Maritime Link Project

Environmental Protection Plan
Minimum Requirements

Revision 6: January 2017

Proprietary Notice

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APPENDICES

LIST OF ACRONYMS

AMP	Avifauna Management Plan
ARD	Acid Rock Drainage
CBRM	Cape Breton Regional Municipality
CCA	Chromated Copper Arsenate
CCME	Canadian Council of Ministers of the Environment
CEPA	Canadian Environmental Protection Act
CSR	Contaminated Sites Regulations
CWS	Canadian Wildlife Services
DFO	Fisheries and Oceans Canada
E2	Environmental Emergencies Regulations
EA	environmental assessment
ECCC	Environment and Climate Change Canada
ENL	Emera Newfoundland and Labrador
EPP	Environmental Protection Plan
ERP	Emergency Response Plan
ESCP	Erosion and Sedimentation Control Plan
HDD	horizontal directional drilling
HVac	high voltage alternating current
HVdc	high voltage direct current
IBA	Important Bird Area
IMHWR	Interprovincial Movement of Hazardous Waste Regulations
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
kV	kilo volts
LFN	low frequency noise
MARPOL	International Convention for the Prevention of Pollution from Ships
MBCA	*Migratory Birds Convention Act*
MBPs	mitigation best practices
MSDS	material safety data sheet
MW	megawatt
NL	Newfoundland and Labrador
NLDEC	Newfoundland and Labrador Department of Environment and Conservation
NLH	Newfoundland and Labrador Hydro
NS	Nova Scotia
NSDNR	Nova Scotia Department of Natural Resources
NSE	Nova Scotia Environment
NSPML	Nova Scotia Power – Maritime Link
NPA	*Navigation Protection Act*
NPP	Navigation Protection Program
OPEP	Oil Pollution Emergency Plan
PAO	Provincial Archaeology Office
PCP	Pentachlorophenol

PNAD	Park and Natural Areas Division
PPWSA	Protected Public Water Supply Area
PWSA	Public Water Supply Area
RoW	right-of-way
SARA	*Species at Risk Act*
SOCI	species of conservation interest
TOGA	*Transportation of Dangerous Goods Act*
WHMIS	Workplace Hazardous Materials Information System

1 INTRODUCTION

NSP Maritime Link Inc. (NSPML), [operating as Emera Newfoundland and Labrador (ENL)], a wholly owned subsidiary of Emera Newfoundland and Labrador Holdings Inc., is constructing and will operate a new 500 megawatt (MW) [+/- 200 kilo volts (kV)] high voltage direct current (HVdc) and high voltage alternating current (HVac) transmission line, and associated infrastructure, between Granite Canal, Newfoundland and Labrador (NL), and Woodbine, Nova Scotia (NS) (the Project; the Maritime Link). The Project will link the provincial electrical power transmission systems of NL and NS.

1.1 ENVIRONMENTAL COMMITMENT

NSPML is committed to conducting business in a manner that is respectful of the environment. This commitment is articulated in ENL's Environmental Policy, which demonstrates a commitment to environmental protection, assurance of full compliance with legal requirements, and overall direction for regulatory compliance.

NSPML employees are expected to have an understanding of the company's commitment to the environment and must endeavor to conduct their work in a manner consistent with this declaration. This expectation extends to those working on behalf of the company including long and short term contractors/consultants and service providers, as well as others who visit NSPML sites and perform operations that could have an environmental impact.

Environmental Policy

NSP Maritime Link Inc. operating as ENL shares in the desires of its customers, shareholders, employees, and others, to enjoy the benefits of a sound economy in a healthy and sustainable environment. It is committed to meeting its business objectives in a manner which is respectful and protective of the environment, and in full compliance with legal requirements and Company policy.

This policy applies to all employees, visitors, contractors, vendors and suppliers working at an Emera Newfoundland and Labrador workplace.

In delivering on this commitment, Emera Newfoundland & Labrador, an Emera Company will:

- Make environment an integral part of decision making, as it pursues sustainable development, environmental performance, quality service to customers and value to shareholders;
- Develop, verify and continually improve environmental management systems through strong leadership and employee commitment;

- Avoid environmental interactions when possible, if avoidance is not possible mitigate and follow-up to determine the effectiveness of mitigation and adjust where necessary;
- Use the Environmental Policy as the framework for setting and reviewing environmental objectives and targets;
- Work with employees and customers to promote the most efficient use of resources, products and services; and
- Communicate with all stakeholders on environmental performance in a proactive and open manner.

NSPML employees are expected to have an understanding of the company's commitment to the environment and must endeavour to conduct their work in a manner consistent with this declaration. This expectation extends to those working on behalf of the company including short and long term contractors/consultants and service providers, as well as others who visit NSPML sites frequently and perform operations that could have an environmental impact.

1.2 PROJECT DESCRIPTION

1.2.1 OVERVIEW

The Maritime Link involves the construction and operation of a new 500 MW (+/- 200 kV) HVdc as well as a 230 kV HVac transmission line, and associated infrastructure, between Granite Canal, NL, and Woodbine, NS.

The Project is divided into three distinct geographical regions; the island of Newfoundland, Cabot Strait, and NS. Each region is briefly described below but additional information is provided in section 1 of the Environmental Assessment (EA) Report (available online at: http://www.gov.ns.ca/nse/ea/maritime-link.asp) (ENL 2013).

1.2.1.1 Island of Newfoundland

The portion of the Project located on the island of Newfoundland includes a transmission line from Granite Canal to Cape Ray, of which 35 km will be new transmission corridor. At Granite Canal, a switching station will be constructed to accommodate termination and interconnection of the Granite Canal - Bottom Brook line into the Newfoundland and Labrador Hydro (NLH) system. The switching station will be constructed adjacent to the existing Granite Canal hydro development.

At Bottom Brook, a new converter station will be constructed and interconnected into the NLH system by expanding the existing sub-station. From this new converter station, the transmission line will follow the existing transmission corridor to the Cape Ray transition compound. A grounding line will originate at the converter station and be routed to a grounding facility in the

St. George's Bay area. From the Cape Ray transition compound, the overhead lines will extend as underground cables to the shoreline landfall site at Cape Ray.

1.2.1.2 Cabot Strait

Two subsea power cables will extend across the Cabot Strait from Cape Ray to an area near the Nova Scotia Power Inc., Point Aconi Generating Station in Cape Breton.

1.2.1.3 Nova Scotia

The NS portion of the Project includes a subsea cable landfall which will be located on the west side of the Point Aconi Generating Station. From the landfall location the cables will extend underground to the transition compound and will then run parallel to an existing transmission corridor, terminating at the converter station at Woodbine. The HVdc lines will connect to the existing Woodbine converter station via an underground connection. A transition compound, located approximately 600 m north of the substation, will transition the overhead lines to underground cables, within a buried conduit. From the Woodbine converter station, a grounding line will run to a grounding facility location in northeast Cape Breton County near Big Lorraine.

1.2.2 CONSTRUCTION ACTIVITIES

Construction will take place over several years commencing in 2014, with completion and commissioning planned for 2017. Construction has been timed to take advantage of seasonal conditions and in consideration of the potential environmental and socio-economic constraints that have been identified and incorporated into the planning and design of the Project. Construction activities include:

- Site preparation: vegetation clearing of transmission corridors, grounding lines, static Project infrastructure such as converter stations, transition compounds and switchyards; and construction of permanent and temporary access roads , laydown areas and temporary accommodation facilities;
- Installation of transmission and grounding line infrastructure: preparation of foundations, tower assembly and erection, installation of counterpoise wire and stringing of conductor;
- Construction of the grounding facilities, including the creation of a breakwater structure and associated impoundment pond; and
- Installation of subsea cables using a dynamically positioned cable laying vessel and involving horizontal directional drilling (HDD) for nearshore areas.

1.3 PROJECT ENVIRONMENTAL COMPLIANCE FRAMEWORK

The regulatory framework for the Maritime Link is a compliance continuum whereby the EA processes, required by the provinces of NL and NS and the federal government, prescribed many of the regulatory authorizations, approvals, permits, certificates and/or other conditions necessary to construct and operate the Maritime Link within these jurisdictions. The Project was released from the respective EA processes on June 21, 2013. Commitments made during the EA review process, as well as specific conditions of EA release, are regulatory requirements that apply to the construction, operation, and maintenance of the Maritime Link. These conditions and commitments include, but are not limited to:

- Mitigation best practices;
- Project-specific mitigation measures;
- Further studies;
- Effects-monitoring programs; and
- Continued engagement with stakeholder groups.

Project-specific mitigation measures are more significant measures taken to address key interactions identified in the EA process (e.g., scheduling of high risk activities to avoid impacts to nesting birds). Additional environmental protection or other requirements may emerge through ongoing regulatory review and permitting processes. The requirements that apply to construction activities collectively form the Environmental Protection Plan (EPP) Minimum Requirements.

1.3.1 EPP MINIMUM REQUIREMENTS – PURPOSE AND SCOPE

The purpose of this document is to describe the EPP minimum requirements to be implemented by NSPML and its Contractors to provide environmental protection of human and ecological receptors during the construction phase of the Project. The environmental risks and activities will vary during construction and as such the Project EPP will evolve and be updated as necessary for relevant changes such as regulatory requirements, changes in protection status of species of conservation interest (SOCI) and/or new updated wildlife protocols.

The ENL EPP Minimum Requirements Document was developed in consideration of the broad spatial (>500 km) and temporal (>3 years) boundaries for Project construction activities, to provide effective and efficient implementation and compliance with EA and other regulatory requirements.

More specifically, this document incorporates:

- Means to comply with the requirements of relevant legislation;

- Environmental protection measures identified as part of the EA;
- Environmental commitments made as part of the EA; and
- Environmental conditions identified with the EA release.

The EPP Minimum Requirements are divided into the following sections: mitigation best practices (MBPs), wildlife and habitat protocols, considerations for species of conservation interest (SOCI), environmental constraints mapping and incident reporting. Project environmental constraints include, but are not limited to: important wildlife habitats; rare flora and other SOCI habitats; wetlands and streams; archaeologically sensitive areas; and protected areas such as provincial parks.

The EPP Minimum Requirements are structured to include detailed steps to avoid or minimize negative effects on the environment for all work elements involved in the applicable construction activity. This will include, but will not be limited to, the following construction specifications:

- Land buffers;
- Clearing, grubbing and disposal of vegetation;
- Erosion and sedimentation control;
- Blasting;
- Waste management;
- Storage and handling of hazardous materials; and
- Noise and dust control.

1.3.2 CONTRACTOR ACTIVITY-SPECIFIC ENVIRONMENTAL PROTECTION PLAN

The EPP Minimum Requirements are provided to Contractors as part of the procurement process for the various initiatives. Using these requirements as a template, each Contractor is required to prepare an activity-specific EPP that provides specific details for the implementation of EPP mitigation requirements. Details include, but are not limited to:

- Procedures/work methods;
- Controls;
- Descriptions;
- Drawings; and
- Maps.

Given the geographic extent of the Project, Contractors may be required to develop specific environmental protection measures by geographic region.

Furthermore, wildlife and habitat protocols, described in Section 3, will also be incorporated into relevant activity-specific EPPs. These include, but are not limited to, protocols for:

- General wildlife;
- Caribou;
- Pine marten;
- Avifauna;
- Other rare fauna;
- Rare flora; and
- Rare and protected habitats.

In the circumstance where the Contractor believes a specific EPP minimum requirement is not applicable to their scope of work, it shall be identified to the Company with an explanation and will be considered as part of the overall EPP review/acceptance process. **All exceptions shall be summarized in a concordance table and submitted as part of the review process.**

NSPML will review the Contractor EPPs to ensure that the Contractor's work methods, procedures, and mitigation measures comply with NSPML's environmental requirements/commitments, and that it has been tailored specifically to the scope of work. The Contractor EPP must be accepted by NSPML prior to the commencement of construction activities. NSPML will accept Contractor EPP documents when they conform to the EPP Minimum Requirements Document. EPP requirements will also be communicated to Contractors at environmental orientation sessions. The Contractor(s) have the responsibility to install, maintain, monitor and report to NSPML on control measures in place until the completion of the contract. NSPML intends to undertake routine monitoring to ensure mitigation measures are being properly implemented.

Contractors will be responsible for implementing appropriate corrective actions arising from a failure to meet EPP requirements. NSPML will monitor to ensure required actions are taken.

1.3.3 ACCESS PLANNING

Site access is an integral component of the EPP as it relates to environmental protection. Site access includes access to the sites, transmission and grounding lines, as well as access within the transmission or grounding lines right-of ways (RoW). Many of the required mitigation measures relate to access through sensitive habitats (i.e., wetlands, streams, or avoidance of

identified environmental constraints). See Sections 2.6 and 2.7 for additional information related to wetland and watercourse crossings.

Where an Access Plan is required, the Contractor will provide a detailed plan that identifies the constraints and associated mitigations. This will include written documentation and access trail mapping. Depending on the scope of work, mapping may be required in GIS format.

In development of the Access Plan, the following should be considered:

- The use of existing access should be maximized to the extent possible. Existing access is defined as resource roads, forestry roads, ATV trails and existing power utility access trails;
- Existing access may be upgraded to accommodate construction requirements; this is to be determined in consultation with, and acceptance from, NSPML;
- Where existing access routes are used by the Contractor, the traveling surface shall be maintained in as good or better condition than found;
- The development and use of new access routes must be minimized to the extent possible. Where new access routes are required, they shall be clearly defined along with plans to minimize environmental impacts;
- All new access routes are temporary and must be remediated to an acceptable condition after construction activities are complete (no longer required). A detailed remediation plan must be submitted to NSPML for acceptance in advance of the completion of construction activities; and
- Erosion and sedimentation control shall be installed, monitored and maintained on new or existing access trails to avoid sedimentation run-off to nearby sensitive receptors (e.g. wetlands, watercourses). See Section 2.9 for additional information on Erosion and Sedimentation Control.

Additional information regarding access can be found in Section 2.11 – Vehicle Traffic and Access Trails.

An Access Trail Decommissioning Plan will be developed, if applicable, by the Contractor to determine the scope of remediation and the types of mitigation required for final completion.

2 MITIGATION REQUIREMENTS

The following is a description of the mitigation requirements to be implemented during Construction activities. The expectation is that only relevant requirements will be included in the activity specific Contractor EPPs.

2.1 GENERAL

a) Throughout the construction and operation of the Project, NSPML and its Contractor(s) will abide and comply with all provisions, licenses, permits and approvals, including, but not limited to, those identified during the EA process (available in Appendix B of the EA report) (ENL 2013).

b) Where a provision, statement or any correspondence made under this EPP is inconsistent or conflicts with a provision, term or condition of NL, NS or federal legislation, policy or guidelines, the provision, term or condition of the NL, NS or federal legislation, policy or guidelines shall have precedence over the provision, statement or any correspondence made under this EPP.

c) The Contractor shall retain copies of all licenses, permits, and approvals on-site.

d) Contractors will prepare a communications plan for engaging with communities impacted by activities such as, but not limited to, traffic and blasting. The plan will address public and media communications. The communications plan must be accepted by NSPML prior to the commencement of construction.

e) Aboriginal consultation through NSPML may be required for permits under Federal or NS jurisdiction.

f) Signage to delineate active work areas will be implemented by the Contractor.

g) In areas where temporary work is being completed, pre- and post- work pictures should be taken by the Contractor, kept on file and provided to NSPML upon request.

h) Only trained and licenced individuals will operate equipment.

i) Soil and aggregates required for construction of access trails, tower foundations, and facility foundations will be sourced from existing approved pits and/or quarries. If new pits or quarries are required, the proponent will follow applicable regulations and standard industry practices.

j) Construction may include additional stabilizing measures such as replacing in-situ materials to increase stability, sub-base preparation, and the use of guy-wires, as required.

k) In NS, the Approval Holder must obtain an approval from Nova Scotia Environment (NSE) for the application of herbicides on utility corridors, as specified in the Activities Designation Regulations under the NS *Environment Act*.

l) For project activities in areas where sulphide bearing materials or acid rock drainage (ARD) may be a concern, Contractor(s) EPP must include a plan to address and implement measures to minimize the risk of ARD generation and adverse effects on water quality.

m) An Access Trail Decommissioning Plan will be developed, if applicable, by the Contractor to determine the scope of remediation and the types of mitigation required for final completion. This plan will address how wetland and watercourse crossings will be left after construction.

2.2 PROTECTED WATER SUPPLY AREAS

The Project footprint intersects protected water supply areas in both NL and NS. In NL, the protected watershed is Dribble Brook located in St. George's and the Stephenville Crossing wellhead area. In NS, the protected watershed is Pottle Lake located in the Cape Breton Regional Municipality (CBRM). The following mitigation requirements are to be implemented for protected water supply areas:

a) In NL, requirements laid out in the Policy for Land and Water Related Developments in Protected Public Water Supply Areas (PPWSA) (NLDEC 2002) will be followed in protected and unprotected water supply areas. Where required, permits will be obtained and all conditions followed.

b) In NL, the Project crosses the protected water supply watershed of Dribble Brook and the Stephenville Crossing Wellhead area. These areas are protected under the Policy for Land and Water Related Developments in PPWSA under the NL *Water Resources Act*. Work undertaken within these areas will be done in compliance with the requirements specified in the Policy.

c) In NS, PWSAs are protected under provincial legislation and are considered sensitive due to the potential to affect water quality. The Project crosses the provincially protected water supply watershed of Pottle Lake in Cape Breton, NS. This PWSA is protected under the Pottle Lake Watershed Protected Water Area Regulations made under subsection 106(5) of the NS *Environment Act*. Work undertaken within the Pottle Lake Watershed Protected Water Area will be done in compliance with the requirements specified in the Pottle Lake Source Water Protection Plan (CBRM Water Utility 2013). These requirements are based on the following, applicable, documents:

    - Pottle Lake Watershed Protected Water Area Regulations; and
    - Best Management Practices/Forest Planning in Municipal Drinking Water Supply Areas, Nova Scotia (NSE 2005).

d) The disposal of wastes of any kind is prohibited in the NS Pottle Lake Watershed Protected Water Area except in accordance with the provisions of the *Water Act*, and the *Public Health Act*.

e) No treated wood poles will be used within known protected and unprotected water supply areas in NS or NL. Wood poles treated with chromated copper arsenate (CCA) will not be used within 5m of potable water supplies, including wells. Wood poles treated with pentachlorophenol (PCP) will not be used within 15m of potable water supplies, including wells. See Section 2.4 for further detail on the use of treated poles.

f) Background water samples should be taken and analyzed by an independent laboratory prior to any transmission line activities in watershed areas in NS and NL. Work is subject to additional stipulations in authorizations received.

2.3 TERRESTRIAL WILDLIFE AND WILDLIFE HABITAT

a) The following mitigation requirements are to be implemented for terrestrial wildlife and wildlife habitat: In NS, the Contractor is required to comply with the Wildlife Habitat and Watercourses Protection Regulations under the NS *Forests Act*.

b) A policy of no hunting or other harassment of wildlife by Project personnel will be developed which will prohibit possession of pets on the work site.

c) Wildlife sightings close to roads will be reported by Project personnel and mitigation will be implemented in high risk areas (e.g., signage, lower speed limits). More detail is provided in Section 3.0 – Wildlife Protocols.

d) Site preparations that include deforestation, clearing and grubbing must be undertaken between September 1st and March 30th in NS and August 1st to April 30th in NL in order to minimize impacts on breeding birds that may include endangered and threatened species listed under the *Species at Risk Act* and/or the NS or NL *Endangered Species Acts*, unless otherwise accepted by NSPML in consultation with NSE or NLDEC.

e) In areas where Bank Swallow burrows occur, NSPML will provide mitigation measures to Contractors to provide protection for nests. This will include maintaining vertical river banks used for burrows (i.e., not allowing them to be collapsed or sloped away from a vertical orientation) and avoiding disturbance due to construction activities. For species such as Bank Swallows, the period when nests would be considered active would include not only the time when birds are incubating eggs or taking care of flightless chicks, but also a period of time after chicks have learned to fly since swallows return to their colony to roost.

f) To discourage migratory birds such as Bank Swallows from nesting in large piles of soil left unattended/un-vegetated, Contractors are to take measures to cover, or to deter birds from, these piles during the breeding season. If migratory birds take up occupancy of these piles, alternate measures will be determined in consultation with NSPML to reduce potential for erosion, and to protect nests until chicks have fledged and left the area.

g) Construction activities will be timed to ensure that waterfowl and/or waterbirds have raised their young, should young waterfowl and/or waterbirds be present in the area at that time. Contractors will consult with NSPML to develop mitigation measures as required.

h) Contractors must recognize that any construction activities in the shoreline/intertidal zone will consider rare species listed under federal and provincial regulations (such as Harlequin Ducks, Barrow's Goldeneye, Piping Plover and Red Knot). NSPML will provide Contractors with specific mitigation measures for construction activities in the shoreline/intertidal zone, if applicable.

i) Removal of beaver dams will be undertaken only where required to facilitate construction or access. Beavers will be removed by a licensed control officer and dam removal will be in accordance with applicable permits and/or guidelines. Contractors may not remove beaver dams without consulting with NSPML. NSPML and Contractors will commit to not altering beaver dams until waterfowl and/or waterbirds have raised their young, should they be using ponds created by beaver dams for nesting or raising young.

j) Only the amount of lighting required for safe operation of construction and operation activities will be installed or utilized. Lights that are not necessary for a particular function will be turned off, and exterior lights will be shielded from above, where the need is identified. Minimal site security lighting will be maintained.

2.4 SENSITIVE AREAS

The following mitigation requirements are to be implemented for sensitive areas:

a) The Contractor should note the presence of environmentally sensitive features that will be identified and clearly marked either in the field with flagging and/or staking, digitally with GPS or both. These features may include, but not be limited to:

- Watercourses and associated buffers;
- Wetlands and associated buffers;

- Rare flora and SOCI;
- Areas of high archaeological potential;
- Legally protected property including parks and natural areas; and
- Arboretums and sensitive silviculture areas.

b) Avoidance of all protected areas and proposed/candidate site boundaries are a priority. In cases where these boundaries must be crossed the Contractor must contact NSPML who will obtain permission from NSE and NLDEC.

c) Project construction activities will not commence in areas where habitat characterization has not been completed (i.e., new or modified Project footprint).

d) In NL, locations where the proposed project occurs within 100 m of or intersects provincial protected areas or other areas of conservation interest, NSPML will consult with NL Parks and Natural Areas Division (PNAD) regarding corridor placement and best practices for construction, maintenance and vegetation control to ensure ecological integrity of these areas is maintained. The Contractor will abide by the best practice requirements for construction and maintenance in these areas.

e) In NL, there are sections of the transmission route that cross parks (T'Railway and Barachois Pond Provincial Parks) and are within 500 m of park boundaries. For any detours, the Contractor will employ a flagging crew and implement appropriate signage. Once specific access requirements are understood in areas where the transmission route will access or cross the T'Railway and/or Barachois Pond Provincial Parks, NSPML will engage the PNAD to review and provide appropriate mitigations. The Contractor is expected to provide sufficient notification and information to NSPML to facilitate this process in an appropriate timeframe.

f) In NS, locations where the proposed project occurs within 100 m of or intersects a provincial protected area or other area of conservation interest, NSPML will consult with NSE regarding corridor placement and best practices for construction and maintenance to ensure ecological integrity of these areas is maintained. The Contractor will abide by the best practice requirements for construction and maintenance in these areas.

g) Disturbance to potential bat hibernacula within work areas in NS must be avoided. Contractors will notify NSPML prior to specific activities (i.e., blasting and rock breaking), and if required NSPML will consult with Department of Natural Resources (NSDNR) regarding potential mitigation measures.

h) Stockpiled soils will not be placed in wetlands or watercourses or in buffer zones or in the other sensitive habitats (e.g., habitats of species at risk or SOCI) (refer to Constraints Mapping in Appendix A for guidance, pending field validation).

i) For chemically treated poles and timbers (including anchors):

- Creosote is not an approved preservation treatment;
- Only preservations registered under the *Pest Control Products Act* can be purchased for use on transmission and distribution poles and timbers. Approved preservations in both NS and NL include:
  - Pentachlorophenol (PCP/Penta); and
  - Chromated Copper Arsenate (CCA).
- All treated wood or timber must be thoroughly dried and cleaned before being brought to or stored at any work site and installed;
- Temporary storage/drop-off points for treated materials will avoid environmentally sensitive areas (refer to Constraints Mapping in Appendix A);
- No treated wood poles will be used within known protected and unprotected water supply areas in NS and NL;
- Wood poles treated with CCA will not be used within 5m of potable water supplies, including wells;
- Wood poles treated with PCP will not be used within 15m of potable water supplies, including wells;
- Debris created during installation of chemically treated poles and timbers must be cleaned-up and disposed of in a proper manner;
- Storage facilities will be located in consideration of proximity to environmentally sensitive sites (refer to Constraints Mapping in Appendix A), type, duration, volume of storage, and will be designed in a manner that avoids treated wood contact with rain, snow, and run-off water;
- Long-term temporary laydown areas will be protected with a poly-liner, and monitored for weeping poles;
- Installation of chemically treated poles or timbers in NL must be in accordance with the restrictions presented in Table 1; and
- Installation of chemically treated poles or timbers in NS must be in accordance with the restrictions presented in Table 2.

Table 1 Restrictions for Chemically Treated Poles or Timbers in Sensitive Sites in Newfoundland and Labrador.

Pole Type	Freshwater River, Pond, Brook, Lake or Stream	Freshwater Wetland	Protected Water Supply Area (PWSA) / Unprotected Water Supply Area	Domestic Wells (Surface or Drilled Artesian)
Untreated	0 m	0 m	0 m	0 m
CCA	5 m	0 m	Not Allowable	10 m
PCP	15 m	0 m	Not Allowable	15 m

Table 2 Restrictions for Chemically Treated Poles and Timbers in Sensitive Sites in Nova Scotia

Pole Type	Freshwater River, Pond, Brook, Lake or Stream	Freshwater Wetland	Protected / Unprotected Water Supply	Potable Water Supply (Including wells)
Untreated	0 m	0 m	0 m	0 m
CCA	5 m	5 m	Not Allowable	5 m
PCP	15 m	15 m	Not Allowable	15 m

2.5 ARCHAEOLOGY

The following mitigation requirements are to be implemented to assure the effective management of archaeological and heritage resources for the general public, and potentially affected Aboriginal groups that have an interest in the preservation and management of heritage resources related to their culture:

a) Excavations, or similarly invasive work, undertaken in high potential areas for archaeological or heritage resources will be completed with a qualified archaeologist present.

b) The Provincial Archaeology Office (PAO) and/or staff with the Geological Survey of NL, Department of Natural Resources or NSDNR and/or the NS Heritage Division paleontological staff will be provided the opportunity to examine newly exposed bedrock known or suspected to contain fossils.

c) The mitigation of any archaeological sites discovered through further field work will be carried out by a licensed professional archaeological team conducted under permit by the PAO in NL or the Special Places Coordinator, Nova Scotia Department of Communities, Culture and Heritage (Heritage Division) in NS.

d) If unexpected archaeological and heritage resources are encountered during construction activities, cease work and contact NSPML. NSPML will contact the NS Heritage Division or PAO in NL immediately upon discovery of an archaeological site or artifact unearthed during any phase of the proposed Undertaking. If the find is of certain or suspected Mi'kmaq origin, NSPML must also contact the Executive Director of the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO).

e) Where avoidance of high potential areas for archaeological or heritage resources within work areas is not possible, results of archaeological testing will be used to confirm if resources are present. Identified resources will be protected through avoidance, mitigation through archaeological recovery, or a combination of these measures. These activities will occur in advance of any Project-related ground disturbances, to the satisfaction of the PAO in NL for discoveries in NL or the Provincial Heritage Division and KMKNO for discoveries in NS.

f) The Contractor will be required to follow the "Contingency Plan for Unexpected Archaeological and Heritage Resources" provided by NSPML (Appendix B).

2.6 WETLANDS AND WETLAND CROSSINGS

2.6.1 WETLANDS

Guidance on wetland conservation in NS will adhere to the Nova Scotia Wetland Conservation Policy (NSE 2011).

Guidance on wetland conservation in NL will adhere to the Policy for Development in Wetlands in Newfoundland (NLDEC 2001).

Wetland avoidance is the primary objective in wetland habitat conservation and is achieved through mitigation by design (i.e., routing of line to avoid wetlands to extent possible), however, the following mitigation requirements are also provided for wetlands:

a) When wetland avoidance is not possible, vegetation clearing within habitats identified as sensitive (refer to Constraints Mapping in Appendix A) will be done by hand, and will be limited to the removal of trees. These wetlands will be identified by NSPML as part of the Constraints Mapping, and confirmed upon field verification.

b) To the extent feasible, access for the purpose of construction will utilize existing roads (e.g., public roads, resource roads, trails) and the existing (cleared) transmission corridor. The Contractor will note that it is preferred that construction equipment and

materials advance linearly along the existing (cleared) transmission corridor, to minimize the extent of disturbance.

c) The Contractor will implement natural vegetated buffers or engineered sedimentation controls if activities are required within 30 m of a wetland in NS or within 20 m of a wetland in NL, to prevent siltation of the wetland from areas of disturbed ground. Within habitats identified as sensitive (refer to Constraints Mapping in Appendix A), conductors will be drawn by hand or light vehicles such as ATVs across wetlands and winched into position in order to minimize damage to vegetation and substrate.

d) Trees will be removed, leaving the root mat intact, within the portion of the cleared area passing through wetland habitat, with shrub cover being left intact, when feasible.

e) The Contractor will direct run-off from construction activities away from wetlands, where possible and as per applicable under provincial requirements.

f) No chips or debris will be left in wetlands or watercourses, or their buffers, or in coastal habitats (e.g., beaches, dunes).

2.6.2 WETLAND CROSSINGS

Heavy equipment working in or travelling across wetlands is a key Project risk from a safety and environmental perspective. Inadequate planning and/or mitigations can result in a range of issues including:

- Serious safety implications for personnel; and/or
- Environmental damage to sensitive habitat (e.g., equipment rutting).

Pre-planning will help ensure appropriate mitigations are employed to reduce the likelihood of environmental or safety incidents. Mitigation measures that are proposed and employed should commensurate with level of risk based on a quantitative assessment of relevant criteria. The following mitigation requirements are provided for wetland crossings:

a) The wetland information provided in the Constraints Mapping (Appendix A) is largely based on modeling outputs, and therefore limitations exist in its application. This information is provided to Contractors for planning purposes only and actual conditions for all wetlands must be verified in the field by the Contractor(s).

b) Wetlands determined to be "high risk" (>1.5 m based on peat depths measured by the Contractor) will be avoided, where possible. Access will deviate around the wetland using established safe travel routes. Where established safe travel routes do not exist, the Contractor shall identify a verified safe travel route. If a high risk wetland cannot be avoided (i.e., due to tower placement), a documented risk assessment must be completed and a mitigation plan developed and submitted to NSPML for review in advance of the planned work. The chosen mitigation plan/measures (e.g., use of swamp mats) must be accepted by NSPML.

c) Prior to crossing any wetland/bog, a documented risk assessment shall be completed by the Contractor that includes field verification of the risks. Results will be used to determine if avoidance or mitigation is required to support the wetland crossing. This information is also required as part of the Contractor's Access Plan to establish safe travel routes.

d) In situations where wetlands traverse the entire width of the transmission corridor, deviation may be required around high risk areas where mitigation measures may not be feasible. The Contractor will be responsible for employing acceptable mitigation measures in consultation with NSPML (e.g., swamp mats).

e) Established wetland crossings must be re-assessed when conditions change (e.g., change of season, increased rainfall, etc.).

f) Wetland crossings and construction within wetlands should be minimized during times of increased and long term precipitation, where feasible.

g) Mitigation measures shall not permanently divert or alter surface water flow.

h) Mitigation measures will be temporary in nature unless otherwise accepted by NSPML.

Refer to Appendix C for additional information outlining the planning process for Contractors to assess wetland crossing risks and the associated mitigation details that should be implemented.

2.7 WATERCOURSE CROSSINGS

Watercourse crossings will be executed in one of four ways depending on crossing width and length of the span required, hydrology, environmental sensitivities and engineering considerations. The four possible means for crossing watercourses are as follows:

1. Use of existing structures, where feasible **(applicable in NS and NL)**;

2. Use of temporary engineered structures where no permanent crossings are present.

Clear span bridges are the preferred option and will be installed in accordance with applicable regulations **(applicable in NS and NL)**;

3. Winter ice crossings will be utilized where and when feasible. Winter mobilization and distribution of materials will be scheduled to take advantage of freeze-over conditions **(applicable in NL only)**; and

4. Fording of watercourses, which is crossing the channel bed once over and back at stable, narrow, low gradient, low flow locations, will be considered as a last resort option under specific conditions and in accordance with regulatory requirements following acceptance from NSPML. **Note:** some fording locations may also trigger a permit requirement. Fording of scheduled salmon fishing rivers should be avoided during the Department of Fisheries and Oceans (DFO) seasonal window.

The following mitigation requirements are provided for watercourse crossings:

a) In NS and NL, watercourses will be crossed utilizing existing structures where feasible. Where no permanent crossings are present, temporary engineered structures will be used. Clear span bridges will be the preferred option. NSPML will follow the requirements of the NS *Environment Act* and the NL *Water Resources Act*, and associated regulations.

b) In NS, the NSE document "Nova Scotia Watercourse Alternation Standards" (NSE 2015) will be followed. A Certified Watercourse Installer is required for crossings (bridges or culverts) that require notification or approval under the Watercourse Alteration Program. Temporary crossings that do not require notification or approval (i.e. the crossing spans the watercourse entirely and there is no disturbance to the bed or bank of the watercourse) can be installed without a Certified Watercourse Installer.

c) In NL, all applicable conditions from the NLDEC – Water Resources blanket water approval and any subsequent approvals will be followed by the Contractor. Confirmation of the crossing removal and location with before and after photos must be provided in accordance with the timelines of the blanket approval.

d) The following best practices will be implemented for a temporary stream crossing:

- The bridge is no greater than one lane in width, and no part of its structure is placed within the wetted portion of the stream;
- The work does not include realigning the watercourse;
- Disturbance to riparian vegetation is minimized;

- The work does not involve dredging, infilling, grading or excavating the bed or bank of the watercourse;
- Fording to install or remove a temporary span (over and back) will not occur in areas that are known fish spawning sites. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, brush matting) should be used provided they do not constrict flows or block fish passage; and
- The crossing will not result in erosion and sedimentation of the stream, or alteration (e.g., compaction or rutting) of the bed and bank substrates.

e) The Contractor will design and construct new temporary crossings in accordance with hydrological conditions, span length, stream bank stability, weight restrictions and other criteria as defined by standard best practices or permit conditions, if applicable.

f) The Contractor will ensure that watercourse crossings will be built to handle the expected load of equipment and materials, and will implement regular inspections to ensure that the crossing is maintained throughout the Project.

g) The Contractor will ensure that the approaches to watercourse crossings are stabilized (e.g., brush mats, corduroy, or aggregate), where necessary to minimize tracking material across the bridge deck The Contractor should also note that stream banks prone to erosion may require additional stabilization and will use material that is clean, non-erodible, and not originating from the stream bank or bed.

h) The Contractor will ensure that all crossings are located in areas that exhibit a stable soil type and where grades approaching the crossings are not too steep.

i) The Contractor will ensure watercourse crossings will not result in permanent diversion, restriction or blockage of natural flow.

j) All wetland and watercourse crossings will be restricted to a single location, at the narrowest point, and occur at the wetland or watercourse.

k) The Contractor will ensure that any temporary bridge crossing will be removed following completion of construction.

l) When accessing temporary watercourse crossings, the Contractor will ensure the following requirements for clearing within the riparian buffer zones:

    i. Clearing will be minimized to accommodate construction traffic requirements only, and will not span the full transmission corridor width;

ii. Cutting will be undertaken by hand or using equipment with a long-reach mechanical arm; and

iii. At tower locations where grubbing is required, grubbed materials will be re-spread or stockpiled and as many stumps and roots as feasible will be left on the ground surface.

m) During freeze-up conditions, vehicles may cross watercourses via ice bridges in NL only. The Contractor must ensure that ice cover is sufficient to hold the weight of the vehicle and that the watercourse is not disturbed.

n) Any structure, device or thing, whether temporary or permanent, that may interfere with navigation, shall not be built or placed in, on, over, under, through, or across any navigable water that is listed in the Schedule 1 of the *Navigation Protection Act* (NPA), unless it has been approved under the Act via NSPML. Transport Canada - Navigation Protection Program (NPP) should be contacted to determine the applicability of the NPA.

o) In NL, when existing access and temporary crossings options are ruled out, fording will be considered as a last resort and only under unique and well-defined circumstances. Where the ford area is not natural bedrock or is easily disturbed by fording, the entire fording area shall be stabilized using vegetation mats, corduroy roads or coarse material (125 mm diameter or greater), when such material is available from a reasonably close location within the RoW. When the substrate of the ford area is not subject to easy disturbance by fording or coarse material is not easily available within the RoW, fording under existing substrate conditions may occur.

p) All applicable conditions from the NLDEC – Water Resources blanket water approval section on fording will be followed by the Contractor (NLDEC 1992). This approval was issued under section 48 of the NL *Water Resources Act*. The Contractor will need to have a qualified individual on site during installation and removal of any spans or brush matting. As part of the Access Plan, the Contractor will identify stream crossings for review by NSPML. Confirmation of the crossing removal and location with before and after photos must be provided in accordance with the timelines of the blanket approval.

2.8 BUFFER ZONES

Buffer zones are established to protect sensitive environmental receptors from construction activities by maintaining zones of undisturbed soils and/or natural vegetation. Buffer zone minimum protection requirements to be implemented include:

a) The Contractor will avoid travel within watercourse buffers with machinery, where feasible, with the exception of temporary water crossing locations.

b) The Contractor will ensure vegetation clearing will be conducted by hand (i.e., chainsaws), inside riparian buffer zones (20 m in NL, 30 m in NS), and vegetation will remain partially altered. "Partially altered" is defined as vegetation of less than 2 m in height will remain. Vegetation over 2 m will be hand cleared to meet system reliability standards.

c) In NS, with the exception of access to temporary watercourse crossing locations, the Contractor will ensure a 30 m partially altered buffer will be retained on both sides of all waterbodies, including wetlands as per the Nova Scotia Watercourse Alteration Standards (NSE 2015).

d) In NL, in non-protected water supply areas, the minimum buffer zone width is 20 m for all waterbodies, including wetland, with slopes less than 30%. For slopes greater than 30%, the buffer distance will be determined using the formula: 20 m + 1.5 m x slope of the land (%) or 20 m, whichever is larger, as per the Guidelines for the Protection of Freshwater Fish Habitat in Newfoundland.

e) In NL, the following buffer zones are required for protected water supply areas by the Policy for Land and Water Related Developments in Protected Public Water Supply Areas under the NL *Water Resources Act*:
   - 150 m around intake pond or lake;
   - 150 m for a distance of 1 km upstream and 100 m downstream of a river intake;
   - 75 m of a main river channel;
   - 50 m around a major tributary, lakes or ponds; and
   - 30 m around other bodies of water.

Refer to Table 3 for a summary of buffer zone protection requirements in NS and NL.

Table 3 Summary of Buffer Zone Protection Requirements in NS and NL[1]

Activity	Environmental Receptor	Buffer Width (m) Nova Scotia	Buffer Width (m) Newfoundland
Storage of bulk fuels	Waterbody*	100 m	100 m
Refuelling	Waterbody	30 m	30 m
Cutting/Construction	Non-protected water supply Riparian zones	30 m	20 m (for slope <30%) 20 m + 1.5 x % slope (for slope >30%)

Activity	Environmental Receptor	Buffer Width (m) Nova Scotia	Buffer Width (m) Newfoundland
Cutting/Construction	Protected water supply area	30 m	150 m - intake pond or lake, and 1km upstream from intake and 100m downstream 75 m - main river channel 50 m - major tributary, lakes or ponds 30 m - other bodies of water
Quarrying and Aggregate Removal from Borrow Areas	Waterbody*	100 m	50 m
All Activities	Archaeological sites	50 m	50 m
Blasting	Waterbody*	If within 200 m, notification to NSE	Based on size of blast** Table 4.3 (DFO 1998)
All activities	Provincial Protected Areas	100 m	100 m T'railway (unless permit received)
Use of creosote treated wood	Waterbody*	15 m	15 m

[1] Buffer zone protection requirements listed in the above table are considered default protection requirements, unless otherwise directed in permit conditions.

* From high water mark

** DFO Guidelines for Protection of Fish in Newfoundland & Labrador (1998)

2.9 EROSION AND SEDIMENT CONTROL

For the Maritime Link Project, all erosion and sedimentation control measures will be temporary until natural re-vegetation occurs. Contractors will use the erosion and sedimentation control measures listed below at all sites where soil or sub-soil has been exposed and there is potential for erosion. Contractor erosion and sedimentation control plans (ESCPs) shall be submitted for review and accepted by NSPML prior to the commencement of the specific construction activity for which the ESCP is required. Transmission line and grounding line corridors may require the development of engineered ESCPs. Project sites will require the development of ESCPs, unless otherwise accepted by NSPML.

ESCP shall include the development of a site monitoring program. This program shall include provisions for water sampling during runoff and/or rain events. If applicable, a water sampling program may be required to ensure compliance with any existing permit conditions. ESCPs may need to be updated as construction activities progress on sites and to fulfil the requirements of

the ESCP as conditions on site change. Changes or deviations to the ESCPs must be accepted by NSPML.

Other erosion and sedimentation control minimum requirements to be implemented include:

a) The Contractor will implement both temporary and permanent erosion and sedimentation control measures prior to the commencement of ground disturbance activities (e.g., grubbing).

b) The Contractor will implement the appropriate (temporary) erosion and sedimentation control measures where soil or sub-soil has been exposed and the potential exists for erosion to occur. These measures should stabilize the slopes/banks on either side of watercourses and wetlands, and prevent sediment run-off.

c) The Contractor will ensure that the area of exposed soil will be limited, and that the length of time soil is exposed without mitigation (e.g., mulching, seeding, rock cover) will be minimized through scheduled work progression. The Contractor will stabilize slopes and areas susceptible to erosion with rock, seeding, or other means approved by NSPML.

d) During dewatering of excavated areas, the Contractor will implement appropriate erosion and sedimentation control measures to minimize and control the release of sediment-laden water.

e) Site run-off from access trails and construction areas will be intercepted and diverted away from watercourses and wetlands as per the requirements of the NS *Environment Act, the* NL *Water Resources Act*, and associated regulations. The quality of the water released from the site will be monitored so that it does not exceed the level of suspended solids specified by regulatory approvals, or in their absence, applicable guidelines (e.g., Canadian Council of Ministers of the Environment (CCME) guidelines). Results of the monitoring will be provided to NSPML.

f) The Contractor will ensure silt curtains will be used during grounding site dredging and breakwater construction to minimize the transport of suspended sediments by water currents, if appropriate with the scope of work as determined with regulators.

g) Silt-fencing, or other sediment barriers, shall be used to prevent silt or other harmful materials from discharging into a watercourse.

h) Any material used to repair or stabilize stream banks will be clean, non-erodible and non-toxic and will not come from the watercourse beds or banks.

i) Erosion protection material shall be clean, durable, non-ore bearing, non-toxic and obtained from a non-watercourse source.

j) The Contractor will provide maintenance requirements for environmental control structures (i.e., erosion and sedimentation controls, temporary bridge spans, etc.).

k) Sediment that has formed and been contained by the sediment containment barriers is to be removed and properly disposed of prior to the removal of the sediment barriers.

l) Where necessary, the Contractor will ensure mitigation measures will remain in place after work is completed and until areas have stabilized. Erosion and sedimentation control measures will be temporary until natural re-vegetation occurs.

m) The Contractor will ensure that all (temporary) erosion and sedimentation control materials are eventually removed from the construction site.

n) The Contractor will be responsible for weekly inspections and maintenance of all erosion and sedimentation control measures/structures. Daily inspections will be conducted during rain events to ensure the effectiveness of erosion and sedimentation controls.

2.10 GENERAL REHABILITATION/SITE STABILIZATION

Upon completion of construction activities, sites should be returned to their original condition or to a better condition in which they were found. General rehabilitation and site stabilization mitigation requirements to be implemented include:

a) The Contractor will provide procedures for post-activity clean-up and demolition as part of the Contractor's execution plan.

b) Rehabilitation/site stabilization should take place as soon as possible after completion of construction activity.

c) The Contractor will ensure that construction materials and debris will be removed from sites and laydown areas when construction is complete, and that the areas are returned to original land-use capability.

d) Materials not originating from the site must be of a similar nature as the in-situ material, and must be from clean sources as close to the rehabilitated area as possible. Should contamination be suspected, the material shall be analyzed prior to use. The

number of samples, sampling locations and analytical parameters shall be approved by NSPML.

e) Where topography has been disturbed, the original contours shall be restored, if practical, to preferably grades 2H: 1V or less. Disturbed or rutted surfaces shall be smoothed upon completion.

2.11 VEHICLE TRAFFIC AND ACCESS TRAILS

The Contractor is responsible for implementing the following requirements related to vehicle traffic and access trails:

a) Upon initial mobilization to a work site, and/or following transportation between sites, the Contractor will clean and inspect work vehicles and/or heavy equipment brought to the site to prevent the introduction of weed/invasive/non-native species to terrestrial corridors. This excludes construction activities that occur in a continuous manner along the transmission corridor.

b) All vehicles and equipment must be clean and in good repair, free of mud and oil, or other harmful substances that could impair water quality.

c) Spill kits should be kept on site at all times in case of emergency.

d) Contractors will decommission work areas and temporary access trails to encourage a return to natural conditions.

e) Where Nova Scotia Power Inc. or NLH or other access roads are utilized, the roads shall be maintained to either the same or a better condition than they were found.

f) The location and construction details for any new access trails, staging areas, laydown areas, and associated infrastructure, and any other such information will be provided to NSPML by the Contractor and can be provided as required to NLDEC and NSE.

g) To the extent possible, the Contractor will control and restrict access to Project-related roads and work areas to site personnel only. Speed in construction areas will be limited based on site conditions.

h) All Project-related equipment will follow traffic regulations and posted speed limits.

i) In NS, any work areas created on provincially owned roads will conform to the Nova Scotia Temporary Workplace Traffic Control Manual (updated 2012).

j) During Project construction, trails used by ATVs and snowmobiles may require temporary closure. NSPML will advise the appropriate associations of temporary closures.

k) In NL, there are sections of the transmission route that cross the T'Railway Provincial Park within 500 m of park boundaries. PNAD permits are required for access to the T'Railway, and public access may be restricted for safety concerns (Section 2.4 (e) and 2.8).

l) The information provided regarding Vehicle bans (under the *Motorized Snow Vehicles and All-Terrain Vehicles Act* and Regulations) will be adhered to by all Project personnel for the beaches in the Grand Bay West to Cheeseman Provincial Park Important Bird Area (IBA) to protect nesting Piping Plovers from disturbance and destruction. If it is determined that other beaches could be accessed where piping plover or other bird species are present, similar avoidance measures will be implemented.

2.12 VEGETATION REMOVAL

The Contractor is responsible for implementing the following minimum requirements during tree removal activities:

a) Tree clearing activities will comply with applicable provincial legislation. In NS, all work will comply with the Wildlife Habitat and Watercourses Protection Regulations under the NS *Forests Act*, and in NL, all timber will be harvested in accordance with the Cutting of Timber Regulations under the NL *Forestry Act*. Tree clearing activities will also be executed in a manner that complies with the *Migratory Birds Convention Act* (MBCA) and the *Species at Risk Act* (SARA), specifically to avoid incidental take.

b) Clearing limits will be marked by the Contractor and Project activities will be limited to designated areas, where feasible. This will include identified environmental sensitive features such as watercourses, wetlands, and areas of high archaeological potential (refer to Constraints Mapping in Appendix A, pending field verification).

c) All watercourses will be kept free of chips and debris resulting from clearing activities.

d) In NL, vegetation greater than 2 m in height within a 20 m watercourse buffer area will be hand cleared (i.e., large machinery will not be used).

e) In NS, vegetation greater than 2 m in height within a 30 m watercourse buffer area will be hand cleared (i.e., large machinery will not be used).

f) Trees, inadvertently felled into a watercourse will be removed immediately.

g) Harvesting of timber on private lands will be subject to agreement of a legal interest in the land and/or a timber harvesting agreement.

h) Permission to access areas for clearing purposes will be obtained from property owners by NSPML.

i) Harvesting timber on Crown Land will be done in accordance with Provincial Crown requirements.

j) A commercial harvesting permit will be obtained from the respective forest management district office prior to commencement of activities.

k) Felling of trees adjacent to an energized transmission corridor will employ qualified personnel in regular scheduled contact with the energy centres and following appropriate protocols established by the respective utilities in both provinces.

l) Stump heights will be kept as low as specified in Contract agreement for future vegetation management purposes.

m) Wood piles shall not restrict access or subsequent construction work on the RoW or access road.

n) Wood piles shall be stacked and arranged in a stable manner to prevent them from toppling over.

o) Non-compatible vegetation (brush) may be disposed of by chipping, matting, mulching or hauling away.

p) Felled trees previously cut or uprooted trees or stumps within the designated limits must be properly disposed of by the Contractor.

q) Damage to any facility or structure (e.g., fences) on or off the RoW caused by the Contractor as determined in the sole judgement of NSPML, shall be repaired to the satisfaction of NSPML at the Contractor's expense.

r) An operating permit will be obtained from each forest management district in the fire season.

s) The following permits will be obtained from the relevant local or area office of the NSDNR, for work during forest bans and/or during the fire season:

- Woods Travel during Forest Closure Permit: required for travel on forest land while a travel ban (woods closure) is in force. Woods closure/travel bans usually occur when the forest is extremely dry, and the hazard of fire is extreme; and
- Burn Permit: required to light a fire in or within 1000 feet (304 m) of the woods in NS during the fire season (i.e., April 15th to October 15th, both dates inclusive).

2.13 BLASTING

Prior to blasting activities, a blasting plan must be prepared by the Contractor that follows the requirements in the **Maritime Link Project Blasting Protocol** (Appendix D). The blasting plan must be provided to NSPML for review and acceptance. Additional minimum requirements to be implemented during blasting events include the following:

a) Should blasting be necessary for rock excavation, it will be conducted in accordance with provincial legislation and subject to terms and conditions of applicable permits.

b) If blasting operations involve the use of ammonium nitrate, Contractors should note that this substance is listed in the Environmental Emergencies (E2) Regulations under the *Canadian Environment Protection Act* (CEPA), and appropriate mitigations should be applied.

c) Blasting near watercourses will only occur in consultation with DFO, and will follow the requirements of the *Fisheries Act* as well as the requirement of the DFO advice - Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013), and/or the DFO Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Wright and Hopky 1998), as applicable.

d) Contractor(s) will include a contingency plan for providing temporary water and replacing damaged wells should a water supply well be affected from blasting, in the unlikely event that this should occur.

e) Blasting will not be carried out within the Protected Water Supply Area of Pottle Lake, NS.

f) In NL, if blasting is required in protected (i.e., Dribble Brook) or unprotected water supply areas, a hydrological assessment will be carried out and mitigation and monitoring will be developed in consultation with NLDEC.

g) Should blasting be required on provincially owned roads in NS, a permit will be obtained from NS Transportation and Infrastructure Renewal's local Area Manager.

h) Three hours prior to any blasting in NL, a visual reconnaissance of the area will be conducted to determine the presence of caribou. If caribou are present, blasting will be delayed, until caribou have left the area of their own accord.

i) Protocols must be included for any proposed blasting within the area of the new transmission corridor in NL (between Granite Canal and Burgeo Highway) to avoid conflict with outfitting operations.

2.14 WASTE MANAGEMENT

The Contractor is responsible for implementing the following minimum requirements regarding waste management:

a) All sites will be kept free from the accumulation of waste material and debris, and upon completion of the works, surplus materials and temporary structures will be cleaned from the sites.

b) All solid waste, including waste construction material, will be properly sorted for recycling, reuse, composting, or landfilling in approved facilities. Way bills will be provided upon request for the disposal of hazardous materials at appropriate, provincially approved waste facilities.

c) Segregated materials will be stored in a manner to prevent degradation, burning or burying on site until they are sent to the appropriate, provincially approved waste disposal, recycling, or composting facility.

d) Permanent storage areas for containers or drums will be clearly identified.

e) Temporary on-site sewage systems required during construction activities will be installed and operated according to relevant provincial legislation. A licensed septic pumping contractor will be used and way bills will be provided upon request.

2.15 STORAGE AND HANDLING OF HAZARDOUS MATERIALS

The Contractor is responsible for ensuring that all provincial and federal regulations are followed in relation to the storage and handling of hazardous materials, including spills and releases. The NS requirements are specified in the Environmental Emergency Regulations (NS Regulation 16/2013), pursuant to the NS *Environment Act*. The NL requirements are specified in the Storage and Handling of Gasoline and Associated Products Regulations, 2003 (NL Regulation 58/03) and the Used Oil Control Regulations 2002 (NL Regulation 82/02), pursuant to the NL *Environmental Protection Act*. All spills to water are reportable as per the *Fisheries Act*. In

addition, the following minimum requirements are to be implemented regarding the storage and handling of hazardous materials:

a) Equipment will be kept in good working order, will be inspected regularly, and observed leaks will be repaired.

b) Permanent storage areas for containers or drums will be clearly identified.

c) Fuel storage areas will have approved secondary containment, capable of capturing the contents of the entire volume being stored.

d) Storage of all hazardous materials will comply with Workplace Hazardous Materials Information System (WHMIS) requirements. Appropriate material safety data sheets (MSDS) will be located at the storage site(s).

e) Transportation of dangerous goods will comply with Transport Canada's *Transportation of Dangerous Goods Act*.

f) In the event of a hazardous release or contamination, the Nova Scotia Contaminated Sites Regulations (CSR) should be followed as required (NSE 2013). The regulations include requirements for determining what a contaminated site is and how the site must be managed.

g) Contractor(s) will provide an emergency response plan (ERP) which will include emergency spill response procedures for potential release of diesel fuel, hydraulic oil and all other types of synthetic oil, drill muds and hazardous materials, and hazardous wastes. Procedure details should include staff and contractor training requirements, emergency contact numbers and fire responders.

h) Spill containment equipment (e.g., spill kits) and trained personnel will be present at site at all times.

i) Secondary containment (i.e., spill trays) should be used during refueling or storage of any hazardous material.

j) In NL, refueling, clean-up kits and storage of fuel will follow permit stipulations under the Policy for Land and Water Related Developments in PPWSA under the NL *Water Resources Act.*

k) Refueling in the field will not occur within 30 m of watercourses and water supply areas (including the known location of private wells). Where equipment is located near a wetland and must be refueled at that location, special precautions will be used to prevent spilled fuel from entering sensitive receptors (e.g., spill tray/absorbent pads located below nozzle and spill response kits fully stocked and located at the refueling location).

l) The provincial governments have jurisdiction over the transportation of hazardous wastes within its province, as well as the licensing and permitting of authorized facilities undertaking disposal or recycling operations and authorizing carriers. Environment and Climate Change Canada (ECCC) is responsible for administering the Interprovincial Movement of Hazardous Waste Regulations (IMHWR) under CEPA (CEPA 1999). In addition, all hazardous wastes must be accompanied by a manifest or movement document. If hazardous wastes or hazardous recyclable materials are to be shipped for disposal or recycling outside Canada or imported into Canada, the Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations under CEPA would be applicable.

m) The IMHWR has been in force since 2002. These regulations set out the conditions which must be met in order to monitor and track the transboundary movement of hazardous wastes in Canada to ensure that they are recycled or disposed of in an environmentally sound manner. Contractors should be aware that under the IMHWR, all hazardous wastes must be identified, appropriately packaged and transported by an authorized carrier within Canada.

n) In the event of an emergency involving dangerous goods, call CANUTEC at 613-966-6666 or *666 (cell phone). Canutec is the Canadian Transport Emergency Centre and is operated by Transport Canada to assist emergency response personnel in handling dangerous goods emergencies. This national bilingual advisory centre is specialized in interpreting technical information, providing advice, and emergency response associated with the transportation of dangerous goods under the *Transportation of Dangerous Goods Act* (TOGA).

2.16 NOISE AND DUST CONTROL

The Contractor is responsible for implementing the following minimum requirements regarding noise and dust control management:

a) Construction equipment will be maintained in good working order and properly muffled.

b) Noise control measures (e.g., sound barriers, shrouds, enclosures) will be used where warranted.

c) Noise-generating construction activities will comply with the requirements of existing by-laws (where applicable).

d) A noise assessment may be undertaken where high-noise events and/or sustained noise-producing activities are planned (e.g., converter stations, HDD locations). This

assessment will identify noise receptors and quantify the potential effects of noise on those receptors. In the event where noise mitigation is required by regulatory authorities, Contractors will be responsible for developing and implementing measures to mitigate noise to the extent feasible.

e) Noise abatement measures will be installed if deemed necessary in consideration of Health Canada guidelines for daytime and night time noise limits (Health Canada 2010) at HDD site locations.

f) In the event of public complaints about low frequency noise (LFN) and/or vibration near the converter station or activities related to HDD, NSPML commits to implementing appropriate measures to mitigate the LFN and/or vibrations. Mitigation may include monitoring.

g) Dust control will be employed as necessary, including limiting exposed soils (e.g., through re-vegetation) and application of water or a suitable, approved dust suppressant, to dry and/or dust-prone soils, if required.

h) Air emissions will be mitigated through regular equipment inspection and maintenance and restriction of engine idling.

2.17 MARINE ENVIRONMENT

The Contractor is responsible for implementing the following commitments during marine activities:

a) For marine work, Marine Atlantic and Transport Canada's Notice to Shipping offices will be notified of work activity and duration. A Notice to Mariners and Notice to Shipping will be published to inform vessel operators of navigational hazards during construction and operations.

b) All marine-based work undertaken by Canadian-registered vessels will comply with the requirements of the *Canada Shipping Act*.

c) Discharges from the Project will comply with Annex 1 of the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) and Pollution Prevention Regulations of the *Canada Shipping Act*.

d) All ballast water management activities will comply with the Ballast Water Control and Management Regulations (updated Oct 31, 2012), under the *Canada Shipping Act*, and the Canadian Ballast Water Management Guidelines.

e) All marine activities will be undertaken in compliance with stipulations in the *Fisheries Act*. A *Fisheries Act* authorization under section 35(2) may be required if

activities cannot avoid or mitigate serious harm to fish. This applies to work being conducted in or near waterbodies that support fish that are part of, or that support a commercial, recreational or Aboriginal fishery.

f) Operations in the marine environment require compliance with pollution prevention provisions pursuant to section 36(3) of the *Fisheries Act* (and applicable CEPA Regulations), and the MBCA.

g) Any Project-related loss or harmful alteration of fish habitat will be addressed through application under the *Fisheries Act*, as applicable, including the requirement to comply with no-net-loss provisions and the DFO Policy for the Management of Fish Habitat.

h) All Project-related vessels will have a shipboard Oil Pollution Emergency Plan (OPEP), as required by MARPOL. Oil spill response and clean-up procedures will be developed in consideration of CWS's Oil Response Procedures Manual and Oil Response Plan (CWS 1999). The OPEP will identify the person authorized to implement the plan and will also confirm that the vessel has an arrangement with a response organization certified by the Canadian Coast Guard.

i) Storage of hazardous materials on vessels will be in accordance with applicable regulation.

j) All marine spills will be reported to the Canadian Coast Guard. Any incident involving the spillage of oil or petroleum lubricating products into the marine environment must be reported immediately to the 24-hour Spill Report Centre (NS: 1-800-565-1633, NL: 1-800-563-9089).

k) All marine-based work undertaken by foreign vessels must be undertaken pursuant to a Coasting Trade Permit issued under the *Coasting Trade Act*, and will comply with applicable regulations under the International Maritime Organization Conventions including MARPOL.

l) The Contractor will ensure that all marine equipment used during construction will be cleaned and inspected prior to use upon initial mobilization at a work site and/or following transportation between sites, to prevent and control marine biofouling. All anti-fouling activities will comply with the Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals (2012), under the *Canada Shipping Act*, as well as requirements set out by Health Canada and the Pest Management Regulatory Agency regarding approved anti-fouling substances.

m) All efforts will be made to avoid collisions with marine mammals and sightings should be recorded.

n) During marine cable installation activities, vessel speeds will not exceed 26 km/hr (14 knots) where practical to reduce potential for collisions with marine mammals.

o) Fill material for the rock berms to be free of fines, debris and any substances that would be deleterious to the marine environment.

p) Mitigation measures include prohibition of illegal dumping of bilge water/wastewater, and the rapid containment and cleanup of hydrocarbon spills.

q) In recognition of the importance of the Bird Islands IBA, the cable laying vessel will commit to avoiding the islands.

r) In the event of seabird strandings on the cable laying vessel or at the HDD site, NSPML will adhere to handling protocols described in The Leach's Storm-Petrel: General Information and Handling Instruction, as well as meeting necessary permit requirements.

s) With regards to birds which may be encountered in the offshore and along the coast and effects to these birds associated with oil spills, Contractors will develop a comprehensive ERP as part of their EPP.

t) Use best management practices for reducing interaction with marine birds, including:

- Vessels travelling at reduced speeds to minimize underwater acoustic emissions and collision with marine mammals and marine reptiles;
- Restriction of boat traffic to construction zone where feasible;
- Minimizing the use of ship's whistles; and
- Restricting night lighting where practical and safe to do so.

u) If required, a fish capture and relocation plan will be developed by NSPML to allow for the safe removal of fish trapped within the saltwater pond created during construction of the grounding elements. This plan will be referenced as a mitigative measure and will be available to DFO for review.

v) All marine Project activities will be conducted in accordance with the requirements of the Canadian Coast Guard Marine Communication and Traffic Services.

w) If unexploded ordnances are encountered, emergency response procedures will be implemented as per the Contractor's ERP, including notification of appropriate personnel and agencies (e.g., Coast Guard, Department of National Defence).

2.18 GEOTECHNICAL/HORIZONTAL DIRECTIONAL DRILLING (HDD)

The Contractor is responsible for implementing the following commitments during HDD activities:

a) For HDD, the rig layout will include containment facilities and specialized trucks at the entry borehole designed to contain a release of drilling fluid from the mud circulation system and prevent the release of drilling muds into the marine environment.

b) The primary mitigation for the potential release of drilling fluid is controlling the mud system and drill bit steering (telemetry system). Following detailed design of the HDD exit location (i.e., drill short or drill through), mitigations such as altering drilling mud composition and the use of divers and/or suction equipment are options, depending on geological conditions and appropriate safe work conditions.

c) If sulphide bearing materials are identified through pre-construction geotechnical surveys by NSPML, these areas will be included in the Contractor's EPP. Rock removal in known areas of elevated potential will conform to relevant legislation (e.g., the Sulphide Bearing Material Disposal Regulation of the NS *Environment Act*), and in consultation with relevant regulatory departments.

d) For HDD, the rig layout will include containment facilities designed to contain a release of drilling fluid from the mud circulation system.

e) If an uncontrolled loss of pressure occurs, emergency response procedures will be implemented as per the Contractor's ERP. Following initial response, reclamation will be undertaken as necessary to restore damaged habitats. In particular, benthic surveys will be conducted to determine the extent of spilled drill fluid in the marine environments. Appropriate offsetting measures will be implemented for activities resulting in serious harm to fish, where required. "Serious harm to fish" is defined in section 2 of the *Fisheries Act* as the death of fish, or permanent alteration to or destruction of fish habitat.

f) A noise assessment may be undertaken where high-noise events and/or sustained noise-producing activities are planned (e.g., converter stations, HDD locations). This assessment will identify noise receptors and quantify the potential effects of noise on those receptors. In the event where noise mitigation is required by regulatory

authorities, contractors will be responsible for developing and implementing measures to mitigate noise to the extent feasible.

g) Noise abatement measures will be installed if deemed necessary in consideration of Health Canada guidelines for daytime and night time noise limits (Health Canada 2010) at HDD site locations.

h) In the event of public complaints about low frequency noise (LFN) and/or vibration near the converter station or activities related to HDD, NSPML commits to implementing appropriate measures to mitigate the LFN and/or vibrations. Mitigation may include monitoring.

2.19 ENVIRONMENTAL TRAINING

Environmental training is mandatory for all ENL employees and contractors prior to start of any construction activities.

All workers and supervisors will attend ENL Orientation Training, in advance of arriving on site, which includes, but is not limited to a review of:

- ENL Minimum Requirements EPP;
- ENL Environmental Commitments; Workers' Environmental Responsibilities;
- Examples of Mitigation Measures and Best Management Practices.
- Examples of Environmental Incidents and Reporting; and
- Proactive Reporting.

In addition to the ENL Orientation Training, prior to starting any scope of work the lead Contractor will conduct environmental training specific to their activity-specific EPP for all workers, including subcontractors.

Contractors will require that all of their on-site supervisors and those of any subcontractors adhere to the following standards:

- Issues of environmental concern will be included as a standard agenda item at Project meetings and tool box talks;
- The Contractor will arrange for regular inspections to monitor for compliance to their activity-specific EPP;
- The Contractor will inform personnel of the requirement to report issues of non-compliance to the Construction Site Manager who will report to NSPML's Site Supervisor or designee;

- Personnel will be informed that hazardous materials and Petroleum, Oils, and Lubricants will be used only by personnel who are trained and qualified in the handling of these materials, and only in accordance with manufacturer's instructions and government regulations. The WHMIS program will be implemented and all employees involved will be appropriately trained; and
- All Project personnel will be made aware of the chemical and oil spill response procedures and incident reporting system, including the location and use of on-site spill response and firefighting equipment.

2.20 REPORTING

The Contractor is responsible for implementing the following minimum requirements for reporting purposes:

- The Contractor shall conduct daily inspections of the Work to confirm environmental compliance. The inspections shall be documented by the Contractor in daily reports which shall be kept on file. Any EPP non-compliance and corrective actions shall be documented by the Contractor. ENL will provide a template which Contractors can use as a guide for reporting (Appendix E);
- The Contractor shall provide to NSPML a weekly summary for environmental compliance reporting. Weekly reports should also include environmentally sensitive activities planned for the following week (i.e., watercourse crossings). ENL will provide a template which Contractors can use as a guide for reporting (Appendix E);
- The Contractor shall provide NSPML with a monthly environmental performance report for the Work. The Contractor's environmental performance report shall include, but is not limited to, the following:
    - Environmental incidents, including loss of fuel or other hazardous products;
    - Proactive environmental actions;
    - Reported EPP non-compliance and associated corrective actions;
    - Wetland crossing risk assessments (if applicable);
    - Summary of watercourse crossings (if applicable); and
    - Wildlife sightings.

3 WILDLIFE, RARE FLORA AND HABITAT PROTOCOLS

3.1 GENERAL STATEMENT

The construction phases of the Maritime Link Project are very likely to interact with wildlife. Furthermore, several species and areas of conservation which are protected under federal and provincial regulations occur within the footprint of the Project or in close proximity. Where sufficient information was available, the presence and the location of these species and habitats were included and delineated in the Constraints Mapping (Appendix A). Given the scope of the work, a wide range of species and habitats will interact with this Project. In some cases, mitigation measures will need to be site and/or species specific and will be developed by NSPML in consultation with regulators. The risk of incidental harm to wildlife and habitats from construction activities will be minimized through general avoidance measures where feasible and through awareness training. Training and Awareness procedures will include, but not be limited to:

- Present information to personnel on site about wildlife (e.g., why they are of concern, how to identify them and their behaviour, including safety protocols);
- Personnel will be made aware of the presence of rare or protected habitat(s) within the footprint of the proposed activity, and of the associated mitigation measures;
- Personnel will be made aware of the presence of rare or protected flora within the footprint of the proposed activity, and of the associated mitigation measures;
- Personnel will be encouraged to report any wildlife sightings during daily commute and on worksite;
- Personnel operating company vehicles will possess a valid driver's license, follow designated speed limits, and undergo safety training with particular emphasis on strategies to avoid wildlife-vehicle collisions;
- A "no harvesting or other harassment of wildlife" policy will be implemented, and there will be no firearms or pets on site;
- Public access will be restricted from temporary roads and active work areas; and
- The EPP will be overseen using trained and experienced environmental monitors or designee(s).

3.2 CARIBOU

Newfoundland caribou will be treated separately in this document as there is a possibility of encounters and a specific set of protocols to be implemented within known caribou calving habitats (refer to Constraints Mapping in Appendix A). These measures include:

- **Temporal:**
  - Modify timing of worksite activities within known caribou habitats to avoid calving, early-post calving, and late-post calving where possible.
  - A main caribou migration route was found to include the area from the Granite Canal camp (km 81) to approximately km 95. Crews will be driving through this area regularly to reach work sites. Work trailers and storage secants are also located within this area. If personnel observe caribou crossing the access road, the appropriate response is to follow the **Stop, Wait, and Proceed with Caution procedure** (see below).
  - In the situation where caribou are observed near the side of the road while a vehicle is driving through, it is appropriate for the vehicle to continue to travel through with caution at a reduced speed.
  - If caribou are observed within 3 km of a work site, the acceptable EPP response is as follows:
    - If caribou is observed travelling through a work site, work is to stop and personnel are to follow the **Stop, Wait, and Proceed with Caution procedure** (see below)**;** and
    - If caribou is observed within 3 km of a work site, personnel should be made aware that the caribou is in the area and the caribou should be monitored. If the caribou is moving towards the work site, work is to stop and personnel are to follow the **Stop, Wait, and Proceed with Caution procedure** (see below)**.** If the caribou is moving away from the work site (i.e., moving through the general area as opposed to crossing the work site), the work can proceed with caution.
  - Pre-calving season defined as April 1- May 19 annually.
  - Calving season defined as May 20 - June 10 annually.
  - Post-calving season define as June 11 – June 30 annually.

- **Spatial:**
  - Modify or restrict location of worksite activities and during calving, early-post calving, and late-post calving; areas of high risk of occurrence within the project corridor will be identified on the project constraints maps.
  - Use existing access (i.e., logging roads, farm roads, and trails) where feasible.

- Post and enforce speed limits in known caribou calving areas (50 km daylight, 30 km dusk-dawn).
- Install caribou warning signs along primary and secondary access roadways.
- Align any new RoW placement and worksite activities to reduce effects to known calving, early-post calving, and late-post calving areas.
- Limit the width, density, and length of access trails where possible to reduce habitat and landscape degradation.
- Rehabilitate work areas no longer required in accordance with the EPP to encourage return to natural conditions.

- **Training and Awareness Procedures:**
  - Present information to personnel on site about caribou (e.g., why they are of concern, how to identify them and their behaviour, how to report sightings on site using a caribou field card).
  - Personnel will be directed to report any caribou sighting during daily commute and on worksite.
  - Personnel operating company vehicles will possess a valid driver's license, follow designated speed limits for caribou habitat, and undergo safety training with particular emphasis on strategies to avoid wildlife-vehicle collisions.
  - A "no harvesting or other harassment of wildlife" policy will be implemented, and there will be no firearms or pets on site.
  - Public access will be restricted from temporary roads and work areas.
  - Crews or designated person/s on the crews can participate in monitoring activities as long as they are provided training on how to properly respond to caribou observations.
  - The EPP will be overseen using trained and experienced environmental monitors or designee(s).

- **Contractor's On-Site Environmental Monitor or designee will:**
  - Complete daily visual scans for caribou activity at work sites.
  - Walk the projected RoW or work site where the daily construction activity is expected to occur.
  - Drive access trails within **5 km** of work sites daily to identify caribou activity/presence by observation of animals or sign:
    - If caribou activity is observed (**> 3km from work sites**), the environmental monitor will advise personnel, activities will proceed with caution and continue to monitor.
    - If caribou activity is observed (**< 3km from work site**), the environmental

monitor will advise NSPML who will contact the Wildlife Division.

- Upon visual observations by project personnel, they will:
  - **STOP** – turn off engines. Assess caribou response.
  - **WAIT** – 5 to 10 minutes for caribou to continue off the right-of-way or site.
  - **PROCEED** – quietly and cautiously, trying not to evoke flight response. If caribou reacts to proceeding, stop and continue to wait.
  - **REPORT** – all caribou encounters are to be reported on caribou response card and submit to on-site Environmental Monitor (Table 4).

Table 4 Caribou Encounter Response Form

Caribou Encounter Report Form								
Date		**Time**		**Location**				
Caribou behavior at time of encounter		Bedded down		Travelling		Feeding		Other
Caribou reaction when encountered		No response		Curious, activity continued		Flight response		Other
Worker activity at time of encounter		Travelling		Actively working		Down time		Other

3.3 NEWFOUNDLAND (PINE) MARTEN

The Newfoundland population of American martens and their Critical Habitat are protected under the NL *Endangered Species Act* and the federal *Species at Risk Act* since 2009. As a result, special care must be taken to avoid harming martens and their habitat. Part of the Project transmission line crosses the Critical Habitat of the pine marten (refer to Constraints Mapping in Appendix A for delineation of Critical Habitat). Similar to the caribou protocols described above, temporal and spatial measures should be implemented to reduce the risk of harm to American marten and their habitat:

- **Temporal:**
  - Where possible, modify timing of worksite activities within known American marten Critical Habitat to avoid denning. Known marten denning locations are identified in the Constraints Mapping in Appendix A.
  - Denning season defined as April 1st - June 30th annually.

- **Spatial:**
  - Modify or restrict location of worksite activities and during denning season, boundaries of the designated Critical Habitat within the project corridor will be identified on the project constraints maps.
  - Should any tree clearing be planned during the marten denning period, NSPML will consult with the NL Wildlife Division to identify a specific plan for identifying and avoiding denning locations prior to work. Given the relatively small area to be cleared along an existing RoW, and the low likelihood of interaction with the species.

- **Training and Awareness Procedures:**
  - Present information to personnel on site about American martens (e.g., why they are of concern, how to identify them and their behaviour).
  - Personnel will be directed to report any marten sightings during daily commute and on worksite.
  - Personnel operating company vehicles will possess a valid driver's license, follow designated speed limits for marten habitat, and undergo safety training with particular emphasis on strategies to avoid wildlife-vehicle collisions.
  - A "no harvesting or other harassment of wildlife" policy will be implemented, and there will be no firearms or pets on site.
  - Public access will be restricted from temporary roads and work areas.
  - The EPP will be overseen using trained and experienced environmental monitors or designee(s).

3.4 AVIFAUNA (BIRDS)

The construction phases of the Maritime Link Project will inevitably interact with avifauna (birds). Given the scope of the work, a wide range of bird species and habitats will interact with this Project. As with other wildlife species, this Project will minimize the risk of harm to birds through temporal and spatial avoidance measures. In addition to the protections under the *Migratory Birds Convention Act* (MBCA), several avifauna species present within the footprint of the Project are listed and protected under the NL *Endangered Species Act*, NS *Endangered Species Act* and *Species At Risk Act* (SARA), and require special attention. For additional details on the regulatory framework of these Acts, refer to Appendix F.

3.4.1 MIGRATORY BIRD NESTING SEASON

For migratory bird species, regulators have established exclusion periods during which some high risk activities are restricted to avoid harming birds, nests, and eggs. These periods typically correspond to the nesting seasons for migratory birds in NL and NS.

In **NL**, the migratory bird exclusion period extends from **May 1st to July 31st** of each year. In **NS**, the exclusion period extends from **April 1st to August 31st** of each year. During these periods, if there is a request for construction activity, risk based assessments will be conducted and the regulator will be consulted. If activity is permitted in these periods, additional mitigation measures will need to be implemented to prevent harm to birds, nests, and eggs as a result of Project activities.

Exclusion periods are set by regulators as indicators of the likely onset of the nesting season "on average", but do not necessarily correspond to the actual onset of the nesting season, which can vary from year to year. The actual start of the nesting season is triggered by the onset of nesting behaviour in migratory birds and raptors. Consultation may occur with regulators on actual nesting season commencement in a given year.

Raptor species are protected under federal and provincial jurisdictions in both provinces all year round, as well as their nests whether they are active or not. Nests of species listed in the Federal SARA as Endangered or Threatened are protected at all times of the year. Measures to mitigate the risk to raptor species during Project activities are detailed in Section 3.4.4.

Certain nests are protected all year if they are active or not. These include Bald Eagles, Osprey, and other birds of prey. These tree-based nests should be obvious by their size. The Constraints Mapping (Appendix A), provided by NSPML, will alert the Contractor if any species at risk are likely to be on site.

3.4.2 AVIFAUNA MANAGEMENT PLAN

If construction activities need to proceed during the bird nesting season, Contractors will submit a detailed scope of work and schedule of activities in advance (i.e., 12 weeks) of any work commencing to NSPML. NSPML will review this plan and evaluate the level of risk associated with the proposed activities. Based on this evaluation and in consultation with regulators, NSPML will accept low and moderate risk activities to proceed with appropriate mitigations as described in Section 3.4.4.

Contractors will be responsible for developing their own activity specific Avifauna Management Plan (AMP) using the framework provided in Section 3.4.4 as a guide. The activity specific AMP will provide details on scope of work including the specific area(s) of construction activities, bird

survey details, mitigation measures upon discovery of nests, etc. Contractors will be responsible for providing regular updates and reports to NSPML.

The responsibilities of NSPML and Contractors for the development and implementation of the AMP are outlined below:

NSPML Responsibilities:

- Provide general AMP (described herein);
- Review of Contractor activity plan and mitigations;
- Evaluation of risk;
- Consultation with Regulators to describe activities and mitigation measures;
- Confirm activity-specific mitigation with Contractor;
- Decision to proceed; and
- Reporting to Regulators.

Contractor Responsibilities:

- Provide detailed activity plan, schedule and mitigations;
- Retain qualified (and NSPML approved) bird surveyor(s);
- Implement mitigation measures including bird/nest surveys to ensure all reasonable measures are taken to avoid causing harm to active nests and nesting/breeding birds prior to starting any activity;
- Documenting all mitigations measures taken and reporting on surveys and discoveries; and
- Re-survey areas if and where nests were found prior to resuming activities within the buffers or setbacks that were implemented.

3.4.3 RISK MATRIX FOR CONSTRUCTION ACTIVITIES

Table 5 provides examples of construction activities and their perceived risk level for impacting birds or their habitats during the bird nesting season.

Table 5 Activity-specific AMP and Mitigations

Activity	Description	Risk Level	Possible Mitigations
Clearing/Harvesting	Felling standing trees with machinery or manually by chainsaw	High	No activity.
Stump brushing	Tree stumps cut to specified height (<15 cm), may be done by mulcher or manually with chainsaw	Low to moderate	Qualified birder surveys to clear site no more than 3 days prior to activity. Apply appropriate buffer zones around nests.
Pruning	Limbing tree branches, may be done manually with chainsaw or by a skilled equipment operator	Moderate	Qualified birder surveys to clear site no more than 3 days prior to activity. Apply appropriate buffer zones around nests.
Mowing	Removal of stumps with a rotating head or drum mulcher	Low to moderate	Qualified birder surveys to clear site no more than 3 days prior to activity. Apply appropriate buffer zones around nests.
Mulching “on the hoof”	Mulching whole trees where they stand with a mulcher head attached to excavator arm	High	No activity.
Mulching of felled trees	Reduction of whole trees or boughs to wood chips with machinery	Low to moderate	Qualified birder surveys to clear site no more than 3 days prior to activity. Apply appropriate buffer zones around nests.
Grubbing	Removal of stumps, roots and organic matter	Low if site already cleared	Qualified birder surveys to clear site no more than 3 days prior to activity. Apply appropriate buffer zones around nests.
Site preparation	Grubbing and grading of site already cleared of trees	Low if site already cleared	Qualified birder surveys to clear site no more than 3 days prior to activity. Apply appropriate buffer zones around nests.

A risk assessment and decision process is illustrated in the decision tree below (Figure 1):

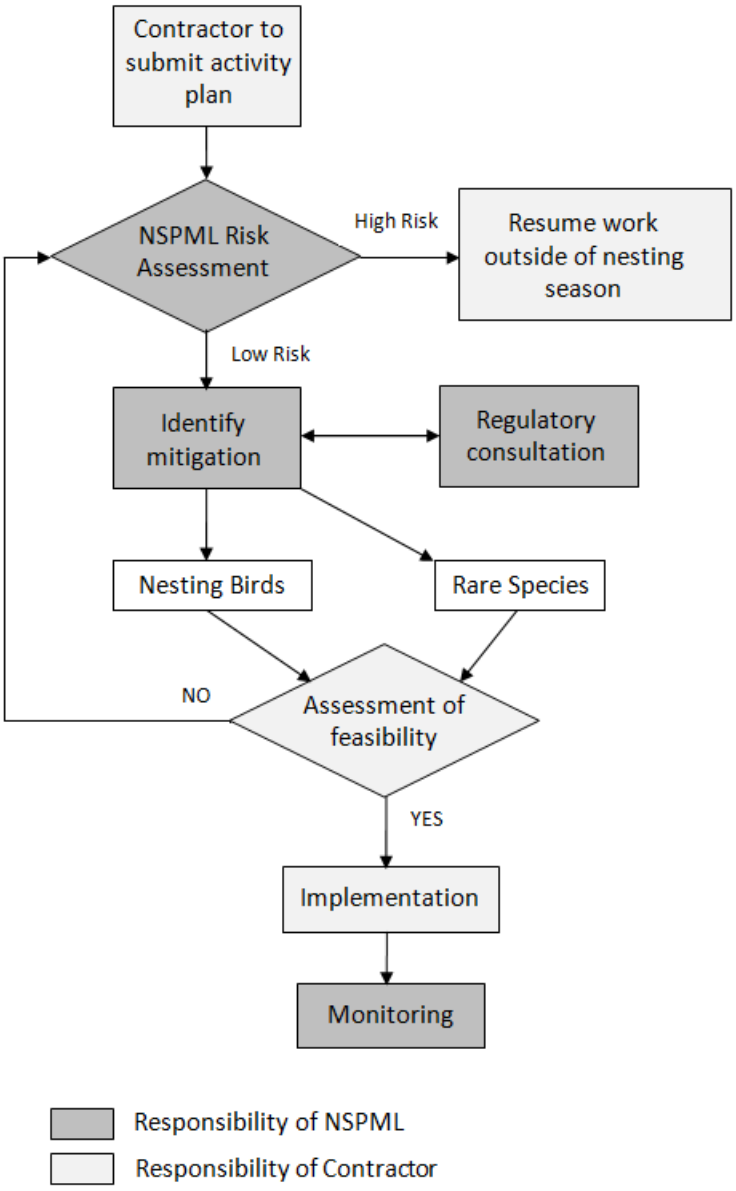

Figure 1 Avifauna Management Decision Tree

3.4.4 MITIGATION FRAMEWORK

For construction activities assessed as low risk that occur during the bird nesting season, a qualified birder (approved by NSPML) will complete ground surveys of the anticipated construction work areas. Surveys will be conducted prior to construction activities and within **three calendar days** of the commencement of such activity. The census techniques will vary according to habitat. Bird nests can be on the ground, in shrubs, in cavities, in trees or on transmission structures.

A) Bird/Nest Surveys

Prior to surveys, a comprehensive list of bird species with potential to nest in the area will be reviewed (Appendix F). This list identifies the specific and preferred habitats where nesting is generally expected to occur.

Surveys will consist of walking transects as well as a Sit and Scope (survey station) component that will be spaced accordingly to allow complete visual coverage of all habitats present in the area of interest, including: open fields, barren areas, manmade structures (e.g., bridges), riparian corridors, wooded areas and brush dominated ground cover within the project area that could support nesting birds. Appropriate spacing will ultimately be determined by the qualified birder/ornithologist in the field, but the following guidelines will be implemented to provide adequate coverage of habitats:

- Surveys shall be conducted no more than three days prior to vegetation clearing or grubbing;
- Survey areas will be defined by Construction Schedule for the specific activity and will be conducted prior to ground disturbance, vegetation or tree removal activities that could result in incidental harm to migratory birds or raptors during the nesting season;
- Depending on the nature of the habitats present, up to three surveys will be conducted to determine the presence of active nests within each designated construction area;
- A survey within the boundaries of a designated area is defined as:
    - Occurring one-half hour before sunrise and for up to four hours after sunrise.
    - Occurring within four hours before sunset and into the evening for a minimum of one-half hour for owls.
    - If a nest is located within the survey area, it will be surveyed up to three additional 2-hour surveys to determine whether it is being actively utilized.
- Observation routes (or stations) will be placed in the best possible locations to hear or see bird activity; and
- Surveys will observe breeding behavior and activity of all bird species.

B) Raptor Surveys

Surveys for raptors will include the project foot print and a 400 m buffer where practical (this buffer could vary depending on the line of sight). Observation points for raptor surveys will be strategically placed at sites with an open view of the horizon, where habitat for breeding raptors has been identified. These surveys will include areas that are anticipated to receive impacts and the associated buffer. Surveys will be conducted in a manner to avoid entering private property unless permission has been granted by the property owner.

All nests will be observed for occupation status and species use, active nests will be flagged and protected accordingly. Active nests are nests that contain eggs and or chicks that have not fledged. The bird surveyor will spend 5-10 minutes at each survey station recording all birds seen and heard, including flyovers (flyovers should be noted as such).

C) Indicators for Presence of Birds

For all avifauna species, when breeding or nesting activities are suspected or observed, the surveyor will spend additional time watching the activity (with the aid of binoculars when appropriate) to determine the status of the observed activity. The following behaviors are indicators that an active nest may be present:

1. Carrying material to build nests within the survey area.
2. Copulations.
3. Carrying food or feeding young.
4. Carrying fecal sacks away from nest.
5. Mate-feeding; repeated “bee-line” flying to likely nest site.
6. Observation of nest.
7. Observation of chicks.
8. Females giving call or chip notes alerting their mate that they are off the nest.
9. Auditory evidence of chicks.

Surveys will also include a thorough walk-through documented search of all vegetation including trees, shrubs, grasslands, down trees as well as standing snags for active nests in the proposed disturbance area. This will also include actively searching for low-level, ground, cavity and tree nests in the vegetation proposed for disturbance. For example, cavity nesting would include searching/inspecting all relevant local features: barns and structures, suitable tree holes and cavities and may require an extension pole with mirror to make a determination. If nests are discovered, it will quickly be determined whether they are actively being used or not.

D) Setbacks & Buffers for Discovery of Birds/Nests

If a potentially active nest has been identified during pre-construction surveys, a setback buffer needs to be established around the nest site to prevent disturbance of the nesting migratory species. GPS coordinates and painted lath with flagging or other suitable marking should be used to mark the buffers with appropriate direction and bearing recorded in the field notes.

If an occupied nest is discovered on or adjacent to the disturbance footprint during construction, activities within a minimum of **30 m in NL** and **10 m in NS** from the nest should not occur. If a nest is found adjacent to a trail, vehicles will be allowed to continue using the trail but will be prohibited from stopping within the recommended setback buffer.

Buffered areas can be revisited at a later date once a qualified person has determined that the young birds have left the nest. Buffer flagging must be removed at the end of the construction activity or after it is confirmed that the young birds have left the nest. Large stick raptor nests in trees need permission to be removed at any time of year.

E) Mitigation of Active Migratory Birds Nests:

In NL the migratory birds nesting season is identified as ranging from **May 1st to July 31st**. **In NS** the migratory birds nesting season is identified as ranging from **April 1st to August 31st**. During this period, buffers will be established around active nests as follows:

For song birds and species not of management concern:

- **30 m in NL** and **10 m in NS** for passerine nests and 100 m for waterfowl/waterbird nests.

For bird species of management concern:

- Setback buffer based on the nest setback guidelines recommended by Regulator.

To avoid detection by predators or other threats, setback buffers should be indicated at a distance of 30 m, 100 m, or 800 m (where possible) from the nest location in each cardinal direction (North, East, South, and West) as well as the direction from approaching clearing activities.

F) Mitigation of Active Raptor Nests

In NL, the following buffers for known active raptor nests will be implemented:

- Replace physically disturbed Osprey or Bald Eagle nests with artificial platforms;
- Restrict activities within 200 m of active raptor nests; and
- Restrict clearing within 800 m of active raptor nest in NL.

In NS, the following Restriction Zones will be implemented around active raptor nests:

- A primary Restriction Zone within 100 m of active raptor nests;
- A Secondary Restriction Zone within 200 m of active raptor nests; and
- A Tertiary Restriction Zone within 400 m of active raptor nest.

Within the buffer Zones, the following restrictions will apply:

- **Primary Zone:** forest harvesting of any kind, land clearing, road construction, and major construction are prohibited. Human access should be minimized;
- **Secondary Zone:** Clearcutting, land clearing, road construction and major construction are prohibited. Some low-level forestry activities can be conducted. Human access should be minimized; and
- **Tertiary Zone:** Land clearing, road construction and major construction should be minimized.

G) Protocol for Removing Exclusion Areas

Buffers and setbacks can be removed once active nests of migratory bird species have been vacated. For raptors and listed rare species nests, buffers, and setbacks should remain in place. In order to reduce the potential for nest abandonment or failure, monitoring or rechecking of an identified active nest will occur after the estimated completion of the fledging period (or when the young have left the nest). Depending on the nesting stage (i.e., incubating or fledging) observed during the nest search, the timing of follow-up nest surveys will be determined using literature-based estimates of the species-specific incubation and fledging periods (i.e., approximate number days for incubation and/or fledging to be completed).

H) Recording & Reporting Observations

The location of a confirmed active nest of a protected species will be included in the daily survey log and then flagged in the field. The survey log(s) and a map illustrating the location of the nest will be submitted to NSPML at least weekly for review. Daily survey logs will include:

1. Observer.
2. Date of Survey.
3. Survey Start and End times.
4. Species observed.
5. Weather conditions.
6. Description of nests observed.
7. Description of survey location.
8. Description of vegetative habitat(s).

9. Map of survey station locations and active nest search routes.
10. Description of the developmental stage of juvenile birds observed and the anticipated fledge date.

Reports will contain:

1. A list of dates during which monitoring activities were conducted.
2. Surveyors name(s), survey/monitoring date and time period, and areas surveyed/monitored.
3. A summary of construction activity in the survey/monitoring area. A summary of all bird avoidance and impact minimization measures implemented at the site(s), if applicable.
4. The location and status of observed nests, as well as activities that indicate possible or probable nesting.
5. An account of disturbance or incidental take of threatened/endangered species/species of special concern during construction (take applies to threatened/endangered species only).
6. A list of potential compliance issues and the resolution or status of each issue.

If a nest is accidentally disturbed or destroyed, NSPML will be contacted immediately. The incident will be documented, recorded and photographs will be taken.

3.5 OTHER RARE FAUNA

Several other rare and endangered species of animals (aquatic and terrestrial) occur within the footprint of the project. In some cases the protection extends to the habitats necessary for the conservation of the species. As previously mentioned, where sufficient information is available, the presence and location of these species will be indicated on the project constraints maps. Where mitigation of activities is required, NSPML will develop the appropriate measures in consultation with regulators. It will be the responsibility of the contractors to implement these measures and document this process.

3.6 RARE FLORA

Close to 40 species of rare flora occur within the footprint of the project (NL and NS). For the most part, these species occur in proximity to wetlands. Presence and location of these species are included in the Constraints Mapping (refer to Appendix A). Mitigation measures will be put in place to minimize the impact of the Project. These measures will be included in the GIS metadata associated with each species.

Table 6 is presented as an example of the possible mitigation measures to be implemented for the protection of rare flora:

Table 6 Examples of possible mitigation measures for the protection of rare flora

Rare Flora Type	Examples of Mitigation Measures
Species listed under *SARA* or Provincial *Endangered Species Acts*	• These species are protected under federal and/or provincial regulations and cannot be harmed. • Create buffer as determined by regulators. • Activities to occur within setback to be determined by regulators on a case by case basis.
Species occurring primarily in the vicinity of wetlands/riparian zones with a preference for shade.	• Create buffer and clear area by hand within setback. These species are light-sensitive. • Leave shading species (~2 m) if compatible with construction activity. • Avoid travelling through wetland with machinery. • Use brush matting or corduroy to travel in wetland if necessary.
Species occurring primarily in the vicinity of wetlands/riparian zones with **no need** for shade.	• Create buffer and clear area by hand within setback. • If within a riparian buffer zone, vegetation to be left at a height of ~2 m. • Avoid travelling through wetland with machinery. • Use brush matting or corduroy to travel in wetland if necessary.

In areas where activities cannot be mitigated, NSPML will be responsible for consultation with the Regulator(s) to determine the path forward to carry out the work.

3.7 RARE AND PROTECTED HABITATS

The Maritime Link Project will include construction sites which will be close (<100 m) or overlap with rare and protected habitats. These habitats have been identified and delineated within the Constraints Mapping (refer to Appendix A). The primary mitigation will be to avoid any activity within the limits of the rare and protected habitats. Where this is not achievable, NSPML will determine, in consultation with regulators, the type of the activities that can take place, and when they can occur.

Two types of habitats fall under this description:

- Habitat protected for the purpose of the conservation and recovery of a rare species.
- Habitat protected under provincial regulations for the purpose of wilderness preservation.
    - Risk of interaction:
        - Areas where construction activities overlap with rare or protected

habitats are identified and delineated in the Constraints Mapping (refer to Appendix A), and therefore the risk of accidental impact to these areas is low; and

- Where construction activities cannot be mitigated, NSPML will obtain the necessary permits to authorize work within the rare habitat boundaries. In such cases, special mitigation measures will likely be required.

4 PROJECT ENVIRONMENTAL CONSTRAINTS

4.1 ENVIRONMENTAL CONTRAINTS MAPPING

Environmental Constraints Mapping has been prepared for the Project. The mapping was developed using GIS software and field surveys to identify environmental constraints along the transmission corridor and access trails. Environmental constraints include, but are not limited to, wildlife, wetlands, archaeology, rare flora and protected areas such as provincial parks. The maps are updated as new information is provided by Contractors and/or members of the ENL field teams.

The Constraints Mapping and the associated GIS files are provided to each Contractor to assist with the development of their activity-specific EPPs, and where applicable, site access plans. For this purpose, NSPML will provide the Contractor with the following information:

- LIDAR/GIS data;
- High resolution imagery;
- Existing access data;
- Archaeological high potential areas;
- Known environmental constraints (e.g., watercourses, wetlands);
- Critical wildlife habitats (avifauna, caribou, NL Marten, etc.);
- Provincial protected areas (e.g., public drinking water supply areas, arboretums, etc.); and
- Defined travel routes along the RoW.

NSPML will provide the GIS data as a File Geodatabase or an ESRI shape file. All spatial data must be in a form compatible with ESRI ArcGIS. For information transferred from the Contractor to Company, the same requirement applies, as follows:

1. ArcGIS File or Personal Geodatabase:
    a. If providing a file geodatabase, zip the .gdb folder to ensure easy transferability.
    b. If providing a personal geodatabase, the .mdb file does not need any special preparation.
2. ESRI Shape File:
    a. .shp – shape format; the feature geometry itself.
    b. .shx – shape index format; a positional index of the feature geometry.
    c. .dbf – attribute format; columnar attributes for each shape, in dBase IV format.
    d. .prj – projection format; coordinate system and projection information.
    e. .sbn and .sbx – a spatial index of the features.
    f. .shp.xml – metadata in XML format. Metadata must be filled in for each file providing a description of the file, date created, data source, accuracy and any known data limitations.

Note: The required coordinate system is NAD 83, CSRS UTM 21 for NL and Zone 20 for NS.

Identified constraints will require avoidance (e.g., archaeology, rare flora), or mitigation measures to be implemented (e.g., stream and wetland crossings). Contractors should utilize the Constraints Mapping as a guidance tool. Field verification by the Contractor is required to determine the specific mitigations applicable to specific construction activities. Specific mitigation measures (i.e., when constraints cannot be avoided), require review and acceptance by NSPML and, in some circumstances, may require regulatory review and/or approval. NSPML will be responsible for leading consultations with regulatory agencies. Contractors may be required to participate or provide information for these consultations.

The Contractor activity-specific EPP shall include high resolution mapping illustrating the necessary information (e.g., access routes, constraints and mitigation measures). Any additional files generated for the contractor's EPP mapping outside of what was provided by NSPML will be provided to NSPML in GIS format listed above. It is recommended that the NSPML

Constraints Mapping be updated to include any proposed access routes, and to show the location of specific mitigation measures (e.g., temporary span installations and wetland matting).

5 INCIDENT NOTIFICATION AND EMERGENCY RESPONSE PLANNING

5.1 INCIDENT NOTIFICATION

When an environmental commitment has not been met, an environmental incident has occurred. These along with uncontrolled releases and identified proactive environmental incidents must be reported to NSPML by Contractors. Contractors must include an environmental incident reporting procedure in their activity specific EPP. This procedure is to be based on the information provided below.

Environmental incidents include regulatory non-compliance (these can include actual environmental impacts or failure to submit a report within specified the time frame), non-conformance with EPP requirements/commitments (including failure to submit a report within a specified time frame), or when activities result in environmental damage.

Incidents resulting in environmental damage include uncontrolled releases (i.e., spills that enter the environment), sedimentation events, incidental take of wildlife, damage to water resources, etc. The Contractor activity-specific EPP shall include the applicable regulatory reporting requirements for each province. The NS requirements are specified in the Environmental Emergency Regulations (NS Regulation 16/2013), pursuant to the NS *Environment Act*. The NL requirements are specified in the Storage and Handling of Gasoline and Associated Products Regulations, 2003 (NL Regulation 58/03) and the Used Oil Control Regulations 2002 (NL Regulation 82/02), pursuant to the NL *Environmental Protection Act*. All spills to water are reportable as per the *Fisheries Act*.

Environmental Incidents, Spill Response, and Reporting Procedure

1. Should an environmental incident occur all steps must be taken to stop, control, and/or mitigate the effects of the incident.
2. The Contractors ERP shall be used in situations where applicable thresholds are triggered. Applicable incidents are outlined in NSPML's Project-specific ERP and are to be identified in the Contractor's ERP.
3. Contractors are to notify NSPML immediately (or as soon as practical) of an incident, and shall provide the following information:
    a. State the nature of the incident;

b. Approximate time of incident;

c. Known extent of incident (i.e., spill quantity, receptors affected); and

d. Determine potential threat to environment, if it is known that damage has occurred, state the nature of the damage (environment and/or assets).

4. The Contractor will be responsible for reporting to authorities any incidents that meet regulatory reporting thresholds. In addition, NSPML will contact regulatory authorities for further consultation, if required.

5. A written environmental incident report is to be submitted to NSPML within four days of the occurrence. At a minimum, this report should include: a description of the incident; a description of any corrective or preventative measures and actions taken or scheduled to be taken; and an assessment of the root cause of the incident.

6. Contractors will work with NSPML to implement corrective and/or preventative actions resulting from an environmental incident. All actions will be tracked and documented.

7. In the event of a significant or moderate environmental incident, NSPML is to be notified immediately of the incident, within four hours at the latest. Examples of incidents include, but are not limited to, those listed in Table 7.

Table 7 Examples of significant and moderate environmental incidents requiring notification to NSPML by the Contractor.

Significant Environmental Incidents: are of the highest severity and include:	
➢ Incidents resulting in an order, charge/conviction, Notice of Violation, etc.; ➢ Contravention of a regulation[1] or permit condition that results in off-site environmental or off-site property impacts and has the potential for legal sanction (charges, ministerial orders or other formal regulatory action related to a non-administrative issue).; ➢ A critical[2] uncontrolled release that is critical by definition and results in off-site property or off-site environmental damage that requires ongoing remedial efforts, and results in numerous public complaints or investigation by regulatory authorities.	➢ Charges, ministerial orders (e.g., stop order) or other formal regulatory sanction related to non-administrative issues. ➢ Major oil release or sedimentation event that requires ongoing remediation efforts to repair impacts of the event and the incident has received regulatory attention. ➢ Working in primary core caribou habitat during calving and early post calving with government, public, or media attention. ➢ Major fish kill or violation with charges/orders ➢ Incidental take of birds/nests ➢ Not reporting the discovery of an archaeological site or artifact; removing an artifact.
Moderate Environmental Incidents: are of moderate severity and include:	
➢ Contravention of a regulation[1] or permit condition that involves the release of a pollutant or environmental impact or involves regulatory action (Summary Offence Ticket,	➢ Non-conformances with an Act or Regulation that have led to environmental impact and/or releases and have a probable risk of environmental sanction. Summary Offence

Notice of Violation, etc.). An uncontrolled release that is a) critical[2] by definition but does not result in public or regulatory investigation; b) minor oil releases[3] with off-site property or off-site environmental damage and requiring ongoing customer contact or ongoing remedial efforts; *or* c) other releases[4] that are reportable to regulatory agencies.	tickets, written warnings etc. related to incidents as described would generally fall into this category (consideration would be given if the company was going to appeal). ➢ An event that impacts the hydrology of the wetland (e.g., severe rutting) or material nonconformance with an Environmental Protection Plan. ➢ Oil or other deleterious substances released to water. ➢ Greater than 100L release of petroleum product. ➢ Gaseous releases above reportable limits. ➢ Silt releases to watercourses and wetlands over approval limits or material nonconformance with Environmental Protection Plans that resulted in silted water release. ➢ Large scale fish kill. ➢ Failure to immediately report a "reportable" release to regulator. ➢ Approval/permit violations with no environmental damage or charges.

[1] This includes not obtaining applicable environmental approvals prior to commencement of work.

[2] Critical by Emera Definition means:
- Release of a deleterious substance to water frequented by fish; or
- Oil release >100 L (26.4 USG), or oil greater than or equal to 50 ppm PCB released to the environmental, or release of 1 gram or greater of PCB (from Canadian locations); or
- Abnormal atmospheric emissions resulting in particulate/acid smut deposition beyond plant boundaries that are confirmed as emanating from an Emera facility.

[3] Minor Oil Releases by Emera Definition means oil releases <100L (26.4 USG) and less than 50 ppm PCB (includes reportable releases of oil 2 ppm PCB or greater from equipment in storage).[4]

Other releases by Emera Definition means releases of substances other than those defined as critical or minor oil releases above (e.g., chemical, gaseous or siltation).

5.2 EMERGENCY RESPONSE PLAN

A project-specific ERP has been developed by NSPML. The ERP has been developed to minimize the extent and duration of effects from any major accident, in the unlikely event that such would occur. The ERP includes the notification and reporting structure to be implemented in a safety and or environmental emergency.

Contractors are required to provide a copy of their ERP that meets or exceeds the requirements outlined in the NSPML ERP. The Contractors ERP may include, but not be limited to, the following:

- Contingency plans to address accidents that include spill response procedures, fires, emergency contacts, and staff training;
- Procedures to be followed in case of an accident and will include staff and contractor training requirements as well as emergency contact numbers, including fire responders;
- Procedures for responding to extreme climate conditions such as storms and flooding to protect workers and the public as a well as the security and integrity of infrastructure; and
- Adherence to NSPML reporting timelines for incidents is required as outlined above and in the NSPML ERP.

6 REFERENCES

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APPENDIX A
Environmental Constraints Mapping
Constraints mapping to be provided by NSPML as a separate, GIS file.

APPENDIX B
Contingency Plan for Unexpected Archaeological and Heritage Resources

Contingency Plan for the Discovery of Unexpected Archaeological and Heritage Resources

Potential Resources:

Archaeological and Historic material that is disturbed, destroyed or improperly removed from a site represents a potential cultural loss of information and history that could otherwise be handled and interpreted in an efficient and appropriate manner. NSPML has screened the Project Area in both provinces for possible high potential with the aid of qualified archaeologists and the provincial departments responsible for stewardship of these resources. Any areas identified in a pre-construction screening as having high potential for resources have been assessed in the field by qualified archaeologists. As a result, the Project Area under development is considered to have low potential for these resources. The contractor should keep in mind that the determination of low and high potential areas is not an absolute measure, and if suspected material is found through the course of construction activities the following measures will be implemented:

Contractor's Response Upon Suspected Discovery:

a) If Archaeological or Historic material is encountered, stop all work in the immediate area of the discovery until authorized personnel from NSPML, having consulted with the Provincial Archaeologist, permit the work to resume.

b) Report the find immediately to NSPML's Site Supervisor, who will report it to NSPML's Environmental and Aboriginal Affairs Team.

c) Use flagging tape to mark the site's visible boundaries. Personnel will not move or remove any artifactss or associated material unless the integrity of the material is threatened.

d) NSPML will report the find to the Provincial Archaeology Office (NL), or the Department of Heritage (NS), and collaborate to determine next steps. Any suspected human remains must be reported to the RCMP.

APPENDIX C
Wetland Crossing Planning

Wetland Crossing Planning/Review Process in NL and NS

1.1 Introduction

Construction activity within or adjacent to wetlands is restricted in both Nova Scotia (NS) and Newfoundland and Labrador (NL). In 2011, Nova Scotia Environment (NSE) released the Wetland Conservation Policy that requires most ground disturbance activity in a wetland to be conducted under a Wetland Alteration Permit. The NL Department of Environment and Conservation (NLDEC) regulates activity near all waterbodies, including wetlands, and issued a Policy for Development in Wetlands in 2001 to avoid impacts to wetland functions and degradation of groundwater.

Heavy equipment working in or travelling across wetlands is a key Project risk from a safety and environmental perspective. Inadequate planning and/or mitigations can result in a range of issues including, but not limited to:

- Serious safety implications for personnel; and/or
- Environmental damage to sensitive habitat (e.g., equipment rutting).

The potential to impact wetlands was a key issue reviewed as part of the Environmental Assessment (EA) process. Wetland crossings will endeavor to be minimized to the extent possible by using existing roads (e.g., public roads, resource roads, trails) and the existing transmission corridor, to the maximum extent feasible. In situations where wetlands traverse the entire transmission corridor width, access may need to deviate from the corridor around the wetland (where feasible) or temporary mitigation such as swamp mats or corduroy will be employed. Since the mats distribute the load weight over a much larger area, any disturbance is expected to be temporal in nature and will quickly rehabilitate to original conditions. The key objectives for working in or around wetlands include:

- Avoidance of <u>all</u> wetlands and wetland crossings to the extent feasible;
- Avoidance of high risk wetlands (i.e., >1.5 m depth) as an equipment travel route; and
- If the wetland cannot be avoided, because there are no other options for access or a tower is being constructed within the wetland, the risk must be assessed and engineered controls must be employed.

Pre-planning will help ensure appropriate mitigations are employed to reduce the likelihood of environmental or safety incidents. Mitigation measures that are proposed and employed should commensurate with level of risk based on a quantitative assessment of relevant criteria. If the proposed route deviates from the transmission corridor, additional land rights (crown or private) may be required.

1.2 Definitions

The following definitions are commonly referenced as part of the planning/procedures for wetland crossings:

A) **Access Plan** – plan submitted by the Contractor prior to construction that describes how equipment and personnel will access the sites and/or transmission corridors. Environmental constraints (e.g., wetland crossings) should be identified and the practices for mitigating constraints described in detail.

B) **Access Road** – previously established roads (e.g., forestry road, public road) that will be used by construction equipment to access the project transmission corridor or a trail that will provide access to the transmission corridor.

C) **Access Trail** – trail used by construction equipment to access the transmission corridor from a public road or access road.

D) **Manual probing** – using handheld probing tools/devices to determine wetland depths.

E) **Mechanical Probing** – using machinery (e.g., head of mulcher) to determine wetland depths.

F) **Safe Travel Route** – established route of safe equipment travel through and/or around constraints such as wetlands, steep slopes, etc. (relative to equipment used).

G) **Wetland** – an area commonly referred to as marsh, swamp, fen or bog that either periodically or permanently has a water table at, near, or above the land's surface or that is saturated with water. Such an area sustains aquatic processes as indicated by the presence of poorly drained soils, hydrophytic vegetation and biological activities adapted to wet conditions.

2.1 Wetland Crossing – Preliminary Assessment

As part of early Project planning, extensive wetland delineation and assessment was conducted to facilitate the EA process and to inform design and execution of the Project. This information was utilized to avoid tower placements within wetlands where feasible. The information was also used in the development of Environmental Constraints Mapping that is provided to contractors to facilitate the development of their Access Plans.

There are still numerous locations where towers will be constructed within wetlands and wetland crossings that will be required on the transmission corridor and access trails. Proposed wetland crossings should initially be identified as part of the Access Plan submittal from the Contractor(s). The intent is to identify safe travel routes for equipment travel during construction and operation of the Maritime Link. This applies to wetland crossings encountered

on the transmission corridor as well as the access trails. Safe travel routes established by one Contractor may not be appropriate for the next Contractor and must be reassessed based on the scope of activity and equipment to be used. The procedure for building a tower within a wetland may be different than equipment travel across a wetland.

2.2 NSPML Wetland Atlas/Constraints Mapping

Environmental constraints maps were developed by NSPML for the Project footprint along the transmission corridor, infrastructure sites and associated access trails using GIS software and field surveys. Included as part of the Constraints Mapping, was an assessment of the wetlands located within the Project footprint to develop a wetland atlas. The wetlands were classified using peat depth (modeled or measured) and vegetation type. The inputs for the wetland atlas include:

- 1 meter Digital Elevation model to establish slope;
- Ecological Land use Classification (ELC) using high-resolution imagery, and validation of the model using test sites for vegetation type; and
- Wetland depths:
    - In NL, depths were measured based on manual probing results for select wetlands and the remaining depths are based on modeling.
    - In NS, the extent of each wetland was delineated within the transmission corridor and infrastructure sites but does not include actual depth measurements.

Table 1 provides the wetland crossing risk matrix from the modeling that was completed based on the peat depth and vegetation cover. The risks for wetland crossings that are deemed low are more likely to have an environmental impact as opposed to safety (e.g., ground rutting, wetland alteration, and erosion or sedimentation issues). The high risk crossings pose a greater safety risk for personnel working in deep and unstable wetlands with heavy equipment.

Table 1 Wetland Crossing Risk Matrix

Wetland Risk Model	Peat depth (m)	Typical Vegetation Cover (indicating substrate stability)
Low	< 0.5	Trees
Medium	0.5 – 1.5	Shrubs and bushes
High	>1.5	Herbaceous plants or open bog

There are limitations with some of the information since it is based on modeling, high resolution imagery, and interpolation/extrapolation. It is required that the Contractor verifies

the wetland information in the field and understands the approach to crossing the wetland in advance of equipment being deployed at that location.

2.3 Contractor Wetland Crossing Practices

As part of the Access Plan submittal, prior to construction, the Contractor shall provide NSPML with the following:

1) **Description of wetland crossing practices used for different levels of risk.**
    - A detailed plan should be provided to describe the wetland crossing practices for low, medium and high risk crossings including the proposed mitigations to demonstrate the effectiveness of the mitigation(s) to accommodate the associated load of the equipment. This should include the specifications for selected mitigations (e.g. swamp mats) and ground pressure capabilities.

2) **Description of wetland avoidance criteria.**
    - Describe the wetland conditions or situations that dictate whether a wetland should be avoided due to unsafe conditions.

3) **Description of mitigation removal and remediation process.**
    - Describe how mitigation measures (e.g., swamp mats) will be removed following the activity. Describe situations and remediation techniques that will be used for areas impacted by mats or equipment travel, if required.

2.4 Contractor Risk Assessment Process

The wetland crossing risk assessment process should be described as part of the Access Plan to demonstrate an understanding of the potential risks and how the mitigations will commensurate with the associated level of risk. This includes:

1) **Description of risk assessment process** – pre-planning and during execution (include forms /templates to be used). Seasonality should also be considered as part of the assessment when determining mitigations (e.g., frozen ground or increased moisture in spring or fall).

2) **Description of activities planned (e.g., travel, tower construction) and the equipment that will be utilized.**

3) **Assessment of the crossing and associated level of risk.**

4) **Describe the change process for scenarios where a deviation from the original plan is required during the execution** - including the re-assessment of the proposed crossing including the verification as well as the necessary reviews by the Contractor and NSPML (as applicable).

2.5 Wetland Crossing Summary by Line Segment

Prior to commencing construction on a transmission line segment, a summary table (i.e., excel spreadsheet), and relevant GIS shape files should be provided to NSPML for each segment that:

1) Identifies all of the wetland crossings that will be encountered and the results of the risk assessment to demonstrate how it will be mitigated.
2) Identifies/lists the wetlands that will be avoided.
3) Identification of safe travel routes.

The transmission line has been divided into nine segments for the Project, in NS and NL:

1) **Nova Scotia:**
   a) **HVdc Segment** – Point Aconi to Woodbine**; and**
   b) **Grounding line** – Woodbine to Big Lorraine grounding site
2) **Newfoundland:**
   a) **HVac Segment 1** - Granite Canal to Victoria Control Structure**;**
   b) **HVac Segment 2** - Victoria Control Structure to Burgeo Highway**;**
   c) **HVac Segment 3** - Burgeo Highway Crossing to Bottom Brook**;**
   d) **HVdc Segment 1** - Bottom Brook to Fischelle's**;**
   e) **HVdc Segment 2** - Fischelle's to South Branch;
   f) **HVdc Segment 3** - South Branch to Cape Ray; and
   g) **Grounding line** – Bottom Brook to Indian Head grounding site.

2.6 Verification during Execution (completed before/during specific wetland crossing)

Recognizing that there may be a substantial time lapse between the submittal of the Access Plan and the actual wetland crossing date, a field verified and documented risk assessment must be conducted closer to the actual work dates to capture any changes in conditions. The initial risk assessment prepared as part of the Access Plan should be available in the field for reference and guidance during the crossing. If a change or deviation from the original plan is required, this should be reviewed with NSPML environment contact prior to the activity.

The documented field assessments should be completed by qualified personnel and must include specific information that demonstrates field verification of site conditions and validation of risk assessment results and mitigation practices. Provide forms/templates to be used as part of the Access Plan submission.

The field verified risk assessments, at minimum, shall describe:

- Date and location of crossing;
- Photos of the crossing before/during/after;
- A description of the assessment process (i.e., probing technique: mechanical or manual) to verify depths, visual cues, etc.;
- Confirmation of the equipment and type of activity that was undertaken within the wetland (e.g., travel, mulching, tower construction); and
- A detailed description of the mitigations used.

Probing methods should be carefully selected by the Contractor(s) to ensure an accurate understanding of the wetland depth is achieved, particularly for high risk wetlands. Probing should be conducted at a frequency and spatial interval appropriate to the characteristics of the wetland. There can be limitations with probing methods depending on the substrate and the type of equipment available. Manual probing by hand has the potential to detect false bottoms while using equipment to probe may not be feasible in some areas due to access or if the equipment doesn't have the appropriate capabilities.

2.7 Submittal of Final Wetland Crossing GIS Package to NSPML

Following the completion of the wetland crossing, the wetland crossing field data should be compiled into a GIS package (shape files) including the field assessment and submitted to NSPML.

The GIS shape files should include:

- Equipment travel routes; and
- Results of field verified risk assessment as described in Section 2.5 above, including:
    - Dates.
    - Geo-referenced photos of the wetland crossing.
    - Probe details.
        - Method.
        - Locations (UTM Nad 83).
        - Depths.

- Mitigation.
  - Location.
  - Type of mitigation.

The documented assessment and GIS files will be forwarded to NSPML or uploaded to the designated FTP site.

Refer to Figure 1 for a summary of the planning and review process for wetland crossings.

Figure 1 Wetland Crossing – Planning & Review Process

APPENDIX D
Maritime Link Project Blasting Protocol

Emera
Newfoundland & Labrador

Maritime Link
Project Blasting Protocol

Document Number: MLP-HS-PRO-0003				Total Pages: 14	
1	2015-10-16	IFU – Issued for Use	Ken Meade Director, Environment & Aboriginal Affairs	Harris McNamara Director, Health, Safety & Security	Gerry Brennan Project Manager
Rev.	Date	Reason for Issue	Originator	Reviewer	Approver

Proprietary Notice

RELATED DOCUMENTS

Document Number	Description	Date
MLP-HS-PLN-0001	Maritime Link Health, Safety & Security Management Plan	2015-07-01
MLP-EV-PLN-0007	Environmental Protection Plan Minimum Requirements	2015-01-21

REVISION HISTORY

Revision	Prepared By	Date	Comments (Changes that have been made to this revision)
1	Dan McQuinn (Stantec)/ Ken Meade	2015-10-15	Document prepared to provide direction to contractors in preparation and execution of blasting plans.

1) INTRODUCTION

This document details a blasting protocol for NSP Maritime Link Inc. (NSPML) construction projects in Nova Scotia and, Newfoundland and Labrador. Section 2 provides general requirements for safe blasting operations referring to specific provincial Occupational Health and Safety Regulations. Section 3 gives minimum requirements for the contractors safe work practice. Sections 4 through 6 specify reporting requirements for blast design, Job Safety Analysis and Blast Logs.

2) BLASTING PROTOCOL NSP MARITIME LINK INC.

All blasting operations shall be conducted in accordance with Occupational Health and Safety Regulations for the provincial jurisdiction in which the work is being carried out, all federal and provincial laws applicable to the transportation and storage of explosives, all other applicable federal provincial and municipal laws regulations, by-laws, ordinances, guidelines, and policies, the NSPML Contract Specifications, and additional requirements in this protocol.

2.1) REGULATORY FRAMEWORK

Applicable laws, regulations by-laws, ordinances, guidelines, and policies, (collectively and individually "Regulations") include, but are not necessarily limited to the following:

(a) Explosives Act (Canada), RSC 1985, c E-17; and Explosives Regulations 2013 Part 9

(b) Transportation of Dangerous Goods Act (Canada) S.C. 1992, c.34

(c) In Nova Scotia: Blasting Safety Regulations made under Section 82 of the Occupational Health and Safety Act Nova Scotia S.N.S. 1996, c. 7 O.I.C. 2008-65 (February 26, 2008, effective April 1, 2008), N.S. Reg. 89/2008 as amended by O.I.C. 2013-65 (March 12, 2013, effective June 12, 2013), N.S. Reg. 54/2013

(d) In Nova Scotia: Dangerous Goods Transportation Act, RS., C. 119, s.1

(e) In Nova Scotia: Dangerous Goods Management Regulations made under Section 84 of the *Environment Act* S.N.S. 1994-95, c. 1 O.I.C. 95-295 (April 11, 1995), N.S. Reg. 56/95 as amended up to O.I.C. 2002-93 (March 1, 2002), N.S. Reg. 23/2002

(f) In Newfoundland and Labrador: Occupational Health and Safety Regulations, 2009, NLR 70/09, PART XIX GENERAL BLASTING

(g) In Newfoundland and Labrador: Dangerous Goods Transportation Act, RSNL 1990, c D-1

(h) Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters, 1998

It is the Contractors responsibility to ensure that it is aware of and complies with all applicable Regulations. Regulations are amended frequently and the latest amendment must be adhered to.

2.2) AUTHORITY DUTIES AND RESPONSIBILITIES

Authority, duties and responsibilities for blasters employers and others are strictly defined throughout the OHS regulations for the respective provinces. Additional duties and responsibilities are defined in the Contract Specifications.

2.3) PRE-BLAST SURVEY AND NOTIFICATION

Pre-Blast Survey

Prior to blasting a pre-blast survey shall be completed on every structure within a Scaled Distance in all directions from the Blasting Area of 32 m/kg$^{0.5}$, Scaled Distance means the actual distance from a blasting hole measured in a horizontal line, divided by the square root of the maximum charge weight per delay in that hole. Blasting area" means the zone extending 50 m in all directions from the place in which explosives are handled, prepared, used or loaded for firing, or in which misfired explosives exist or are believed to exist. The pre-blast survey shall meet the following requirements:

(a) a letter of introduction containing a project description, the blasting contractor's name, the name of the firm conducting the survey, and an approximate start and completion date for the project shall be distributed to all property owners in the area to be surveyed;

(b) appointments with property owners shall be made and the survey carried out in a timely manner;

(c) each property owner shall be contacted in person and if the homeowner cannot be contacted, notification is to be sent via registered mail, advising the owner who to contact to schedule an appointment;

(d) the survey shall consist of high quality digital video or still photography of the exterior of the structure, in reproducible format, and which shows an overview of every side of the structure, and including details of any deficiencies noted at any location on the exterior;

(e) the survey shall include fences, sidewalks, trees, and other similar features if the structure is within 15m of the construction site;

(f) photo or video surveys shall be carried out on the interior of the structure with the owner's consent, or in sketch format if the owner does not consent to video;

(g) the survey shall be carried out under normal lighting conditions from a distance of 1 -2 meters, objects such as furniture are not to be moved during the survey, all deficiencies such as cracking, water staining, structural distortions, thermos pane fogging door jamming etc. are noted, and the video record shall be supplied to NSPML, and to the property owner upon request;

(h) a written report shall be compiled for each structure and delivered to the property owner and NSPML;

(i) if the structure is connected to a well, a report on the age and condition of the well shall be included if known. The Contractor shall also ensure that bacteriological and chemical analyses according to the are performed on water from the well before blasting has commenced and after blasting has been completed in case of a dispute. Parameters to be measured shall include Sodium, Calcium, Magnesium, Hardness, Alkalinity, Sulfate, Chloride, Nitrate/Nitrite, Ammonia, Iron, Manganese, pH, Lead, Arsenic, Uranium, and Bacteria (present or absent);

(j) if the structure is connected to an on-site sewage disposal system, a report on the age and condition of the on-site sewage disposal system shall be included if known.

(k)Notwithstanding (a)-(j), NSPML may require other structures to be surveyed and in addition other water tests to be performed.

Notification:

(i) The Contractor shall deliver a notice by hand at least four (4) days prior to the commencement of blasting, to every property owner or business within 300m of the construction site (or such greater distance as NSPML may specify) which shall contain:

(a) the name of the person or company responsible for the blasting, including a contact person and telephone number;

(b) the intended date and time when blasting shall commence and its expected duration period, and;

(c) the location of the blasting including civic address or UTM coordinates.

(ii) The Contractor shall hold a public information meeting if such a meeting is required by NSPML or by one the regulatory authorities that regulate the blasting activities.

(iii) The Contractor shall not blast within 300 meters of a school, hospital, or other health care facility unless: (a) such notice as required in subsection(i) has been given to the senior administrator of the school, hospital or other health care facility, and; (b) the senior administrator is also informed at least 2 hours prior to each blast.

2.4) HANDLING AND STORING EXPLOSIVES

Safe Handling and Storage of Explosives is regulated and licensed by the Canada Explosives Act and within the respective Provincial Regulations.

2.5) DRILLING

Safe drilling of blast holes is prescribed in the respective Provincial Occupational Health and Safety Regulations. In addition, the driller must report to the blaster all observed unusually fractured rock, wide joints and reduced burden to allow the blaster to design and load the blast in a manner to prevent blowout and sympathetic detonation.

2.6) LOADING AND PREPARING FOR FIRING

Loading and preparing for firing is prescribed in the respective Provincial Occupational Health and Safety Regulations. In addition to the regulations it is stressed that a blaster, using a blasting meter, shall personally test the continuity of a loaded hole containing an electric detonator before the hole is stemmed. The blaster must ensure that a sufficient amount of stemming is used in all holes and that the stemming is made from a durable suitably graded crushed stone. The stemming shall fill the collar area completely and should be lightly tamped during the filling operation.

The blast must have a sufficient amount of burden as calculated by accepted industry standards including consideration of charge density ratio and charge diameter to minimize the amount of flying material.

2.7) BLASTING MATS

Blasting mats of appropriate weight, size and strength, most commonly recovered rubber tires cabled together, must be placed on all blasts unless an application for deviation is made in writing to NSPML with appropriate reasoning and shall include a safe work plan (SWP) at least 10 working days prior to the blast.

As a guide, blast mats should extend beyond the perimeter blast holes at least 2 metres and over the open face. Where multiple mats are required, the mats should be overlapped at least 1.5 metres at the joint. Use of blast mats does not substitute for the requirement of properly designed stemming material and depth. The blasting mats must be in good condition free of holes or tears. Care must be taken to ensure that detonating wires are not damaged while placing the mats. Prior to detonation the upper surface of the blasting mats shall be inspected for the presence of loose rock or debris that may become a projectile upon initiation of the shot. All loose material shall be removed by hand.

2.8) FIRING

Firing procedures are prescribed in the respective Provincial Occupational Health and Safety Regulations. It is stressed that once the charges are tested and fully connected to the means of firing; firing should take place as soon as it is safe to do so. If for any reason it is not possible or safe to detonate a blast before the end of each day trained security personnel must be posted until the blast can be safely fired.

The detonation apparatus shall be of the type approved by the detonation system manufacturer for the type of blasting operation to be undertaken. All apparatus shall be kept in working order and shall be thoroughly inspected before and after each blasting operation.

Persons and property must be removed from an area where flying material may create a hazard, or to a shelter sufficient for protection from flying material in accordance with the contractors accepted safe work practice.

All blasts shall be video recorded and the recording shall be identified by blast number date and time and submitted with the blast log (Section 6). All blasts shall be monitored with an approved seismograph and air blast meter; however, monitoring is not required where the scaled distance between the blasting hole and the nearest structure or utility is greater than 45 $m/kg^{0.5}$ unless required by the applicable Regulations or otherwise specified in the Contract.

2.9) AFTER FIRING

Post firing is prescribed in the respective Provincial Occupational Health and Safety Regulations. The contractor must provide detailed post firing procedures as part of the safe work practice; minimum requirements are given in Section 3.

Any blast which results in flying material must be reported immediately to the NSPML OSR.

2.10) MISFIRES

Handling of misfires is prescribed in the respective Provincial Occupational Health and Safety Regulations. The contractor must provide detailed procedures to mitigate hazards associated with misfires within the blasting safe work practice document. Minimum requirements are given in Section 3.

Any misfires once known must be reported to the NSPML OSR and the site must be secured.

3) DETAILED SAFE WORK PRACTICE

A detailed blasting Safe Work Procedure (SWP) must be provided to NSPML for review and acceptance at least 10 working days prior to commencement of blasting operations. As a minimum the SWP must include the following:

(a) Training and certification of personnel;

(b) Blasting specifics and details of blasting tools, equipment and vehicles;

(c) Emergency equipment;

(d) Explosive products to be used;

(e) Transportation storage and handling explosives;

(f) Details of the notifications made to the respective utilities or authorities and nearby residents.

(g) Proposed agenda for daily tool box meetings including:
- site and time specific work scope,
- potential hazards,
- hazard controls and responsibilities.

(h) Regular site inspections to be made relative to blast design and geological anomalies;

(i) Regular equipment inspections to be made;

(j) Detailed Safe loading procedures shall include but not necessarily be limited to:
- sequence of work,
- tamping,
- borehole inspections,
- methods to mitigate blockages,
- charge weight control,
- prevention of overloading due to voids,
- explosive column height control,
- explosives retrieval,
- electrical continuity testing and initiation system inspection,
- stemming.

(k) Detailed safe firing procedures;

(l) Detailed post blast inspection procedures including but not necessarily limited to limited to:
- personnel responsibilities,
- site reentry criteria,
- search for undetonated explosives, undisturbed leg wires, detonating cord, shock tube, or undisturbed rock,
- examination for unstable muck piles or high wall,
- examination of tools or equipment for damage.

(m) Detailed procedure to mitigate perceived misfires.

4) DETAILED BLAST DESIGN

A detailed blast design must be prepared by the blaster for each blast and submitted to NSPML at least 48 hours before each blast. The blast design report shall conform to the Blast Log form, attached, and must include details included in blocks a, b, c, f, g, h, i, j and l of the Blast Log forms.

5) TOOL BOX MEETING AND JOB SAFETY ANALYSIS

Each day that blasting takes place a tool box meeting must be held at the beginning of the day. A detailed job safety analysis must be prepared for the meeting in the contractors form but at a minimum containing the items in the attached JSA template. The contractor shall add potential hazards that are specific to the project site and proposed mitigation measures. The JSA shall be signed by the attendants of the meeting whom shall include the contractor's supervisor, blaster, blasters assistants, labourers NSPML's OSR and any other field personnel involved with the blasting.

6) BLAST LOG

A Blast Log is required by the respective Provincial Occupational Health and Safety Regulations for each province. A template for the Blast Log on NSPML Projects is attached. The signed blast log shall be submitted within 24 hours after detonation of each blast and as a minimum the Blast Log requires the following information:

(a) the date and time of the blast;

(b) the location of the blast;

(c) the name, address and telephone number of the employer;

(d) the name, blaster certificate number and signature of the blaster who had direction and control of the blasting operation;

(e) the distance from the nearest house, residence, shop, church, school or other structure occupied in whole or in part by people;

(f) the distance from the nearest service infrastructure or structure other than one referred to in clause (e);

(g) how the blast was initiated;

(h) the following drilling and loading characteristics for each hole or for each group of holes sharing the same characteristics:
- hole identifier number,
- hole diameter,
- hole depth,
- burden,
- spacing,
- quantity of explosives planned to be loaded in each hole, recorded in kilograms,
- total quantity of explosives planned to be used for the blasting operation, recorded in kilograms,
- type and length of stemming,

- type and brand of explosive,
- type of detonator.

(i) a sketch of the loading pattern for the blast;

(j) the total quantity of explosives actually loaded into each hole, recorded in kilograms;

(k) the maximum quantity of explosives per delay, recorded in kilograms;

(l) the specifics of the delay pattern;

(m) the number of detonators used in the blast;

(n) the period numbers of the detonators used in the blast, top and down hole;

(o) the resistance in the electric blasting circuit compared to the values calculated in the blast design;

(p) the type of warning signal used;

(q) whether blasting mats were used;

(r) whether radio announcements were made and warning signs were posted on all public roads near the blasting area, leading to the blasting area and leading from the blasting area;

(s) whether all roads and approaches were guarded or barricaded;

(t) the results of the inspection of the blasting area conducted after the blast as required by Section 84;

(u) whether a misfire occurred;

(v) whether flying material occurred;

(w) whether there was any injury to persons or damage to property resulting from the blast.

The attached forms adapted from the US Department of Transportation Federal Highway Administration provide a uniform method for recording details for the blast design submission before each blast and field records prepared during and after each blast.

Attachments: Job Safety Analysis
Blast Design/Blast Log Template

Job Safety Analysis

Basic Job Steps	Potential Hazards	Controls to Reduce or Eliminate Hazard	Person Responsible
Receiving and Site Storage of Explosives	Insecure Day Box or mobile magazine		
	Inappropriate amount of explosives on site		
Drilling	Inadequate hole burden and spacing control		
	Drilling into loaded holes		
Securing Site for Blasting	Keeping workers and residents at a safe distance		
Loading	Unauthorized personnel on site		
	Poor crew briefing		
	Improper loading		
	Blocked holes		
	Wet holes		
	Stuck cartridges		
	Stray currents		
	Improper stemming		
	Faulty circuits		
	Improper connection sequence		
	Inadequate shunting		
Matting Shot	Inadequate or damaged mats		
	Damaged connections		
	Improper or inadequate mat placement		
Testing Shot	Damaged connections		
	Uncovered surface detonators		
	Water on connectors		

Basic Job Steps	Potential Hazards	Controls to Reduce or Eliminate Hazard	Person Responsible
	Kinked or improper det. Cord layout		
	Improper testing sequence		
	Poorly operating test equipment		
Post Blast Procedures	Premature entry to blast area		
	Burning explosives		
	Toxic Fumes		
	Poor rock stability		
	Identification of misfires		
	Damaged equipment		
Misfires	Accidental initiation by drilling		
	Detonation of uncovered explosives		
	Fly rock		
	Damage to det. cord		
	Inadequate burden in partially detonated shot		
	Handling and disposal of damaged unexploded materials		
	Stray currents		
Excavation	Digging near misfires		
	Unstable muck piles		

BLAST DESIGN ☐ BLAST LOG ☐ (CHECK ONE)

BLAST No.: DATE: TIME:

A

Blasting Company _____

Type of Shot _____ Project Sta. or Grid Location _____

Type of Material _____ Type of Blast: CONSTRUCTION ☐ QUARRY ☐ PRODUCTION ☐ CONTROLLED ☐

#1 Seis. Grid Loc. (N)_____ (E)_____ Nearest Hole Grid Loc. (N)_____ (E)_____ Dist. Nearest Hole to Seis. _____ (m)

#2 Seis. Grid Loc. (N)_____ (E)_____ Nearest Hole Grid Loc. (N)_____ (E)_____ Dist. Nearest Hole to Seis. _____ (m)

Dist. to Nearest Structure _____ (m) Dist. to Nearest Occupied Structure _____ (m)

B

Number of Holes _____ Diameter (mm) _____ Depth (Range) _____ Face Height _____ (m)

Subdrilling _____ (m) Burden _____(m) Spacing_____ (m)

Stemming _____ (m) Type of Stemming _____ Delay Periods (Range) _____

Number of Rows_____ Method of Firing _____ Type of Circuit: Series_____ Parallel _____

Maximum Kg per delay _____ Mats used Yes ____ No ____

If No mats used state details of Authorization and Fly Rock Mitigation _____

C

Trade Name of Explosives and Detonators	Amount
	Total

Powder Factor _____

D

Fragmentation ___ Excel ___ V.Good ___ Good ___ Fair ___ Poor

Backbreak (m) ___ 10m ___ 20m ___ 30m ___ 40m ___ 50m or _____ (m)

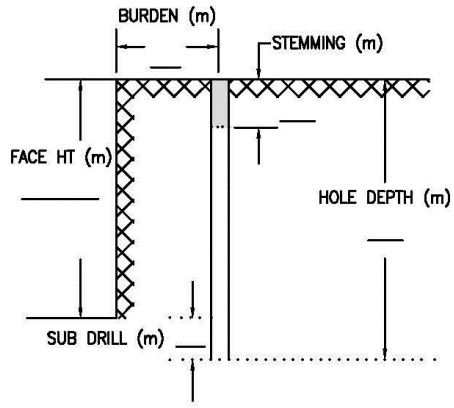
E

Weather (Check Two) ___ Clear ___ Cloudy ___ Rain ___ Snow ___ Hot ___ Warm ___ Cold

Wind From (Check One) ___ N ___ NE ___ East ___ SE ___ S ___ SW ___ West ___ NW

F

SHOW DIMENSIONS ON SECTIONS, INCLUDE DEPTH OF POWDER



1 of 3

BLAST DESIGN ☐ BLAST LOG ☐ (CHECK ONE)

BLAST No.: DATE: TIME:

G Charge/Hole Number	Total Depth (m)	Subdrill Depth (m)	No. of Decks	Spacing Between Decks (m)	Weight Exp/Deck (kg)	Collar Depth (m)	kg/Deck	Total kg Exp.
							Total CHG.	kg

* Use more than one Sheet as Necessary

2 of 3

BLAST DESIGN ☐ BLAST LOG ☐ (CHECK ONE)

BLAST No.: DATE: TIME:

H

PRIMER(S) LOCATION SKETCH PATTERN, SHOW INITIATION HOOK UP DELAYS TOP AND BOTTOM

I REMARKS

WARNING SIGNS – TYPE AND LOCATION _____

J

SECURITY DETAILS _____

K RESULTS OF BLAST AREA INSPECTION

PREDETONATION _____

POSTDETONATION _____

MISFIRES _____

L

Superintendent (print) _____ Sig. _____ Date _____ Phone _____

Blaster (print) _____ Sig. _____ Date _____ Phone _____

NSPML Rep. _____ Sig. _____ Date _____

Blast Certificate _____

3 of 3

APPENDIX E
Reporting Templates

Example - Site Inspection					
Date				Site/Location	
Observer				Contractor	
Description of Work					
Compliance			Item	Control(s)	Notes
Yes	No	N/A			
			Documentation		
			Are required hardcopy Permits/Approvals/ Authorizations on site?		
			Is copy of EPP and ESCP available on site? (electronic or hardcopy)		
			Is required signage displayed if required as per permit conditions?		
			Erosion & Sedimentation Control		
			Have erosion & sedimentation control measures been properly implemented as per the ESCP?		
			Are stockpiles, excess fill and steep slopes covered and mitigated?		
			Has silt fencing & berms been checked for silt height? Silt reaching 33% of height will require removal of silt.		
			Is the amount of exposed soil/overburden minimized to the smallest practical area and shortest practical period?		
			Is dewatering required?		
			Are access roads graded and ditched to minimize erosion?		
			Have erosion control measures been inspected following recent storm events?		
			Are additional sediment control materials inventory available on site in adequate supply to handle significant storm events?		
			Is run-off being directed away from wetlands/watercourses?		
			Marine Environment/Sampling Program		
			Are controls in place to prevent siltation of waterbody as per ESCP?		
			Have waterbodies been sampled for Total Suspended Solids (TSS) or turbidity as per DFO guidelines?		
			Infill and/or aggregate placed near water is coarse, clean, non-erodible, non-ore bearing & non-toxic?		
			Blasting		
			Is the blasting plan compliant with applicable guidelines?		
			Have marine mammal observations been conducted as per DFO guidelines?		
			Have fish scare tactics been employed for marine blasting?		
			Fuel Handling & Storage		
			Are fuel/petroleum products stored and handled properly (containment & labelling)?		
			Fuelling/servicing occurring outside of 100m setback from surface water?		
			Is machinery being cleaned and inspected for drips?		
			Is there a containment liner or spill placed under construction equipment when refuelling?		
			Are oil and/or chemical release response materials on site and readily available?		
			Are adequate spill kits available?		
			Are adequate oil booms available?		
			Waste & Disposal Management		
			Are hazardous waste materials handled/stored properly and are there appropriate plans for disposal?		
			Are waste materials being properly sorted and recycled?		
			Construction debris (e.g. concrete and associated dust, etc.) and solid waste handled, stored, and disposed of properly?		
			Special Considerations		
			Has a bird monitoring program been established for construction (i.e. for breeding migrating birds)? If so, is monitoring being conducted?		
			Have there been any community inquiries? Follow-up required?		
			Has any archaeology or heritage resources been identified? If so, have the appropriate people been contacted?		
			Have wildlife interactions been documented and reported as per EPP?		
			General Notes/Observations/Required Actions		
			Sign-Off		
			Signature	**Date**	**Name**
			Inspected by:		

Example - Site Inspection					
Date			Site/Location		
Observer			Contractor		
Non-conformance			Due date for non-conformance		
Description of Work					
Compliance			Item	Control	Notes
Yes	No	N/A			
Documentation					
☐			Are required hardcopy Permits/Approvals/ Authorizations on site?		
			Is copy of EPP and environmental constraints mapping available on site? (electronic or hardcopy)		
			Is required signage displayed if required as per permit conditions?		
Erosion & Sedimentation Control					
			Have erosion & sedimentation control measures been properly implemented as per the EPP/plan?	**i.e.** 1) Environmental fencing 2) Silt curtains 3) Erosion control blankets (geotextile, straw) 4) Settling ponds 5) Diversion ditches 6) Rock – riprap and/or gravel	
			Are stockpiles, excess fill and steep slopes covered?	**i.e.** 1) Geotextile 2) woodchips 3) straw 4) Rock - riprap and/or gravel 5) other	
			Has silt fencing & berms been checked for silt height? Silt reaching 33% of height will require removal of silt.		
			Amount of exposed soil/overburden minimized to the smallest practical area and shortest practical period?		
			Are access roads graded and ditched to minimize erosion?		
			Have erosion control measures been inspected following recent storm events?		
			Are additional sediment control materials inventory available on site in adequate supply to handle significant storm events?		
			Is run-off from RoW access trail/route being directed away from wetlands/watercourses?		
Wetland Markings and Avoidance					
			Are wetland and buffer zone flagging visible and evident at all wetland locations?		
			Are controls in place to prevent siltation of wetlands where applicable?	i.e. 1) brush matting 2) swamp mats 3) corduroy 4) other	
			Has the wetland been crossed?	**i.e.** 1) brush matting 2) swamp mats 3) corduroy 4) other	
Water Crossing					
			Are watercourse crossings properly installed? What crossing measure is being used?	**i.e.** 1) clear span bridge 2) brush mats/corduroy (NL only) 3) ice bridge 4) other	
			Has notification been given to regulatory authorities including "before" photo at least 3 days in advance?		
			Is flagging for watercourse crossings visible and evident?		
			Are controls in place to prevent siltation of watercourses where applicable?		
			Have approaches to crossings been stabilized with brush mats where necessary?		
			Has crossing been removed and site returned to normal state?		
			Has notification been given to regulatory authorities for crossing removal with "after" photo?		
Tree Clearing					
			Where clearing is permitted within buffer zones, has clearing been undertaken manually (i.e. chainsaws)?		
			Have contractors left vegetation height of 2 meters within riparian zones?		
			Have watercourses, wetlands or buffers been kept free from chips and debris?		
			Have bird nests been identified? Have those areas been flagged as "no-go areas"?		

Blasting					
			Blasting plan available/compliant with applicable guidelines?		
			Have communication plans been administered?		
Site Monitoring					
			Have flowing watercourses been sampled for Total Suspended Solids (TSS) during rain events?		
			Has NSE indicated noise monitoring is required? If so, is monitoring being conducted?		
			Has NSE indicated that dust monitoring is required? If so, is monitoring being conducted?		
			Infill and/or aggregate placed near water is coarse, clean, non-erodible, non-ore bearing & non-toxic?		
			On-site pit or quarry activities are per applicable "Pit & Quarry Guidelines"		
			Has a bird monitoring program been established for construction (i.e. for breeding migrating birds)? If so, is monitoring being conducted?		
Fuel Handling & Storage					
			Are fuel/petroleum products stored and handled properly (containment & labelling)?		
			Stored in tanks with secondary containment in quantities less than 450 litres?		
			Stored outside 100m setback from surface water?		
			Fuelling/servicing occurring outside of 100m setback from surface water?		
			Machinery being cleaned and inspected for drips?		
			Are oil and/or chemical release response materials on site and readily available?		
			Are adequate spill kits available?		
Waste & Disposal Management					
			Are hazardous waste materials handled/stored properly and are there appropriate plans for disposal?		
			Are waste materials being properly sorted and recycled?		
			Construction debris (e.g. concrete and associated dust, etc.) and solid waste handled, stored, and disposed of properly?		
Special Considerations					
			Have there been any community inquiries? Follow-up required?		
			Has any archaeology or heritage resources been identified? If so, have the appropriate people been contacted?		
			Have wildlife interactions been documented and reported as per EPP?		
General Notes/Observations/Required Actions					
Sign-Off					
			Signature	**Date**	**Name**
Inspected by:					
Contractor(s) Representative					

APPENDIX F
Avifauna Management Plan – Regulatory Background and Bird Survey Results

B-1 Avifauna Management - Regulatory Setting

Migratory birds are protected federally under the *Migratory Birds Convention Act, 1994* (MBCA), which is administered by Environment and Climate Change Canada (ECCC). The MBCA and associated Regulations provide protection to all birds listed in the ECCC's *"*Birds protected in Canada under the *Migratory Birds Convention Act, 1994*" (ECCC 2016)". The Act and associated Regulations state that no person may disturb, destroy, or take/have in their possession a migratory bird (alive or dead), or its nest or eggs, except under authority of a permit (refers to hunting permits only). Migratory birds protected by the Act generally include all seabirds, except cormorants and pelicans, all waterfowl, all shorebirds, and most land birds (birds with principally terrestrial life cycles) (MBCA 1994). Birds not falling under federal jurisdiction within Canada include grouse, quail, pheasants, ptarmigan, hawks, owls, eagles, falcons, cormorants, pelicans, crows, jays and kingfishers. Most birds not included under the MBCA are protected under provincial laws. **There are no provisions under the MBCA that permit the incidental destruction of migratory birds, nests or eggs.**

Newfoundland (NL) - The key provision in the NL provincial *Wild Life Act* for birds is the definition of wildlife which includes both birds and the eggs of birds. The Act prohibits the hunting, taking or killing of wild life or classes of wild life, except under license or permit.

Nova Scotia (NS) - Under the *Wildlife Act* of NS, the definition for wildlife refers to "vertebrates that, in their natural habitat, are usually wild by nature and includes domestic organisms, exotic wildlife, and eggs, sperm or embryos of wildlife". Wildlife habitat is defined as, "any water or land where wildlife may be found and the roads and highways thereon". The Act states that no person shall destroy, take, possess, buy or sell any egg of a bird or disturb the nest of a bird, unless a permit has been issued by the Minister.

Regulatory requirements under the Federal *Species at Risk Act* (SARA) are designed to prevent wildlife from becoming extirpated or extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened, and to manage species of special concern to prevent them from becoming endangered or threatened. The Act states that no person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species under Schedule 1, and no person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species. These prohibitions do not apply to listed species unless they are on federal lands, with the exception of aquatic species or migratory birds protected under the MBCA. Species designated as Special Concern under SARA are not protected under the same prohibitions for those listed otherwise under Schedule 1, however, there is a requirement for provincial or regional management plans to be

developed that provide specific conservation measures for those species. **There are currently no provisions under SARA that permit the incidental destruction of birds, nests or eggs of species listed under Schedule 1.**

Similarly, the NL *Endangered Species Act* and the NS *Endangered Species Act* prohibit the killing, harassing, injuring, possessing, disturbing, taking, or interference, or any attempt as such, of any endangered or threatened species or their residence. This regulation applies to extirpated species in NL. Recovery plans must be developed for protected species, and management plans are required for species designated as vulnerable. Specific protection measures may be applied to habitat identified as "critical habitat", "core habitat" or "recovery habitat", for species listed as endangered, threatened, or extirpated (NL only).

Migratory birds (not listed under SARA or the NL or NS *Endangered Species Act*) are protected seasonally under MBCA. Migratory birds listed under SARA or the NS or NL *Endangered Species Act* are protected year round. Raptors, in both provinces, are protected year round.

Table 1 provides a summary of the regulatory framework for migratory birds in Canada, NL, and NS.

Table 1 Summary of Regulatory Setting for Migratory Birds in Canada, NL, and NS.

Legislation	Regulator	Prohibitions	Risks	Permitting	Opportunities
Migratory Birds Convention Act	Environment and Climate Change Canada (Canadian Wildlife Services)	No incidental take of nest or individuals during nesting season	Fines of 300K to 1M per infraction* Project shutdown	No provision for permitting of incidental take	Work outside of nesting/breeding season
Species At Risk Act	Environment and Climate Change Canada (Canadian Wildlife Services)	No incidental harm to individuals or destruction of Critical Habitat on Federal land	Fines of 300K to 1M per infraction* Project shutdown	Currently no implementation of permitting	Mitigation to minimize impact. Monitoring during and post-construction
NL *Endangered Species Act*	NL Wildlife Department	No incidental harm to individuals	Fines of 2K to 400K per infraction*	Section 19 permit (NSPML will provide details as required)	Mitigation to minimize impact. Monitoring during and post-construction
NS *Endangered Species Act*	NS Department of Natural Resources	No incidental harm to individuals, residence or core habitat	Fine of up to 1M per infraction*	No provision for permitting of commercial activity	Work outside of nesting/breeding season

Legislation	Regulator	Prohibitions	Risks	Permitting	Opportunities
* A penalty could be issued for each day that an infraction occurs or is not corrected					

If the construction phases of the Maritime Link Project occur during bird nesting season, it is very likely that activities will interact with birds. Although ECCC provides guidance to proponents regarding the protection of migratory birds during nesting season, it is important to note that this advice does not constitute an authorization as outlined by the following statement from the ECCC website:

***Warning**: Note that it is the responsibility of the individual or company undertaking the activities to determine set-back distances. The information presented (above) constitutes advice only. This advice does not provide an authorization for harming or killing migratory birds or for the disturbance, destruction or taking of nests or eggs under the Migratory Birds Regulations (MBR). It does not provide a guarantee that activities will avoid contravening the MBR or other laws and regulations. This is general information that should not be relied on as official advice concerning the legality of any specific activity. It is not a substitute for the Migratory Birds Convention Act, 1994, the MBR, or any other legislation. In particular instances, specific recommendations or requirements may apply and may be found in such documents as Species at Risk Recovery Strategies or other official documents* (ECCC 2016).

Although bird surveys are common practice to clear areas for construction activities, most regulators recognize that these surveys are only partially effective (at best) at identifying the presence of active nests and often cause a disturbance to the breeding birds. ECCC specifically states that:

"*In most cases nest search techniques are not recommended because, in most habitats, the ability to detect nests remains very low while the risk of disturbing active nests is high. Flushing nesting birds increases the risk of predation of the eggs or young, or may cause the adults to abandon the nest or the eggs. Therefore, except when the nests searched are known to be easy to locate without disturbing them, active nest searches are generally not recommended; they have a low probability of locating all nests, and are likely to cause disturbance to nesting birds. In many circumstances, incidental take is likely to still occur during industrial or other activities even when active nest searches are conducted prior to these activities"* (ECCC 2016).

As a result, in most forested areas, clearing activities retain a high risk of causing harm to nests and breeding birds, even after the completion of thorough nest and nesting surveys. Under these circumstances NSPML has decided to alleviate this risk by generally avoiding high risk activities during bird breeding seasons. Low and moderate risk activities will be considered and where appropriate, will be permissible when appropriate mitigations are implemented. For

further information and technical advice refer to the Environment and Climate Change Canada - Nature - Technical Information (2016).

B-2 AVIFAUNA SURVEYS

Various avifauna surveys were conducted from 2011-2013 as summarized in Table 2, 3, and 4. In addition, ACCDC data, North American Breeding Bird Survey data, and habitat mapping was used to model potential presence of SOCI in the Study Area.

B-2.1 Summary of the Findings of Avifauna Surveys in Newfoundland (NL)

A summary of the species identified during surveys in NL, conducted in support of the Project between 2011 and 2013, is provided in Table 2. In total, 130 avifauna species were confirmed in the areas surveyed, and include species of forest songbirds, corvids, raptors, upland game birds, shorebirds, waterfowl and other waterbirds.

Table 2 Avifauna Species Identified During Surveys (NL), between 2011 and 2013

Species		Survey Type					
Common Name	**Scientific Name**	**Breeding Bird**	**General Wildlife**	**Habitats of Interest**	**Nest Search**	**Shorebird / Shoreline**	**Targeted Surveys[1]**
Alder Flycatcher	*Empidonax alnorum*	√			√		
American Black Duck	*Anas rubripes*	√	√			√	
American Crow	*Corvus brachyrhynchos*	√	√			√	√
American Goldfinch	*Spinus tristis*	√			√	√	
American Redstart	*Setophaga ruticilla*	√					
American Robin	*Turdus migratorius*	√		√	√	√	
American Kestrel	*Falco sparverius*					√	
``American Pipit	*Anthus rubescens*					√	
American Redstart	*Setophaga ruticilla*	√		√	√		
American Three-toed Woodpecker	*Picoides dorsalis*	√					
American Wigeon	*Anas americana*					√	
Arctic Tern	*Sterna paradisaea*					√	
Bald Eagle	*Haliaeetus leucocephalus*		√			√	√
Bank Swallow	*Riparia riparia*					√	
Barn Swallow	*Hirundo rustica*					√	
Bay-breasted Warbler	*Setophaga castanea*	√					
Belted Kingfisher	*Megaceryle alcyon*	√	√			√	
Black Guillemot	*Cepphus grylle*	√				√	√
Black Scoter	*Melanitta americana*	√				√	
Black-and-white Warbler	*Mniotilta varia*	√			√		

Table 2 Avifauna Species Identified During Surveys (NL), between 2011 and 2013

Species		Survey Type					
Common Name	Scientific Name	Breeding Bird	General Wildlife	Habitats of Interest	Nest Search	Shorebird / Shoreline	Targeted Surveys[1]
Black-backed Woodpecker	*Picoides arcticus*	√			√		
Black-bellied Plover	*Pluvialis squatarola*					√	
Blackburnian Warbler	*Setophaga fusca*	√					
Black-capped Chickadee	*Poecile atricapillus*	√			√		
Black-legged Kittiwake	*Rissa tridactyla*					√	
Blackpoll Warbler	*Setophaga striata*	√		√	√		
Black-throated Green Warbler	*Setophaga virens*	√		√	√		
Blue Jay	*Cyanocitta cristata*	√					
Blue-headed Vireo	*Vireo solitarius*	√			√		
Boreal Chickadee	*Poecile hudsonicus*	√			√	√	
Brown Creeper	*Certhis americana*	√					
Canada Goose	*Branta canadensis*		√				√
Cape May Warbler	*Setophaga tigrina*				√		
Caspian Tern	*Hydroprogne caspia*					√	
Cedar Waxwing	*Bombycilla cedrorum*	√			√		
Chestnut-sided Warbler	*Setophaga pensylvanica*	√					
Chipping Sparrow	*Spizella passerina*	√			√		
Common Eider	*Somateria mollissima*	√	√			√	√
Common Goldeneye	*Bucephala clangula*		√				
Common Grackle	*Quiscalus quiscula*	√				√	
Common Loon	*Gavia immer*	√	√		√	√	
Common Merganser	*Mergus merganser*	√	√		√	√	√
Common Murre	*Uria aalge*					√	√
Common Raven	*Corvus corax*	√			√	√	
Common Tern	*Sterna hirundo*	√	√		√	√	
Common Yellowthroat	*Geothlypis trichas*	√			√	√	
Dark-eyed Junco	*Junco hyemalis*	√			√	√	
Double-crested Comorant	*Phalacrocorax auritus*	√	√			√	√
Downy Woodpecker	*Picoides pubescens*	√		√	√		
Eastern Kingbird	*Tyrannus tyrannus*	√					
European Starling	*Sturnus vulgaris*	√					
Fox Sparrow	*Passerella iliaca*	√		√	√		
Golden-crowned Kinglet	*Regulus satrapa*	√			√		
Gray Jay	*Perisoreus canadensis*	√			√		

Table 2 Avifauna Species Identified During Surveys (NL), between 2011 and 2013

Species		Survey Type					
Common Name	**Scientific Name**	**Breeding Bird**	**General Wildlife**	**Habitats of Interest**	**Nest Search**	**Shorebird / Shoreline**	**Targeted Surveys[1]**
Gray-cheeked Thrush	***Catharus minimus***	**√**					
Great Black-backed Gull	*Larus marinus*	√				√	√
Great Blue Heron	*Ardea herodias*	√	√		√	√	
Greater Shearwater	*Puffinus gravis*					√	
Greater Yellowlegs	*Tringa melanoleuca*	√	√		√	√	
Green-winged Teal	*Anas crecca*		√				
Hairy Woodpecker	*Picoides villosus*	√		√	√		
Harlequin Duck	***Histrionicus histrionicus***						**√**
Hermit Thrush	*Catharus guttatus*	√			√		
Herring Gull	*Larus argentatus*	√				√	√
House Sparrow	*Passer domesticus*	√					
Killdeer	*Charadrius vociferus*					√	
Least Flycatcher	*Empidonax minimus*	√		√			
Least Sandpiper	*Calidris minutilla*					√	
Lincoln's Sparrow	*Melospiza lincolnii*	√			√		
Magnolia Warbler	*Setophaga magnolia*	√			√		
Manx Shearwater	*Puffinus puffinus*					√	
Merlin	*Falco columbarius*	√					
Mourning Warbler	*Geothlypis philadelphia*	√		√	√		
Nashville Warbler	*Oreothlypis ruficapilla*	√					
Northern Flicker	*Colaptes auratus*	√		√	√		
Northern Gannet	*Morus bassanus*	√				√	√
Northern Goshawk	*Accipiter gentilis*	√	√	√			
Northern Harrier	*Circus cyaneus*	√	√		√	√	
Northern Waterthrush	*Parkesia noveboracensis*	√		√	√	√	
Olive-sided Flycatcher	***Contopus cooperi***	**√**					**√**
Osprey	*Pandion haliaetus*	√			√	√	
Ovenbird	*Seiurus aurocapilla*	√		√	√		
Palm Warbler	*Setophaga palmarum*	√			√		
Philadelphia Vireo	*Vireo philadelphicus*	√			√		
Pine Grosbeak	*Pinicola enucleator*	√			√		
Pine Siskin	*Spinus pinus*	√			√		
Piping Plover	***Charadrius melodus***					**√**	
Purple Finch	*Haemorhous purpureus*	√		√	√	√	
Purple Sandpiper	*Calidris maritima*						√
Red Crossbill	***Loxia curvirostra***	**√**					

Table 2 Avifauna Species Identified During Surveys (NL), between 2011 and 2013

Species		Survey Type					
Common Name	**Scientific Name**	**Breeding Bird**	**General Wildlife**	**Habitats of Interest**	**Nest Search**	**Shorebird / Shoreline**	**Targeted Surveys[1]**
Red-breasted Merganser	*Mergus serrator*	√				√	√
Red-breasted Nuthatch	*Sitta canadensis*	√			√	√	
Red-eyed Vireo	*Vireo olivaceus*	√					
Red-throated Loon	*Gavia stellata*					√	
Ring-billed Gull	*Larus delawarensis*					√	
Ring-necked Duck	*Aythya collaris*	√	√			√	
Rough-legged Hawk	*Buteo lagopus*	√	√				
Ruby-crowned Kinglet	*Regulus calendula*	√		√	√		
Ruffed Grouse	*Bonasa umbellus*	√	√		√		
Rusty Blackbird	***Euphagus carolinus***	**√**					**√**
Sanderling	*Calidris alba*					√	
Savannah Sparrow	*Passerculus sandwichensis*	√		√	√	√	
Semipalmated Plover	*Charadrius semipalmatus*					√	
Semipalmated Sandpiper	*Calidris pusilla*					√	
Sharp-shinned Hawk	*Accipiter striatus*				√		
Short-billed Dowitcher	*Limnodromus griseus*					√?	
Snow Bunting	*Plectrophenax nivalis*						√
Song Sparrow	*Melospiza melodia*	√			√	√	
Sooty Shearwater	*Puffinus griseus*					√	
Spotted Sandpiper	*Actitis macularius*					√	
Spruce Grouse	*Falcipennis canadensis*				√		
Surf Scoter	*Melanitta perspicillata*					√	
Swainson's Thrush	*Catharus ustulatus*	√		√	√		
Swamp Sparrow	*Melospiza georgiana*	√		√	√		
Tennessee Warbler	*Oreothylpis peregrina*	√					
Tree Swallow	*Tachycineta bicolor*	√		√	√	√	
Veery	*Catharus fuscescens*	√		√			
White-crowned Sparrow	*Zonotrichia leucophrys*	√					
White-rumped Sandpiper	*Calidris fuscicollis*					√	
White-throated Sparrow	*Zonotrichia albicollis*	√		√	√		
White-winged Crossbill	*Loxia leucoptera*	√			√		
White-winged Scoter	*Melanitta fusca*	√				√	
Willow Ptarmigan	*Lagopus lagopus*				√		

Table 2 Avifauna Species Identified During Surveys (NL), between 2011 and 2013

Species		Survey Type					
Common Name	**Scientific Name**	**Breeding Bird**	**General Wildlife**	**Habitats of Interest**	**Nest Search**	**Shorebird / Shoreline**	**Targeted Surveys[1]**
Wilson's Snipe	*Gallinago delicata*	√			√		
Wilson's Warbler	*Cardellina pusilla*	√		√			
Winter Wren	*Troglodytes hiemalis*	√			√		
Yellow Warbler	*Setophaga petechia*	√		√	√		
Yellow-bellied Flycatcher	*Empidonax flaviventris*	√		√	√		
Yellow-rumped Warbler	*Setophaga coronata*	√		√	√		
Unconfirmed Observations							
passerines	*e.g.*, *Catharus* sp.				√		
ptarmigan / grouse			√		√		
seabirds						√	
shorebirds						√	√
waterfowl						√	√
woodpeckers		√					

[1]Targeted surveys include all incidental observations (e.g., Harlequin Duck were found during Purple Sandpiper surveys).
? Indicates that this species was not confirmed.
Species in **bold** indicate a designated Species at Risk.

The most abundant species observed during breeding bird surveys in NL are summarized below (in alphabetical order):

- American Robin;
- Common Yellowthroat;
- Double-crested Cormorant;
- Fox Sparrow;
- Herring Gull;
- Magnolia Warbler;
- Ruby-crowned Kinglet;
- Swainson's Thrush;
- White-throated Sparrow; and
- Yellow-bellied Flycatcher.

Common shorebird species identified in NL were Semi-palmated Sandpiper, Semi-palmated Plover, and Least Sandpiper. Other relatively common avifauna species included Herring Gull, Double-crested Cormorant, Northern Gannet (shorebird and coastal migration surveys), Ring-necked Duck, Common Goldeneye and Canada Goose (general wildlife surveys). Refer to Figure 1 for location of survey efforts in NL.

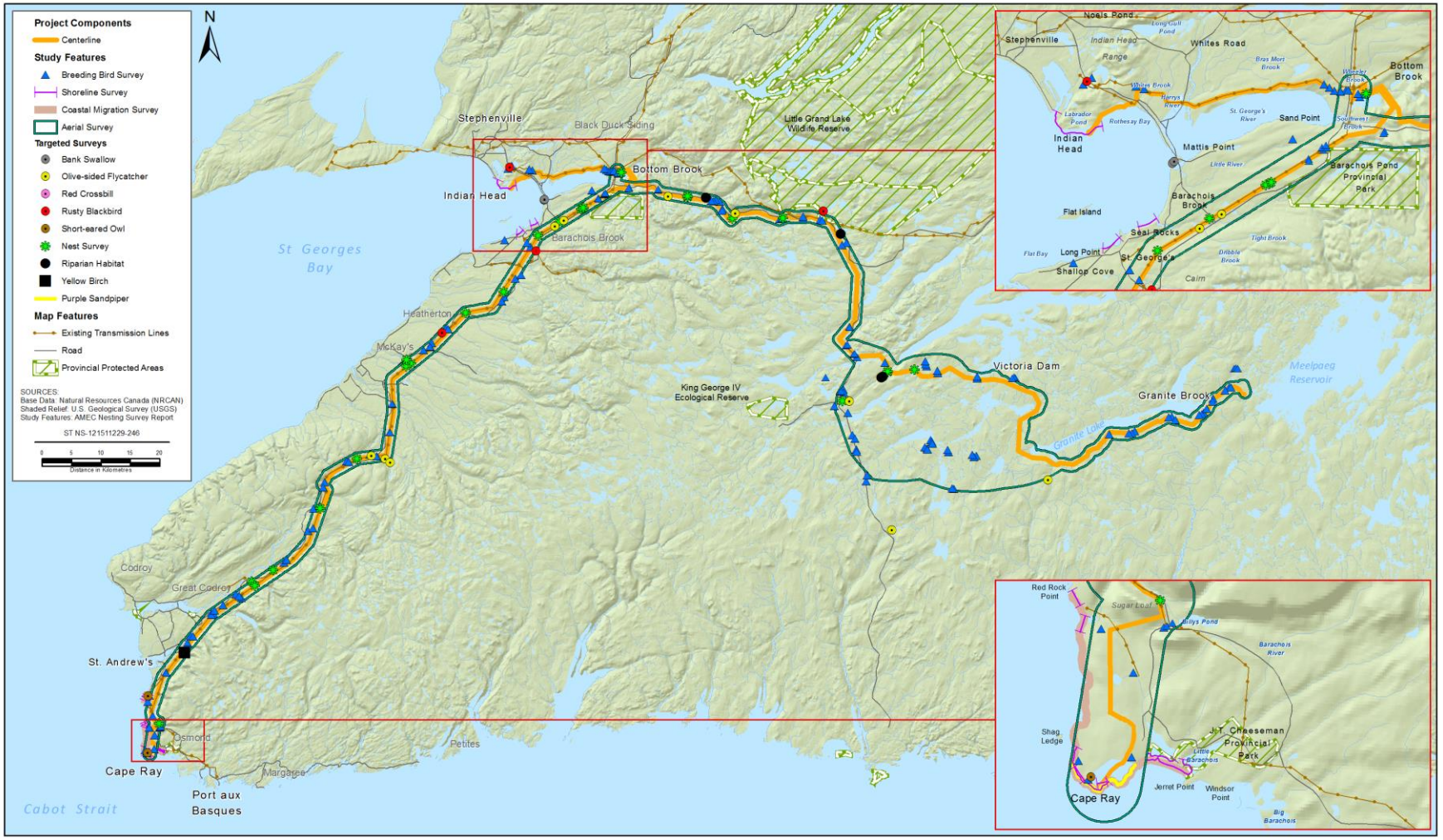


Figure 1 Location of Survey Efforts in Newfoundland between 2011 and 2013

B-2.2 Summary of the Findings of Avifauna Surveys in the Cabot Strait

A summary of the avifauna species identified during coastal avifauna migration surveys and shoreline surveys in the Cabot Strait is provided in Table 3. In total, 55 species were confirmed in the areas surveyed, including songbirds, raptors, shorebirds, waterfowl and other waterbirds.

Table 3 Avifauna Species Identified During Surveys (Cabot Strait), between 2011 and 2012

Species		Survey Type	
Common Name	**Latin Name**	**CWS Data**	**Project Surveys**
American Black Duck	*Anas rubripes*		√
American Crow	*Corvus brachyrhy-nchos*		√
American Robin	*Turdus migratorius*	√	
American Tree Sparrow	*Spizella arborea*	√	
American Wigeon	*Anas americana*		√
Arctic Tern	*Sterna paradisaea*	√	√
Baird's Sandpiper	*Calidris bairdii*		√
Bald Eagle	*Haliaeetus leucocephalus*		√
Belted Kingfisher	*Megaceryle alcyon*		√
Black Guillemot	*Cepphus grille*	√	√
Black Scoter	*Melanitta americana*		√
Black-bellied Plover	*Pluvialis squatarola*		√
Black-legged Kittiwake	*Rissa tridactyla*	√	
Caspian tern	*Hydroprogne caspia*		√
Common Eider	*Somateria mollissima*		√
Common Loon	*Gavia immer*	√	√
Common Merganser	*Mergus merganser*		√
Common Murre	*Uria aalge*	√	√
Common Raven	*Corvus corax*		√
Common Tern	*Sterna hirundo*	√	√
Double-crested Cormorant	*Phalacrocorax auritus*		√
Dovekie	*Alle alle*	√	
Glaucous Gull	*Larus hyperboreus*	√	√
Great Black-backed Gull	*Larus marinus*	√	√
Great Blue Heron	*Arde herdias*		√
Greater Shearwater	*Puffinus gravis*	√	√
Greater Yellowlegs	*Tringa melanoleuca*		√
Harlequin Duck	***Histrionicus histrionicus***		**√**
Herring Gull	*Larus argentatus*	√	√
Iceland Gull	*Larus glaucoides*	√	
Laughing Gull	*Leucophaeus atricilla*		√

Table 3 Avifauna Species Identified During Surveys (Cabot Strait), between 2011 and 2012

Species		Survey Type	
Common Name	**Latin Name**	**CWS Data**	**Project Surveys**
Leach's Storm Petrel	*Oceanodroma leucorhoa*	√	
Least Sandpiper	*Calidris minutilla*		√
Lesser Yellowlegs	*Tringa flavipes*		√
Manx Shearwater	*Puffinus puffinus*	√	√
Northern Fulmar	*Morus bassanus*	√	
Northern Gannet	*Morus bassanus*	√	√
Osprey	*Pandion haliaetus*		√
Piping Plover	***Charadrius melodus***		**√**
Red Phalarope	*Phalaropus fulicarius*	√	
Red-breasted merganser	*Mergus serrator*		√
Red-throated Loon	*Gavia stellata*		√
Ring-billed Gull	*Larus delawarensis*		√
Ring-necked Duck	*Aythya collaris*		√
Ruddy Turnstone	*Arenaria interpres*		√
Sanderling	*Calidris alba*		√
Semiplamated Plover	*Charadrius semipalmatus*		√
Semiplamated Sandpiper	*Calidris pusilla*		√
Short-billed Dowitcher	*Limnodromus griseus*		√
Sooty Shearwater	*Puffinus griseus*	√	√
Spotted Sandpiper	*Actitis macularius*		√
Thayer's Gull	*Larus glaucoides*	√	
Thick-billed Murre	*Uria lomvia*	√	
White-rumped Sandpiper	*Calidris fuscicollis*		√
Wilsons Storm Petrel	*Oceanites oceanicus*	√	
Species in **bold** indicate a designated Species at Risk () CWS data was collected from 1969-2010 (P. Chamberland, CWS, pers. comm. ,2013)			

B-2.3 Summary of the findings of Avifauna Surveys in Nova Scotia

A summary of the species identified throughout surveys in Nova Scotia, conducted in support of the Project between 2011 and 2013, is provided in Table 4. In total, 149 avifauna species were confirmed in the areas surveyed, and include species of forest songbirds, raptors, shorebirds, seabirds, waterfowl and other waterbirds.

Table 4 Avifauna Species identified during Surveys (NS), between 2011 and 2013

Species		Survey				
Common Name	**Latin Name**	**Breeding Bird**	**Coastal Migration**	**Nest**	**Shorebird / Shoreline**	**Targeted Surveys**
Alder Flycatcher	*Empidonax alnorum*	√		√		
American Black Duck	*Anas rubripes*	√	√			√
American Crow	*Corvus brachyrhynchos*	√	√	√		
American Goldfinch	*Spinus tristis*	√	√	√	√	
American Kestrel	*Falco sparverius*	√				
American Redstart	*Setophaga ruticilla*	√		√	√	
American Robin	*Turdus migratorius*	√	√	√		
American Wigeon	*Anas americana*		√			
American Woodcock	*Scolopax minor*	√	√			
Baird's Sandpiper	*Calidris bairdii*				√	
Bald Eagle	*Haliaeetus leucocephalus*	√	√	√		√
Bank Swallow	*Riparia riparia*				√	
Barn Swallow	***Hirundo rustica***	**√**		**√**		
Barred Owl	*Strix varia*	√				√
Bay-breasted Warbler	*Setophaga castanea*	√				
Belted Kingfisher	*Megaceryle alcyon*	√	√			
Black Guillemot	*Cepphus grylle*	√	√			√
Black Scoter	*Melanitta americana*					√
Black-and-white Warbler	*Mniotilta varia*	√		√		
Black-bellied Plover	*Pluvialis squatarola*				√	
Blackburnian Warbler	*Setophaga fusca*	√				
Black-capped Chickadee	*Poecile atricapillus*	√	√	√		
Black-legged Kittiwake	*Rissa tridactyla*		√			√
Blackpoll Warbler	*Setophaga striata*				√	
Black-throated Blue Warbler	*Setophaga caerulescens*	√				
Black-throated Green Warbler	*Setophaga virens*	√		√		
Blue Jay	*Cyanocitta cristata*	√	√	√		
Blue-headed Vireo	*Vireo solitarius*	√		√		
Bobolink	***Dolichonyx oryzivorus***	**√**				
Bonaparte's Gull	*Chroicocephalus philadelphia*	√	√			
Boreal Chickadee	*Poecile hudsonicus*	√	√			
Brown Creeper	*Certhis americana*	√	√	√		
Canada Goose	*Branta canadensis*	√	√			
Canada Warbler	***Cardellina canadensis***	**√**		**√**		

Table 4 Avifauna Species identified during Surveys (NS), between 2011 and 2013

Species		Survey				
Common Name	**Latin Name**	**Breeding Bird**	**Coastal Migration**	**Nest**	**Shorebird / Shoreline**	**Targeted Surveys**
Cape May Warbler	*Setophaga tigrina*	√				
Cedar Waxwing	*Bombycilla cedrorum*	√		√		
Chestnut-sided Warbler	*Setophaga pensylvanica*	√		√		
Chimney Swift	***Chaetura pelagica***	**√**				
Common Eider	*Somateria mollissima*		√			√
Common Goldeneye	*Bucephala clangula*	√	√			√
Common Grackle	*Quiscalus quiscula*	√		√		
Common Loon	*Gavia immer*	√	√			√
Common Merganser	*Mergus merganser*		√			
Common Nighthawk	***Chordeiles minor***	**√**		**√**		
Common Raven	*Corvus corax*	√	√	√		
Common Tern	*Sterna hirundo*	√				
Common Yellowthroat	*Geothlypis trichas*	√		√	√	
Dark-eyed Junco	*Junco hyemalis*	√	√	√		
Double-crested Cormorant	*Phalacrocorax auritus*	√	√		√	√
Dovekie	*Alle alle*					√
Downy Woodpecker	*Picoides pubescens*	√	√	√		√
Eastern Wood-Pewee	*Contopus virens*	√		√		
European Starling	*Sturnus vulgaris*	√	√			
Evening Grosbeak	*Coccothraustes vespertinus*	√				
Fox Sparrow	*Passerella iliaca*	√				
Glaucous Gull	*Larus hyperboreus*		√		√	√
Golden-crowned Kinglet	*Regulus satrapa*	√	√	√		
Gray Catbird	*Dumetella carolinensis*	√				
Gray Jay	*Perisoreus canadensis*	√		√		
Great Black-backed Gull	*Larus marinus*	√	√		√	√
Great Blue Heron	*Ardea herodias*	√				
Great Cormorant	*Phalacrocorax carbo*		√			√
Greater Yellowlegs	*Tringa melanoleuca*				√	
Green-winged Teal	*Anas crecca*		√			
Hairy Woodpecker	*Picoides villosus*	√		√		√
Harlequin Duck	***Histrionicus histrionicus***					**√**
Hermit Thrush	*Catharus guttatus*	√	√	√		
Herring Gull	*Larus argentatus*	√	√	√	√	√
Horned Grebe	*Podiceps auritus*		√			

Table 4 Avifauna Species identified during Surveys (NS), between 2011 and 2013

Species		Survey				
Common Name	**Latin Name**	**Breeding Bird**	**Coastal Migration**	**Nest**	**Shorebird / Shoreline**	**Targeted Surveys**
Horned Lark	*Eremophila alpestris*		√			
House Sparrow	*Passer domesticus*	√				
Iceland Gull	*Larus glaucoides*		√			√
Killdeer	*Charadrius vociferus*		√			
Laughing Gull	*Leucophaeus atricilla*				√	
Least Flycatcher	*Empidonax minimus*	√		√		
Least Sandpiper	*Calidris minutilla*				√	
Lesser Yellowlegs	*Tringa flavipes*				√	
Lincoln's Sparrow	*Melospiza lincolnii*	√		√		
Long-tailed Duck	*Clangula hyemalis*		√			√
Magnolia Warbler	*Setophaga magnolia*	√		√		
Mallard	*Anas platyrhynchos*	√	√			
Merlin	*Falco columbarius*	√				√
Mourning Dove	*Zenaida macroura*	√	√	√		
Mourning Warbler	*Geothlypis philadelphia*	√		√		
Nashville Warbler	*Oreothlypis ruficapilla*	√		√		
Nelson's Sparrow	*Ammodramus nelsoni*	√			√	
Northern Flicker	*Colaptes auratus*	√	√	√		√
Northern Gannet	*Morus bassanus*	√	√			√
Northern Harrier	*Circus cyaneus*	√	√	√	√	
Northern Parula	*Setophaga americana*	√		√		
Northern Shrike	*Lanius excubitor*		√			
Northern Waterthrush	*Parkesia noveboracensis*	√				
Olive-sided Flycatcher	***Contopus cooperi***	**√**				
Orange-crowned Warbler	*Oreothlypis celata*		√			
Osprey	*Pandion haliaetus*	√				
Ovenbird	*Seiurus aurocapilla*	√		√		
Palm Warbler	*Setophaga palmarum*	√		√		
Pied-billed Grebe	*Podilymbus podiceps*	√				
Pileated Woodpecker	*Dryocopus pileatus*	√		√		√
Pine Grosbeak	*Pinicola enucleator*	√	√			
Pine Siskin	*Spinus pinus*	√				
Purple Finch	*Haemorhous purpureus*	√		√		
Purple Sandpiper	*Calidris maritima*					√
Razorbill	*Alca torda*					√

Table 4 Avifauna Species identified during Surveys (NS), between 2011 and 2013

Species		Survey				
Common Name	**Latin Name**	**Breeding Bird**	**Coastal Migration**	**Nest**	**Shorebird / Shoreline**	**Targeted Surveys**
Red Crossbill	*Loxia curvirostra*	√				
Red-breasted Merganser	*Mergus serrator*		√			√
Red-breasted Nuthatch	*Sitta canadensis*	√				
Red-eyed Vireo	*Vireo olivaceus*	√		√	√	
Red-necked Grebe	*Podiceps grisegena*		√			√
Red-tailed Hawk	*Buteo jamaicensis*	√		√		√
Red-throated Loon	*Gavia stellata*		√			√
Red-winged Blackbird	*Agelaius phoeniceus*	√		√	√	
Ring-billed Gull	*Larus delawarensis*	√	√		√	√
Ring-necked Duck	*Aythya collaris*	√				
Rock Pigeon	*Columba livia*	√	√		√	
Ruby-crowned Kinglet	*Regulus calendula*	√		√		
Ruby-throated Hummingbird	*Archilochus colubris*	√				
Ruddy Turnstone	*Arenaria interpres*				√	
Ruffed Grouse	*Bonasa umbellus*	√	√	√		
Rusty Blackbird	***Euphagus carolinus***	**√**				
Sanderling	*Calidris alba*				√	
Savannah Sparrow	*Passerculus sandwichensis*	√	√	√	√	
Semipalmated Plover	*Charadrius semipalmatus*				√	
Semipalmated Sandpiper	*Calidris pusilla*				√	
Sharp-shinned Hawk	*Accipiter striatus*	√				√
Snow Bunting	*Plectrophenax nivalis*		√			
Song Sparrow	*Melospiza melodia*	√	√	√	√	
Sora	*porzana carolina*	√				
Spotted Sandpiper	*Actitis macularius*	√			√	
Spruce Grouse	*Falcipennis canadensis*	√				
Surf Scoter	*Melanitta perspicillata*	√	√			√
Swainson's Thrush	*Catharus ustulatus*	√	√	√		
Swamp Sparrow	*Melospiza georgiana*	√	√	√		
Tennessee Warbler	*Oreothylpis peregrina*	√				
Tree Swallow	*Tachycineta bicolor*	√			√	
Veery	*Catharus fuscescens*	√				
Vesper Sparrow	*Pooecetes gramineus*			√		
Western Sandpiper	*Calidris mauri*		√			
Whimbrel	*Numenius phaeopus*					√

Table 4 Avifauna Species identified during Surveys (NS), between 2011 and 2013

Species		Survey				
Common Name	**Latin Name**	**Breeding Bird**	**Coastal Migration**	**Nest**	**Shorebird / Shoreline**	**Targeted Surveys**
White-throated Sparrow	*Zonotrichia albicollis*	√		√		
White-winged Crossbill	*Loxia leucoptera*			√		
White-winged Scoter	*Melanitta fusca*		√			√
Wilson's Snipe	*Gallinago delicata*	√		√		
Wilson's Warbler	*Cardellina pusilla*	√				
Winter Wren	*Troglodytes hiemalis*	√				
Yellow Warbler	*Setophaga petechia*	√		√	√	
Yellow-bellied Flycatcher	*Empidonax flaviventris*	√		√		
Yellow-bellied Sapsucker	*Sphyrapicus varius*	√				√
Yellow-rumped Warbler	*Setophaga coronata*	√				
Unconfirmed Observations						
waterfowl / waterbirds	*e.g.*, scaup, grebe,		√			√
passerines			√			
seabirds	*e.g.*, murre, cormorant gull		√			√
shorebirds			√			

[1]Targeted surveys include all incidental observations
Species in **bold** indicate a designated Species at Risk

The most abundant species observed during breeding bird surveys, in NS, are listed below (in alphabetical order):

- Alder Flycatcher;
- American Goldfinch;
- American Robin;
- Bank Swallow;
- Blue-headed Vireo;
- Common Yellowthroat;
- Greater Black-backed Gull;
- Hermit Thrush;
- Herring Gull;
- Magnolia Warbler;
- Ovenbird;
- Red-eyed Vireo;
- Ring-billed Gull; and

- White-throated Sparrow.

The most common shorebird species identified in NS were Semipalmated Plover, Semiplamated Sandpiper, and Sanderling. Other relatively common avifauna species included Northern Gannet and Herring Gull, particularly during atlas surveys. Refer to Figure 2 for location of survey efforts.

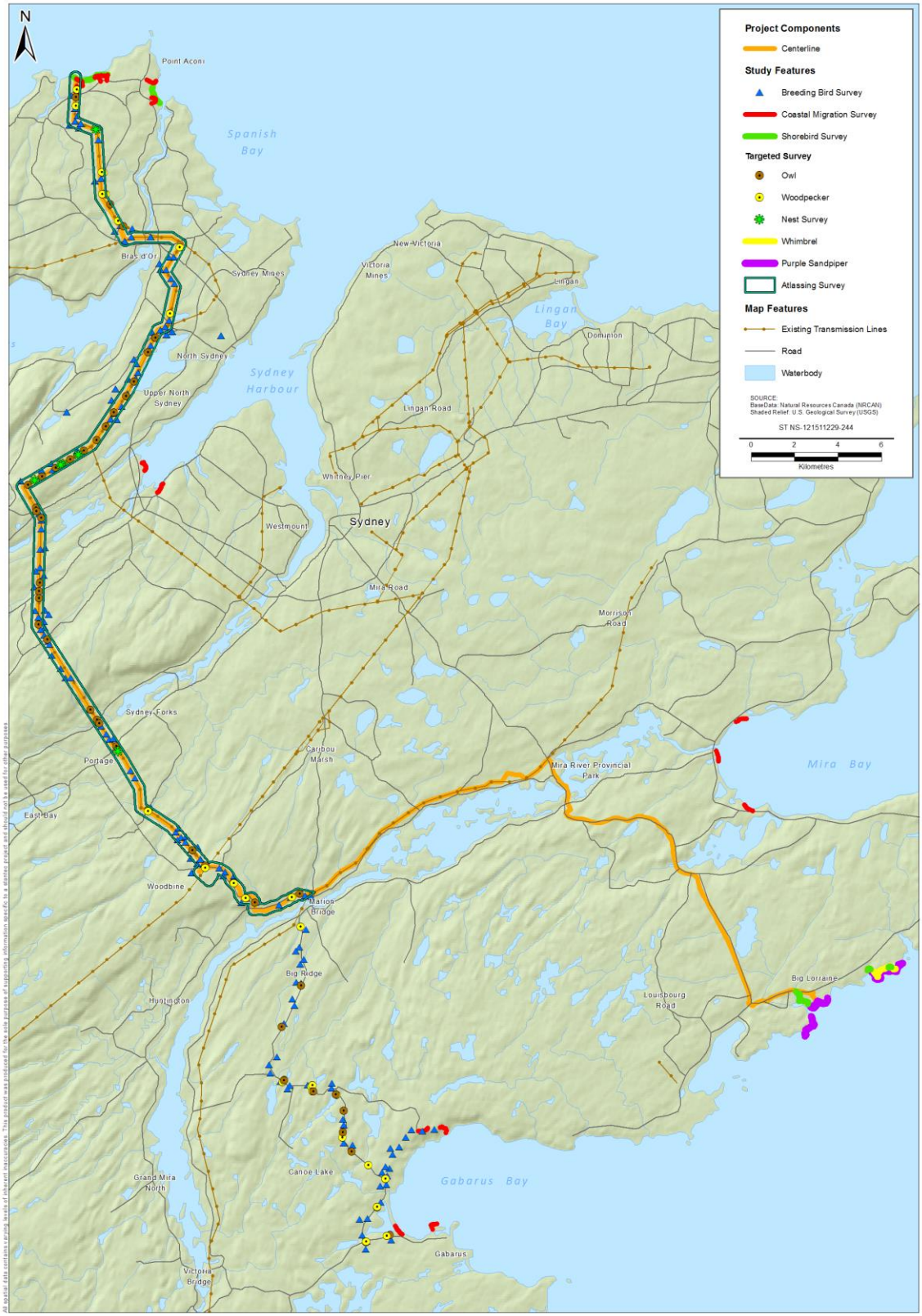


Figure 1 Location of Survey Efforts in Nova Scotia between 2011 and 2013