

# **NOEL PAUL'S BROOK BRIDGE INSTALLATION**

**Environmental Assessment Registration**  
Pursuant to the Newfoundland and Labrador *Environmental Protection Act*

**Submitted by Newfoundland and Labrador Hydro**  
February 2016



# Noel Paul's Brook Bridge Installation

## Environmental Assessment Registration

Pursuant to the Newfoundland & Labrador *Environmental Protection Act (Part X)*

**Submitted by:**

**Newfoundland and Labrador Hydro**

A Nalcor Energy Company  
Hydro Place, 500 Columbus Drive  
P.O. Box 12400  
St. John's, Newfoundland and Labrador  
A1B 4K7 Canada

**Prepared by:**

**Amec Foster Wheeler Environment & Infrastructure**

A Division of Amec Foster Wheeler Americas Limited  
133 Crosbie Road, PO Box 13216  
St. John's, Newfoundland and Labrador  
A1B 4A5 Canada

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## Table of Contents

<b>1.0</b>	<b>INTRODUCTION</b> .....	<b>1</b>
1.1	Nature of the Undertaking .....	1
1.2	Purpose of the EA Registration .....	3
1.3	The Proponent .....	3
1.4	Environmental Assessment Process and Requirements .....	7
<b>2.0</b>	<b>PROJECT DESCRIPTION AND SCOPE</b> .....	<b>8</b>
2.1	Overview of Vehicle Access Across Noel Paul's Brook.....	8
2.2	Project Purpose, Rationale and Need.....	10
2.3	Project Planning and Alternatives.....	11
2.4	Project Components and Lay-out.....	12
2.4.1	Bridge Abutments.....	12
2.4.2	Bailey Bridge .....	15
2.4.3	Improvements to Road Approaches.....	15
2.5	Construction .....	16
2.5.1	Construction Activities and Sequence .....	16
2.5.2	Construction Workforce .....	17
2.6	Operation and Maintenance .....	17
2.7	Project Schedule and Cost Estimate .....	18
2.8	Project Documents.....	18
2.9	Environmental Management and Protection .....	18
2.9.1	Environmental Protection Planning .....	18
2.9.2	Safety, Health and Environmental Emergency Response Plan .....	19
2.10	Environmental Permits and Approvals .....	20
<b>3.0</b>	<b>ENVIRONMENTAL SETTING, POTENTIAL INTERACTIONS AND MITIGATION</b> .....	<b>21</b>
3.1	Existing Environment .....	21
3.1.1	Biophysical Environment .....	21
3.1.2	Socioeconomic Environment.....	25
3.2	Potential Environmental Interactions and Planned Mitigation.....	29
3.2.1	Atmospheric Environment .....	29
3.2.2	Terrestrial Environment .....	30

3.2.3 Freshwater Environment..... 33

3.2.4 Socioeconomic Environment..... 34

**3.3 Environmental Monitoring and Follow-up .....37**

**4.0 SUMMARY AND CONCLUSION .....38**

**5.0 REFERENCES .....39**

## List of Figures

Figure 1.1 Location of Proposed Noel Paul's Brook Bridge.....2

Figure 1.2 Nalcor Energy Organizational Structure.....4

Figure 1.3 Existing Newfoundland and Labrador Generation and Transmission System .....6

Figure 2.1 Aerial View of Existing Noel Paul’s Brook Ford Site and Proposed Bridge Location.....9

Figure 2.2 Photograph of Noel Paul’s Brook with a Temporary Bailey Type Bridge in Place in 2003 .....10

Figure 2.3 Proposed Noel Paul’s Brook Bridge Plan and Profile .....13

Figure 2.4 Proposed Bridge North Abutment Site – Photographed from the South Abutment Location.....14

Figure 2.5 Proposed Bridge South Abutment Site – Photographed from the North Abutment Location.....15

Figure 3.1 Exploits River below Noel Paul’s Brook Water Flows (Monthly Discharge, 1985-2014) .....23

Figure 3.2 Noel Paul’s Brook Area - Resource Access Roads and Commercial Outfitter Locations.....26

Figure 3.3 Noel Paul’s Brook Area - Designated Domestic Harvest and Silviculture Areas .....27

Figure 3.4 Noel Paul’s Brook Area - Quarry, Mining Lease and Designated Development Areas .....28

## List of Tables

Table 2.1 Occupations Likely to be Represented in the Construction Work Force .....17

Table 3.1 Climate Normals for Buchans (1981-2010) .....21

Table 3.2 Fish Species Known to Occur in Noel Paul’s Brook .....24

Table 3.3 Summary of Key Migration Times for Fish Species Known to Occur in Noel Paul’s Brook .....25

Table 3.4 Environmental Effects Assessment Summary: Atmospheric Environment .....30

Table 3.5 Environmental Effects Assessment Summary: Terrestrial Environment .....32

Table 3.6 Environmental Effects Assessment Summary: Freshwater Environment.....33

Table 3.7 Environmental Effects Assessment Summary: Socioeconomic Environment.....36

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## List of Appendices

Appendix A List of Potentially Applicable Permits and Authorizations

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## 1.0 INTRODUCTION

**PROJECT NAME:** *Noel Paul's Brook: Bridge Installation*

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### 1.1 Nature of the Undertaking

Newfoundland and Labrador Hydro – A Nalcor Energy Company (NL Hydro) is proposing to install a bridge across Noel Paul's Brook in central Newfoundland, Figure 1.1, to replace an existing ford<sup>1</sup> site and improve access to the Ebbegunbaeg Control Structure. NL Hydro has operated the Ebbegunbaeg Control Structure at the outlet of Meelpaeg Reservoir since 1967. This concrete control structure is comprised of three gates that control the flow of water from Meelpaeg and other upstream reservoirs to power hydroelectric generation facilities at Upper Salmon and Bay d'Espoir. Gate operations at the Ebbegunbaeg facility are controlled remotely from the Bay d'Espoir Generating Station's control centre. NL Hydro does not maintain a full time personnel presence at the control structure, although personnel must travel to the site from Bay d'Espoir for planned maintenance and emergency repair requirements as needed.

Located in a remote section of the Island of Newfoundland, approximately 70 km south of Millertown (Figure 1.1), overland access to the site is achieved by way of a gravel road that connects to Millertown and the Buchans to Badger highway (Route 370). This gravel road is not cleared of snow during the winter and travel during non-winter months is restricted to four-wheel drive and/or all-terrain-vehicles. Vehicles traveling to Ebbegunbaeg via the access road must cross Noel Paul's Brook at a designated ford site that has been maintained and used by NL Hydro since the original access road construction in 1966. Therefore, even when road conditions permit, road access to Ebbegunbaeg may be prohibited by high water levels in this watercourse.

NL Hydro's main areas of focus include a commitment to safety, the environment and the operational performance of its assets. In keeping with these objectives and principles, the company is proposing to construct a Bailey type bridge across Noel Paul's Brook at the existing fording location. This will allow for improved accessibility to the road link between the Ebbegunbaeg Control Structure and the Buchans to Badger highway. This improved accessibility will allow improved asset management capability for ongoing maintenance and operational requirements at the Ebbegunbaeg Control Structure.

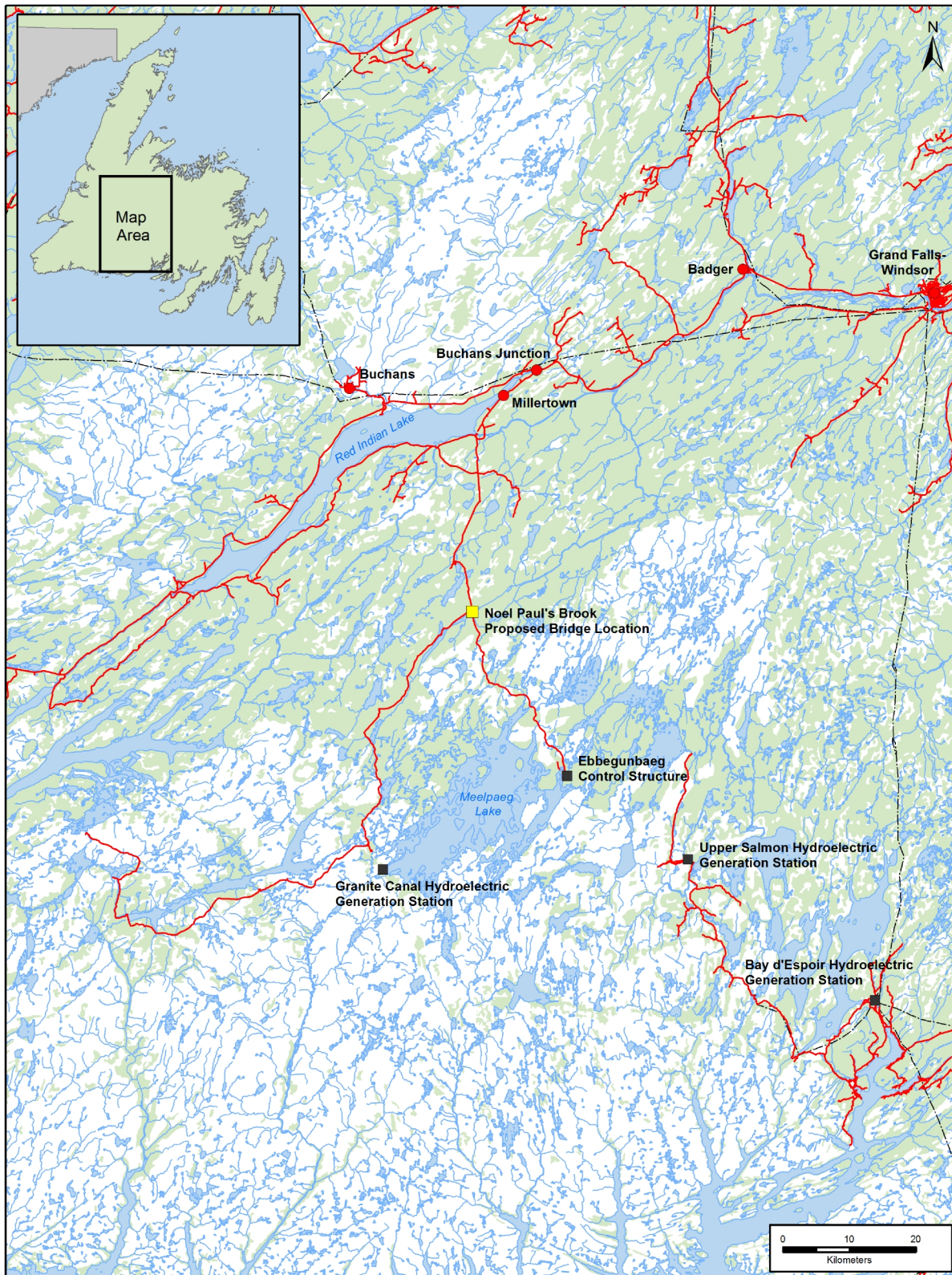
Bridge construction including tendering, pre-engineered bridge fabrication, on-site civil works and bridge installation will take approximately 20 weeks to complete and is planned to be completed in the second half 2016.

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<sup>1</sup> A ford is a shallow place with stable bed and banks where a river or stream may be crossed by wading or in a vehicle



Figure 1.1 Location of Proposed Noel Paul's Brook Bridge



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## 1.2 Purpose of the EA Registration

The proposed Project is subject to Part 10 of the Newfoundland and Labrador *Environmental Protection Act* and the associated *Environmental Assessment Regulations*. This document is intended to initiate the provincial environmental assessment (EA) review, and in doing so it:

- Identifies the Project's proponent and describes its goals, core values, and environmental management approaches and procedures;
- Describes the proposed Project, including its overall purpose and rationale, as well as its key components and planned construction and operational activities;
- Describes a number of recent Project-related consultation activities undertaken by NL Hydro and their main findings; and
- Provides an overview of the existing environmental setting for the Project, some of the potential environmental considerations that have been identified to date, and NL Hydro's planned approaches for addressing these in moving forward with Project planning and eventual implementation.

This *EA Registration* document has been prepared and submitted by NL Hydro, with assistance from Amec Foster Wheeler Environment and Infrastructure.

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## 1.3 The Proponent

**Name of Corporate Body:** Newfoundland and Labrador Hydro (a Nalcor Energy Company)

**Address:** Hydro Place, 500 Columbus Drive  
P.O. Box 12400  
St. John's, Newfoundland and Labrador  
Canada A1B 4K7  
Tel. (709) 737-1440, Fax. (709) 737-1800  
Email. [hydro@nlh.cl.ca](mailto:hydro@nlh.cl.ca)

**President and Chief Executive Officer:** Edmund J. Martin

**Contact Person for Environmental Assessment Purposes:** Brent Sellars  
Manager - Capital Projects / Environmental Assessment  
Environmental Services Department  
Tel. (709) 737-1764, Fax. (709) 737-1777  
Email. [bsellars@nalcorenergy.com](mailto:bsellars@nalcorenergy.com)

Newfoundland and Labrador has an immense and diverse energy warehouse. In 2007, guided by a long-term *Energy Plan* to manage these energy resources, the Government of Newfoundland and Labrador created a new provincial energy corporation - Nalcor Energy - whose vision is to build a strong economic future for successive generations of Newfoundlanders and Labradorians. The corporation currently has six lines of business (Figure 1.2):

**Figure 1.2 Nalcor Energy Organizational Structure**



NL Hydro is the Proponent of the proposed Noel Paul's Brook Bridge Installation Project, and is the primary generator of electricity in the province. With an installed generating capacity of 1,892.6 MW, the company generates and transmits over 80 percent of the electrical energy that is used by Newfoundlanders and Labradorians, most of which is comprised of clean, hydroelectric generation.

NL Hydro is committed to delivering safe, reliable, least-cost power to industrial, utility and over 38,000 direct customers in 200 communities in rural Newfoundland and Labrador, and has been doing so for more than 50 years. NL Hydro's regulated assets include nine hydroelectric generating stations (959 MW), one oil-fired plant (490 MW), five combustion turbines (373.5 MW), and 25 diesel plants (70.1 MW), and the company also maintains 54 high-voltage terminal stations, 25 lower-voltage interconnected distribution stations, and thousands of kilometres of transmission and distribution lines throughout the province.

NL Hydro's electrical system includes the Bay d'Espoir Hydroelectric Generating Facility in south-central Newfoundland, which has been in operation since 1967. The headwaters of this system begin at Victoria Lake at an approximate elevation of 320 m. Through an array of dams and canals, including the Ebbegunbaeg Control Structure, water is directed to generating plants at Granite Canal, Upper Salmon and finally to its final tidewater destination at Bay d'Espoir, located some 150 km from Victoria Lake. Road access to the Ebbegunbaeg Control Structure crosses Noel Paul's Brook approximately 30 km south of the community of Millertown.

NL Hydro is focused on long-term strategic capital planning to ensure an on-going, reliable source of electricity now and for future generations. Its continuous infrastructure upgrades and use of new technology are some of the ways in which the company commits to providing excellent customer service. The utility is fully dedicated to operational excellence and environmentally sound practices while delivering reliable service at the least cost.

Additional information on NL Hydro, including its overall organization, values, priorities and activities, can be found at: [www.nlhydro.com](http://www.nlhydro.com).



NL Hydro strives to be a leader in environmental protection and sustainability, and is committed to maintaining a high standard of environmental responsibility and performance. NL Hydro has constructed and currently operates an extensive electricity transmission system throughout Newfoundland and Labrador (Figure 1.3). This includes interconnected electrical power systems on the Island and in Labrador, as well as isolated distribution systems in rural areas of the province.

Environmental protection planning is an integral part of NL Hydro's planning, construction, operations and maintenance programs. The corporation has state-of-the-art and proven policies and procedures related to environmental protection and management which will be implemented throughout this Project. The corporation has an outstanding record of environmental protection and stewardship, and this objective and experience will be applied to the planning and development of this Project to avoid or reduce potential environmental effects during its various phases.



Figure 1.3 Existing Newfoundland and Labrador Generation and Transmission System



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## 1.4 Environmental Assessment Process and Requirements

The Newfoundland and Labrador *Environmental Protection Act (NL EPA)* requires anyone who plans a project that could have a significant effect on the natural, social or economic environment (an "Undertaking") to present it for examination through the provincial EA process. The definition of an "Undertaking" in the *NL EPA* includes proposed modifications, rehabilitations and extensions of such projects.

The associated *Environmental Assessment Regulations (Part 3)* list those projects (potentially including proposed modifications, rehabilitations and extensions of same) that require registration and review.

Section 28 of the *Environmental Assessment Regulations* state that:

*28. An undertaking that will occur within 200 metres of the high water mark of a river that is a scheduled salmon river under the Fisheries Act (Canada) shall be registered.*

Noel Paul's Brook is a scheduled salmon river, which forms part of the Exploits River and tributary stream system.

Following public and governmental review of this EA Registration, the Minister of Environment and Conservation will determine whether the Project may proceed, subject to any terms and conditions and other applicable legislation, or whether further assessment is required.

In addition to approvals under the provincial EA process, the Project may also require a number of other authorizations from relevant regulatory authorities. These are identified and discussed further later in this document and in Appendix A.

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## 2.0 PROJECT DESCRIPTION AND SCOPE

The proposed Project will involve the construction of bridge abutments in the bank of Noel Paul's Brook and the placement of a spanning Bailey type bridge to connect the abutments and provide for safe vehicle travel across the watercourse. Construction activities are currently planned to be completed in the second half of 2016.

The following sections provide a description of the proposed Project, including an overview of the NL Hydro's past and on-going use of the stream crossing location as background and context, as well as the primary components and activities that will be involved in the planned work.

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### 2.1 Overview of Vehicle Access Across Noel Paul's Brook

Development of the Bay d'Espoir hydroelectric generating system in the late 1960's included the creation of water storage reservoirs at Victoria and Meepaeg Lakes and the diversion of water flows from these reservoirs to the Long Pond Reservoir. The Ebbegunbaeg Control structure is located at the outlet of the Meelpaeg Reservoir and serves to regulate water flow into the Upper Salmon and Bay d'Espoir hydroelectric generation facilities (Figure 1.1). The Ebbegunbaeg Control Structure is a vital component of the Bay d'Espoir hydroelectric generating system, as its operation is essential to ensuring the efficient operation of the downstream generation plants. The concrete control structure was constructed in 1967 and is comprised of three gates that discharge water through a two kilometer long downstream canal.

Access to the control structure site is by way of an existing 70 km long gravel access road which connects with the provincial road network, Route 370, at the community of Millertown (Figure 1.1). This access road crosses Noel Paul's Brook approximately 30 km south of Millertown. Historically access across Noel Paul's Brook has been by fording of vehicles and equipment at a wide and shallow section of stream with a stable, gravel/cobble streambed located downstream of the outlet of Haven Steady (Figure 2.1).

A temporary bridge was installed at this river crossing site in 2002 to enhance the access for the transport of materials and equipment during the construction of a new transmission line connecting substations at the Upper Salmon Hydroelectric Generating Station and a new hydroelectric generating station at Granite Canal. The temporary bridge was removed in 2005, following completion of the transmission line construction project. The fording site continues to be used for the transport of materials to the control structure when required. Figure 2.1 is a photograph of the site taken in July 2015 showing the ford site as well as the location of the previous temporary bridge. Figure 2.2 is a photograph of the site in 2003 showing the temporary Bailey type bridge that was installed across Noel Paul's Brook at that time.



**Figure 2.1 Aerial View of Existing Noel Paul's Brook Ford Site and Proposed Bridge Location**





**Figure 2.2 Photograph of Noel Paul's Brook with a Temporary Bailey Type Bridge in Place in 2003**

## 2.2 Project Purpose, Rationale and Need

NL Hydro's foundation is built on its core business - the generation and transmission of electrical power – and the corporation has a strong commitment to providing safe, reliable and dependable electricity to its utility, industrial, residential and retail customers.

The Ebbegunbaeg Control Structure is a key component of the Bay d'Espoir hydroelectric generation system. Located on the downstream side of the Meelpaeg Reservoir, the largest such reservoir in the system, the structure is utilized to control the flow of water into the Upper Salmon and Bay d'Espoir hydroelectric generation facilities. Its operation is essential to ensuring the efficient operation of these plants, and thus to the generation and supply of electricity on the Island of Newfoundland.

The control structure is currently more than 40 years old, and has therefore reached the age in which an increase in the required frequency and magnitude of maintenance and repair work at the facility is anticipated. Upgrading of the facilities may also be required in the future as a result of technology changes and equipment replacement needs. In order to properly implement a comprehensive asset management strategy, an increase in the frequency

and duration of scheduled maintenance, as well as the number of employees required to carry out such maintenance, will be required.

NL Hydro employees working at Ebbegunbaeg Control Structure have typically driven to site and stayed at the existing site accommodation facilities. NL Hydro has identified concerns with the physical deterioration of the existing accommodations facilities and is planning to replace those facilities in order to meet acceptable levels of employee safety and comfort. The need for these facilities is magnified due to the remote location and logistical issues, associated with site access, which makes it impractical to transport employees to and from the site on a daily basis.

Construction of a bridge across Noel Paul's Brook is required to enable safe and effective transport of personnel, equipment and materials to the Ebbegunbaeg Control Structure while new accommodation facilities are constructed, and will provide more effective continued accessibility to the site for ongoing asset management requirements.

The proposed Project that is the subject of this EA Registration - and for which EA approval is being sought – is comprised of the planned bridge installation across the Noel Paul's Brook scheduled salmon river. The Ebbegunbaeg Control Structure and other associated infrastructure will continue to function in the same manner in which the facility is currently operated. The scope of the Project for EA purposes therefore does not include the on-going and future operation and asset management of these long-standing water control facilities or other associated facilities and infrastructure by NL Hydro.

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### 2.3 Project Planning and Alternatives

The consideration of environmental issues from the earliest stages of project planning and design is an important and integral part of Hydro's approach to its development projects and other activities. This approach allows potential environmental interactions to be identified early, so they can be considered and addressed in a proactive manner through appropriate development planning and design. The objective is to attempt to avoid adverse environmental effects where possible and practical, or at least, to put in place appropriate mitigation measures to ensure that these are maintained at acceptable levels

As described in the previous section, NL Hydro has identified the potential for an increase in the frequency and magnitude of maintenance and repair work at the Ebbegunbaeg Control Structure. Associated with this will be an increase in vehicle and equipment traffic across Noel Paul's Brook. NL Hydro is proposing to install a bridge to replace the existing ford site at the Ebbegunbaeg Control Structure access road crossing of this watercourse. This will:

- Allow vehicle access across Noel Paul's Brook during higher flow conditions;
- Reduce the potential disturbance to the bed and bank of the watercourse associated with increased traffic;
- Reduce the potential for accidents resulting in loss of environmental contaminants such as fuel and oil from vehicles while fording the watercourse; and,
- Enhance vehicle safety at the crossing.

The alternative of maintaining the existing fording site would continue to limit vehicle access to the Ebbegunbaeg Control Structure during higher flow conditions and entails higher risk to personnel, equipment and materials while being transported across Noel Paul's Brook. Maintaining the ford site at Noel Paul's Brook is not the preferred alternative as the frequency of travel along this access road to the Ebbegunbaeg Control Structure is expected to increase.

NL Hydro also uses helicopters to transport personnel to and from the Ebbegunbaeg Control Structure, however, this can be restricted by weather conditions and poses logistical issues to the planning and implementation of maintenance work at the Structure. Helicopter access also does not address requirements for the transport of equipment and materials. Use of helicopter for transport requirements associated with long term asset management at the Ebbegunbaeg facility is not preferred because of such practical limitations, and road access remains the preferred alternative.

As indicated previously, a temporary bridge had been installed at this watercourse crossing site in 2002. NL Hydro is proposing to install the new bridge at the same location as the previous temporary bridge. This will maximize the utilization of previously disturbed terrain as opposed to disturbing new sites. Use of this site is preferred for this reason.

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## 2.4 Project Components and Lay-out

The Project includes the installation of a bridge at Noel Paul's Brook, including the following components:

- 1) Installation of bridge abutments on both banks of Noel Paul's Brook directly adjacent to the existing ford site;
- 2) Installation of a Bailey type bridge spanning the two abutments;

The Project also includes the refurbishment of the access road approaches to the bridge site previously used in 2002, in order to ensure that these approaches allow for safe vehicle access to the proposed bridge.

The following sections provide an overview description of the Project's key components, based on previous and ongoing engineering studies and reflecting the current stage of Project planning and design.

As described below, the Project is the subject of ongoing engineering, and as with any development project this will be subject to continued refinement and optimization as its planning and eventual implementation move forward.

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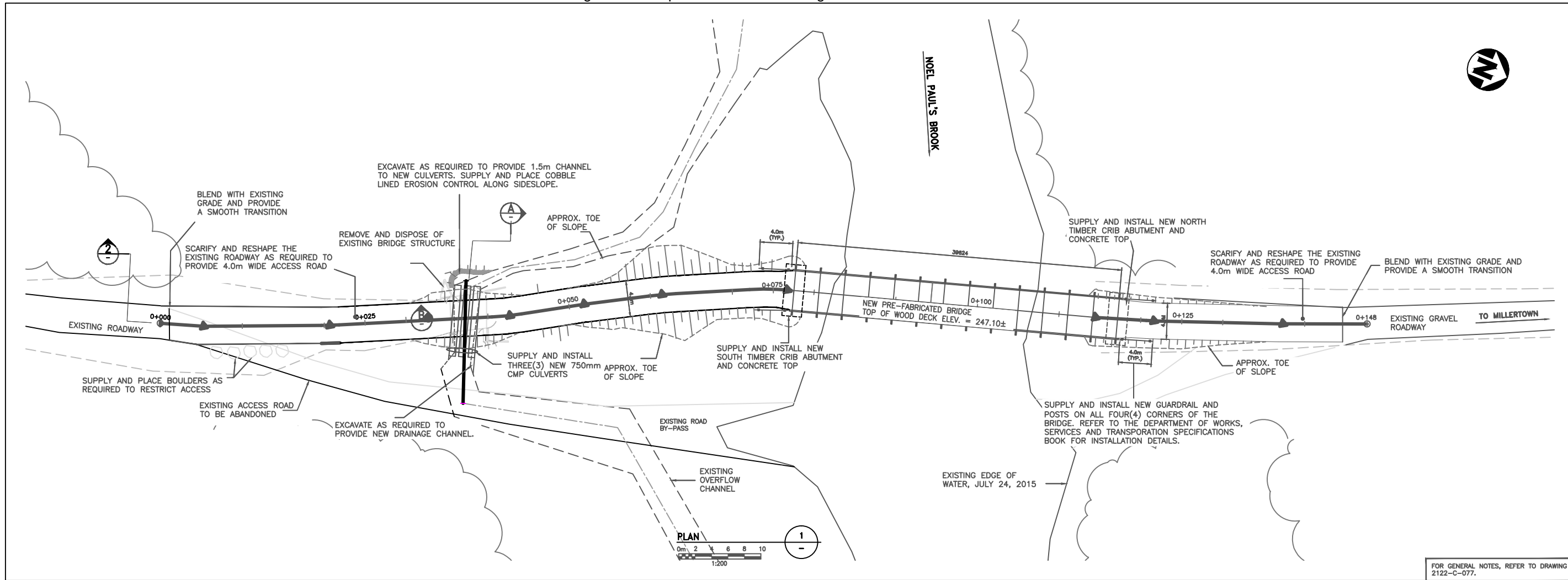
### 2.4.1 Bridge Abutments

Bridge abutments will be built into the north and south banks of Noel Paul's Brook, above the high water mark. These abutments will be timber crib construction using CCA pressure treated 20 cm X 20 cm timber which will be filled with ballast rock. Abutment dimensions will be approximately 3 m long, 4 m wide, and 2 m high. Sketches of the proposed bridge plan and profile are provided in Figure 2.2. Photographs of the north and south abutment locations from July 2015 are provided in Figures 2.3 and 2.4.

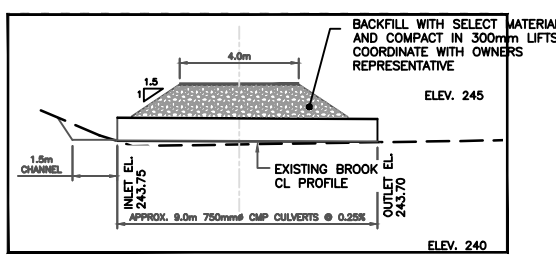
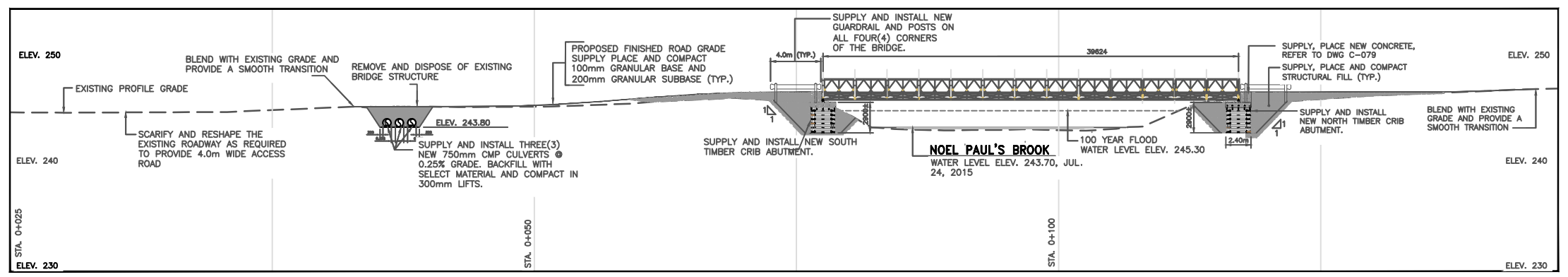




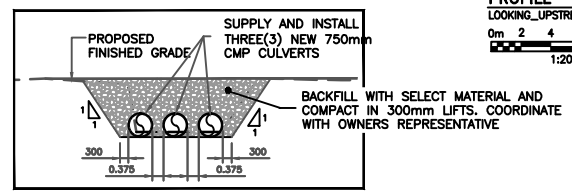
Figure 2.3 Proposed Noel Paul's Bridge Plan and Profile



FOR GENERAL NOTES, REFER TO DRAWING 2122-C-077.



SECTION ROAD @ CULVERTS  
0m 2 4 6 8 10  
1:200



SECTION CULVERTS  
0m 2 4 6 8 10  
1:200

PROFILE LOOKING UPSTREAM  
0m 2 4 6 8 10  
1:200

DWG. NO.	TITLE	A	ISSUED FOR REVIEW/APP'D	NO.	DATE	DESCRIPTION	DWN.	DESIGN.	CHK.	APP'D
	REFERENCE DRAWINGS									

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**amec foster wheeler**  
Amec Foster Wheeler Americas Limited  
133 Crofton Road, St. John's, NL, A1B 1H3  
Tel: (709) 724-1900  
Fax: (709) 739-5458  
www.amecfrw.com  
PROJECT NUMBER - 180289

**hydro**  
Newfoundland and Labrador Hydro

BAY D'ESPOIR DEVELOPMENT - STAGE 2  
EBBEGUNBAEG CONTROL STRUCTURE  
NOEL PAUL'S BROOK  
PLAN & PROFILE

ELECT. SCALE: AS SHOWN  
CIVIL DESIGNED: D. KENNEY  
TRANS. DRAWN: G. MILLS  
MECH. DATE: 14AUG15  
P&C CHECKED: -  
TELC. APPROVED: -

DWG. NO. B1- 2122-C-078  
REV A

**Figure 2.4 Proposed Bridge North Abutment Site – Photographed from the South Abutment Location**





**Figure 2.5 Proposed Bridge South Abutment Site – Photographed from the North Abutment Location**

---

#### 2.4.2 Bailey Bridge

The Bailey bridge itself will be a prefabricated steel frame design with a span of approximately 40 m. No mid span support is required for the installation or operation of this bridge. The bridge is a single lane design approximately 4 m wide. The driving surface will be CCA pressure treated timber bolted horizontally across the metal bridge surface. The bridge will be designed for a 1:100 year return flood condition with a design flow of 67.0 m<sup>3</sup>/s

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#### 2.4.3 Improvements to Road Approaches

The road approaches used during the previous temporary bridge installation remain in place and will be re-surfaced for this new bridge installation. The access ramp approaches to the bridge are approximately 75 meters long on the south side of the watercourse and approximately 25 meters long on the north side. In general, refurbishment of these sections will involve scarification and reshaping of the roadway as required to provide for a 4 meter wide road bed.

A drainage channel crosses the access road leading to the proposed bridge location approximately 35 meters south of Noel Paul's Brook. This channel receives drainage flows from a ridge of land to the west of the road bed as well as overflows from Noel Paul's Brook that occur during high flow periods. The channel is approximately four meters wide and is presently spanned by wooden timbers that are damaged and deteriorated to the extent that they no longer provide a safe driving surface. It is proposed to remove the existing timber and supports and replace these with a culvert arrangement suitable to accept appropriate design flows, subject to approval by government regulatory agencies. The preliminary design indicates that three 750 mm diameter culverts will provide acceptable flow capacity.

---

## 2.5 Construction

A general overview of the primary activities that will be associated with the construction phase of the Project is provided in the following sections. The Project will be constructed with commonly used construction practices and in accordance with standard procedures and applicable regulatory requirements.

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### 2.5.1 Construction Activities and Sequence

Installation of the proposed bridge and preparation of road access ramps will involve the following activities.

1) Marshalling of equipment and materials.

A previously disturbed area is available adjacent to the existing road bed on the north side of Noel Paul's Brook and is proposed to be used for placement of a temporary office trailer and the stockpile of materials such as abutment timber, Bailey bridge sections and road culverts, prior to installation.

2) Excavation and Installation of abutments

The locations of the previous temporary bridge abutments will be used for the proposed new bridge abutments. The abutment locations are above the high water level in the Brook and do not constrict the present bank of the watercourse at this location. Rock and other earthen materials will be excavated, and the locations will be shaped and leveled to accommodate the new abutment timbers. Timber cribs will be constructed on the north and south banks and filled with appropriately sized ballast rock.

3) Installation of the Bailey bridge

The Bailey bridge itself will be a prefabricated steel frame design with a span of approximately 40 m. It will be installed by cantilevering, using counterweights, from the north abutment to the south abutment. No mid span support is required for the installation or operation of this bridge. The driving surface will be CCA pressure treated timber bolted horizontally across the metal bridge surface.

4) Upgrading of the existing road ramp approaches to the bridge.

For the most part this will involve grading and reshaping of the existing road ramp approaches. Placement and compacting of new road surface material may also be required to ensure smooth vehicle access is provided to the bridge.

At the drainage channel crossing located in the southern road approach, the existing timber span arrangement will be removed for suitable disposal and an approved new culvert arrangement put in its place. Drainage flows will be diverted or otherwise controlled so that this work can be completed while minimizing any potential for sediment laden waters entering Noel Paul's Brook.

All of these activities will occur at locations that have been previously used as part of the 2002 temporary bridge installation at this site.

### 2.5.2 Construction Workforce

Project construction will be carried out on a contractual basis, with workers hired at the discretion of the Contractor and in accordance with its own hiring practices and policies. Once construction is completed, the facility will continue to be operated using NL Hydro's existing workforce. NL Hydro supports employment and gender equity in its hiring and contracting practices.

An initial estimate of the Project's required construction labor force, by number, occupation and National Occupational Classification (NOC) code, is provided in Table 2.1.

**Table 2.1 Occupations Likely to be Represented in the Construction Work Force**

Project Phase	Number (Approximate)	Occupation	National Occupational Classification (NOC)
Construction	1	Supervisor / Foreperson	NOC 7205
	2	Heavy Equipment Operators	NOC 7521
	1	Crane Operator	NOC 7371
	2	Concrete Finishers	NOC 7282
	2	Steel Erectors	NOC 7235
	2	Truck Drivers	NOC 7511
	2	Mechanical Technicians (compressors)	NOC 7311
	4	Labourers	NOC 7611
	1	Environmental Monitor	NOC 2231

### 2.6 Operation and Maintenance

This site has been used for approximately 50 years and has been very stable, requiring minimal maintenance. Once in place and operational, the bridge will be subject to normal inspection and maintenance including replacement of any damaged or deteriorated decking as required.

---

## 2.7 Project Schedule and Cost Estimate

Following detailed and on-going engineering design and planning, the current Project schedule is for bridge construction to occur in the second half of 2016. Project sanction, initiation and scheduling is, however, subject to final Project planning and engineering activities, and the receipt of all required corporate and regulatory approvals to proceed.

The estimated capital cost of the overall Project, based on the current stage of engineering design and planning, is approximately \$500,000.

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## 2.8 Project Documents

Apart from this EA Registration, no other EA-related documents have been produced by NL Hydro in relation to this Project.

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## 2.9 Environmental Management and Protection

The number and diversity of environmental challenges facing large companies and their development projects and operations require a structured and consistent management approach. NL Hydro has chosen the ISO 14001 Environmental Management System (EMS) standard developed by the International Organization for Standardization (ISO) to manage environmental aspects. This decision has resulted in continual improvement of environmental performance, while fulfilling the corporation's mandate to provide customers with cost-effective and reliable power. Existing NL Hydro facilities have been individually registered by an external auditor (Quality Management Institute, QMI) as compliant with the ISO 14001 standard. This Project will be undertaken in accordance with NL Hydro's EMS.

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### 2.9.1 Environmental Protection Planning

Environmental protection planning is an integral part of NL Hydro's construction, operations and maintenance programs.

As noted previously, NL Hydro currently operates an extensive electricity generation and transmission system in Newfoundland and Labrador. This includes interconnected electrical power systems in Labrador and on the Island as well as isolated distribution systems throughout rural areas of the province. As a corporation with significant experience in constructing and maintaining hydroelectric and other generation facilities and transmission infrastructure in Newfoundland and Labrador, NL Hydro has state-of-the-art and proven policies and procedures related to environmental protection and management which will be implemented during the various phases of this proposed Project.

An Environmental Protection Plan (EPP) is an important tool for consolidating environmental information in a format that provides sufficient detail for the implementation of environmental protection measures in the field during construction. An EPP provides concise instructions to personnel regarding protection procedures and



descriptions of techniques to reduce potential environmental effects associated with any construction activity. The main objectives are to:

- Consolidate information for planning;
- Ensure that environmental standards are current and complied with;
- Provide details of corporate commitments to environmental protection and planning; and
- Provide guidelines for field activities and decision-making on environmental issues relevant to construction, operations and maintenance activities.

A project-specific EPP will be prepared and implemented by the selected Contractor(s) for this Project's construction phase. The EPP will be a field-useable document, addressing provisions that will avoid or reduce environmental effects which may be associated with construction. As appropriate, the EPP will include items relating to work in or near water, earth work and drainage water control, demolition and removal of structures with treated timber, handling and installing cement and formwork, contingency plans for unplanned events such as spills, rehabilitation and compliance monitoring, and others.

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#### 2.9.2 Safety, Health and Environmental Emergency Response Plan

In the construction, operation and maintenance of any development project, an accidental release or other unplanned event is an unlikely, but unfortunately possible, event. NL Hydro proactively identifies potential emergency situations and develops response procedures, including Safety, Health and Environmental Emergency Response Plans (SHERPs).

The purpose of a SHERP is to identify responsibilities in the event of an unplanned incident, including the accidental release of fuel or other hazardous material, on-site or during transportation, and to provide the information required for the effective response and reporting of such an incident. NL Hydro will conform to both provincial and federal legislation with the intent of meeting both its legal and corporate responsibilities.

The establishment and maintenance of emergency response procedures addresses the:

- Protection and maintenance of human health and safety;
- Identification of the potential for accidents and emergency situations;
- Planned response to accidents and emergency situations; and
- Prevention and mitigation of potential environmental effects associated with accidents and emergency situations.

A site/activity-specific SHERP will be prepared and implemented for the Project. The Project-specific SHERP will address: roles and responsibilities, personal protective equipment, materials storage, driving safety, working at heights, working near or over water, emergency response communications, spill response, personnel injury response, search and rescue, fire response, and vehicle / equipment accidents.

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## 2.10 Environmental Permits and Approvals

In addition to approval under the provincial EA process, the Project will also require a number of other provincial and federal permits and authorizations. NL Hydro is committed to obtaining, and complying with the conditions of, these required permits and approvals during Project construction and operations, and will require the same of any and all contractors that are involved in this Project.

A number of key environmental permits and approvals that may be required in relation to the Project include those listed in Appendix A.



### 3.0 ENVIRONMENTAL SETTING, POTENTIAL INTERACTIONS AND MITIGATION

This Chapter provides an overview of the existing environmental setting for the proposed Project, including a description of relevant components of the biophysical and socioeconomic environments. This is followed by an analysis of the Project's potential environmental interactions and the identification and description of mitigation measures which will be put in place to avoid or reduce any such effects.

#### 3.1 Existing Environment

The following sections provide a general description of the existing natural and human environments in the area within which the Project will be located, based on existing and available information. The objective is to present an overview summary of the environmental setting and context for the Project.

##### 3.1.1 Biophysical Environment

The proposed Project site is located in Central Newfoundland, on Noel Paul's Brook, a tributary of the Exploits River, a scheduled Atlantic Salmon river.

The climate of the Noel Paul's Brook watershed is typical of the larger region, which has the most continental climate of any part of insular Newfoundland including the highest summer and lowest winter temperatures on the Island. A summary of the key climatic characteristics of the Buchans area, the nearest community at which climate normals have been recorded, is presented in Table 4.1, based on climate normals data for the years 1981 to 2010.

**Table 3.1 Climate Normals for Buchans (1981-2010)**

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Temperature (°C)	-8.2	-8.4	-4.8	1.0	7.0	12.1	16.3	16.2	11.9	6.0	0.5	-4.5	3.8
Precipitation (mm)	122.0	98.1	95.0	85.7	86.6	87.8	95.3	123.0	110.4	97.5	111.8	123.1	1,236.2
Rainfall (mm)	33.7	25.6	39.5	59.5	82.2	87.7	95.3	123.0	110.3	92.5	81.5	46.3	877.0
Snowfall (cm)	88.3	72.5	55.5	26.2	4.4	0.1	0.0	0.0	0.1	5.0	30.4	76.9	359.3

Source: Environment Canada (2014)

Overall, the mean monthly temperature at this location is 3.8°C, and ranges from -8.4°C in February to 16.3°C in July. The Buchans area also receives fairly consistent precipitation throughout the year, averaging 1,236.2 mm annually. April is generally the driest month with 85.7 mm of precipitation, while December is the wettest on average with 123.1 mm. August is also a relatively wet month with an average precipitation of 123.0 mm. The total annual snowfall is 359.3 cm each year, generally occurring between October and May.

The underlying bedrock of the Noel Paul's Brook ford site area is characterized primarily by the Cambrian Middle Ordovician, Storm Brook Formation (Rogers et al, 2005), and is comprised predominantly of felsic tuffaceous sandstone, conglomerate, siltstone and shale, locally pyritiferous, rare limestone, quartz, and feldspar porphyritic

to aphyric felsic to intermediate volcanic rock and minor basalt and associated gabbro. Surficial geology within and around the Project area is primarily of fluvial origin containing mixtures of grain sizes from clay to boulders. Bedrock is mostly concealed by vegetation, patches of till, sand and gravel, and bog (Liverman et al, 1994).

The Project area is located within the Central Newfoundland Ecoregion (Meades 1990), which encompasses much of the north-central portion of the Island of Newfoundland. This ecoregion is again characterized by a continental climate with relatively high summer temperatures and low winter temperatures. Due to the warm summer and high evapo-transpiration losses, soils in the northern part of this ecoregion display soil moisture deficiency. The hylacomium-balsam fir forest type occupies the zonal soils of this area. These soils are generally lighter in colour and have lower organic matter content compared to other ecoregions. Forest fires have played an important role in the natural history of this region, and much of the balsam fir-feathermoss forest types have been converted to black spruce and some of the richer site types to hardwood forests dominated by white birch and aspen. Although aspen occurs in other regions, it is most abundant and vigorous in Central Newfoundland, but yellow birch is absent from this region primarily because of the short frost-free period. Alders rather than mountain maple are the most common species on wet seepage slopes.

Within the larger Central Newfoundland Ecoregion, the proposed Project area is located in the Red Indian Lake Subregion. This Subregion is distinguished from the rest of the Central Newfoundland Ecoregion by having the coolest summers, highest precipitation, and the shortest growing season. Despite the cooler average temperatures, however, summertime night frosts are not as common as in other areas. Although the subregion experiences higher precipitation than other subregions in the Central Newfoundland Ecoregion, it is generally drier than other Island Ecoregions. Because of the relatively dry, warm summers, the Red Indian lake subregion experiences higher fire frequency than anywhere else in Newfoundland. The subregion is characterized by dense forests, bogs, and rolling hills that are gradually higher from north to south within the subregion, from 150 m above sea level in the north to 450 m above sea level in the south. The rolling to undulating topography is characterized by shallow, medium quality till with a soil texture range from sandy loam to loam. Balsam fir forests are the most common in the subregion, though black spruce will replace balsam fir on well drained hilly sites after a fire. White birch grows in the area in stands or as part of mixed forests. White birch colonizes areas that have been disturbed and thrives in this ecoregion because of the high number of forest fires. Where tree regeneration is lacking, succession to dwarf shrub heath dominated by *Kalmia angustifolia* occurs on the nutrient-poor coarse textured till that is prevalent through much of this area (Meades 1990). The proposed Project site itself is primarily cleared ground associated with the road bed and existing ford site.

The Central Newfoundland region, with its productive and scrub forests, extensive wetlands and barren areas also provides habitats for a range of wildlife that are typical of boreal forest ecosystems. Typical species groups include large mammals (e.g. moose and black bear), furbearers (e.g. red fox, eastern coyote and Canada lynx), small mammals (e.g. meadow voles and southern red-backed voles), and semi-aquatic mammals (e.g. muskrat, American beaver and river otter). This ecoregion also supports a diverse assemblage of avian groups, particularly along riparian habitat, including raptors, waterfowl, songbirds and upland game birds.

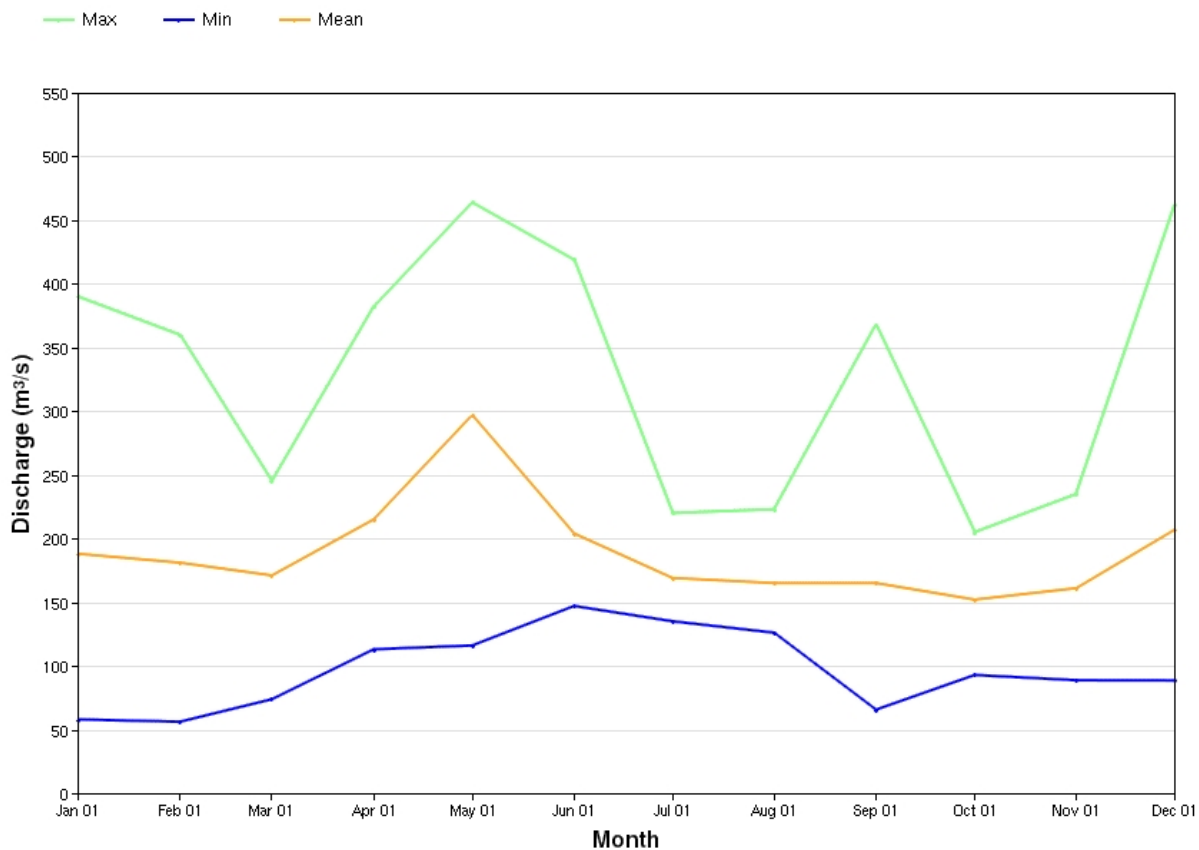
Caribou may also be found periodically in the Noel Paul's Brook and Ebbegunbaeg Control Structure areas. However, studies conducted by NL Hydro during construction of the Upper Salmon Hydroelectric Generating Station and the Granite Canal Generating Station indicated that these areas do not contain critical or core habitat for the caribou herds found in Central and Southern Newfoundland. This is supported by more recent studies

undertaken by the Government of Newfoundland and Labrador intended to improve the understanding of Newfoundland's caribou population dynamics in response to a declining caribou population (Environment and Conservation, 2015).

No plant or animal species that are listed under the Newfoundland and Labrador *Endangered Species Act* (NL ESA) or the Canadian *Species at Risk Act* (SARA) are known or likely to occur within the proposed Project area itself. Noel Paul's Brook flows into the Exploits River approximately 23 km downstream from the outlet of Red Indian Lake. The overall Noel Paul's Brook watershed has a drainage area of 1,062 square kilometers. The drainage area above the proposed bridge location is approximately 172 square kilometers. The river is 88.5 kilometers long, including standing water (Mercer, 1967).

Although water flows have not been measured and monitored in Noel Paul's Brook directly, there has been a gauging station operated in the Exploits River below Noel Paul's Brook since 1985. Lower monthly flows at that station have typically occurred in the period July through November and highest monthly flows have normally occurred in April and May, during the spring freshet (Figure 4.1).

**Figure 3.1 Exploits River below Noel Paul's Brook Water Flows (Monthly Discharge, 1985-2014)**



Source: Water Survey of Canada (2015)

Fisheries and Oceans Canada conducted fish population studies in Noel Paul's Brook in 1968. The Brook had been selected to undergo experimental fish introductions and it was considered desirable to have a knowledge of fish populations before introduction. The Brook was found to contain populations of brook trout (*Salvelinus fontinalis*), threespine stickleback (*Gasterosteus aculeatus*) and landlocked salmon (*Salmo salar*) (Pond, 1968). A brief summary of the overall life history and uses of these species is presented in Table 4.2.

From 1968 to 1975 the Department of Fisheries and Oceans stocked Noel Paul's Brook with Atlantic salmon fry at an average density of 42 fry/100m<sup>2</sup> of river habitat (O'Connell, et al 1983). As well, from 1976 to 1992, the Department operated a spawning channel and incubation box facility at Noel Paul's Brook that was used to produce Atlantic salmon fry for use in stocking tributaries of the Exploit's River, including Noel Paul's Brook (Bourgeois, et al 2001). The incubation box facility has since been decommissioned.

**Table 3.2 Fish Species Known to Occur in Noel Paul's Brook**

Common Name	Scientific Name	Biological/Habitat Details
Atlantic salmon	<i>Salmo salar</i>	<p>Typical Habitat</p> <ul style="list-style-type: none"> <li>Preferred temperature: 8-16°C</li> <li>Preferred depth: Variable</li> <li>Preferred substrate: gravel, cobble, boulder</li> </ul> <p>Biology and Ecology</p> <ul style="list-style-type: none"> <li>Distributed throughout Newfoundland and Labrador</li> <li>Occurs as landlocked (Ouananiche) and anadromous life histories</li> <li>Spawn in clean, well aerated, gravel bottom riffle sections of stream</li> <li>Diet depends on the size and habitat of fish, as well as season</li> <li>Juvenile anadromous salmon remain in natal watersheds for 2-4 years</li> <li>Adult salmon generally remain at sea for 1-3 years before returning to their natal stream to spawn</li> </ul> <p>Recreational/Commercial Value</p> <ul style="list-style-type: none"> <li>Recreational fishery</li> <li>There has not been a commercial salmon fishery in Newfoundland since 1997</li> </ul>
Brook trout	<i>Salvelinus fontinalis</i>	<p>Typical Habitat</p> <ul style="list-style-type: none"> <li>Preferred temperature: 11-16°C</li> <li>Preferred depth: 0.06-0.90 m</li> <li>Preferred substrate: gravel, cobble, boulder</li> </ul> <p>Biology and Ecology</p> <ul style="list-style-type: none"> <li>Inhabits lakes and rivers throughout Newfoundland and Labrador</li> <li>Can be landlocked or anadromous</li> <li>Feed mainly on aquatic and terrestrial insects and fish</li> <li>Can hybridize with other salmonid species</li> </ul> <p>Recreational/Commercial Value</p> <ul style="list-style-type: none"> <li>Recreational fishery</li> <li>No commercial fishery in Newfoundland</li> </ul>
Threespine stickleback	<i>Gasterosteus aculeatus</i>	<p>Typical Habitat</p> <ul style="list-style-type: none"> <li>Preferred temperature: 9-12°C</li> <li>Preferred depth: variable, generally &lt;1m</li> <li>Preferred substrate: within or near vegetation</li> </ul>

Common Name	Scientific Name	Biological/Habitat Details
		<p>Biology and Ecology</p> <ul style="list-style-type: none"> <li>• Common throughout Newfoundland and Labrador, in fresh, brackish and marine environments</li> <li>• Maximum lifespan is typically 2-2.5 years</li> </ul> <p>Recreational/Commercial Value</p> <ul style="list-style-type: none"> <li>• Limited; may be a food source for larger recreational / commercial species</li> </ul>
Sources: Grant and Lee (2004), DFO (2012)		

All of the fish species present in Noel Paul's Brook can undertake migrations (to varying degrees), which may occur as part of their seasonal changes in habitat associated with feeding and/or spawning or to avoid adverse environmental conditions (such as water temperatures). Table 4.3 presents a summary of known high intensity fish migration periods for these species.

**Table 3.3 Summary of Key Migration Times for Fish Species Known to Occur in Noel Paul's Brook**

Species	Season	Direction of Migration
Atlantic salmon	Spring-Fall	Upstream
	Fall	Downstream
Brook trout	Spring	Downstream
	Fall	Upstream
Stickleback <sup>1</sup>	Spring	Upstream

<sup>1</sup> Large scale migrations can occur in anadromous populations; landlocked populations undergo localized migrations  
Source: Grant and Lee (2004); Scott and Crossman (1973)

### 3.1.2 Socioeconomic Environment

The nearest community, Millertown, is approximately 30 km north of the proposed Noel Paul's Brook bridge location. The local area is used for recreational and commercial land and resource use activities. A variety of large and small game are hunted throughout the general region in season, and angling is also an important recreational activity. Cabins are located throughout the area, and there are several commercial outfitters in the general area (Figure 4.2). Although there are no commercial outfitters located in the immediate area of the Noel Paul's Brook proposed bridge, five cabins are located with 500 m of the site. Other consumptive resource activities, such as domestic wood cutting and berry picking, as well non-consumptive recreational activities also occur.

Numerous access roads and trails are located in the area and are used by recreational users as well as commercial loggers and mining enterprises. Most access roads are located on the north side of Noel Paul's Brook and provincial government designated domestic harvest areas, silviculture areas, mining leases and other designated resource development areas are also located to the north of Noel Paul's Brook (Figures 4.3 and 4.4).

The economy of the local area has traditionally been based on natural resource based industries, particularly forestry and mining. Logging has taken place in the region since the early 1900's. The Department of Natural Resources continues to manage cutting areas in the Noel Paul's Brook area with both softwood and hardwood harvesting occurring (Forestry and Agrifoods Agency, 2015). The most recent active mine in the area was operated by Tech Resources at the Duck Pond mine to the north of Noel Paul's Brook, but, within the Noel Paul's Brook watershed. This mine is in the process of closing because of depletion of the ore deposit.



Figure 3.2 Noel Paul's Brook Area - Resource Access Roads and Commercial Outfitter Locations

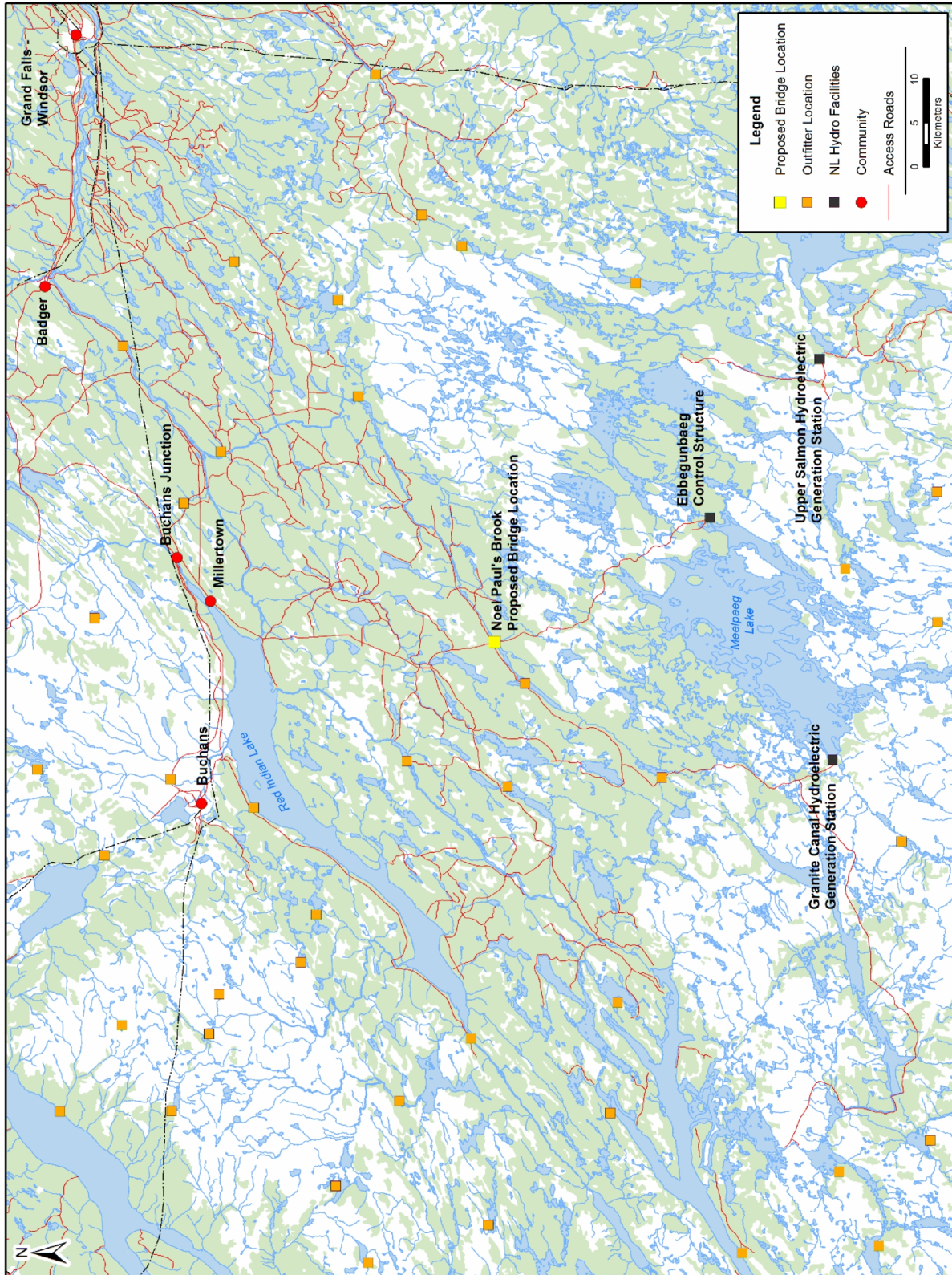




Figure 3.3 Noel Paul's Brook Area - Designated Domestic Harvest and Silviculture Areas

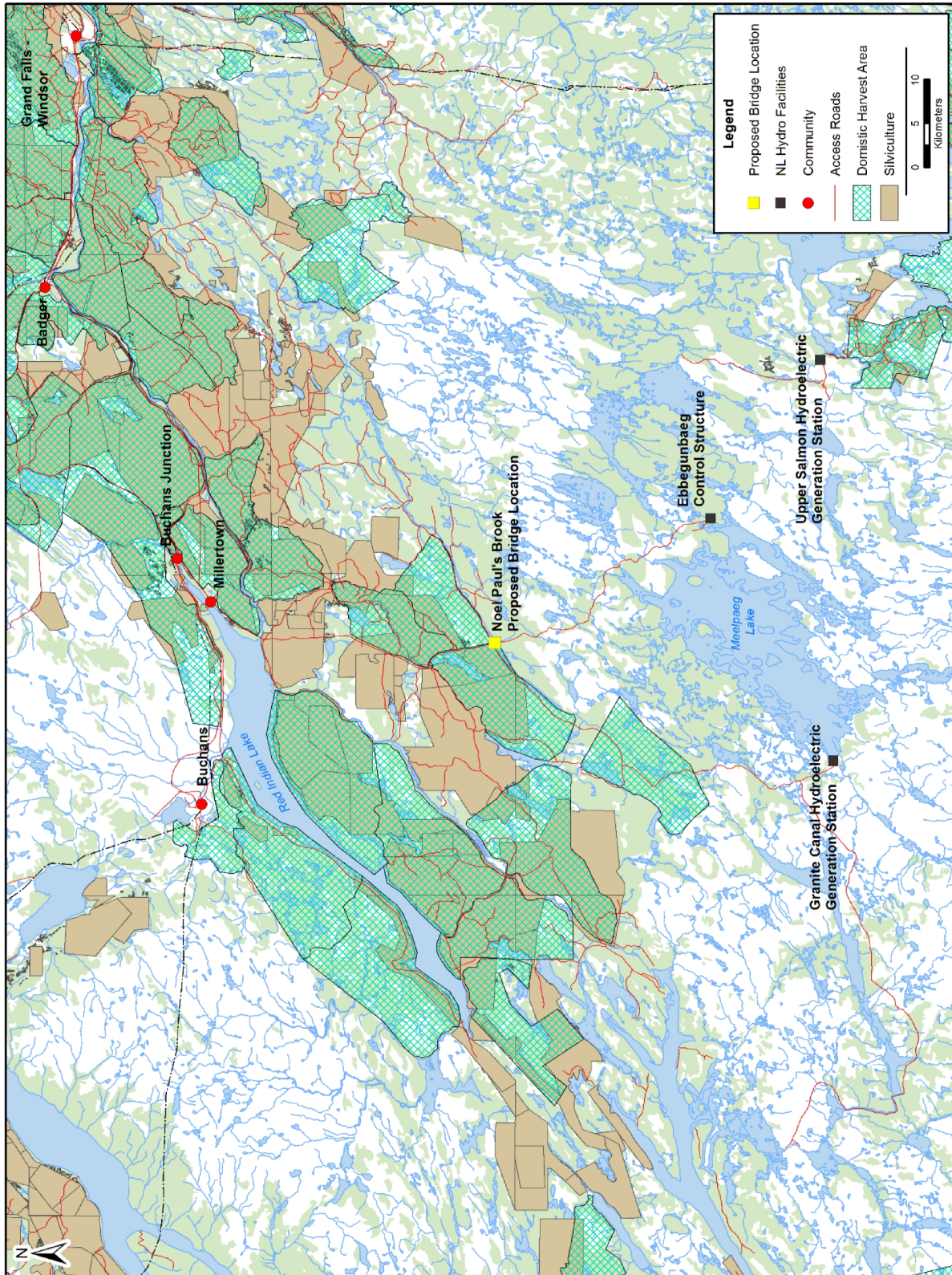
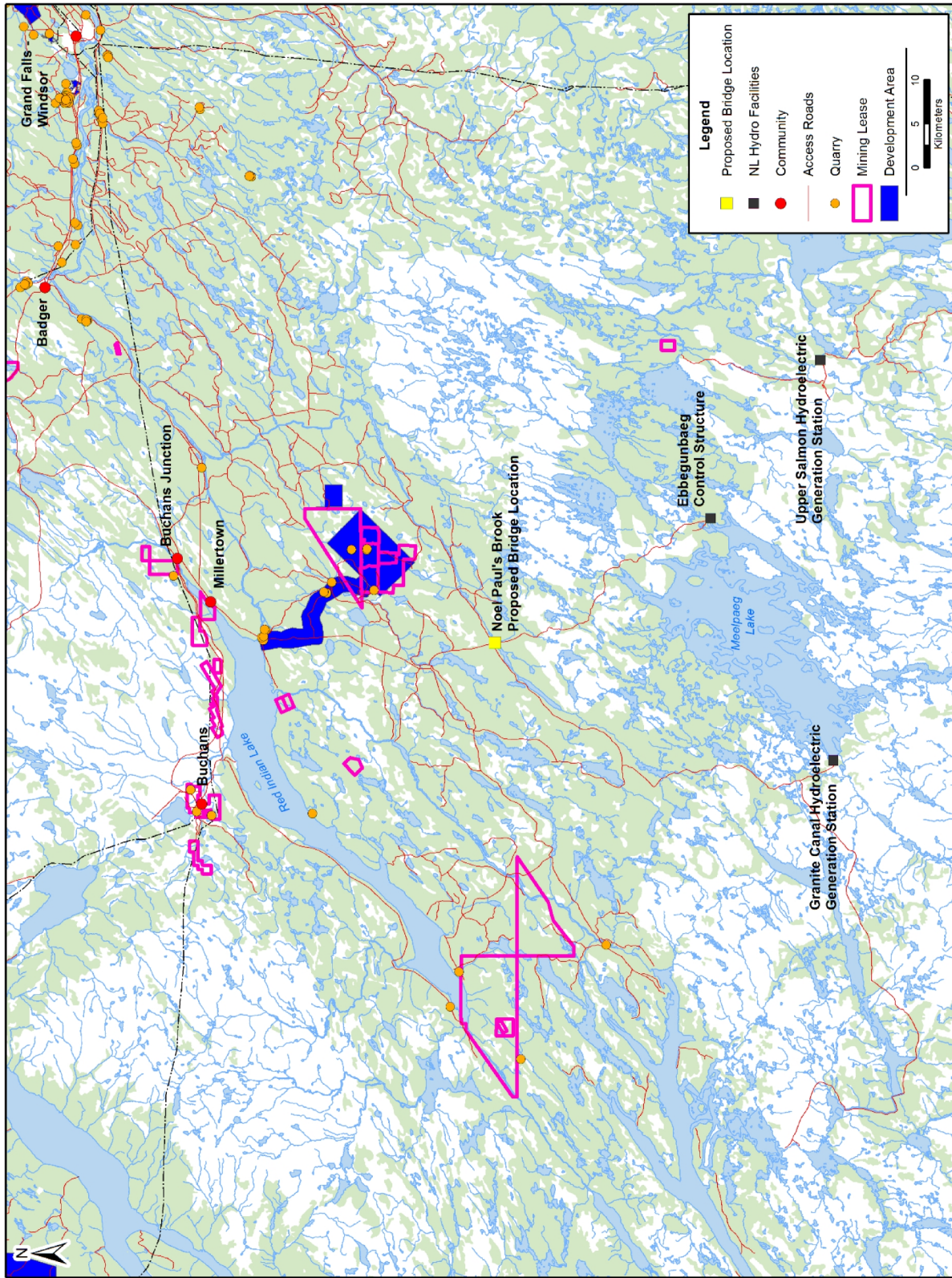




Figure 3.4 Noel Paul's Brook Area - Quarry, Mining Lease and Designated Development Areas





## 3.2 Potential Environmental Interactions and Planned Mitigation

Nalcor Energy has well over four decades of experience in planning, designing, building, maintaining and operating electrical generation and transmission infrastructure projects in Newfoundland and Labrador, and currently maintains an extensive electricity transmission and distribution system throughout the province. This, along with the fact that the environmental effects of proposed activities such as those being proposed here are well understood and manageable, means that there is a very good understanding of potential environmental issues and interactions that may be associated with the proposed Project as well as appropriate and effective measures for avoiding or reducing any such effects.

The following sections provide an environmental effects analysis for the proposed Project, including each of its associated components and activities. The analysis focuses upon, and is organized according to, the following themes:

- 1) Atmospheric Environment;
- 2) Terrestrial Environment;
- 3) Freshwater Environment; and
- 4) Socioeconomic Environment

The analysis for each component includes a discussion and description of the likely environmental considerations (adverse and positive) that may be associated with the Project, with separate subsections for the Construction and Operations and Maintenance phases. Environmental planning and mitigation measures to avoid or reduce environmental effects are identified and considered integrally within the analyses. The assessment also includes possible accidental events and malfunctions that could potentially occur during each phase of the Project. This is followed by a summary and evaluation of the likely residual (with mitigation) environmental effects of the Project.

The environmental analysis concludes with an overview of any environmental monitoring and follow-up which may be required during one or both phases of Project implementation.

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### 3.2.1 Atmospheric Environment

The environmental analysis for the Atmospheric Environment includes consideration of any likely implications of the Project on air quality and noise levels within and around the Project area.

#### **Construction**

The main potential interactions between the Project and the Atmospheric Environment relate to the use of equipment, primarily during Project construction, and the noise, dust and engine emissions that may be associated with these activities. The use of heavy equipment will be limited to that required for the excavation and placement of bridge and culvert components as well as the upgrading of the road approaches. The atmospheric emissions from this equipment will occur within a localized area over a relatively short period.

Project-related vehicles and equipment will be maintained in good repair and inspected regularly, and any associated air emissions from equipment and vehicles will conform to applicable regulations and guidelines. Any fugitive dust from construction activities will be controlled as necessary using dust control agents such as water.

Any potential emissions or interactions with the Atmospheric Environment during Project construction are therefore likely to be negligible (and within existing regulations or standards), localized and short-term (intermittent over the construction period).

**Operations and Maintenance**

During Project operations, the nature and degree of on-site activity will be considerably less than that during the construction phase, and will be characterized primarily by occasional vehicle travel across the bridge, and periodic maintenance. These operational activities are not particularly noisy, nor are they characterized by significant air emissions or other planned environmental discharges.

**Environmental Effects Summary and Evaluation**

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the Atmospheric Environment is provided in the Table below.

**Table 3.4 Environmental Effects Assessment Summary: Atmospheric Environment**

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations	Issues / Interactions	
Air Quality	•		<ul style="list-style-type: none"> <li>▪ Construction works (noise, dust)</li> <li>▪ Equipment use (vehicles, fuel consumption, exhausts)</li> <li>▪ Possible accidental event (fire, others)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Localized and short-term construction activity.</li> <li>▪ Standard construction and operational practices.</li> <li>▪ Regular inspection and maintenance of equipment.</li> <li>▪ Accidental event prevention and response.</li> </ul>
Noise Levels	•			

The proposed Project is not likely to result in significant adverse environmental effects on the Atmospheric Environment.

**3.2.2 Terrestrial Environment**

The Terrestrial Environment is comprised of relevant components of the “on-land” biophysical environment which may interact with the Project, including vegetation, soils, landforms and wildlife.

**Construction**

The proposed Project site occurs within an already developed area. Project construction will involve very limited additional vegetation clearing, grubbing, excavation or other on-land site preparation activities. As well, the areas

to be used for construction related activities will be limited to those that have been previously disturbed. No listed (protected) plant species are known or likely to occur within or near the proposed Project area.

Adverse interactions with wildlife are also not likely to occur during the Project's construction phase. There are no SARA and/or NL ESA listed species that are known to occur within or near the proposed Project area. Any wildlife that may be present in the immediate area that may be disturbed by Project-related noise, human presence or other interactions may temporarily avoid the immediate vicinity of such works during the very short-term period of construction. Any such avoidance and disturbance associated with the Project is not expected to affect the overall presence or health of any wildlife population in the area, and there is similar habitat available throughout the larger, surrounding area. Construction within riparian areas is sometimes a concern for semi-aquatic mammals, however, the absence of slow moving, deep water at the proposed bridge location reduces the potential use by beaver and muskrat which are not typically associated with shallow, rocky habitat. The potential for interactions between the Project and wildlife is therefore limited.

The following additional mitigative measures will be implemented to further reduce the potential for interactions between Project activity and any wildlife that may occur in the area at those times:

- Work areas will be kept clear of garbage;
- Project personnel will not hunt or harass wildlife;
- Equipment and vehicles will yield the right-of-way to wildlife; and,
- Any nuisance animals will be dealt with in consultation with the NL Inland Fish and Wildlife Division.

NL Hydro will apply standard waste management practices to the construction and operations phases of the proposed Project. Waste materials generated through construction activities will be removed from the area and disposed of at an existing, approved site. Non-hazardous construction refuse will be stored in covered metal receptacles, and will be disposed of on an as-needed basis at an approved landfill site, as per Nalcor Energy's on-going operations and practices. Waste materials will be reused / recycled where possible.

Any hazardous wastes will be stored in sealed, labeled containers and disposed of according to applicable regulations and NL Hydro practice. These include procedures for the characterization / identification, storage, inspection, labeling and transportation of hazardous wastes produced at the facility, as well as emergency preparedness / prevention and training. There will therefore be no adverse interaction between construction waste materials and the environment.

There will not be any new fuel storage facilities or fueling locations established as part of this Project. Any chemicals and other materials that are being used during construction at the worksites will be handled and used in accordance with NL Hydro procedures and in compliance with all relevant regulatory requirements for such activities. Personnel responsible for the use and handling of any such products will be appropriately trained prior to commencing work at the site.

NL Hydro will locate hydrocarbon spill response materials on site during construction to respond to a small spill of fuel or hydraulic fluid from equipment if such were to occur. Personnel working on the Project will be appropriately trained and knowledgeable about these spill response procedures, and any such incidents will be reported to environmental authorities as applicable.

**Operations and Maintenance**

During the operations phase of the Project there will be no additional soil or vegetation disturbance, and therefore, little or no potential for effects to these aspects of the terrestrial environment. Wastes, fuels and other such materials and substances will continue to be handled, used and disposed of properly throughout the life of the Project, as outlined earlier. None of the facility’s operational activities are or will be particularly noisy or otherwise disruptive to the surrounding environment.

No additional interactions with or adverse effects on the Terrestrial Environment are therefore anticipated during this phase of the Project.

**Environmental Effects Summary and Evaluation**

A summary of potential environmental interactions, identified mitigation measures and the residual environmental effects of the Project on the Terrestrial Environment is provided in the Table below.

**Table 3.5 Environmental Effects Assessment Summary: Terrestrial Environment**

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations	Issues / Interactions	
Vegetation	•	•	<ul style="list-style-type: none"> <li>• Clearing of vegetation</li> <li>• Possible fuel or chemical spills</li> </ul>	<ul style="list-style-type: none"> <li>• Project footprint is within a previously disturbed site</li> <li>• Localized and clearly delineated work areas</li> <li>• Compliance with applicable regulations and permits</li> <li>• Accidental event prevention and response</li> </ul>
Soils	•	•		
Wildlife	•	•	<ul style="list-style-type: none"> <li>• Noise, human presence, vehicle and equipment use, other disturbances</li> </ul>	<ul style="list-style-type: none"> <li>• No harvesting or harassment of wildlife by Project personnel</li> <li>• Waste and other materials management (facilities and procedures)</li> <li>• Accidental event prevention and response</li> </ul>

The proposed Project is not likely to result in significant adverse environmental effects on the Terrestrial Environment.



3.2.3 Freshwater Environment

The Freshwater Environment includes surface water (quantity and quality) and fish and fish habitat which may interact with the Project.

**Construction**

The majority of the proposed construction work will be undertaken in the dry. The abutments for the bridge will be constructed in the bank of the brook above the normal water level. Excavation for the abutments will be controlled so as to minimize the risk of runoff to the brook. There will be a need to ford equipment across Noel Paul’s Brook initially to enable excavation for the south abutment, however, this will occur in the existing ford site and as per existing approvals for these activities. The bridge itself will span from abutment to abutment and will not require any midspan support either during placement or operation.

The proposed construction work will be performed in a manner that ensures no deleterious substances, such as sediment, fuels and oils, and other such materials enter the brook, either directly or indirectly. Standard environmental protection measures will be implemented to isolate work areas from flowing water and control any water that accumulates in work areas prior to discharge. A water management plan will be developed to identify detailed work site specific measures for dealing with potential water quality control during construction. Tools and equipment will not be washed in any body of water and wash water will not be discharged directly into any waters. A designated cleaning area for tools will be established. Wastes, fuels and other such materials and substances will be handled, used and disposed of properly throughout the life of the Project, as outlined earlier, with appropriate equipment and procedures in place to respond to an accidental spill should one occur.

**Operations and Maintenance**

During planned operations activities there will be no additional, direct interactions with the Freshwater Environment. The bridge will be used, inspected and maintained / repaired as required, and all such activities will occur in compliance with relevant regulations and permits.

No additional interactions or adverse effects to the Freshwater Environment are therefore anticipated during this phase of the Project.

**Environmental Effects Summary and Evaluation**

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the Freshwater Environment is provided in the Table below.

**Table 3.6 Environmental Effects Assessment Summary: Freshwater Environment**

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations	Issues / Interactions	
	•	•	<ul style="list-style-type: none"> <li>• Drainage / sedimentation</li> </ul>	<ul style="list-style-type: none"> <li>• No water use / extraction associated with this Project</li> </ul>

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations	Issues / Interactions	
Surface Water (Quantity and Quality)			<ul style="list-style-type: none"> <li>Potential accidental spills</li> </ul>	<ul style="list-style-type: none"> <li>Isolation of work areas from flowing water</li> <li>Development of a water management plan with measures to prevent deleterious substances from entering water</li> <li>Compliance with regulations and permits</li> <li>Accidental event prevention and response</li> </ul>
Fish and Fish Habitat	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<ul style="list-style-type: none"> <li>Drainage water sedimentation</li> <li>Potential accidental spills causing fish mortality</li> </ul>	<ul style="list-style-type: none"> <li>Measures to prevent deleterious substances from entering water</li> <li>Compliance with regulations and permits</li> <li>Accidental event prevention and response</li> </ul>

The proposed Project is not likely to result in significant adverse environmental effects on the Freshwater Environment.

### 3.2.4 Socioeconomic Environment

The Socioeconomic Environment includes relevant components of the human and cultural environments, including historic and heritage resources, land and resource use (commercial, municipal, recreational), human health and well-being, community services and infrastructure, and economy.

#### Construction and Operations

Historic resources include sites and objects of historic and archaeological, cultural, spiritual and paleontological importance, which may be protected under the Newfoundland and Labrador *Historic Resources Act* (1985) administered by the Provincial Archaeology Office (PAO) of the NL Department of Business, Tourism, Culture and Rural Development. Ownership of all archaeological objects is vested in the Crown. Development activities and associated ground disturbance have the potential to disturb or destroy archaeological sites and other historic resources, where they exist.

There are no known historic resources within or near the Project area. The proposed Project occurs within an existing disturbed area that has already been subject to past development, and comprises a very small footprint overall. It is therefore very unlikely that the Project will result in the disturbance or destruction of historic resources. During Project construction, however, standard precautionary and reporting procedures will be implemented. Should an accidental discovery of historic resources occur, all work will cease in the immediate area of the discovery until authorization is given for the resumption of the work. Any archaeological materials encountered will be reported to the PAO, including information on the nature of the material discovered and the location and date of the find. During the operations phase of the Project there will be no further ground disturbance, and therefore, little or no potential for effects to historic and heritage resources. The precautionary

and reporting procedures implemented for construction will, however, continue to be in place throughout the life of the Project.

Project construction will be characterized by fairly standard and non-intrusive activities and practices, will occur within a small and localized area over a relatively short period. Road access to the Noel Paul's Brook proposed bridge site from the Trans-Canada Highway includes Route 370, which passes through the communities of Badger, Buchans Junction and Millertown. The proposed Project will involve transport of materials and equipment on roads within these community boundaries. Any road restrictions that may apply will be identified in advance and road transport of equipment will be coordinated so as to minimize potential for impacting negatively on traffic flow.

A number of cabins are located adjacent to the road between Millertown and Noel Paul's Brook, and five cabins are located within 500 m of the proposed bridge location. Use of the road in this area may be restricted for periods to ensure safety as equipment and materials are delivered and managed on site. NL Hydro will establish communications with the cabin owners to ensure that there is adequate awareness of any concerns so that potential conflicts can be avoided. No other commercial or recreational land and resources uses occur in the immediate Project area.

As the existing ford site is likely used by recreational fishers and hunters who visit the area, the proposed bridge will enhance safety for those recreational users when crossing Noel Paul's Brook. The bridge will, therefore, provide greater accessibility by fishers, hunters and other recreational users to the area south of Noel Paul's Brook during higher flow periods. This may result in added pressure on the natural resources in the area south of the Noel Paul's Brook crossing. However, accessibility to this area has been available, using the fording site, for significant periods of each year since 1967. The Project is therefore, not expected to have any significant negative effect on natural resources in the area.

Some development projects can result in increased demands on local, regional and provincial services and infrastructure. This may include both direct Project requirements, such as in the use of local transportation and accommodations, as well as indirect demands from project workers and their families. Given the relatively small size and duration of the Project's construction labour requirements (Chapter 2) no adverse effects related to the availability or quality of community services and infrastructure are anticipated. NL Hydro will continue to consult with the local communities and other stakeholders regarding Project related activities, schedules and requirements during Project construction.

Project construction will be carried out by a qualified and experienced Contractor selected by NL Hydro through a competitive bid process. The Project will therefore create business opportunities during its construction phase (Section 2.4), and the requirement for labour and for goods and services during Project construction may provide opportunities for local and provincial workers and businesses. These direct economic benefits will be supplemented by indirect and induced "spin-off" effects through, for example, spending by Project employees and contractors.

**Environmental Effects Summary and Evaluation**

A summary of potential environmental interactions, identified mitigation measures, and the residual environmental effects of the Project on the Socioeconomic Environment is provided in the Table below.

**Table 3.7 Environmental Effects Assessment Summary: Socioeconomic Environment**

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations	Issues / Interactions	
Historic Resources	•		<ul style="list-style-type: none"> <li>• Ground disturbance</li> </ul>	<ul style="list-style-type: none"> <li>• Project-related ground disturbance limited to previously disturbed location</li> <li>• Localized and clearly delineated work areas</li> <li>• No known (and low potential for) historic resources in the area</li> <li>• Standard precautionary and reporting procedures</li> </ul>
Land and Resource Use	•	•	<ul style="list-style-type: none"> <li>• Potential direct interaction with current uses and other disturbances (noise, dust, visibility, access, etc)</li> <li>• Increased utilization of natural resources in the area to the south of the proposed bridge</li> </ul>	<ul style="list-style-type: none"> <li>• Localized and short-term construction activity</li> <li>• Distance from local community, no likely overlap or interaction</li> <li>• Communications with local cabin owners and other land and resource owners will be used to mitigate conflicts or access restrictions</li> <li>• The existing ford site has allowed access to natural resources in the area to the south of the proposed bridge for significant periods in each year since the late 1960’s</li> </ul>
Human Health and Well-Being	•	•	<ul style="list-style-type: none"> <li>• Potential implications of Project-related disturbances for human health and well-being in local communities or elsewhere</li> </ul>	<ul style="list-style-type: none"> <li>• Localized, routine and short-term construction activity</li> <li>• No construction or operational discharges or emissions to the environment</li> <li>• Communications with local cabin owners and other land and resource users will be used to mitigate conflicts or access restrictions</li> <li>• Accidental event prevention and response</li> </ul>
	•	•	<ul style="list-style-type: none"> <li>• Potential Project use of, and demands for,</li> </ul>	<ul style="list-style-type: none"> <li>• Localized and short-term construction activity, small construction workforce</li> <li>• No new operational employees</li> </ul>



Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations	Issues / Interactions	
Community Services and Infrastructure			local services and infrastructure	<ul style="list-style-type: none"> <li>Distance from and minimal interaction with the community</li> </ul>
Economy	•	•	• Employment and business opportunities	<ul style="list-style-type: none"> <li>Positive effects (direct and indirect)</li> </ul>

The proposed Project is not likely to result in significant adverse environmental effects on the Socioeconomic Environment.

### 3.3 Environmental Monitoring and Follow-up

Any potential environmental issues which may be associated with the Project can be addressed and mitigated through the use of good construction and operational practices and procedures. These will be further addressed through the specific environmental permitting requirements and compliance standards and guidelines which will apply to Project activities and components.

Once operational, the Project will be subject to regular inspections and maintenance as required. The Proponent is committed to obtaining all required authorizations for the proposed Project, and to complying with all applicable regulations. No other follow-up is considered necessary in relation to the proposed Project.

## 4.0 SUMMARY AND CONCLUSION

NL Hydro has managed and operated the Ebbeguenbaeg Control Structure at the outlet of Mealpeg Reservoir since 1967. This structure is essential to the operation of hydroelectric generating facilities at Upper Salmon and Bay d'Espoir. As the Control Structure is more than 40 years old, NL Hydro has identified the potential for an increase in the frequency and magnitude of maintenance and repair work at the Control Structure associated with asset management requirements. NL Hydro is proposing installation of a Bailey bridge across Noel Paul's Brook, to replace the existing fording crossing at this Brook, in order to provide safe and reliable access to the Control Structure to meet increasing asset management needs. As Noel Paul's Brook is a scheduled salmon river under the *Fisheries Act*, the bridge construction is considered an undertaking under section 28 of the provincial *Environmental Assessment Regulations*.

This *Environmental Assessment Registration* is intended to initiate the provincial EA process for the proposed bridge, which will undergo review in accordance with applicable regulatory requirements.

The Project will be planned and implemented so as to avoid or reduce any potential adverse environmental effects. Given the nature, scale and characteristics of the proposed Project, including its location within the existing access road and immediately adjacent to the long-standing ford site across Noel Paul's Brook, it is not likely to have significant environmental issues or effects associated with it. The Project will be undertaken in accordance with NL Hydro's proven environmental policies, plans and practices to help ensure that it is constructed and operated in a safe and environmentally-responsible manner.

## 5.0 REFERENCES

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## **APPENDIX A**

List of Potentially Applicable Permits and Authorizations



## APPENDIX A List of Potentially Applicable Permits and Authorizations (Provincial, Federal, Municipal)

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
<b>Government of Newfoundland and Labrador</b>				
Licence to Occupy Crown Land Crown Land Leases/Grants/ Easements	<i>Lands Act</i>	Any development on Crown Lands	Crown Lands Division, Department of Municipal and Intergovernmental Affairs	Approval is required for project activities and infrastructure on Crown Land.
Certificate of Approval for any Alteration to a Body of Water	<i>Water Resources Act</i>	Any activities which may alter a water body	Water Resources Management Division, Department of Environment and Conservation	Permits are required for construction activities within 15 m of the high watermark of any water body. An application form is required for each alteration.
Certificates of Approval for any Instream Activity (including Culvert Installation, Bridges and Forging a Watercourse)	<i>Water Resources Act</i>	Any in-stream activity	Water Resources Management Division, Department of Environment and Conservation	Approval is required for any in-stream activity, including bridge, culvert and fording activities, before undertaking the work.
Certificate of Approval for Construction Site Drainage	<i>Water Resources Act</i>	Any run-off from the project site being discharged to receiving waters	Water Resources Management Division, Department of Environment and Conservation	Approval is required for any run-off from the project site being discharged to receiving waters.
Policy Directives	<i>Water Resources Act</i>	Project activities (as applicable)	Water Resources Management Division, Department of Environment and Conservation	The Department has a number of potentially applicable policy directives in place for particular types of in or near water work
Quarry Permit	<i>Quarry Materials Act and Regulations</i>	Extracting borrow material	Mineral Lands Division, Department of natural Resources	A permit is required to dig for, excavate, remove and dispose of any Crown quarry material.
Cutting Permit	<i>Forestry Act and Cutting of Timber Regulations</i>	Clearing land areas for laydown areas and abutment locations	Department of Natural Resources	A permit is required for the commercial or domestic cutting of timber on crown land.

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
Certificate of Approval for Storing and handling Gasoline and Associated Products	<i>Environmental Protection Act, Storage and Handling of Gasoline and Associated Products Regulations</i>	Storage and handling of gasoline and associated products	Engineering Services Division, Services NL	A Certificate of Approval is required for storing and handling gasoline and associated products.
Certificate of Approval for Installation of a Sewage System	<i>Sanitation Regulations, under the Health and Community Services Act</i>	Sewage disposal and treatment at construction camps	Department of Health and Community Services	Sewage disposal systems designed, constructed or installed to service a private dwelling or a commercial or other building with a daily sewage flow less than 4,546 L must be approved by an inspector before installation.
Compliance Standard	<i>Fire Prevention Act, and Fire Prevention Regulations</i>	On-site structures (temporary or permanent)	Engineering Services Division, Service NL	All structures must comply with fire prevention standards.
Compliance Standard	<i>Environmental Control Water and Sewage Regulation under the Water Resources Act</i>	Any waters discharged from the Project	Pollution Prevention Division, Department of Environment and Conservation	A person discharging sewage and other materials into a body of water must comply with the standards, conditions and provisions prescribed in these regulations for the constituents, contents or description of the discharged materials.
Compliance Standard	<i>Occupational Health and Safety Act and Regulations</i>	Project-related occupations	Service NL	Outlines minimum requirements for workplace health and safety. Workers have the right to refuse dangerous work. Proponents must notify Minister of start of construction for any project greater than 30 days in duration.
Compliance Standard	<i>Workplace Hazardous Materials Information System (WHMIS) Regulations, under the Occupational Health and Safety Act</i>	Handling and storage of hazardous materials	Operations Division, Service NL	Outlines procedures for handling hazardous materials and provides details on various hazardous materials.



Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
<b>Government of Canada</b>				
Letter of Notification	<i>Fisheries Act and Regulations</i>	Project activities in or near water	Department of Fisheries and Oceans	Where a potential for harmful effects to fish habitat can be prevented, a Letter of Notification is issued outlining appropriate mitigation procedures or conditions to be followed.
Permit(s) for construction within Navigable Waters	<i>Navigation Protection Act Associated Regulations</i>	Project activities in or across water	Transport Canada	Permit required only within scheduled waters. There are no scheduled waters involved, however, any “non-scheduled” waters are subject to the Act if the owner wishes to opt-in.
Compliance Standard	<i>Fisheries Act, Section 36(3), Deleterious Substances</i>	Any run-off from the project site being discharged to receiving waters	Environment Canada Department of Fisheries and Oceans	Environment Canada is responsible for Section 36(3) of the <i>Fisheries Act</i> . However, DFO is responsible for matters dealing with sedimentation. Discharge must not be deleterious and must be acutely non-lethal.
Compliance Standard	<i>Migratory Birds Convention Act and Regulations</i>	Any activities which could result in the mortality of migratory birds and endangered species and any species under federal authority	Canadian Wildlife Service, Environment Canada	Prohibits disturbing, destroying or taking a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird, and possessing a live migratory bird, carcass, skin, nest or egg, except when authorized by a permit. The Canadian Wildlife Service should be notified about the mortality of any migratory bird in the project area.
Compliance standards; permits may be required.	National Fire Code	On-site structures (temporary or permanent)	Service NL	Approval is required for fire prevention systems in all approved buildings.
Compliance standards; permits may be required.	National Building Code	On-site structures (temporary or permanent)	Service NL	Approval is required for all building plans.
<b>Municipalities</b>				
Development or Building Permit	<i>Urban and Rural Planning Act, 2000, and Relevant Municipal Plan and Development Regulations</i>	Development within municipal boundary	Community Council	A permit is required for any development or building within municipal boundaries.

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
Approval for Waste Disposal	<i>Urban and Rural Planning Act, 2000</i> , and Relevant Municipal Plan and Development Regulations	Waste disposal	Community Council	The use of a community waste disposal site in Newfoundland and Labrador by proponents/contractors to dispose of waste requires municipal approval. Restrictions may be in place as to what items can be disposed of a municipal disposal site.