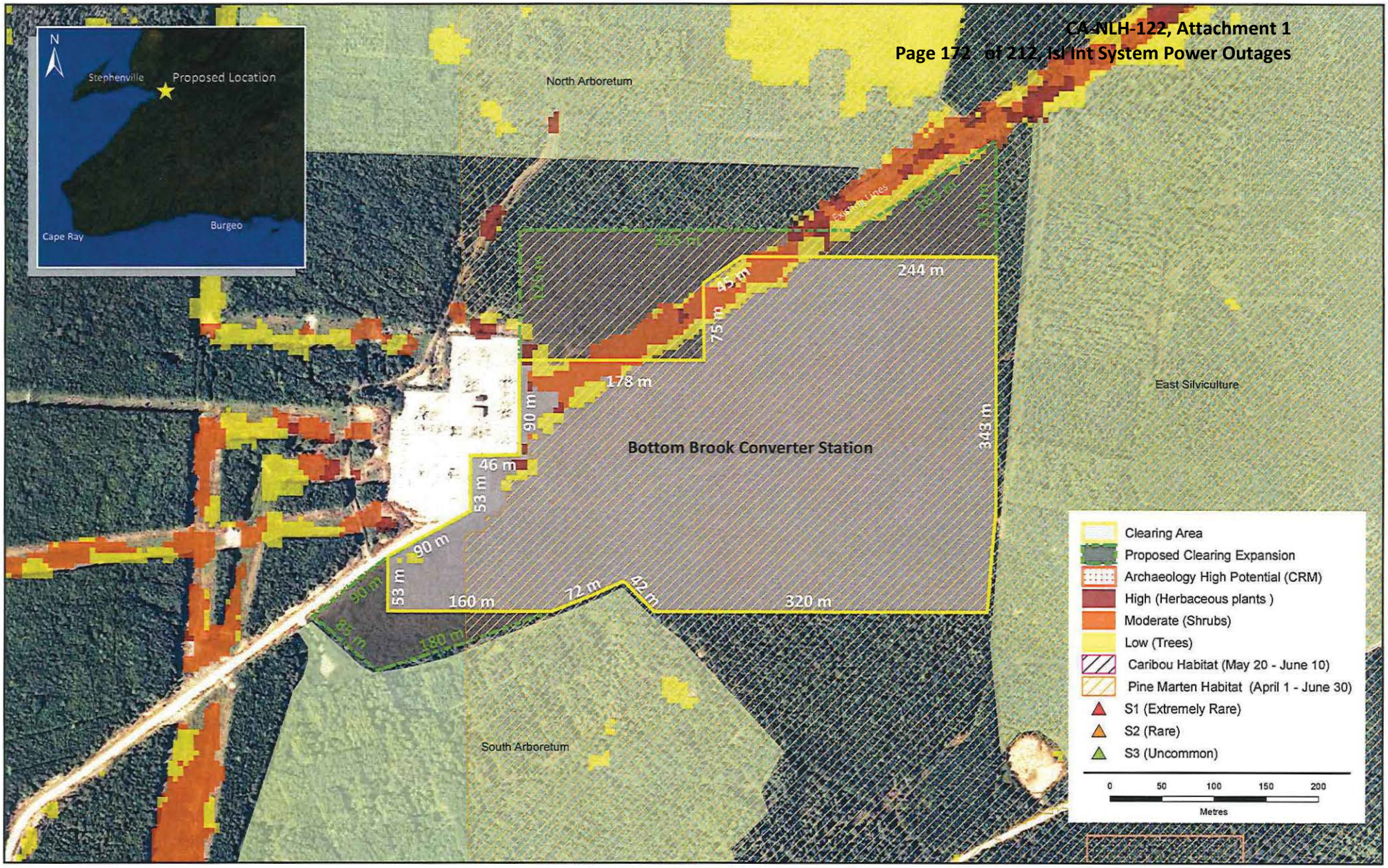
Scale: 1:776,650

Date: 1/20/2014

Overview of the Maritime Link Project
Newfoundland

FIGURE 6

ENL0333



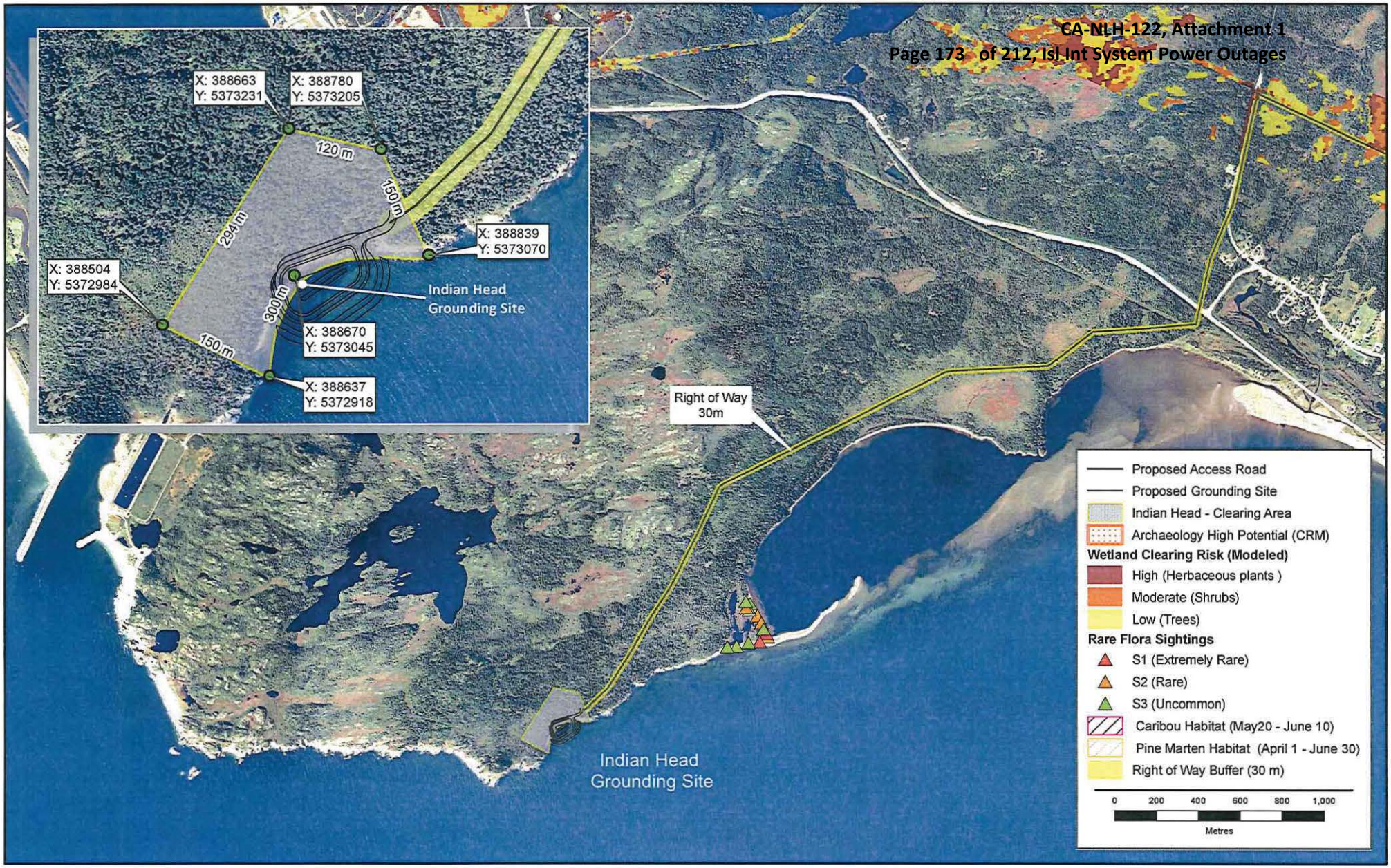
Emera Newfoundland & Labrador

Coordinate System: UTM NAD 83 Zone 21
Date: 11/01/13
Scale: 1:5,000

Data Sources:
Clearing Area: ENL
Wetlands / Rareflora: CBCL
Caribou / Pine Marten: Stantec

Site Preparation
Bottom Brook, Newfoundland & Labrador

FIGURE 7



Emera Newfoundland & Labrador

Coordinate System: UTM NAD 83 CSRS Zone 21
Date: 11/01/13
Scale: 1:25,000

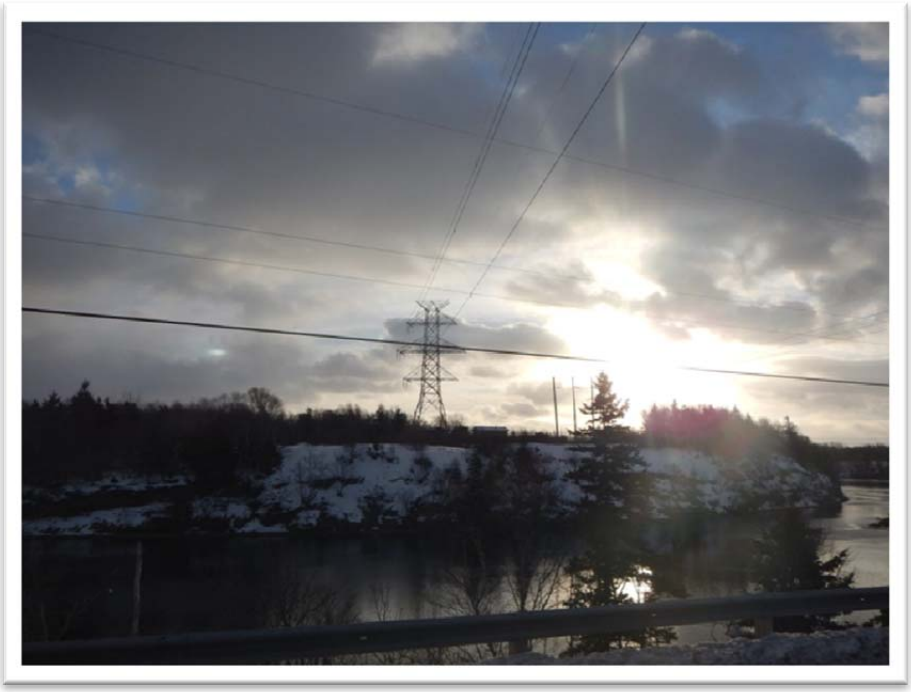
Data Sources:
Clearing Area: ENL
Wetlands / Rareflora: CBCL
Caribou / Pine Marten: Stantec

Site Preperation
Indian Head, Newfoundland & Labrador

FIGURE 8

Photographic Log – Maritime Link Project IE Site Visit January 21-23, 2014

Newfoundland and Labrador
Nova Scotia

Photograph ID: 1 **Date:** January 21, 2014 **Location:** Point Aconi HDD Site	
Photograph ID: 2 **Date:** January 21, 2014 **Location:** Bras d'Or River Crossing	

Photograph ID: 3 **Date:** January 21, 2014 **Location:** Woodbine Substation – Existing; Transition Compound – New Site	
Photograph ID: 4 **Date:** January 21, 2014 **Location:** Woodbine Existing TR Line	

Photograph ID: 5 **Date:** January 21, 2014 **Location:** Big Lorraine Grounding Site	
Photograph ID: 6 **Date:** January 22, 2014 **Location:** Cape Ray HDD Site	

Photograph ID: 7	
Date: January 22, 2014	
Location: Bottom Brook Substation	

Photograph ID: 8	
Date: January 22, 2014	
Location: Bottom Brook Transmission Line	

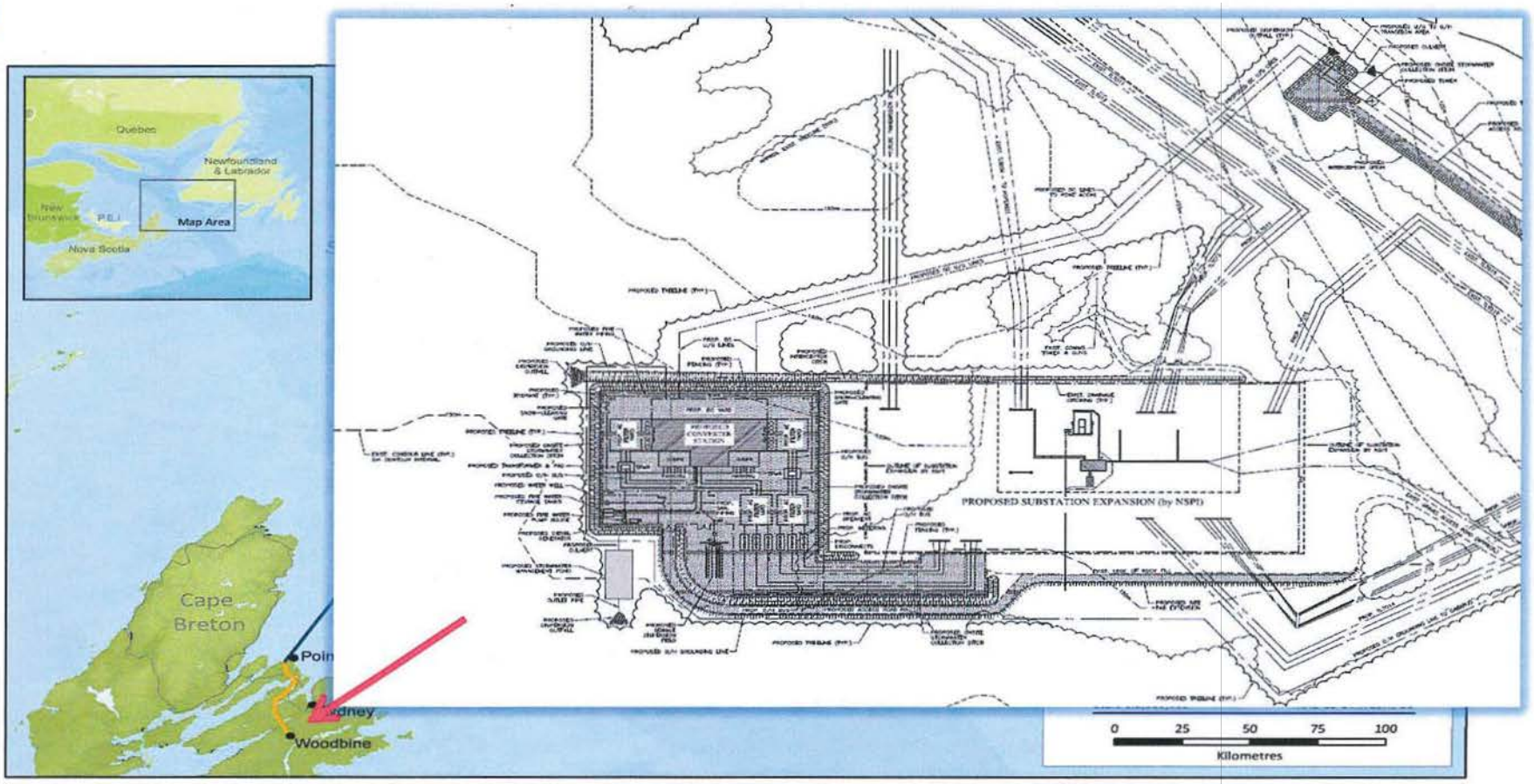
Photograph ID: 9 **Date:** January 22, 2014 **Location:** Bottom Brook – Existing Transmission Line	
Photograph ID: 10 **Date:** January 22, 2014 **Location:** Bottom Brook – Proposed New Substation Site	

Photograph ID: 11	
Date: January 23, 2014	
Location: Indian Head Grounding Site	

APPENDIX I

Site Plans and One-Line Diagrams

Woodbine – Converter and Substation Upgrade



Emera Newfoundland & Labrador

Date: 21 September 2012
Data Sources: Geogratis
National Atlas Framerwork 1: 2 Million

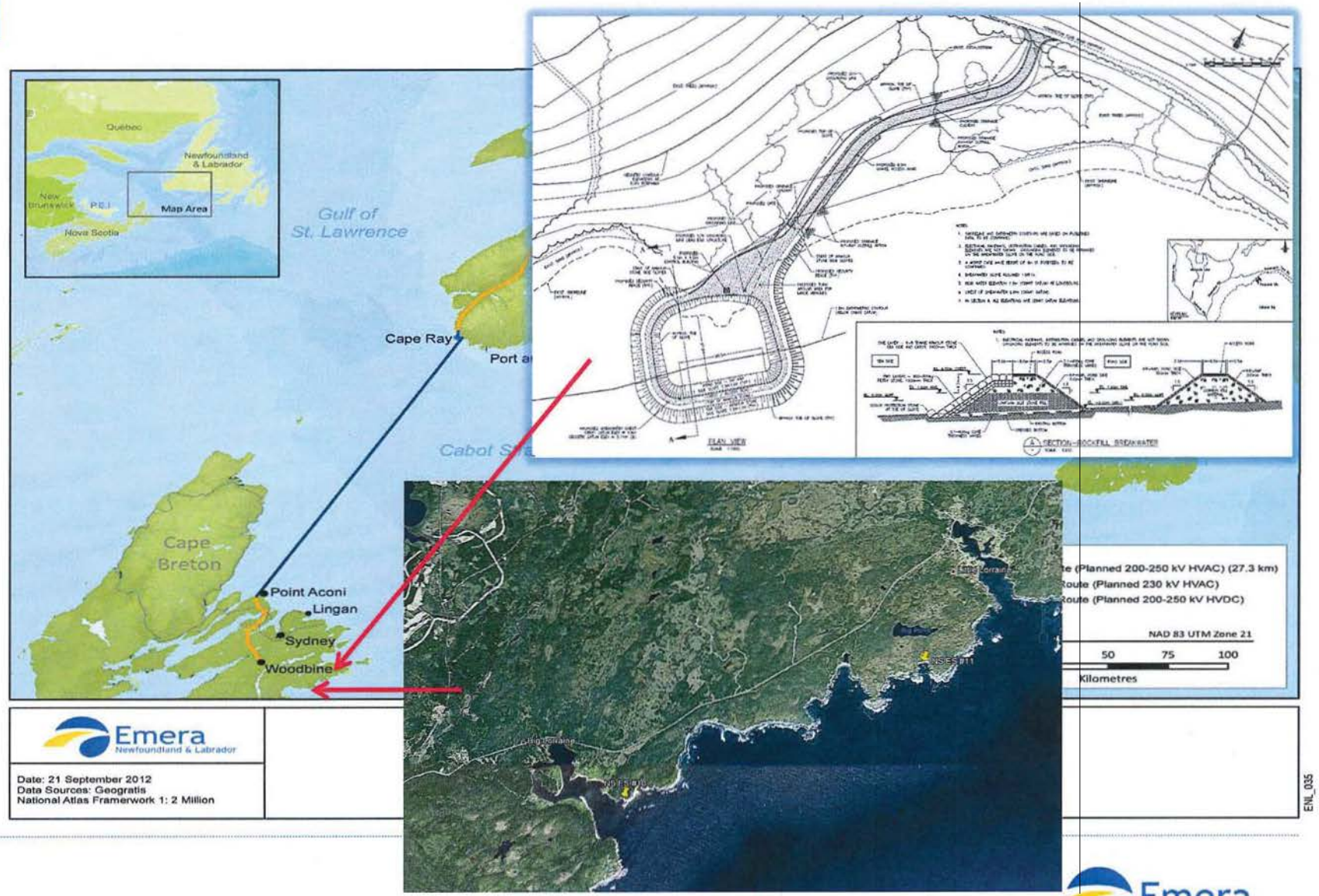
Maritime Link Project

ENL_035

energy everywhere.

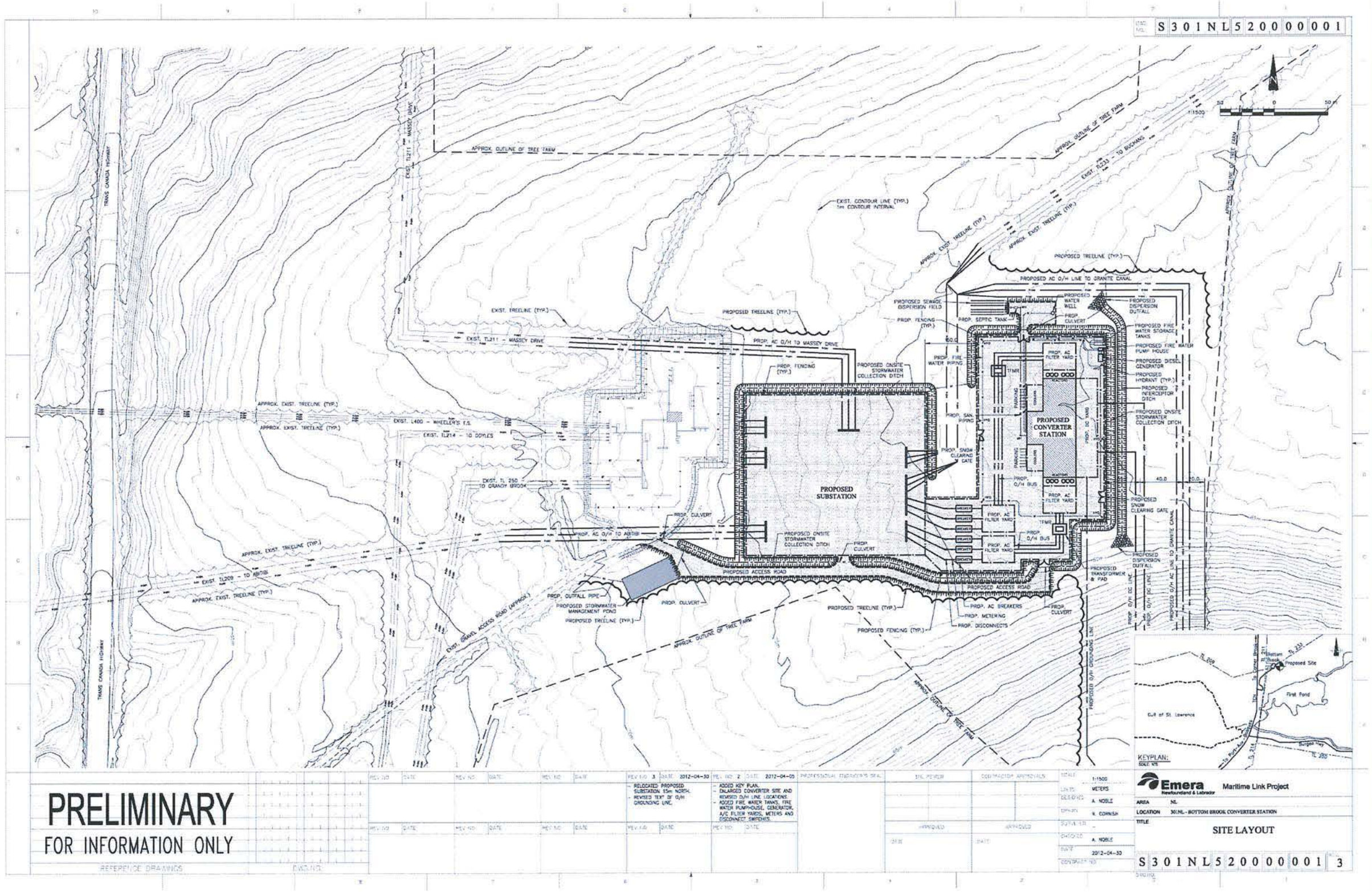
Emera Newfoundland & Labrador

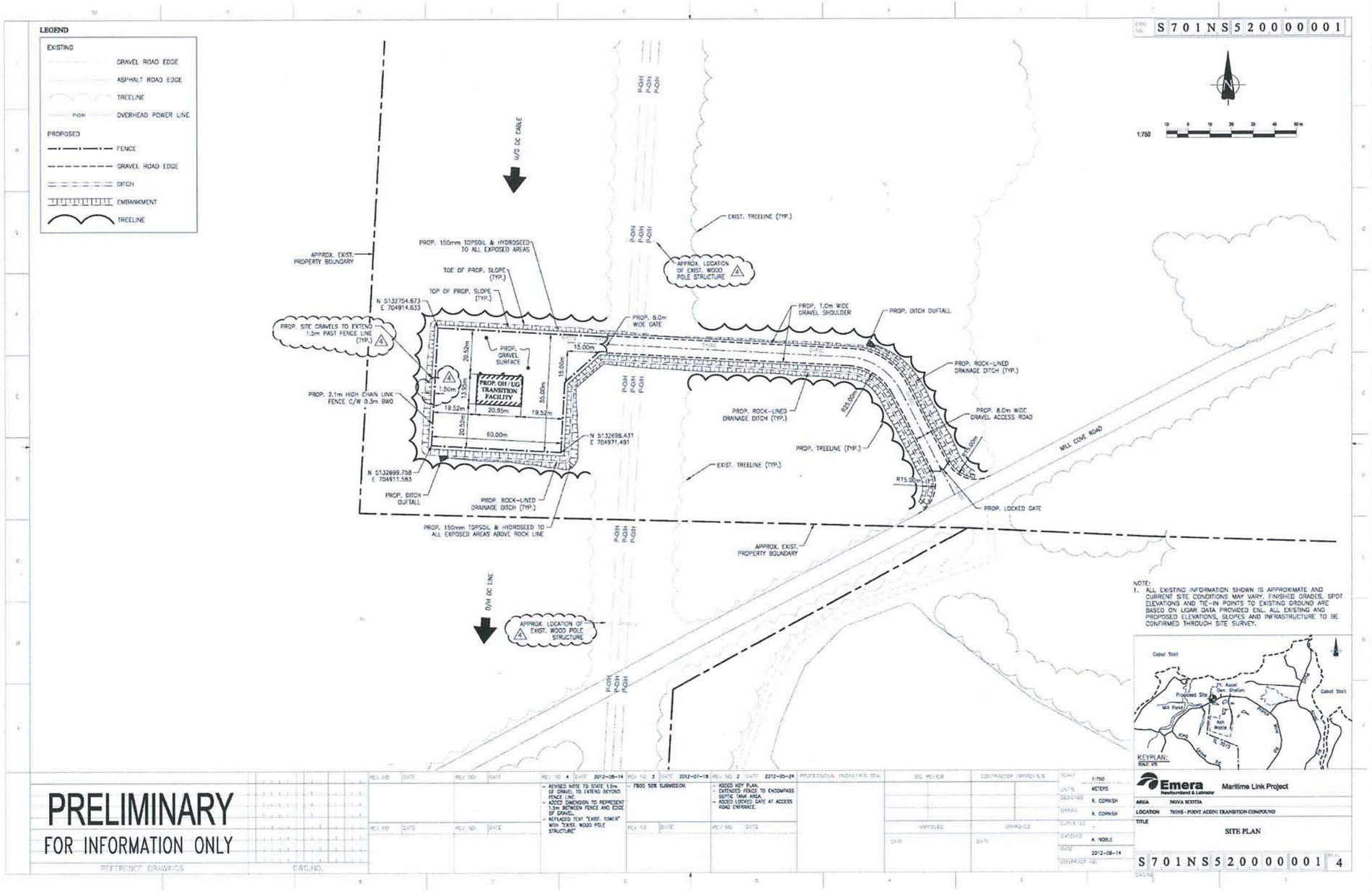
Nova Scotia Grounding Site



energy everywhere.

Emera
Newfoundland & Labrador





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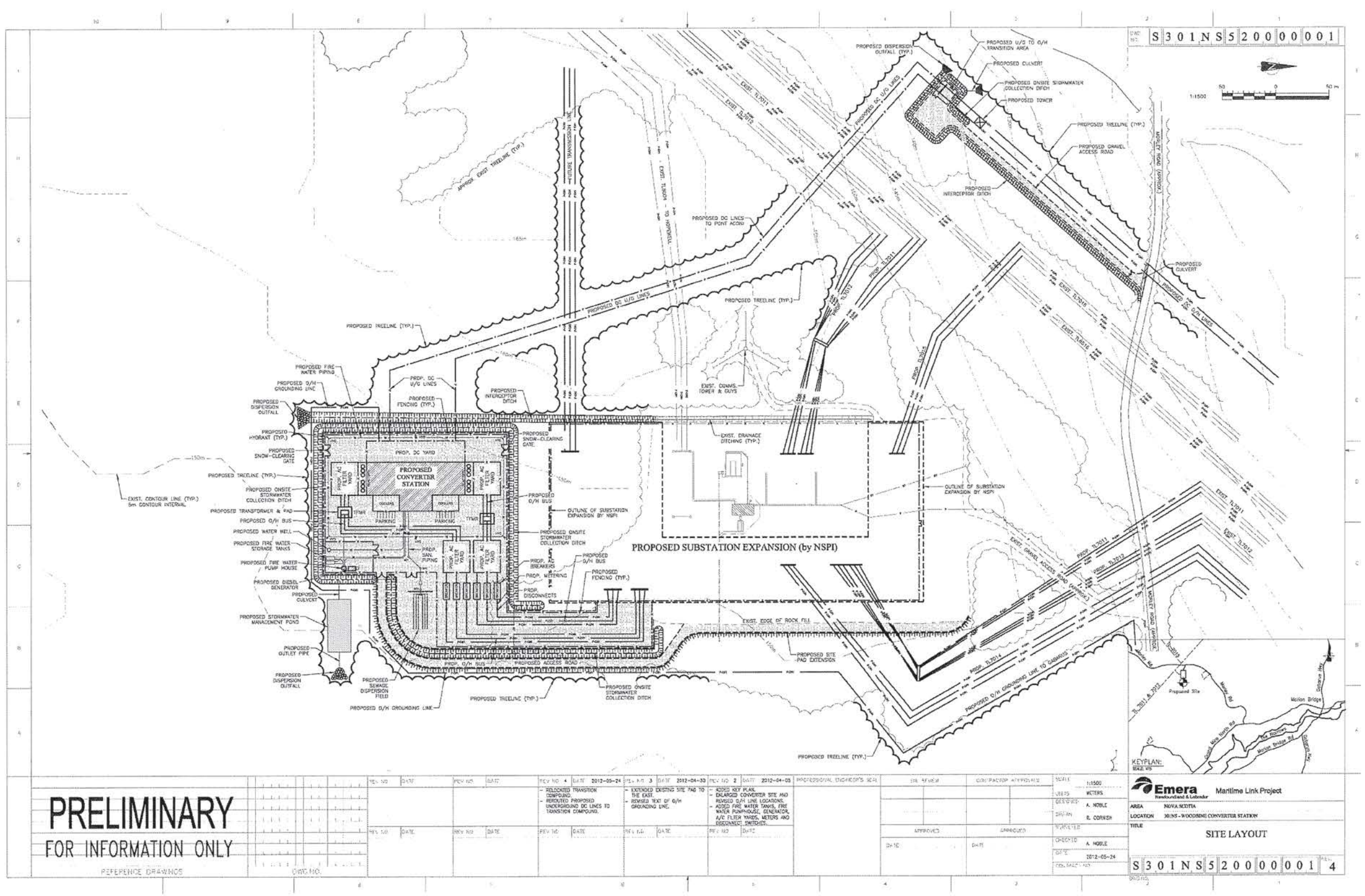
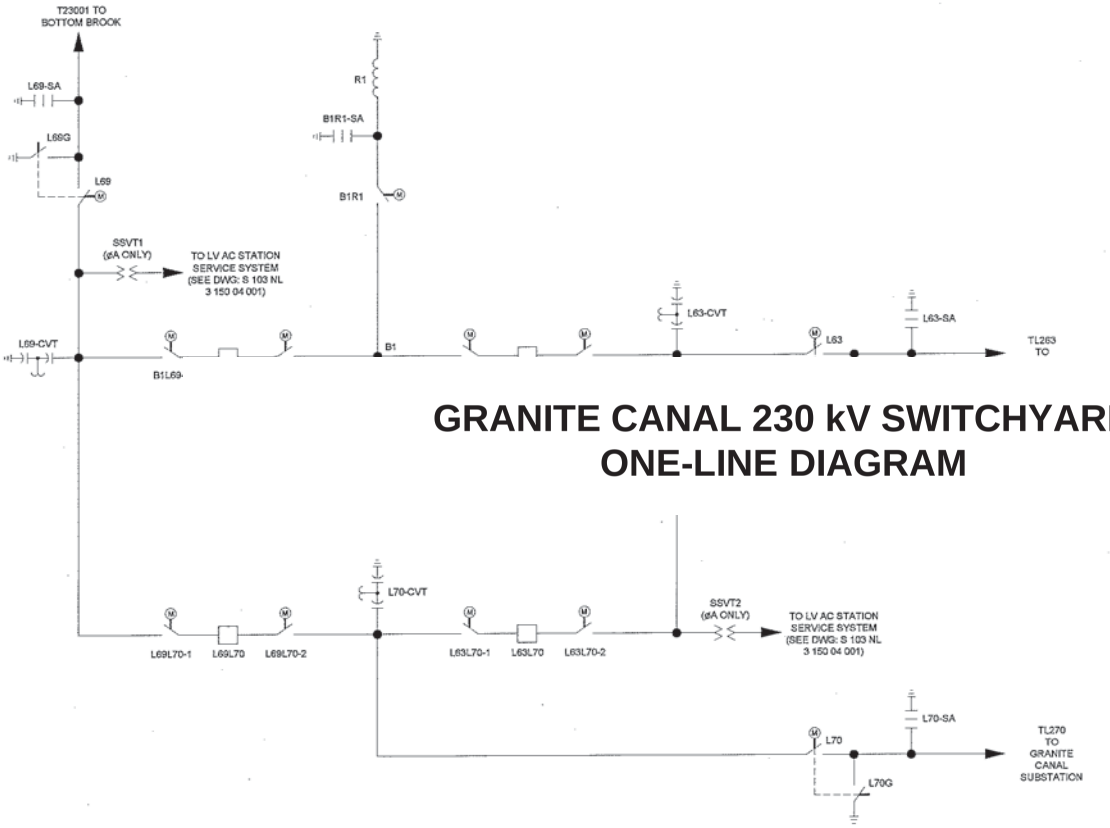




GRANITE CANAL 230 kV SWITCHYARD ONE-LINE DIAGRAM

DWG. NO. S 1 0 3 N L 3 1 5 0 0 8 0 0 1

BUS RATINGS

BUS DESIGNATION	TUBULAR BUS SIZE	STRAIN BUS SIZE	AMPACITY (A)
B1	4" IPS, SCHEDULE 40 AL TUBE	TWIN 1272 ASC (NARCISSUS)	1200

CIRCUIT BREAKERS:

DESIGNATION	MANUFACTURER	TYPE	VOLTAGE (kV)	BIL (kV)	CURRENT (A)	INTERRUPTING RATING (kA)
B1L63; B1L69; L63L70; L69L70		DEAD TANK, SINGLE POLE OPERATED	230	1050	2000	31.5

CURRENT TRANSFORMERS:

DESIGNATION	MANUFACTURER	TYPE	VOLTAGE (kV)	CURRENT	RATIO	ACCURACY
B1L63; B1L69; L63L70; L69L70		CIRCUIT BREAKER C/W BUSHING CT	230	2000	2000 : 5 MR (8 CORES PER BUSHING)	2.5E800

DISCONNECT SWITCHES:

DESIGNATION	MANUFACTURER	TYPE	VOLTAGE (kV)	BIL (kV)	CURRENT (A)	MOMENTARY CURRENT (kA)
B1L63-1; B1L63-2; B1L69-1; B1L69-2; L63L70-1; L63L70-2; L69L70-1; L69L70-2		VERTICAL BREAK, MOTOR OPERATOR	230	1050	1200	61
B1R1		VERTICAL BREAK, MOTOR OPERATOR	230	1050	1200	61
L63&L63G; L69&L69G; L70&L70G		VERTICAL BREAK, MOTOR OPERATOR, C/W GROUNDING SWITCH	230	1050	1200	61

VOLTAGE TRANSFORMERS:

DESIGNATION	MANUFACTURER	TYPE	SYSTEM VOLTAGE (kV)	BIL (kV)	RATIO	ACCURACY AND BURDEN
L63-CVT; L69-CVT; L70-CVT; B1-CVT		CAPACITIVE	230	1050	1200/2000:1:1	0.3WXYZ

SHUNT REACTORS:

VOLTAGE (kV)	BIL (kV)	RATING (Mvar)	
230	1050	15	

VOLTAGE (kV L-G)	BIL (kV)	MCOV (kV)	
192	1050	152	

SYSTEM VOLTAGE / BIL (kV)	RATED PRIMARY / SECONDARY VOLTAGE (V)	CAPACITY (kVA)	IMPEDANCE (%)
230 / 1050	133000 /120 - 120	100	TBD

NOTE:

1. EQUIPMENT DESIGNATIONS FOR REFERENCE ONLY. FINAL DESIGNATIONS WILL BE DETERMINED BY ENL.

LEGEND:

- CB: CIRCUIT BREAKER
- DS: DISCONNECT SWITCH, MOTOR OPERATED
- DS C/W GS: DISCONNECT SWITCH (MOTOR OPERATED) WITH GROUNDING SWITCH (MANUALLY OPERATED), INTERLOCK BETWEEN DS AND GS
- CVT: CAPACITIVE VOLTAGE TRANSFORMER
- SA: SURGE ARRESTER
- R: REACTOR
- SSVT: STATION SERVICE VOLTAGE TRANSFORMER

PRELIMINARY
NOT FOR CONSTRUCTION

HATCH

REV NO	DATE	REV NO	DATE	REV NO	DATE
REV NO 6	DATE 2012-09-06	REV NO 4	DATE 2012-05-18	REV NO 2	DATE 2012-04-02
REVISED PER ENL COMMENTS - CHANGED STATION CONFIGURATION TO 4 BREAKERS RING BUS.		REVISED PER ENL COMMENTS - CHANGED REACTORS BIL TO TBA		REVISED PER ENL COMMENTS - ADDED ENL'S DRAWING NO. AND NAME - DELETED ADDITIONAL BREAKER AT EXISTING GRANITE CANAL STATION - CHANGED LINE ENT DIRECTION FOR LINE TO BOTTOM BROOK - UPDATED NOTE - UPDATED DATA SHEET	
REV NO 5	DATE 2012-07-17	REV NO 3	DATE 2012-05-11		
- UPDATED BIL DATA BASED ON ENL'S CONFIRMATION - ADDED SWIT1 AND SSVT2, BUT ON HOLD FOR MORE INFORMATION		REVISED PER ENL COMMENTS - CORRECTED DRAWING NAME - ADDED LINE NO. FOR LINE TO BOTTOM BROOK - CHANGED SYMBOL FOR GROUND SWITCHES TO REMOVE MOD FROM GROUND SWITCHES - ADDED EQUIPMENT SYMBOL LEGEND - UPDATED DATA SHEET			

PROFESSIONAL ENGINEER'S SEAL

ENL REVIEW: APPROVED, DATE

CONTRACTOR APPROVALS: APPROVED, DATE

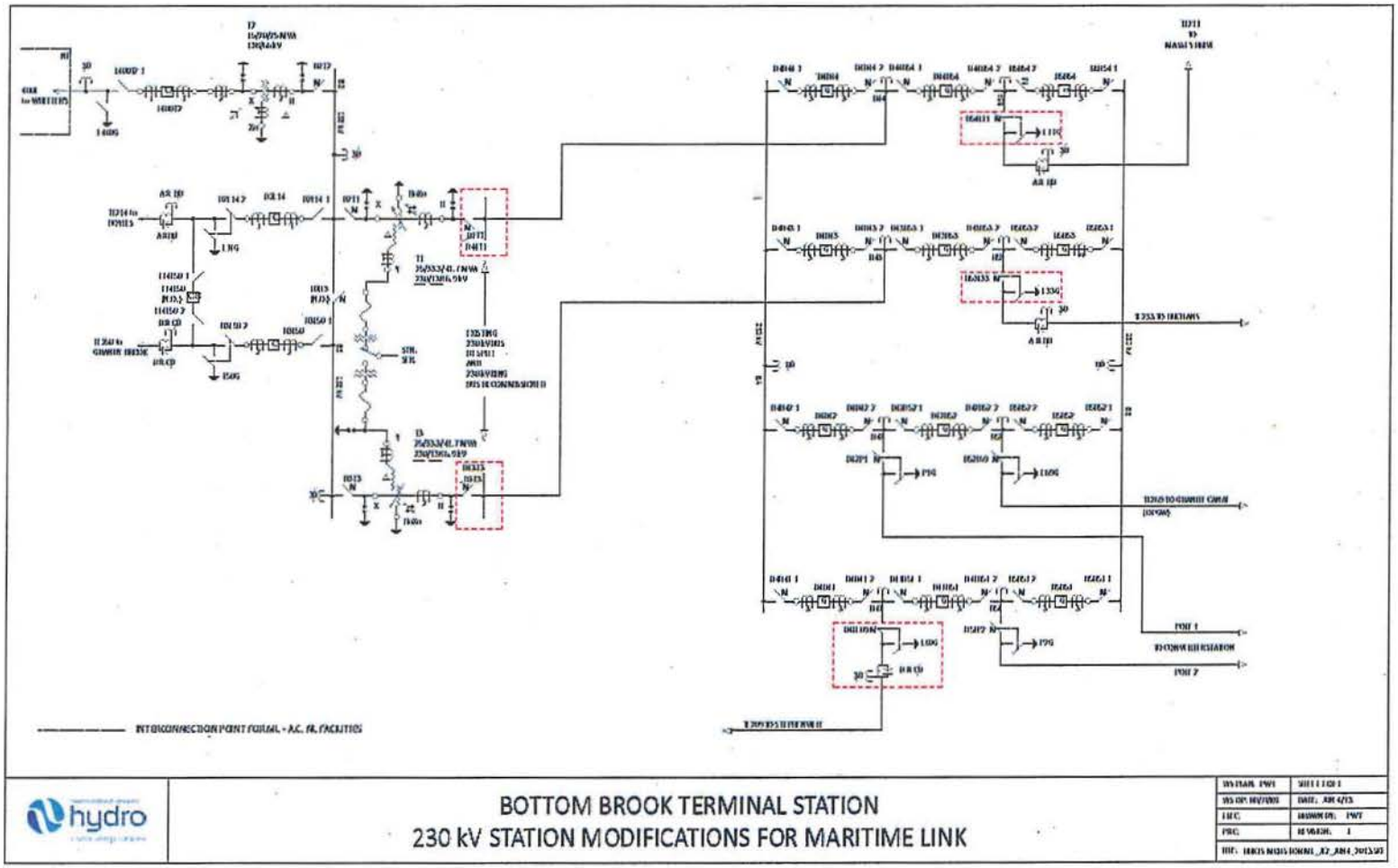
SCALE	NONE
UNITS	
DESIGNED	J. Z.
DRAWN	P. M.
SURVEYED	—
CHECKED	B. B.
DATE	2012 - 03 - 15
CONTRACT NO.	511

Emera Newfoundland & Labrador — Maritime Link Project

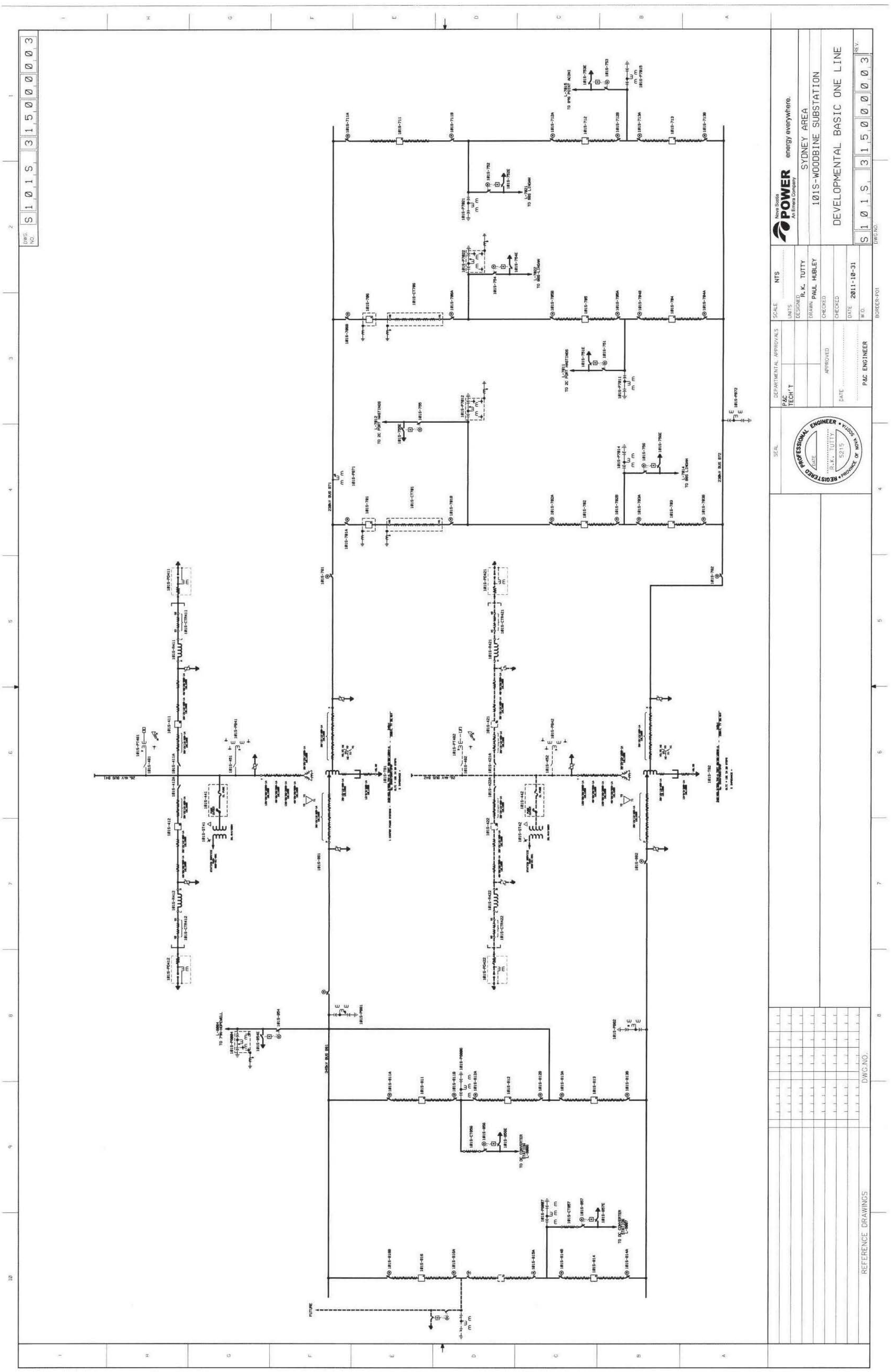
AREA	NEWFOUNDLAND
LOCATION	103NL - GRANITE CANAL SWITCH YARD
TITLE	EQUIPMENT SINGLE LINE DIAGRAM

DWG.NO. S 1 0 3 N L 3 1 5 0 0 8 0 0 1

103NL - GRANITE CANAL SWITCH YARD - AC BLOCK DIAGRAM
REFERENCE DRAWINGS
DWG.NO. S 1 0 3 N L 3 1 5 0 0 4 0 0 1



Data Source:
Maritime Link - Asset Interconnection Agreement
Schedule 1 - Maritime Link NL AC Facilities
Appendix A - Single Line Diagram Bottom Brook 230kV Terminal Station
MC/ML AIA - MC Draft August 19_13.DOC



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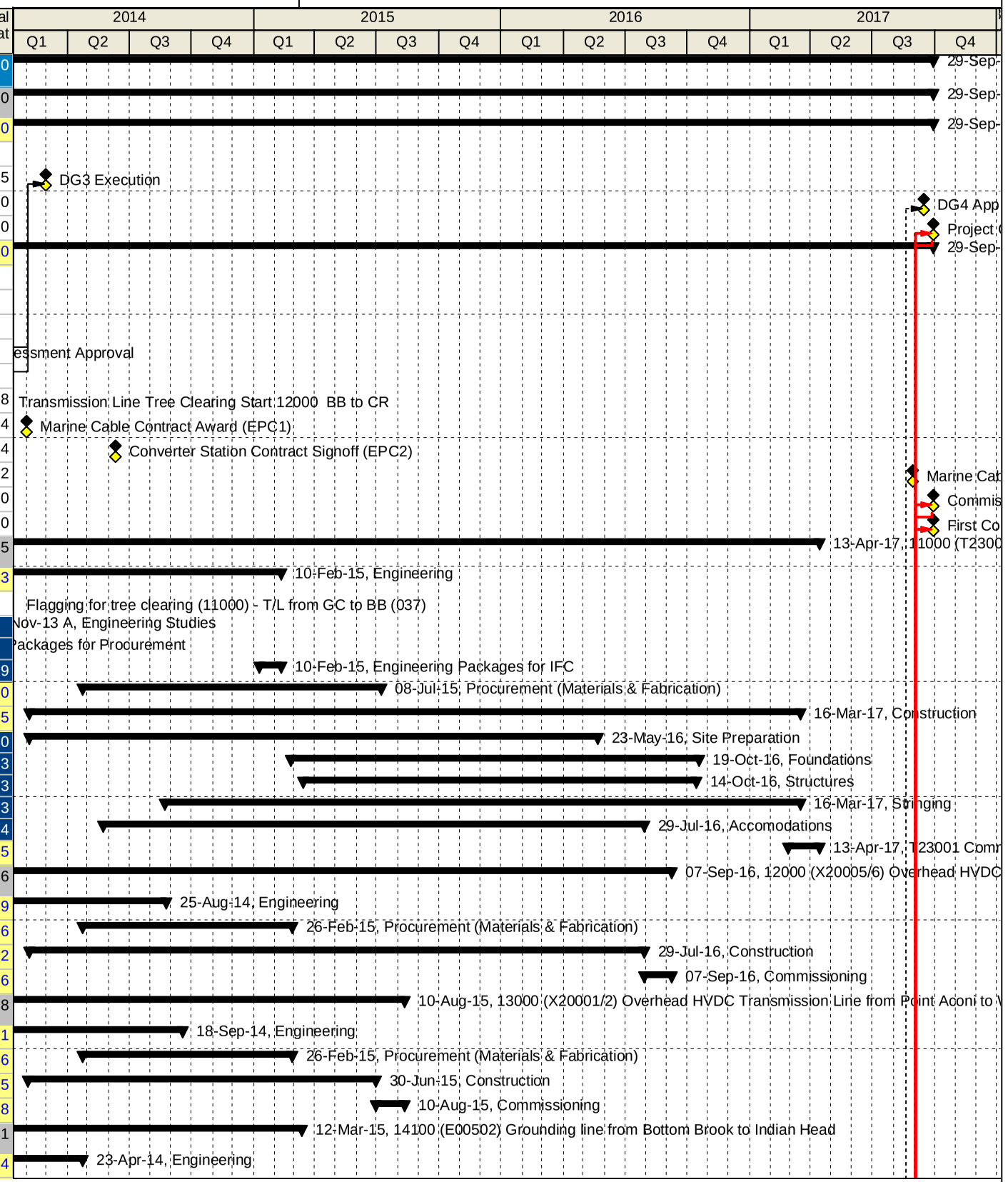
APPENDIX J

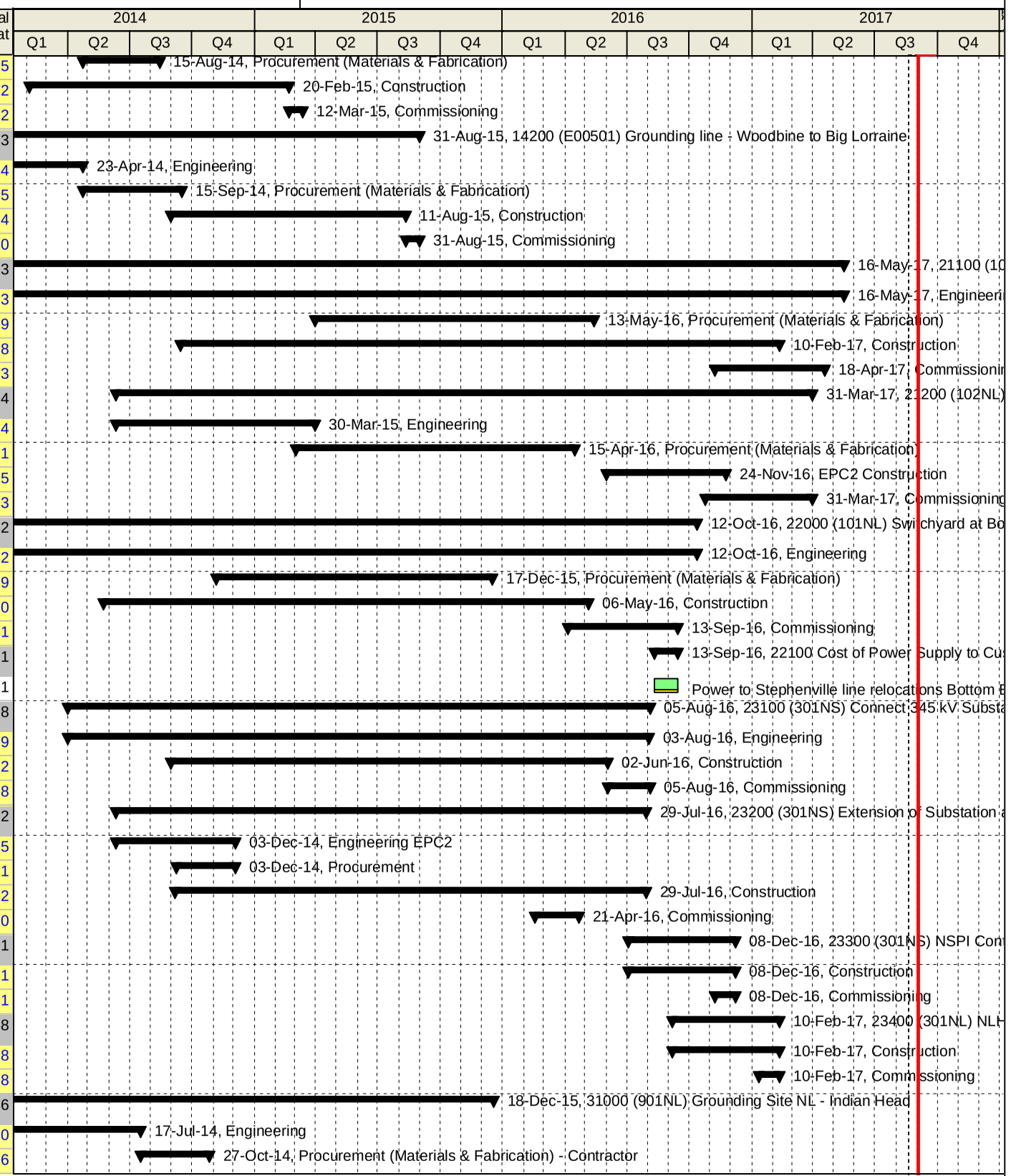
Construction Schedule

Activity ID	Activity Name	Start	Finish	Original Duration	Total Float
Maritime Link Project		01-Mar-11 A	29-Sep-17	1654	0
Gates & Milestones		01-Mar-11 A	29-Sep-17	1655	0
Gates		20-Dec-12 A	29-Sep-17	1186	0
DG000020	DG2 Conceptual	20-Dec-12 A		0	
DG000030	DG3 Execution	28-Feb-14*		0	895
DG000040	DG4 Approval	15-Sep-17		0	10
DG000050	Project Completion (Handover)		29-Sep-17	0	0
Milestones		01-Mar-11 A	29-Sep-17	1655	0
MS000000	Start MLP	01-Mar-11 A		0	
MS000001	Submit EA Report		10-Jan-13 A	0	
MS000003	Submit UARB Application		28-Jan-13 A	0	
MS000002	Environmental Assessment Approval		21-Jun-13 A	0	
MS000004	UARB Approval		22-Jul-13 A	0	
MS000027	Transmission Line Tree Clearing Start 12000 BB to CR	30-Dec-13		0	938
MS000007	Marine Cable Contract Award (EPC1)		31-Jan-14	0	914
MS000009	Converter Station Contract Signoff (EPC2)		11-Jun-14	0	64
MS000017	Marine Cable Install Complete & Demobilization Start		29-Aug-17	0	22
MS000018	Commission Complete		28-Sep-17	0	0
MS000019	First Commercial Power		29-Sep-17	0	0
11000 (T23001) Overhead AC Transmission Line from Granite Canal to ...		05-Nov-12 A	13-Apr-17	1077	115
Engineering		05-Nov-12 A	10-Feb-15	529	663
S1100SP01	Flagging for tree clearing (11000) - T/L from GC to BB (037)	22-Jul-13 A	11-Jan-14 A	59	
Engineering Studies		05-Nov-12 A	15-Nov-13 A	244	
Engineering Packages for Procurement		11-Mar-13 A	29-Mar-13 A	50	
Engineering Packages for IFC		09-Jan-15	10-Feb-15	22	659
Procurement (Materials & Fabrication)		23-Apr-14	08-Jul-15	303	190
Construction		04-Feb-14	16-Mar-17	783	135
Site Preparation		04-Feb-14	23-May-16	578	340
Foundations		24-Feb-15	19-Oct-16	592	153
Structures		14-Mar-15	14-Oct-16	569	153
Stringing		23-Aug-14	16-Mar-17	898	153
Accomodations		23-May-14	29-Jul-16	772	414
T23001 Commissioning		26-Feb-17	13-Apr-17	34	105
12000 (X20005/6) Overhead HVDC Transmission Line from Bottom Bro...		05-Nov-12 A	07-Sep-16	926	266
Engineering		05-Nov-12 A	25-Aug-14	413	779
Procurement (Materials & Fabrication)		23-Apr-14	26-Feb-15	213	396
Construction		04-Feb-14	29-Jul-16	626	292
Commissioning		29-Jul-16	07-Sep-16	26	256
13000 (X20001/2) Overhead HVDC Transmission Line from Point Aconi ...		02-Oct-12 A	10-Aug-15	654	538
Engineering		02-Oct-12 A	18-Sep-14	431	761
Procurement (Materials & Fabrication)		23-Apr-14	26-Feb-15	213	646
Construction		01-Feb-14	30-Jun-15	354	565
Commissioning		30-Jun-15	10-Aug-15	27	528
14100 (E00502) Grounding line from Bottom Brook to Indian Head		05-Nov-12 A	12-Mar-15	551	641
Engineering		05-Nov-12 A	23-Apr-14	328	864



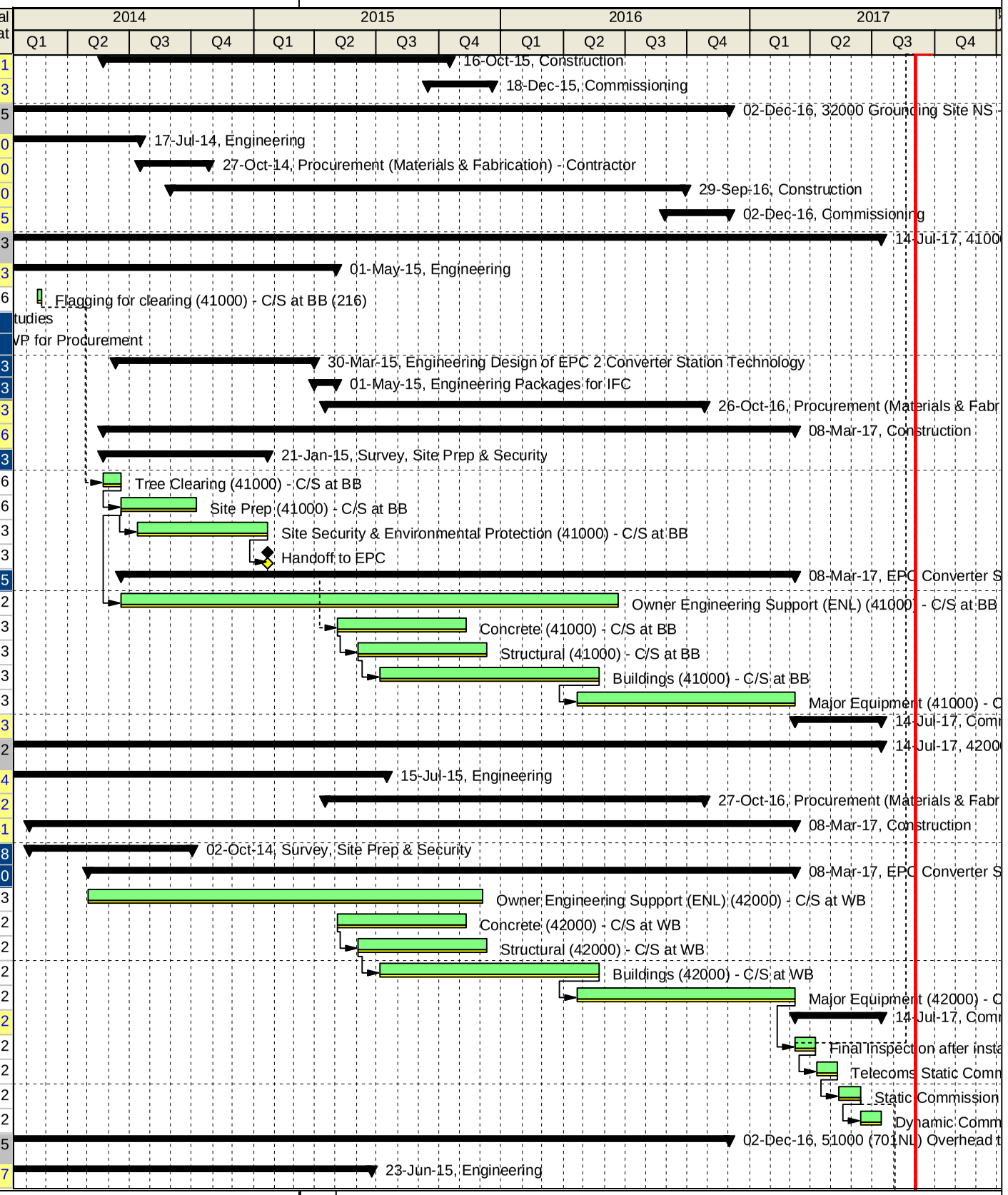
Primary Baseline | Remaining Work | Baseline Milestone
Actual Work | Critical Remaining Work | Milestone

Activity ID	Activity Name	Start	Finish	Original Duration	Total Float
	Procurement (Materials & Fabrication)	23-Apr-14	15-Aug-14	80	605
	Construction	04-Feb-14	20-Feb-15	263	632
	Commissioning	20-Feb-15	12-Mar-15	20	892
	14200 (E00501) Grounding line - Woodbine to Big Lorraine	02-Oct-12 A	31-Aug-15	706	523
	Engineering	02-Oct-12 A	23-Apr-14	365	864
	Procurement (Materials & Fabrication)	23-Apr-14	15-Sep-14	100	605
	Construction	01-Sep-14	11-Aug-15	237	514
	Commissioning	11-Aug-15	31-Aug-15	20	720
	21100 (103NL) Switchyard at Granite Canal	03-Dec-12 A	16-May-17	1118	93
	Engineering	03-Dec-12 A	16-May-17	1112	93
	Procurement (Materials & Fabrication)	31-Mar-15	13-May-16	280	279
	Construction	15-Sep-14	10-Feb-17	607	158
	Commissioning	08-Nov-16	18-Apr-17	110	93
	21200 (102NL) Modifications for P&C Communications, Ductbanks to E...	12-Jun-14	31-Mar-17	705	124
	Engineering	12-Jun-14	30-Mar-15	200	624
	Procurement (Materials & Fabrication)	03-Mar-15	15-Apr-16	280	231
	EPC2 Construction	01-Jun-16	24-Nov-16	177	295
	Commissioning	25-Oct-16	31-Mar-17	110	123
	22000 (101NL) Switchyard at Bottom Brook	03-Dec-12 A	12-Oct-16	969	242
	Engineering	03-Dec-12 A	12-Oct-16	969	242
	Procurement (Materials & Fabrication)	05-Nov-14	17-Dec-15	280	239
	Construction	23-May-14	06-May-16	493	350
	Commissioning	06-Apr-16	13-Sep-16	110	241
	22100 Cost of Power Supply to Customers During Outages, NL	11-Aug-16	13-Sep-16	22	261
A34570	Power to Stephenville line relocations Bottom Brook - 1/2	11-Aug-16	13-Sep-16	22	261
	23100 (301NS) Connect 345 kV Substation at Woodbine to Converter St...	01-Apr-14	05-Aug-16	591	288
	Engineering	01-Apr-14	03-Aug-16	584	289
	Construction	30-Aug-14	02-Jun-16	442	332
	Commissioning	03-Jun-16	05-Aug-16	44	278
	23200 (301NS) Extension of Substation at Woodbine	12-Jun-14	29-Jul-16	537	292
	Engineering EPC2	12-Jun-14	03-Dec-14	121	475
	Procurement	09-Sep-14	03-Dec-14	60	521
	Construction	07-Sep-14	29-Jul-16	478	292
	Commissioning	18-Feb-16	21-Apr-16	44	350
	23300 (301NS) NSPI Control Centre Modifications	04-Jul-16	08-Dec-16	111	201
	Construction	04-Jul-16	08-Dec-16	111	201
	Commissioning	07-Nov-16	08-Dec-16	22	201
	23400 (301NL) NLH Control Centre Modifications	06-Sep-16	10-Feb-17	110	148
	Construction	06-Sep-16	10-Feb-17	110	148
	Commissioning	11-Jan-17	10-Feb-17	22	148
	31000 (901NL) Grounding Site NL - Indian Head	17-Jul-13 A	18-Dec-15	595	446
	Engineering	17-Jul-13 A	17-Jul-14	235	800
	Procurement (Materials & Fabrication) - Contractor	17-Jul-14	27-Oct-14	70	536



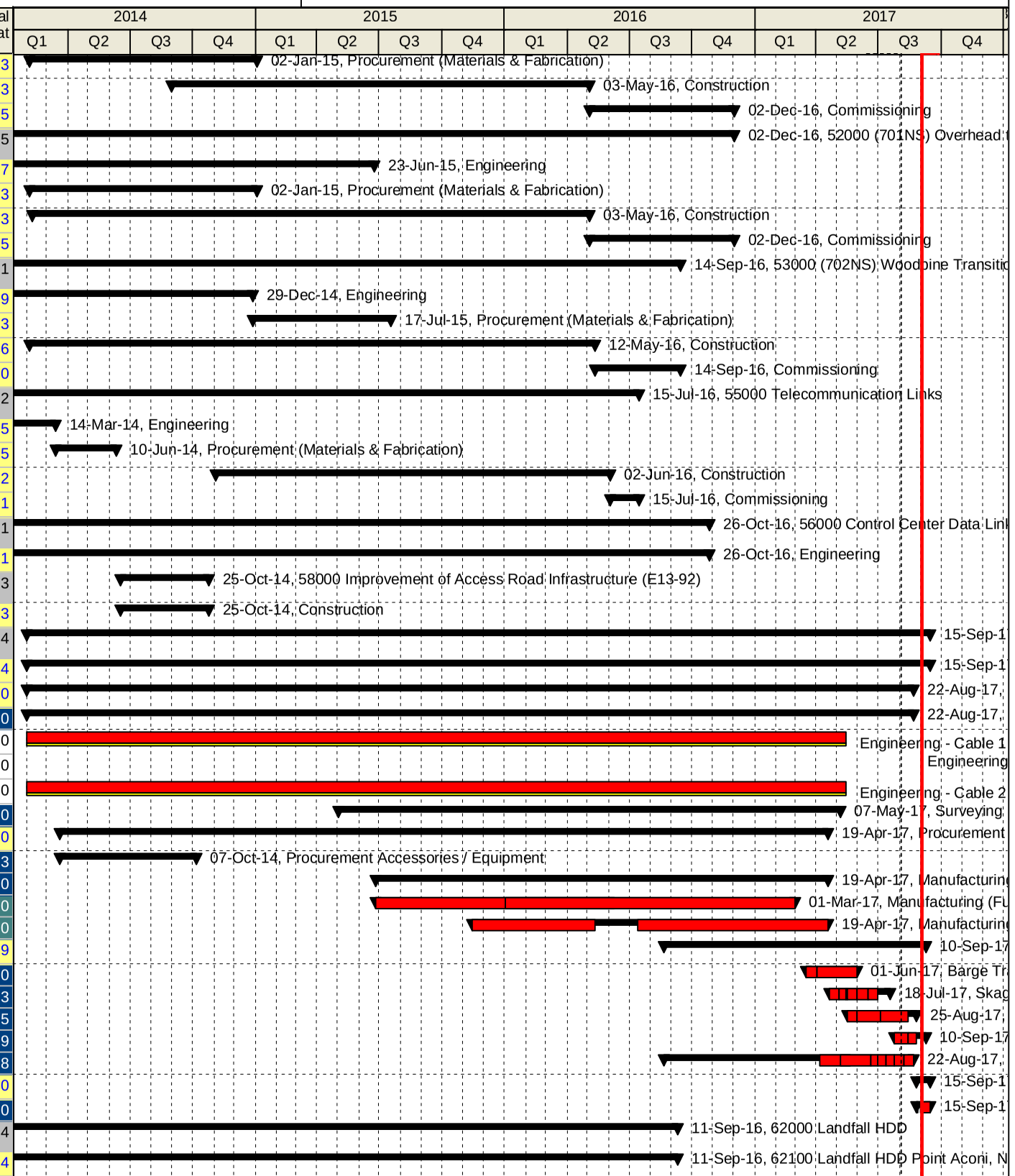
Primary Baseline | Remaining Work | Baseline Milestone
Actual Work | Critical Remaining Work | Milestone

Activity ID	Activity Name	Start	Finish	Original Duration	Total Float
Construction		23-May-14	16-Oct-15	352	491
Commissioning		15-Sep-15	18-Dec-15	66	443
32000 Grounding Site NS - Big Lorraine		27-Sep-13 A	02-Dec-16	801	205
Engineering		27-Sep-13 A	17-Jul-14	200	800
Procurement (Materials & Fabrication) - Contractor		17-Jul-14	27-Oct-14	70	690
Construction		30-Aug-14	29-Sep-16	524	250
Commissioning		30-Aug-16	02-Dec-16	66	205
41000 (301NL) Bottom Brook Converter Station		01-Oct-12 A	14-Jul-17	1203	53
Engineering		01-Oct-12 A	01-May-15	646	53
S4100SP00	Flagging for clearing (41000) - C/S at BB (216)	17-Feb-14*	21-Feb-14	5	176
Engineering Studies		01-Oct-12 A	22-Mar-13 A	147	
Engineering WP for Procurement		22-Mar-13 A	26-Mar-13 A	1	
Engineering Design of EPC 2 Converter Station Technology		12-Jun-14	30-Mar-15	200	53
Engineering Packages for IFC		31-Mar-15	01-May-15	22	53
Procurement (Materials & Fabrication)		16-Apr-15	26-Oct-16	383	143
Construction		23-May-14	08-Mar-17	702	76
Survey, Site Prep & Security		23-May-14	21-Jan-15	167	123
S4100SP05	Tree Clearing (41000) - C/S at BB	23-May-14*	20-Jun-14	28	166
S4100SP10	Site Prep (41000) - C/S at BB	20-Jun-14*	08-Oct-14	110	166
S4100SP40	Site Security & Environmental Protection (41000) - C/S at BB	14-Jul-14	21-Jan-15	132	123
S4100SP30	Handoff to EPC		21-Jan-15	0	123
EPC Converter Station Installation BB		20-Jun-14	08-Mar-17	678	75
S4100CT60	Owner Engineering Support (ENL) (41000) - C/S at BB	20-Jun-14	21-Jun-16	500	252
S4100CT10	Concrete (41000) - C/S at BB	04-May-15*	10-Nov-15	132	53
S4100CT20	Structural (41000) - C/S at BB	03-Jun-15	11-Dec-15	132	53
S4100CT30	Buildings (41000) - C/S at BB	06-Jul-15	24-May-16	220	53
S4100CT40	Major Equipment (41000) - C/S at BB	21-Apr-16	08-Mar-17	220	53
Commissioning		08-Mar-17	14-Jul-17	88	53
42000 (301NS) Woodbine Converter Station		01-Oct-12 A	14-Jul-17	1203	52
Engineering		01-Oct-12 A	15-Jul-15	697	64
Procurement (Materials & Fabrication)		16-Apr-15	27-Oct-16	384	142
Construction		04-Feb-14	08-Mar-17	777	141
Survey, Site Prep & Security		04-Feb-14	02-Oct-14	166	198
EPC Converter Station Installation WB		01-May-14	08-Mar-17	713	140
S4200CT60	Owner Engineering Support (ENL) (42000) - C/S at WB	01-May-14	04-Dec-15	400	453
S4200CT10	Concrete (42000) - C/S at WB	04-May-15*	10-Nov-15	132	52
S4200CT20	Structural (42000) - C/S at WB	04-Jun-15	11-Dec-15	132	52
S4200CT30	Buildings (42000) - C/S at WB	07-Jul-15	24-May-16	220	52
S4200CT40	Major Equipment (42000) - C/S at WB	22-Apr-16	08-Mar-17	220	52
Commissioning		09-Mar-17	14-Jul-17	88	52
C4200020	Final Inspection after installation (42000) - C/S at WB	09-Mar-17	07-Apr-17	22	52
C4200030	Telecoms Static Commission Converter Sta. 301NS (42000) - C/S at WB	10-Apr-17	11-May-17	22	52
C4200040	Static Commission Converter Sta. 301NS (42000) - C/S at WB	12-May-17	13-Jun-17	22	52
C4200050	Dynamic Commission Converter Sta. 301NS (42000) - C/S at WB	14-Jun-17	14-Jul-17	22	52
51000 (701NL) Overhead to Underground Transition Compound at Cap...		28-Jan-13 A	02-Dec-16	969	205
Engineering		28-Jan-13 A	23-Jun-15	601	567

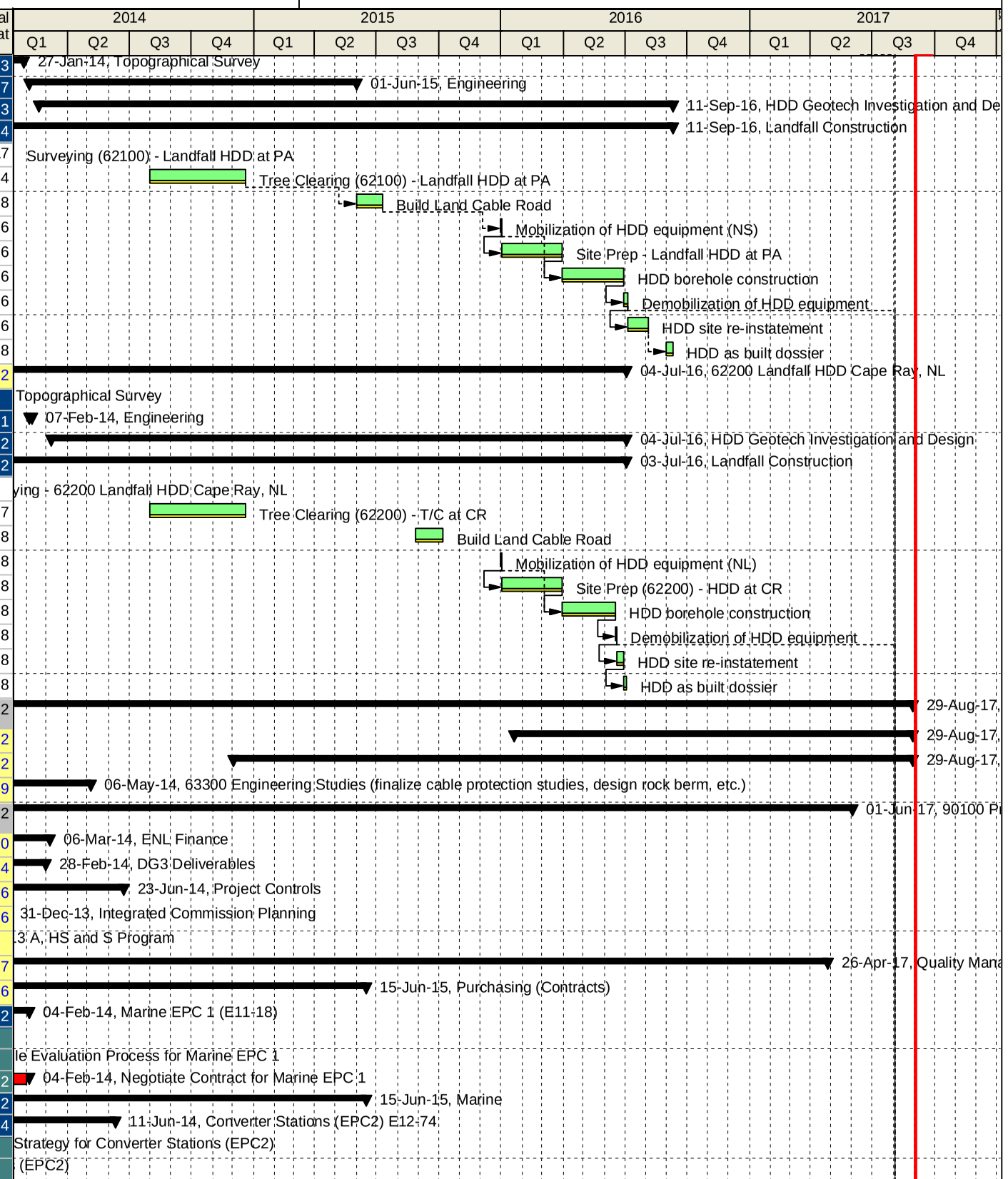


Primary Baseline | Remaining Work | Baseline Milestone
Actual Work | Critical Remaining Work | Milestone

Activity ID	Activity Name	Start	Finish	Original Duration	Total Float
	Procurement (Materials & Fabrication)	03-Feb-14	02-Jan-15	230	453
	Construction	30-Aug-14	03-May-16	421	353
	Commissioning	04-May-16	02-Dec-16	147	205
	52000 (701NS) Overhead to Underground Transition Compound at Poin...	08-Oct-12 A	02-Dec-16	890	205
	Engineering	08-Oct-12 A	23-Jun-15	522	567
	Procurement (Materials & Fabrication)	03-Feb-14	02-Jan-15	230	453
	Construction	08-Feb-14	03-May-16	561	353
	Commissioning	04-May-16	02-Dec-16	147	205
	53000 (702NS) Woodbine Transition Compound	30-Dec-13	14-Sep-16	682	261
	Engineering	30-Dec-13	29-Dec-14	249	689
	Procurement (Materials & Fabrication)	29-Dec-14	17-Jul-15	140	453
	Construction	04-Feb-14	12-May-16	572	346
	Commissioning	13-May-16	14-Sep-16	85	260
	55000 Telecommunication Links	03-Dec-12 A	15-Jul-16	799	302
	Engineering	03-Dec-12 A	14-Mar-14	210	885
	Procurement (Materials & Fabrication)	14-Mar-14	10-Jun-14	60	575
	Construction	03-Nov-14	02-Jun-16	399	302
	Commissioning	03-Jun-16	15-Jul-16	30	301
	56000 Control Center Data Link	30-Dec-13	26-Oct-16	707	231
	Engineering	30-Dec-13	26-Oct-16	707	231
	58000 Improvement of Access Road Infrastructure (E13-92)	18-Jun-14	25-Oct-14	130	373
	Construction	18-Jun-14	25-Oct-14	130	373
	61000 Submarine Cable, Land Cable, and Terminations	31-Jan-14	15-Sep-17	1322	14
	Project (Payment) Milestones	31-Jan-14	15-Sep-17	1322	14
	Engineering	31-Jan-14	22-Aug-17	1298	0
	Engineering - Cable, Accessories & Installation	31-Jan-14	22-Aug-17	1298	0
A35040	Engineering - Cable 1 & Accessories	31-Jan-14	14-May-17	1198	0
A35050	Engineering - Installation	31-Jan-14	22-Aug-17	1298	0
A35045	Engineering - Cable 2 & Accessories	31-Jan-14	14-May-17	1198	0
	Surveying	03-May-15	07-May-17	735	10
	Procurement (Materials & Fabrication)	21-Mar-14	19-Apr-17	1125	0
	Procurement Accessories / Equipment	21-Mar-14	07-Oct-14	200	263
	Manufacturing	27-Jun-15	19-Apr-17	662	0
	Manufacturing (Futtsu, Japan)	27-Jun-15	01-Mar-17	613	0
	Manufacturing (Halden, Norway)	15-Nov-15	19-Apr-17	521	0
	Construction	21-Aug-16	10-Sep-17	385	19
	Barge Transport	18-Mar-17	01-Jun-17	75	0
	Skagerrak Operation	21-Apr-17	18-Jul-17	88	73
	Trenching	16-May-17	25-Aug-17	101	35
	Rock Installation	24-Jul-17	10-Sep-17	48	19
	Land Installation	21-Aug-16	22-Aug-17	366	38
	Commissioning	26-Aug-17	15-Sep-17	20	0
	Testing	26-Aug-17	15-Sep-17	20	0
	62000 Landfall HDD	03-Sep-12 A	11-Sep-16	804	264
	62100 Landfall HDD Point Aconi, NS	03-Sep-12 A	11-Sep-16	804	264

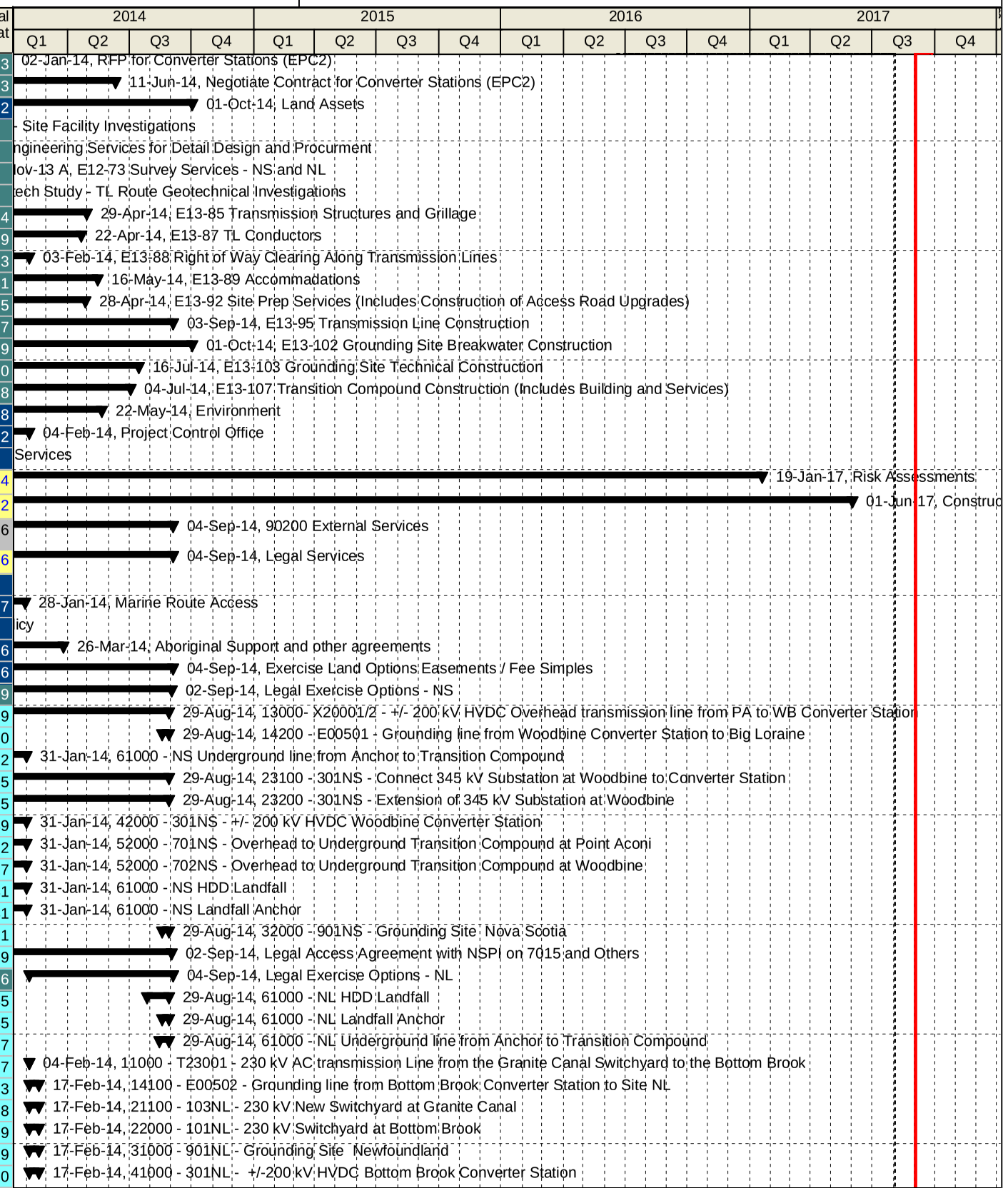


Activity ID	Activity Name	Start	Finish	Original Duration	Total Float
Topographical Survey		03-Sep-12 A	27-Jan-14	144	583
Engineering		03-Feb-14	01-Jun-15	332	587
HDD Geotech Investigation and Design		18-Feb-14	11-Sep-16	936	383
Landfall Construction		02-Jan-14	11-Sep-16	677	264
A34120	Surveying (62100) - Landfall HDD at PA	02-Jan-14	11-Jan-14	10	1317
A34020	Tree Clearing (62100) - Landfall HDD at PA	01-Aug-14*	20-Dec-14	142	544
A34000	Build Land Cable Road	01-Jun-15*	10-Jul-15	40	398
R6210HD12	Mobilization of HDD equipment (NS)	01-Jan-16*	02-Jan-16	2	236
R6210HD11	Site Prep - Landfall HDD at PA	02-Jan-16	30-Mar-16	88	236
R6210HD13	HDD borehole construction	30-Mar-16	30-Jun-16	92	236
R6210HD14	Demobilization of HDD equipment	30-Jun-16	05-Jul-16	5	236
R6210HD15	HDD site re-instatement	05-Jul-16	04-Aug-16	30	236
R6210HD16	HDD as built dossier	01-Sep-16	11-Sep-16	10	208
62200 Landfall HDD Cape Ray, NL		26-Jul-13 A	04-Jul-16	694	312
Topographical Survey		27-Jul-13 A	11-Aug-13 A	30	
Engineering		03-Feb-14	07-Feb-14	5	611
HDD Geotech Investigation and Design		07-Mar-14	04-Jul-16	849	452
Landfall Construction		26-Jul-13 A	03-Jul-16	683	312
A34130	Surveying - 62200 Landfall HDD Cape Ray, NL	26-Jul-13 A	02-Aug-13 A	10	
A34030	Tree Clearing (62200) - T/C at CR	01-Aug-14*	20-Dec-14	142	437
A34010	Build Land Cable Road	28-Aug-15	07-Oct-15	40	698
R6220HD12	Mobilization of HDD equipment (NL)	01-Jan-16*	02-Jan-16	2	308
R6220HD11	Site Prep (62200) - HDD at CR	02-Jan-16	30-Mar-16	88	308
R6220HD13	HDD borehole construction	30-Mar-16	18-Jun-16	80	308
R6220HD14	Demobilization of HDD equipment	18-Jun-16	20-Jun-16	2	308
R6220HD15	HDD site re-instatement	20-Jun-16	30-Jun-16	10	308
R6220HD16	HDD as built dossier	30-Jun-16	03-Jul-16	3	308
63000 Marine Consultancy Services		17-Aug-12 A	29-Aug-17	1107	22
63100 Marine Warranty Survey Services		20-Jan-16	29-Aug-17	403	22
63200 Marine 3rd Party Engineering Verification Services		02-Dec-14	29-Aug-17	684	22
63300 Engineering Studies (finalize cable protection studies, design rock berm, etc.)		17-Aug-12 A	06-May-14	260	849
90100 Project Management		15-Mar-11 A	01-Jun-17	1264	82
ENL Finance		30-Dec-13	06-Mar-14	48	890
DG3 Deliverables		21-Jan-13 A	28-Feb-14	255	894
Project Controls		04-Mar-13 A	23-Jun-14	313	816
Integrated Commission Planning		18-Mar-13 A	31-Dec-13	250	936
HS and S Program		04-Jun-12 A	27-Sep-13 A	181	
Quality Management Program		23-Sep-13 A	26-Apr-17	897	107
Purchasing (Contracts)		15-Mar-11 A	15-Jun-15	770	576
Marine EPC 1 (E11-18)		15-Mar-11 A	04-Feb-14	427	912
RFP for Marine EPC 1		15-Mar-11 A	19-Mar-12 A	200	
Cable Evaluation Process for Marine EPC 1		22-May-12 A	12-Jul-13 A	291	
Negotiate Contract for Marine EPC 1		12-Jul-13 A	04-Feb-14	136	912
Marine		15-Jun-12 A	15-Jun-15	749	572
Converter Stations (EPC2) E12-74		09-Oct-12 A	11-Jun-14	419	824
Contract Strategy for Converter Stations (EPC2)		02-Jan-13 A	07-May-13 A	45	
EOI for Converter Stations (EPC2)		09-Oct-12 A	23-Nov-12 A	139	



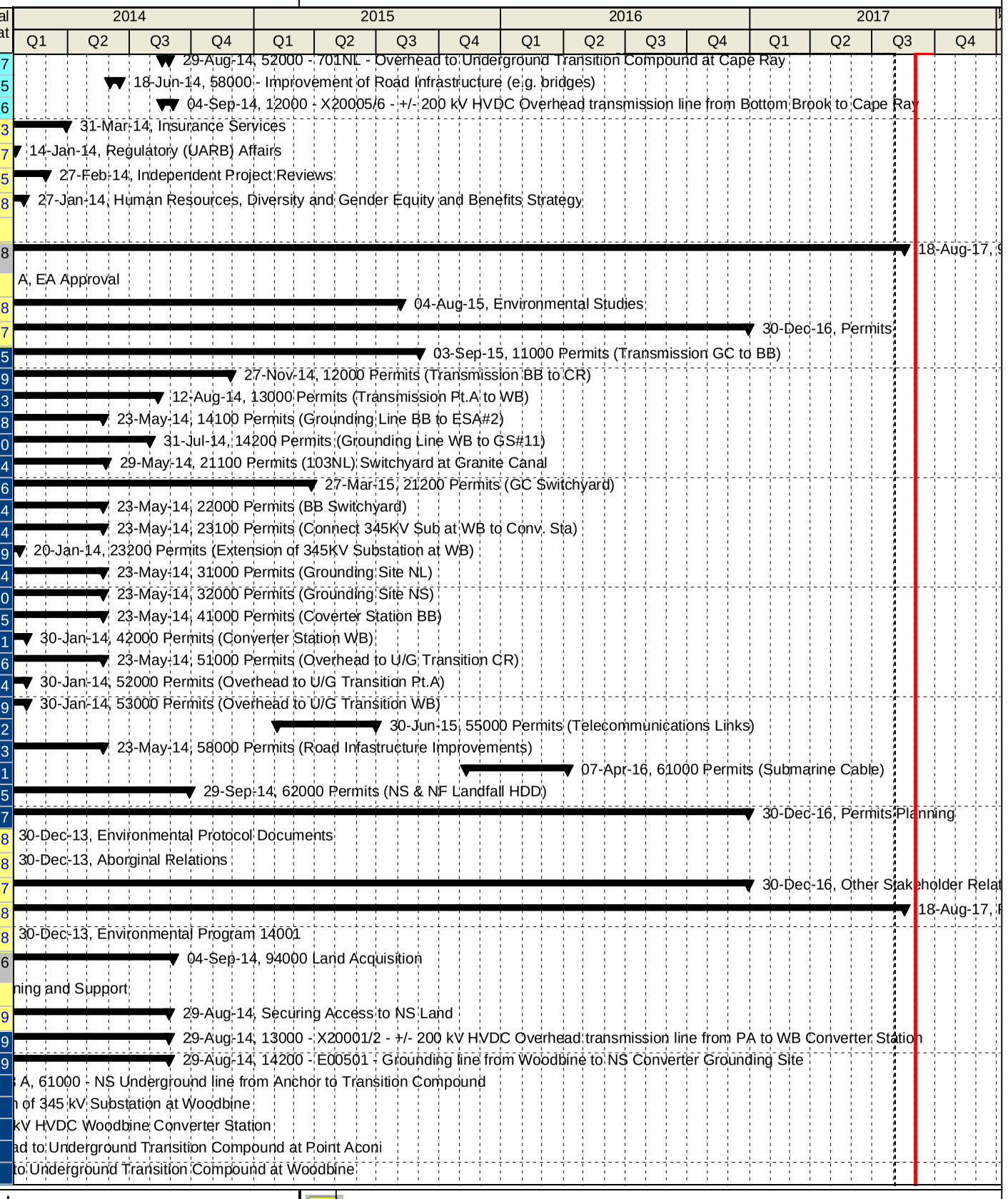
Primary Baseline | Remaining Work | Baseline Milestone
Actual Work | Critical Remaining Work | Milestone

Activity ID	Activity Name	Start	Finish	Original Duration	Total Float
	RFP for Converter Stations (EPC2)	13-Nov-12 A	02-Jan-14	284	53
	Negotiate Contract for Converter Stations (EPC2)	03-Jan-14	11-Jun-14	111	53
	Land Assets	18-Jun-12 A	01-Oct-14	570	752
	E12-53 Geotech Study - Site Facility Investigations	18-Jun-12 A	19-Dec-12 A	332	
	E12-62 Engineering Services for Detail Design and Procurment	01-Oct-12 A	03-May-13 A	114	
	E12-73 Survey Services - NS and NL	03-Dec-12 A	08-Nov-13 A	235	
	E12-79 Geotech Study - TL Route Geotechnical Investigations	12-Nov-12 A	10-Apr-13 A	88	
	E13-85 Transmission Structures and Grillage	04-Feb-13 A	29-Apr-14	295	854
	E13-87 TL Conductors	18-Feb-13 A	22-Apr-14	246	859
	E13-88 Right of Way Clearing Along Transmission Lines	11-Feb-13 A	03-Feb-14	269	913
	E13-89 Accommadations	11-Mar-13 A	16-May-14	288	841
	E13-92 Site Prep Services (Includes Construction of Access Road Upgrades)	11-Feb-13 A	28-Apr-14	271	855
	E13-95 Transmission Line Construction	18-Feb-13 A	03-Sep-14	382	767
	E13-102 Grounding Site Breakwater Construction	25-Feb-13 A	01-Oct-14	391	439
	E13-103 Grounding Site Technical Construction	11-Feb-13 A	16-Jul-14	295	800
	E13-107 Transition Compound Construction (Includes Building and Services)	18-Feb-13 A	04-Jul-14	315	808
	Environment	22-Jun-11 A	22-May-14	372	838
	Project Control Office	09-Jul-12 A	04-Feb-14	394	912
	Land Acquisition Services	29-Oct-12 A	22-Feb-13 A	80	
	Risk Assessments	09-Sep-13 A	19-Jan-17	840	174
	Construction Management	06-Aug-13 A	01-Jun-17	955	82
	90200 External Services	04-Jan-12 A	04-Sep-14	549	766
	Legal Services	25-Jun-12 A	04-Sep-14	549	766
	NL Legal Materials/Agreements	25-Jun-12 A	26-Jul-12 A	23	
	Marine Route Access	30-Dec-13	28-Jan-14	21	917
	Records Retention Policy	02-Oct-12 A	31-Dec-12 A	61	
	Aboriginal Support and other agreements	07-Aug-12 A	26-Mar-14	40	876
	Exercise Land Options Easements / Fee Simples	04-Mar-13 A	04-Sep-14	363	766
	Legal Exercise Options - NS	04-Mar-13 A	02-Sep-14	360	769
	13000- X20001/2 - +/- 200 kV HVDC Overhead transmission line from PA to WB Convert...	29-Nov-13 A	29-Aug-14	188	769
	14200 - E00501 - Grounding line from Woodbine Converter Station to Big Loraine	18-Aug-14	29-Aug-14	10	510
	61000 - NS Underground line from Anchor to Transition Compound	29-Nov-13 A	31-Jan-14	43	322
	23100 - 301NS - Connect 345 kV Substation at Woodbine to Converter Station	30-Dec-13	29-Aug-14	169	415
	23200 - 301NS - Extension of 345 kV Substation at Woodbine	30-Dec-13	29-Aug-14	169	435
	42000 - 301NS - +/- 200 kV HVDC Woodbine Converter Station	04-Mar-13 A	31-Jan-14	215	249
	52000 - 701NS - Overhead to Underground Transition Compound at Point Aconi	04-Mar-13 A	31-Jan-14	215	322
	52000 - 702NS - Overhead to Underground Transition Compound at Woodbine	04-Mar-13 A	31-Jan-14	215	687
	61000 - NS HDD Landfall	04-Mar-13 A	31-Jan-14	215	641
	61000 - NS Landfall Anchor	04-Mar-13 A	31-Jan-14	215	641
	32000 - 901NS - Grounding Site Nova Scotia	18-Aug-14	29-Aug-14	10	301
	Legal Access Agreement with NSPI on 7015 and Others	04-Mar-13 A	02-Sep-14	360	769
	Legal Exercise Options - NL	03-Feb-14	04-Sep-14	148	766
	61000 - NL HDD Landfall	28-Jul-14	29-Aug-14	24	545
	61000 - NL Landfall Anchor	18-Aug-14	29-Aug-14	10	545
	61000 - NL Underground line from Anchor to Transition Compound	14-Aug-14	29-Aug-14	12	287
	11000 - T23001 - 230 kV AC transmission Line from the Granite Canal Switchyard to the...	03-Feb-14	04-Feb-14	2	397
	14100 - E00502 - Grounding line from Bottom Brook Converter Station to Site NL	03-Feb-14	17-Feb-14	11	903
	21100 - 103NL - 230 kV New Switchyard at Granite Canal	03-Feb-14	17-Feb-14	11	618
	22000 - 101NL - 230 kV Switchyard at Bottom Brook	03-Feb-14	17-Feb-14	11	509
	31000 - 901NL - Grounding Site Newfoundland	03-Feb-14	17-Feb-14	11	509
	41000 - 301NL - +/-200 kV HVDC Bottom Brook Converter Station	03-Feb-14	17-Feb-14	11	180



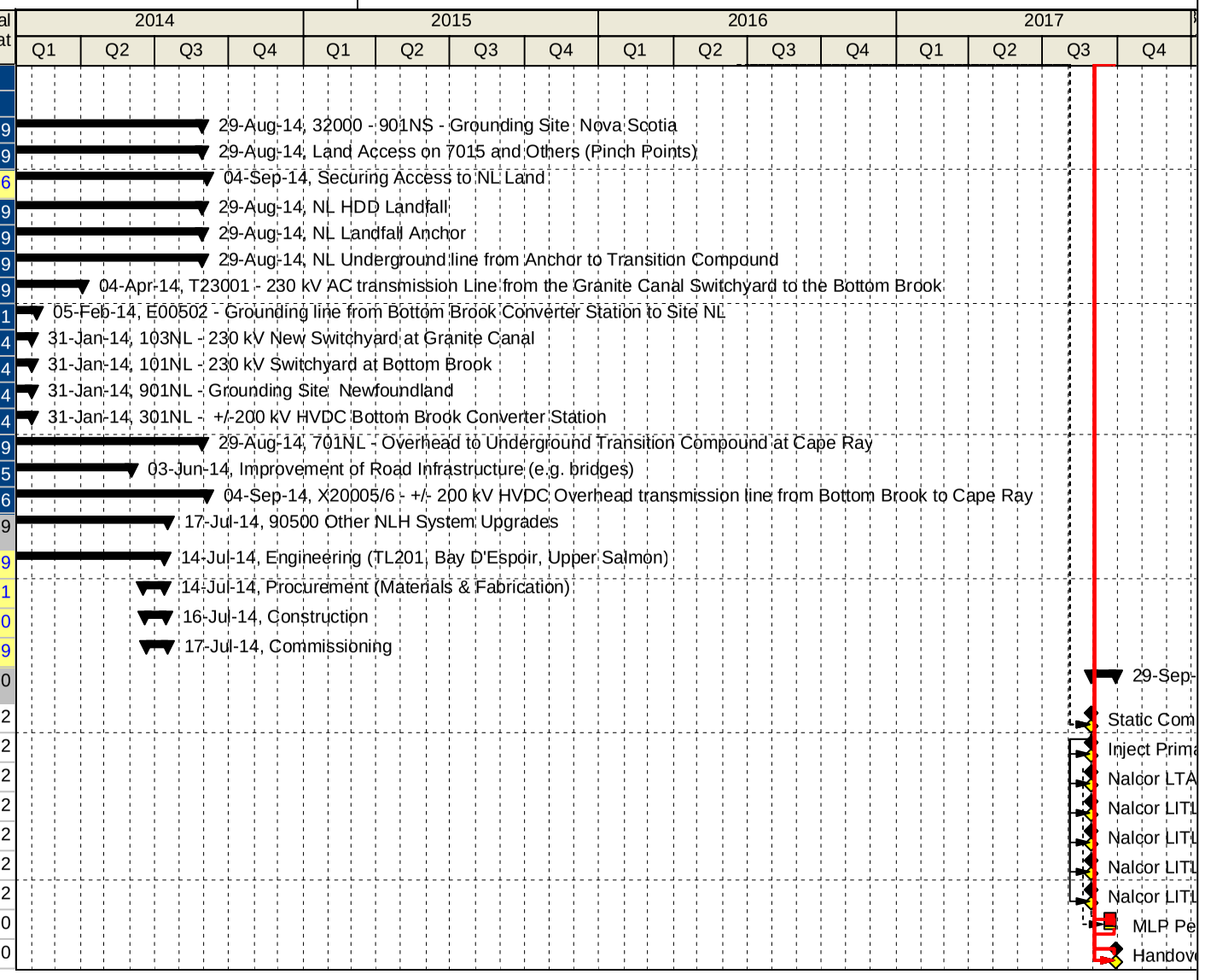
Primary Baseline | Remaining Work | Baseline Milestone
Actual Work | Critical Remaining Work | Milestone

Activity ID	Activity Name	Start	Finish	Original Duration	Total Float
	52000 - 701NL - Overhead to Underground Transition Compound at Cape Ray	18-Aug-14	29-Aug-14	10	287
	58000 - Improvement of Road Infrastructure (e.g. bridges)	03-Jun-14	18-Jun-14	11	305
	12000 - X20005/6 - +/- 200 kV HVDC Overhead transmission line from Bottom Brook to ...	18-Aug-14	04-Sep-14	13	766
	Insurance Services	03-Jul-12 A	31-Mar-14	437	873
	Regulatory (UARB) Affairs	02-Jan-13 A	14-Jan-14	259	927
	Independent Project Reviews	08-Jul-13 A	27-Feb-14	124	895
	Human Resources, Diversity and Gender Equity and Benefits Strategy	01-Aug-12 A	27-Jan-14	334	918
	CBoD/FBoD Hatch	04-Jan-12 A	22-Jan-13 A	158	
	93000 Enivronmental	02-Apr-12 A	18-Aug-17	1084	28
	EA Approval	11-Jan-13 A	09-Sep-13 A	147	
	Environmental Studies	02-Apr-12 A	04-Aug-15	551	538
	Permits	01-Apr-13 A	30-Dec-16	945	187
	11000 Permits (Transmission GC to BB)	01-May-13 A	03-Sep-15	493	205
	12000 Permits (Transmission BB to CR)	01-May-13 A	27-Nov-14	301	709
	13000 Permits (Transmission Pt.A to WB)	01-May-13 A	12-Aug-14	207	783
	14100 Permits (Grounding Line BB to ESA#2)	11-Oct-13 A	23-May-14	152	838
	14200 Permits (Grounding Line WB to GS#11)	11-Oct-13 A	31-Jul-14	200	790
	21100 Permits (103NL) Switchyard at Granite Canal	11-Oct-13 A	29-May-14	156	834
	21200 Permits (GC Switchyard)	30-Dec-13	27-Mar-15	312	626
	22000 Permits (BB Switchyard)	11-Oct-13 A	23-May-14	152	444
	23100 Permits (Connect 345KV Sub at WB to Conv. Sta)	11-Oct-13 A	23-May-14	152	484
	23200 Permits (Extension of 345KV Substation at WB)	11-Oct-13 A	20-Jan-14	67	589
	31000 Permits (Grounding Site NL)	11-Oct-13 A	23-May-14	152	444
	32000 Permits (Grounding Site NS)	11-Oct-13 A	23-May-14	152	370
	41000 Permits (Coverter Station BB)	11-Oct-13 A	23-May-14	152	115
	42000 Permits (Converter Station WB)	11-Oct-13 A	30-Jan-14	74	251
	51000 Permits (Overhead to U/G Transition CR)	11-Oct-13 A	23-May-14	152	356
	52000 Permits (Overhead to U/G Transition Pt.A)	11-Oct-13 A	30-Jan-14	74	324
	53000 Permits (Overhead to U/G Transition WB)	11-Oct-13 A	30-Jan-14	74	689
	55000 Permits (Telecommunications Links)	05-Feb-15	30-Jun-15	100	312
	58000 Permits (Road Infastructure Improvements)	30-Dec-13	23-May-14	100	323
	61000 Permits (Submarine Cable)	10-Nov-15	07-Apr-16	100	371
	62000 Permits (NS & NF Landfall HDD)	11-Oct-13 A	29-Sep-14	240	475
	Permits Planning	01-Apr-13 A	30-Dec-16	940	187
	Environmental Protocol Documents	30-Dec-13	30-Dec-13	0	938
	Aborginal Relations	11-Jun-12 A	30-Dec-13	189	938
	Other Stakeholder Relations	28-Jan-13 A	30-Dec-16	166	187
	Post EA Enivronmental Monitoring Program	01-Jun-13 A	18-Aug-17	770	28
	Environmental Program 14001	31-Jan-13 A	30-Dec-13	211	938
	94000 Land Acquisition	15-Jul-12 A	04-Sep-14	594	766
	Land Acquisition Planning and Support	16-Jul-12 A	08-Jan-13 A	295	
	Securing Access to NS Land	15-Jul-12 A	29-Aug-14	417	769
	13000 - X20001/2 - +/- 200 kV HVDC Overhead transmission line from PA to WB Converter St...	15-Jul-12 A	29-Aug-14	229	769
	14200 - E00501 - Grounding line from Woodbine to NS Converter Grounding Site	25-Feb-13 A	29-Aug-14	360	769
	61000 - NS Underground line from Anchor to Transition Compound	06-May-13 A	13-Sep-13 A	70	
	23200 - 301NS - Extension of 345 kV Substation at Woodbine	05-Nov-12 A	20-Nov-12 A	1	
	42000 - 301NS - +/- 200 kV HVDC Woodbine Converter Station	03-Dec-12 A	06-Dec-12 A	2	
	52000 - 701NS - Overhead to Underground Transition Compound at Point Aconi	05-Nov-12 A	05-Dec-12 A	2	
	52000 - 702NS - Overhead to Underground Transition Compound at Woodbine	05-Nov-12 A	07-Nov-12 A	1	



Primary Baseline | Remaining Work | Baseline Milestone
Actual Work | Critical Remaining Work | Milestone

Activity ID	Activity Name	Start	Finish	Original Duration	Total Float
	61000 - NS HDD Landfall	05-Nov-12 A	07-Nov-12 A	2	
	61000 - NS Landfall Anchor	05-Nov-12 A	07-Nov-12 A	2	
	32000 - 901NS - Grounding Site Nova Scotia	05-Nov-12 A	29-Aug-14	417	769
	Land Access on 7015 and Others (Pinch Points)	01-Mar-13 A	29-Aug-14	375	769
	Securing Access to NL Land	05-Nov-12 A	04-Sep-14	442	766
	NL HDD Landfall	18-Feb-13 A	29-Aug-14	306	769
	NL Landfall Anchor	05-Feb-13 A	29-Aug-14	254	769
	NL Underground line from Anchor to Transition Compound	21-Jan-13 A	29-Aug-14	437	769
	T23001 - 230 kV AC transmission Line from the Granite Canal Switchyard to the Bottom Brook	05-Nov-12 A	04-Apr-14	219	869
	E00502 - Grounding line from Bottom Brook Converter Station to Site NL	01-May-13 A	05-Feb-14	178	911
	103NL - 230 kV New Switchyard at Granite Canal	07-Jan-13 A	31-Jan-14	235	914
	101NL - 230 kV Switchyard at Bottom Brook	07-Jan-13 A	31-Jan-14	235	914
	901NL - Grounding Site Newfoundland	06-May-13 A	31-Jan-14	175	914
	301NL - +/-200 kV HVDC Bottom Brook Converter Station	01-Apr-13 A	31-Jan-14	196	914
	701NL - Overhead to Underground Transition Compound at Cape Ray	18-Feb-13 A	29-Aug-14	360	769
	Improvement of Road Infrastructure (e.g. bridges)	29-Nov-13 A	03-Jun-14	127	305
	X20005/6 - +/- 200 kV HVDC Overhead transmission line from Bottom Brook to Cape Ray	07-Jan-13 A	04-Sep-14	363	766
	90500 Other NLH System Upgrades	31-Aug-12 A	17-Jul-14	469	799
	Engineering (TL201, Bay D'Espoir, Upper Salmon)	31-Aug-12 A	14-Jul-14	238	799
	Procurement (Materials & Fabrication)	17-Jun-14	14-Jul-14	18	801
	Construction	19-Jun-14	16-Jul-14	18	800
	Commissioning	20-Jun-14	17-Jul-14	18	799
	Dynamic Commissioning (90100)	29-Aug-17	29-Sep-17	22	0
C9000010	Static Commissioning Complete		29-Aug-17	0	12
C9000050	Inject Primary Voltage to MLP	29-Aug-17		0	12
CNAL1000	Nalcor LTA Ready for Power (CF to MF)	29-Aug-17		0	22
CNAL1010	Nalcor LITL Ready for Power (Lab)	29-Aug-17		0	22
CNAL1020	Nalcor LITL Ready for Power (Nfld)	29-Aug-17		0	22
CNAL1030	Nalcor LITL Ready for Power (Crossing)	29-Aug-17		0	22
CNAL1040	Nalcor LITL Ready for Operations (Telecoms)	29-Aug-17		0	22
C9000060	MLP Performance Testing	15-Sep-17	28-Sep-17	10	0
C9000070	Handover MLP to Operations	29-Sep-17		0	0



Primary Baseline | Remaining Work | Baseline Milestone
Actual Work | Critical Remaining Work | Milestone

APPENDIX K

Construction Budget

WBS	WBS_L1 Description	DG3 Budget ($)
11000	T23001 - 230 kV AC transmission Line from the Granite Canal Switchyard to the Bottom Brook Switchyard in NL	[redacted]
12000	X20005/6 - +/- 200 kV HVDC Overhead transmission line from Bottom Brook to Cape Ray, at the Cabot Strait in NL	[redacted]
13000	X20001/2 - +/- 200 kV HVDC Overhead transmission line from Point Aconi to Woodbine Converter Station, NS	[redacted]
14100	E00502 - Grounding line from Bottom Brook Converter Station to Site St George's	[redacted]
14200	E00501 - Grounding line from Woodbine Converter Station to Big Lorraine.	[redacted]
21100	103NL - 230 kV New Switchyard at Granite Canal	[redacted]
21200	102NL – Modifications for P&C, Communications and some Ductbanks to Existing 230 kV Substation at Granite Canall	[redacted]
22000	101NL - 230 kV Switchyard at Bottom Brook	[redacted]
22100	Generator Fuel Supply	[redacted]
23100	301NS - Connect 345 kV Substation at Woodbine to Converter Station	[redacted]
23200	301NS - Extension of 345 kV Substation at Woodbine, NS	[redacted]
23300	301NS - NSPI Control Centre Modifications	350,875
23400	102NL NLH Control Centre Modifications	350,875
31000	901NL - Grounding Site Newfoundland	[redacted]
32000	901NS - Grounding Site Nova Scotia	[redacted]
41000	301NL - +/-200 kV HVDC Bottom Brook	[redacted]
42000	301NS - +/-200 kV HVDC Woodbine	[redacted]
51000	701NL - Overhead to Underground Transition at Cape Ray	[redacted]
52000	701NS - Overhead to Underground Transition at Point Aconi	[redacted]
53000	702NS - Overhead to Underground Transition at Woodbine	[redacted]
55000	Telecommunications Links - TBD	8,170,000
56000	Control Center data Link	819,000
58000	Improvement of Road Infrastructure (e.g. bridges)	3,980,772
61000	Submarine Cable and Terminations	[redacted]
62100	Landfall HDD Point Aconi	[redacted]
62200	Landfall HDD Cape Ray	[redacted]
63000	Submarine Cable and Terminations	[redacted]
90100	Project Management Team Costs	108,318,375
90200	External Project Costs	57,191,993
90500	Other NLH system upgrades	10,916,000
90600	Insurance	[redacted]
93000	Environmental	19,751,263
94000	Land Acquisition	[redacted]
Total		[redacted]
	Escalation and Contingency	[redacted]
Grand Total		[redacted]

APPENDIX L

Operations and Maintenance Initial O&M Assumptions

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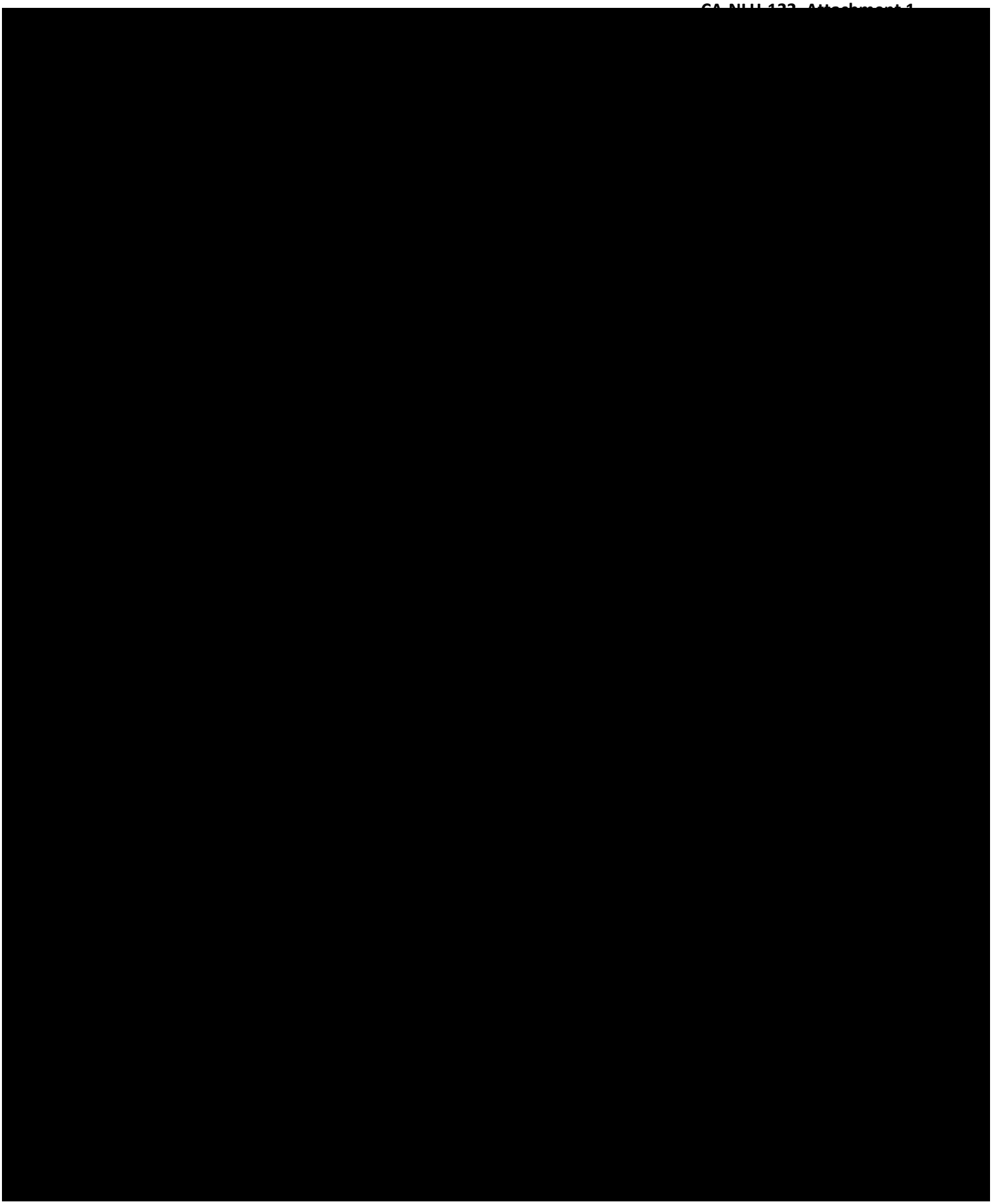

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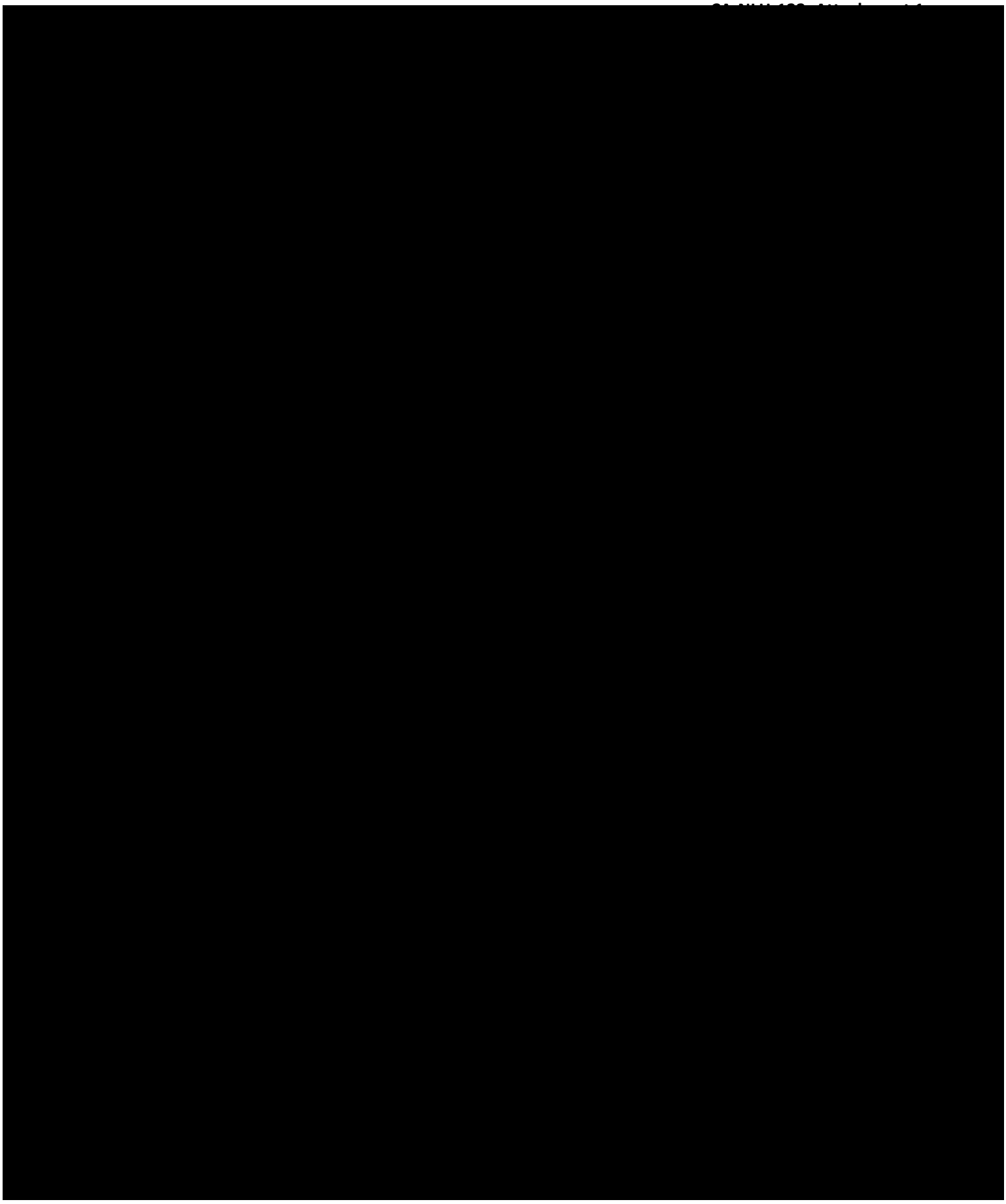

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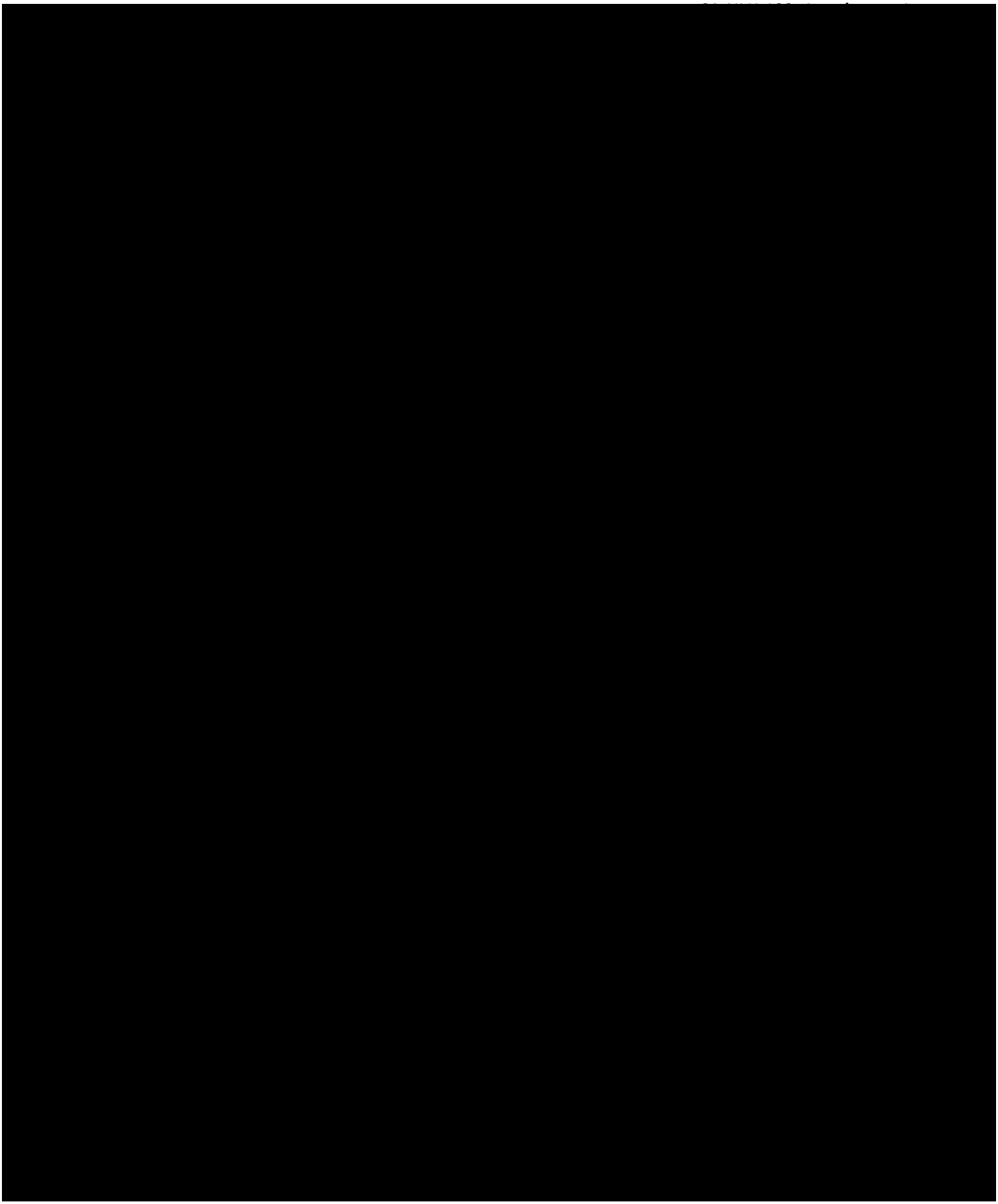

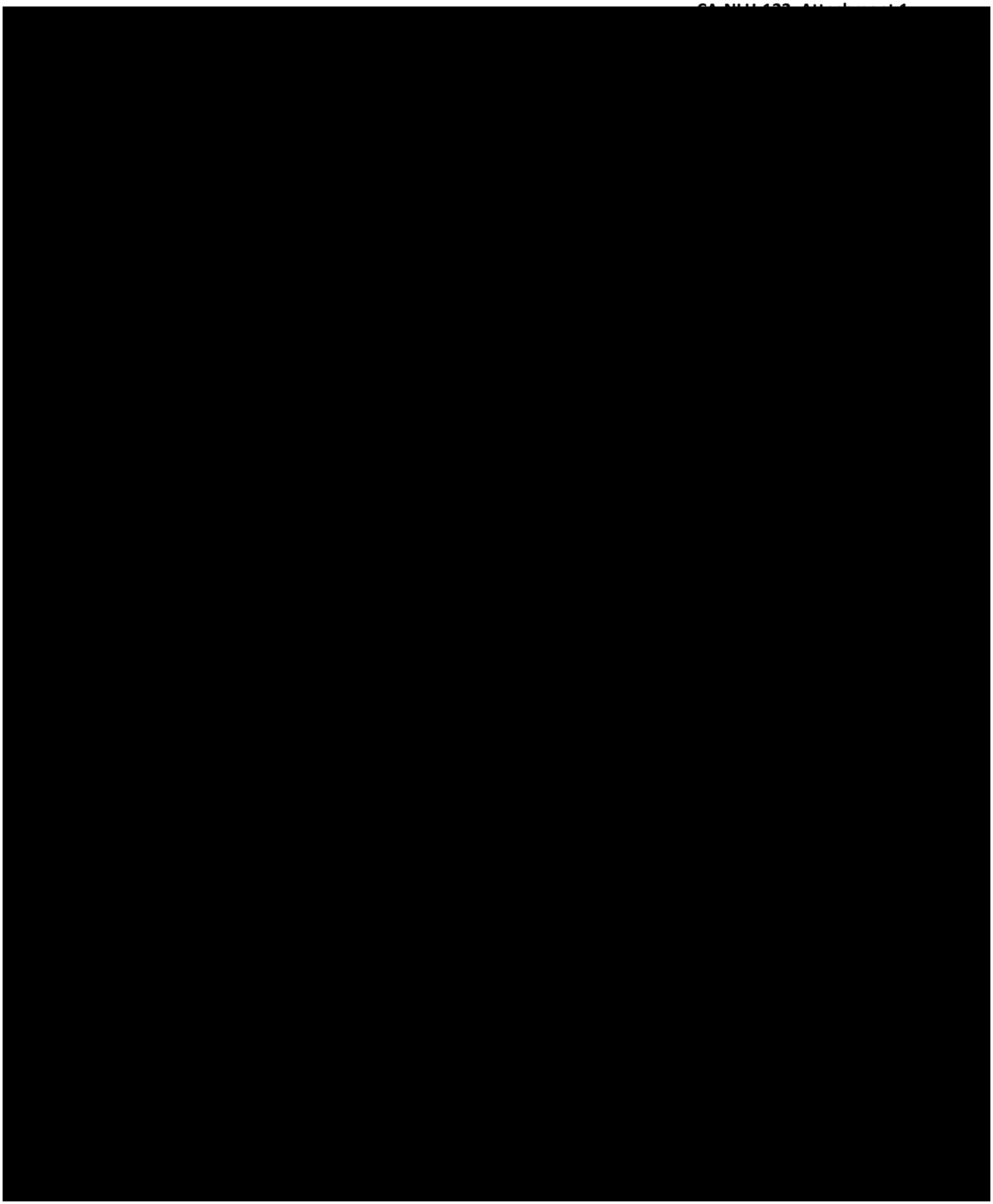

Maritime Link - Initial O-M Assumptions