

**Draft Detailed Impact Analysis:
Never Forgotten National Memorial,
Cape Breton Highlands National Park**



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Executive Summary

The Never Forgotten National Memorial Foundation (the Foundation) is proposing to construct a memorial to commemorate more than 114,000 Canadians killed in wars outside of Canada that are buried or lost overseas. The Never Forgotten National Memorial Complex (NFNMC) will be constructed at Green Cove, a scenic rocky point on the eastern coast of Cape Breton Highlands National Park of Canada (CBHNPC) along the Cabot Trail.

The NFNMC has been planned in five phases to allow for expansion over time to meet visitor expectations and to allow for construction to progress as funding becomes available. Construction of Phase 1 (Stage 1 and Stage 2) is planned to begin in 2015. Pending funding and regulatory approvals, additional phases of the development may be constructed. Phase 1 of the Project includes the construction of:

- Mobility Impaired Parking Lot;
- Procession Pathway Bridge;
- Commemorative Ring of True Patriot Love;
- With Glowing Hearts Sanctuary;
- Memorial Gateway;
- Statue Base;
- Off-site construction of the statue;
- Observation Deck; and
- Bathroom facilities.

This document is intended to fulfill requirements for a Detailed Impact Analysis (DIA) pursuant to Parks Canada Interim Directive on Implementation of the *Canadian Environmental Assessment Act*. The DIA is being undertaken in accordance with Parks Canada DIA Terms of Reference (ToR) dated September 2, 2014.

The assessment methods used in this DIA include identification and evaluation of the potential effects of the Project on Valued Components (VCs) that may arise during Project activities, focusing on construction, and operation and maintenance (decommissioning and abandonment is not planned at this time). VCs are environmental and cultural attributes associated with the Project that have been identified in the ToR. The VCs evaluated in this DIA include:

- Natural Resources (focusing on vegetation, wildlife and unique geological features);
- Cultural Resources (focusing on cultural resources);

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- Visitor Experience (focusing on aesthetics, and visitor access and experience); and
- Marine Fish and Fisheries (focusing on marine fisheries species and fisheries related activities).

Project activities that could affect the selected VCs include site preparation; installation of physical structures; emissions and waste; presence and maintenance of physical structures during operation; and operation and maintenance. Mitigation is proposed to reduce or eliminate adverse environmental effects. An Environmental Protection Plan (EPP) will be prepared to provide best management practices for construction, operation and maintenance activities. With the application of proposed mitigation measures, the residual effects of the Project on the environment are generally predicted to be negligible to moderate in magnitude and will be primarily localized within a previously disturbed area. Monitoring and follow-up activities during and after construction are outlined for natural resources, cultural resources and visitor experience.

The assessment methods also include the analysis of potential accidents and malfunctions, as well as consideration of the effects of the environment on the Project. In addition, the evaluation of potential cumulative effects considers whether there is potential for the residual environmental effects of the Project to interact cumulatively with the residual environmental effects of other past, present, or future (*i.e.*, certain and reasonably foreseeable) physical activities in the vicinity of the Project.

The potential accidents and malfunctions during Project related activities that could cause adverse environmental effects that were assessed in this DIA include hazardous materials spills and vehicular accidents. Any accidental spill occurring would be small, localized and rapidly cleaned up. Spill prevention, response and recovery procedures will be developed and included in the EPP. The potential increased risk of vehicular accidents during construction and operation will be reduced with appropriate mitigation measures.

Effects of the environment on the Project were assessed, considering potential effects associated with extreme weather and icing; seismic events and tsunamis; climate change and sea level rise; and forest fires. The Project will be designed in accordance with safety standards; best engineering practices; and adherence to applicable standards and codes, including selection of materials that are able to withstand the environmental conditions that can be reasonably expected in the Project area. Effects of the environment on the Project are predicted to be not significant.

Public consultation and Aboriginal engagement and consultation has been conducted throughout Project planning and design as well as through the DIA process, to gather feedback regarding the Project and to inform interested parties on how public, stakeholder and Aboriginal input is shaping the planning, design and mitigation decisions.

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The assessment suggests that negligible to moderate residual effects may result for natural resources, cultural resources, visitor experience, and marine fish and fisheries. Enhanced visitor access to Green Point may result in potential positive effects on visitor experience.

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List of Acronyms

ACCDC	Atlantic Canada Conservation Data Centre
CBHNPC	Cape Breton Highlands National Park of Canada
CEAA	<i>Canadian Environmental Assessment Act</i>
CFA	Crab Fishing Area
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRA	Commercial, recreational and Aboriginal
DIA	Detailed Impact Analysis
EMP	Environmental Management Plan
EPP	Environmental Protection Plan
ERP	Emergency Response Plan
ESCP	Erosion and Sediment Control Plan
The Foundation	The Never Forgotten National Memorial Foundation
KMK	Kwilmu'kw Maw-klusuaqn
LAA	Local Assessment Area
LFA	Lobster Fishing Area
MBCA	<i>Migratory Birds Convention Act</i>
MEKS	Mi'kmaq Ecological Knowledge Study
MSDS	Material Safety Data Sheet
NAFO	Northwest Atlantic Fisheries Organization
NAPS	National Air Pollution Surveillance
NFNMC	Never Forgotten National Memorial Complex
NS ESA	Nova Scotia <i>Endangered Species Act</i>
NSDNR	Nova Scotia Department of Natural Resources
NSTIR	Nova Scotia Department of Transportation and Infrastructure Renewal
OMP	Operation and Management Plan
Parks Canada	Parks Canada Agency
PDA	Project Development Area
RAA	Regional Assessment Area
SARA	<i>Species at Risk Act</i>
SC	Subdivision of county municipality
SOCC	Species of Conservation Concern
TEOM	Tapered Element Oscillating Microbalance
ToR	Terms of Reference
UHPC	Ultra-high-performance concrete
VC	Valued Components
WHMIS	Workplace Hazardous Materials Information System

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Introduction

1.0 INTRODUCTION

More than 114,000 Canadians killed in wars outside Canada lie buried in foreign lands, were lost at sea, or disappeared into the landscapes of war. The Never Forgotten National Memorial Complex (NFNMC) will commemorate Canada's war dead, wherever they may lie, honouring these servicemen and women who gave their lives so far from home by creating a memorial on Canadian soil. As the first national memorial to commemorate our fallen soldiers in this manner, the NFNMC will complement existing memorials that recognize and honour Canadian war dead.

This document is a Detailed Impact Analysis (DIA) to examine potential environmental effects associated with the first phase of the proposed NFNMC (the Project) in Cape Breton Highlands National Park of Canada (CBHNPC). Parks Canada Agency (Parks Canada) has determined that a DIA is required pursuant to the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and Parks Canada's Interim Directive on Implementation of the CEAA 2012.

The DIA is being undertaken in accordance with Parks Canada DIA Terms of Reference (ToR) dated September 2, 2014. The ToR and concordance with the DIA are provided in Appendix A. The DIA evaluates potential Project-related environmental effects and proposes economically and technically feasible mitigation, and monitoring and follow-up measures as necessary to reduce the potential for significant adverse effects and/or public concern with respect to ecological integrity, the integrity of cultural resources or characteristics of the environment that are important to key visitor experience objectives.

1.1 PROPONENT INFORMATION

The Never Forgotten National Memorial Foundation (the Foundation) is a not-for-profit charitable organization incorporated under the *Canada Not For Profit Corporations Act* S.C.2009, c.23. The Foundation provides an administrative framework for community, government and key individual and corporate engagement, as well as oversight for construction and a major fund raising initiative. The Foundation intends that all planning, design and construction costs are to be funded by private individuals or corporate entities in-kind support for aspects of the Project is also a possibility. An operations fund will also be created by the Foundation for the ongoing operation and maintenance costs associated with the Project.

Contact information for the Proponent is provided in Table 1.1.

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Introduction

Table 1.1 Proponent and Parks Canada Contact Information

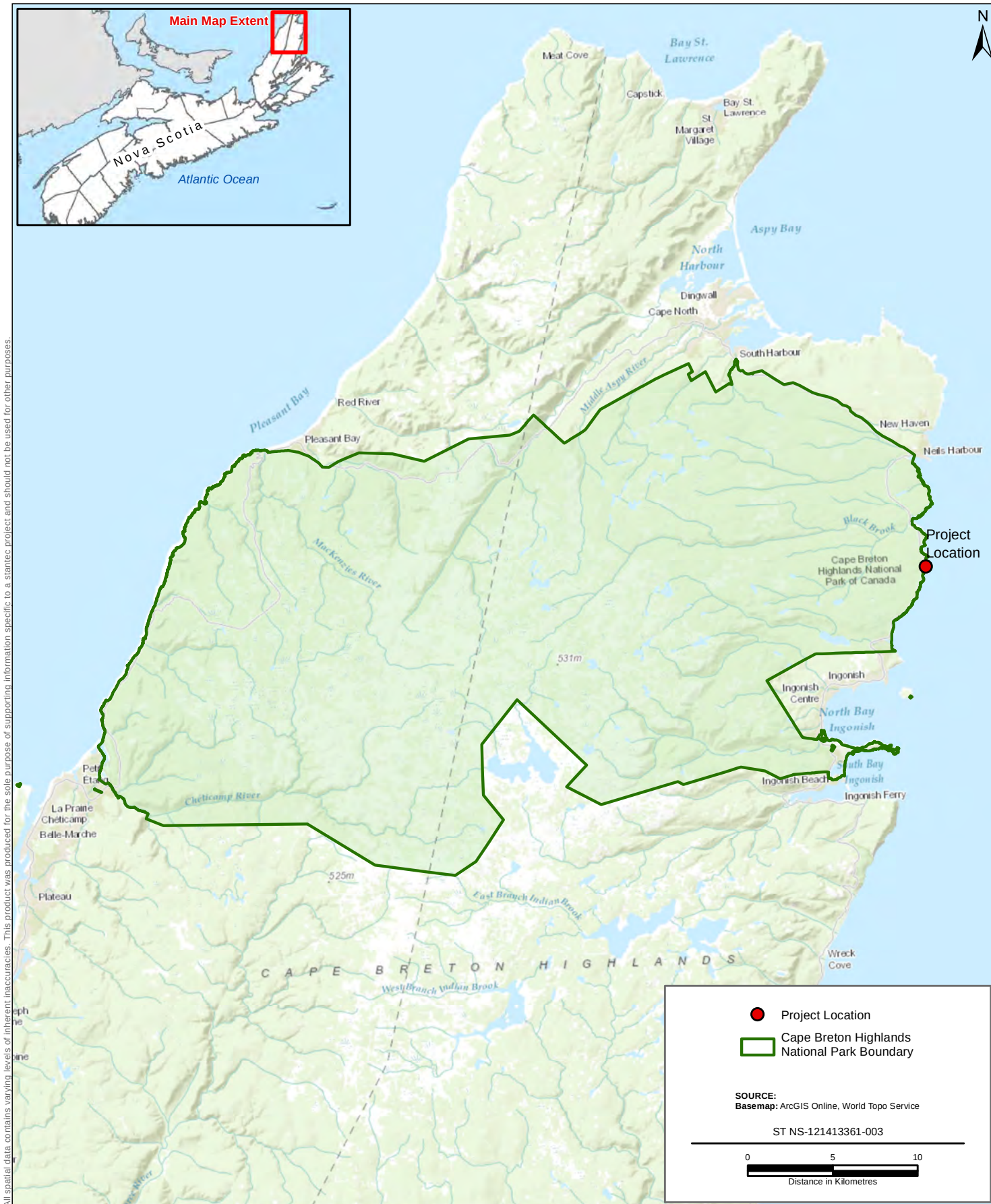
Never Forgotten National Memorial Foundation	Foundation Headquarters 6 Vansco Road, Toronto, Ontario M8Z 5J4 Tel: (416) 353-1917 www.nfnm.ca
Principal Contact for Purposes of Regulatory Review	Terry McGuire, P.Eng. Email: terry.mcguire@shaw.ca
Parks Canada	Eddy Kennedy Project Manager Eddy.Kennedy@pc.gc.ca

1.2 PROJECT LOCATION AND OWNERSHIP

The NFNMC will be located at Green Cove, a scenic ocean viewpoint approximately 6 km north of Ingonish, along the world-renowned Cabot Trail, in CBHNPC, Nova Scotia (Figure 1.1).

CBHNPC was established in 1936 as the first national park in Atlantic Canada and remains the largest national park in the Maritimes, protecting 950 km² of the Maritime Acadian Highlands Natural Region (Parks Canada 2010). Green Cove is a rocky granite headland, elevated approximately 10 m above sea level. A short (0.2 km) trail leads from a parking lot off the Cabot Trail to the headland for scenic viewing.

Lands at Green Cove are subject to the *Canada National Parks Act*, S.C. 2000, c. 32, and will be available to the Foundation under a License of Occupation with Parks Canada for the duration of construction of each phase, in keeping with *Canada National Parks Act* and its regulations. Upon completion of construction of each phase of the NFNMC (including the first phase, which comprises the Project), that portion of the NFNMC will be given to the Government of Canada, by way of Parks Canada with the authorities in the Parks Canada Agency Act, S.C. 1998, c. 31, and will be part of the Park.



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Project Description

2.0 PROJECT DESCRIPTION

2.1 OVERVIEW OF THE NFNMC

The NFNMC has been planned and designed in five phases, to allow for growth and expansion over time to suit the requirements of visitors and to allow for construction to progress sequentially as funding becomes available. Each phase represents a stand-alone component of the NFNMC, which will be accessible and offer meaningful visitor experiences. The NFNMC is compatible with planning objectives of the CBHNPC Management Plan (Parks Canada 2010) in the following ways:

- it is predicted to increase park visitation;
- it will enhance experience for many visitors; and
- it adds a new cultural experience to the Park.

Beyond Phase 1 (Stage 1 and Stage 2), which form the basis of the project evaluated in this DIA, future phases are described for context only as no detailed designs or specifications have been developed and funding is not available at this current time to advance their development. If future phases are to be advanced in the future, they will require an Environmental Impact Analysis that would include a full consideration of cumulative effects. If the project as described in this DIA is approved, it does not create any implied approval of the subsequent conceptual developments described below.

An artistic rendering of the full NFNMC (Phases 1-5) is presented in Appendix B. Design development drawings are also provided in Appendix B. As noted above, the images in Appendix B represent a preliminary concept of future phases. The spatial footprint of Stages 1 and 2 of the NFNMC (*i.e.*, the current Project) is shown on Figure 2.1.

2.1.1 Current Project

Phase 1 (Stage 1 and Stage 2) includes the development of Remembrance Point at the headland of Green Cove.

Phase 1 (Stage 1) of the Project includes:

- site preparation;
- portion of Mobility Impaired Parking Lot;
- Procession Pathway Bridge; and
- Commemorative Ring of True Patriot Love.

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Phase 1 (Stage 2) of the Project includes:

- With Glowing Hearts Sanctuary including Maple Leaf and drilled shaft to hold relics;
- Memorial Gateway;
- off-site fabrication of full size statue;
- statue Base;
- installation of the statue;
- Observation Deck;
- remaining portion of Mobility Impaired Parking Lot; and
- bathroom facilities.

2.1.2 Future Conceptual Phases

Full build-out and realization of the master plan is dependent on many factors (e.g., fundraising, visitor numbers). Completion of the master plan would involve the following phases and components to be implemented sequentially over a period of approximately ten years following the implementation of Phase 1.

Phase 2 includes the following components at a site approximately 300m north of Green Cove, (the Northern Site):

- an approximately 60 stall hard surfaced parking lot north of the Green Cove site;
- an observation platform to provide another vantage point for the Mother Canada statue a path connecting the existing informal trail network in the area; and
- a temporary boardwalk structure to connect the Northern Site to Green Cove (a permanent boardwalk will be constructed in future phases).

Phase 3 involves the construction of a Commemorative Square plaza area. This will involve redesigning the parking area that was constructed in Phase 1.

Phase 4 involves the construction of an interpretive centre (viability contingent on visitor numbers). The interpretive centre would include visitor reception areas, washroom, and interpretive galleries. This phase may also include additional parking expansion at the Northern Site.

Phase 5 may involve construction of a Gratitude Pavilion, if visitor numbers and interest warrant. The Gratitude Pavilion would provide a venue for appropriate entertainments (e.g., music presentations, storytelling).



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REVIEWED BY:	C Shupe
CLIENT:	Never Forgotten National Memorial Foundation

Never Forgotten National Memorial (NFM) Complex, Phase I

Environmental Features Overview

FIGURE NO.:	2.1
DATE:	Apr 28, 2015

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Project Description

2.1.3 Project Schedule

Scheduling of Project construction is contingent on a number of processes including, but not limited to DIA acceptance and permitting stakeholder and Aboriginal engagement public consultation and engineering design. Phase 1 is planned to move forward in two stages depending on the Foundation securing the necessary funds for completion of each stage. Stage 1 reflects putting necessary infrastructure in place to permit subsequent work out on the point in Stage 2. Stage 1 construction is planned to augment celebrations of Canada's 150 anniversary in 2017 with Stage 2 at a later date or potentially concurrently with Stage 1 depending on the fiscal situation.

To accomplish this, the following general schedule is planned as presented in Table 2.1.

Table 2.1 Project Planning Schedule*

Phase/Stage	Target Schedule
Phase 1 (Stage 1)	
Site Preparation	2015, Q4
Portion of Mobility Impaired Parking Lot	2016, Q2
Procession Pathway Bridge	2016, Q2-Q4
Commemorative Ring of True Patriot Love	2016, Q4 – TBD
Phase 1 (Stage 2)	
With Glowing Hearts Sanctuary including Maple Leaf and drilled shaft to hold relics and	TBD
Memorial Gateway	TBD
Off-site fabrication of full size statue	TBD
Statue Base	TBD
Installation of the statue	TBD
Observation Deck	TBD
Remaining portion of Mobility Impaired Parking Lot	TBD
Bathroom facilities	TBD
Notes:	
* This schedule is provided for planning purposes and should be considered preliminary; the schedule may change pending the timing of approvals, funding, and other requirements necessary for commencement.	

For the safety of visitors, a complete closure to the access of Green Cove will be required during construction. The Contractor(s) will work closely with Parks Canada to determine a compatible construction schedule for access and public traffic detours and closures. Weekly progress meetings will address updates to design status, permit acquisition, utility conflicts and construction progress.

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Project Description

2.1.4 Project Alternatives

2.1.4.1 Alternative Sites

The following paragraphs describe the criteria that were used to identify candidate sites for the NFNMC.

- It was important to select a site on the eastern coast of Canada, with a geographic bearing that would allow the Mother Canada statue to be situated in a representative alignment to France, in order to underscore its relationship to the Vimy Ridge Memorial, and the Canada Bereft statue there.
- Site selection focused on areas that would be under the protection of government agencies in order to provide protection to the integrity of the infrastructure and message.
- The site's natural characteristics were an important consideration, to underscore the solemnity of the memorial, and to enhance the aesthetic experience of visitors.
- Various constructability, feasibility and environmental considerations were considered such as the size of the site the ability of the geography to support the infrastructure and the environmental impact.

Using the above criteria, three candidate sites were selected: two sites within CBNHPC (Green Cove and Lakies Head) and the Fortress of Louisbourg National Historic Site of Canada.

The Fortress of Louisbourg was subsequently dismissed as a viable option since the concept of the NFNMC did not align with the existing infrastructure at the site.

Lakies Head met the desirable criteria for hosting the NFNMC; however it was too small to support the planned development into future phases and was therefore dismissed as a viable option.

The preferred candidate site, based on the aforementioned criteria, was Green Cove (the current proposed location).

2.1.4.2 Construction Methods

Construction methods will depend on the final design of the statue and a review of geotechnical and constructability factors. In addition to environmental and social considerations, design and construction decisions will be based on, but not limited to, the following:

- foundation design will depend on the geotechnical requirements to support the statue and related infrastructure;

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- design and construction including composition of Mother Canada statue will consider local climate conditions and exposure;
- heavy equipment movement on site may be constrained by topography;
- design of concrete elements will follow CAN/CSA A23.1, A23.2, and A23.3 including applicable referencing documents as appropriate; and
- design of structural steel elements will follow CAN/CSA S-16.

Design and construction will be undertaken and prepared under the Seal of Registered Professional Engineers licensed or registered to practice in the Province of Nova Scotia including any or all of the electrical, mechanical, components required therein.

2.2 PROJECT COMPONENTS

Table 2.2 provides the dimensions of the project components. Detailed drawings of the project components are provided in Appendix B.

Table 2.2 Approximate Dimensions of Project Components

Project Component	Approximate Dimensions	Approximate Area
Parking lot	94 x 30 m	2,420 m ²
Procession Pathway Bridge	56 x 2.5 m	164 m ² (deck)
Commemorative Ring of True Patriot Love	10 m radius	354 m ²
We see thee Rise Observation Deck and Statue Base	40 x 24 m	666 m ²
Statue	24 m tall	60 m ²

2.2.1 Commemorative Ring and Sanctuary

A circular promontory known as the Commemoration Ring of True Patriot Love will lead visitors to a metal or concrete outline of a maple leaf which will overlay the natural rock in the centre of this area to be known as the With Glowing Hearts National Sanctuary. Within the centre of the maple leaf, a vertical shaft will be bored to hold sealed capsules of sacred soil and water gathered from overseas cemeteries and battlefields.

2.2.2 Observation Deck

An observation deck will be constructed to surround the Mother Canada statue base. The observation deck and promenades have been located back from the tip of the point to avoid badly fissured and broken bedrock.

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Project Description

2.2.3 Promenade Walkway

The elevated walkway will span an existing natural low area. A series of sentry columns will be constructed on either side of the walkway with rows of durable markers representing various Canadian Armed Forces and Merchant Navy groups spanning the landscape below. The promenade walkway will have controlled maximum grades to meet barrier-free access requirements to allow for easy movement of mobility impaired visitors with anti-slip surfacing. The existing wooden walkway will be removed and warning signs concerning the dangers of rogue waves will be incorporated into overall site operational and warning signage.

2.2.4 Boardwalk

A boardwalk along the east edge of the parking lot leading out to the start of the Promenade Walkway will be constructed with a pressure treated timber boardwalk. The boardwalk will have railings to increase public safety and discourage visitors from walking outside of the physical structures.

2.2.5 Mobility impaired drop off and parking lot

The mobility impaired drop off and parking lot is to be constructed to provide additional parking for the site. This will be a 60 stall, asphalt surfaced parking lot, complete with 4 disabled stalls and a bus drop-off area.

2.2.6 Bathroom facilities

A visitor washroom facility will also be constructed during this phase. The washroom will be a prefabricated facility with two stalls for each sex and designed to meet accessibility standards. The unheated washroom will be a composting style, sitting on a buried concrete vault that will need to be pumped out on a periodic basis. Hand sanitizer dispensers will be provided for hand cleaning and hygiene purposes. The bathrooms will have electrical lighting by means of solar power in the early phase and by an overhead line connected to an existing overhead power line on the east side of the Cabot Trail in later phases.

2.2.7 Mother Canada Statue

The proposed statue will be an approximately 25 m high statue of Mother Canada sculpted in the image of Canada Bereft at the Vimy Memorial, with head raised and arms outstretched. The statue will face eastward toward Vimy, France. The statue will be located approximately 10 m above sea level on a high strength concrete reinforced base that will be anchored into the bedrock. The statue will be designed for a minimum 75-year service life. The statue will be built off-site in sections, and subsequently erected on site. Applicable Canadian building codes (e.g., lightning protection) will be met.

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The statue will be tendered to design-build fabricators with experience in large scale installations, off-site fabrication capabilities, and knowledge of materials and construction methods suitable for a coastal environment.

A review of logistical constraints has been undertaken (*i.e.*, transportation, access to materials). Options for fabrication and installation will ultimately be decided based on the final design and with input from the contractors. However, three methods for the fabrication and installation of the statue are under consideration. These are outlined below and summarized in Table 2.2.

2.2.7.1 Option 1 High-performance concrete blocks with partial steel frame

For this option, molds would be created to cast the sculpture in large concrete blocks that would be installed around a structural member on site. Other details of this option are described below.

- The block sections of the sculpture would be attached with a mending plate attachment internal to the sculpture and seamed on site with mortar adhesive.
- The blocks will be designed with voids to decrease weight where possible.
- Galvanized steel framework will be used where required (*e.g.*, cantilevered arms).

2.2.7.2 Option 2 Ultra high performance fiber reinforced concrete panels clad over a full steel framework

For this option, molds would be created to cast the sculpture in thin pre-cast concrete panels. The panels would have structural connections cast integrally and these would be clad around a very precise internal steel armature. Other details of this option are described below.

- A full galvanized steel framework will be built to support the lightweight concrete cladding.
- The sculpture could potentially be designed to allow access inside for maintenance equipment.
- The sculpture will be divided into panel sections as large as possible for transport and installation.
- Each panel would be constructed with cast-in mounting and hoisting hardware.
- The statue would be seamed on site with mortar adhesive.

2.2.7.3 Option 3 Fabricated metal or composite panels clad over a full steel framework

For this option, molds would be created to either cast the sculpture in thin composite panels or use the forms as templates to fabricate metal to the geometry. The panels would have structural connections integral to their design and these would be clad around a very precise internal steel armature. Other details of this option are described below.

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- A full galvanized steel framework will be built to support the lightweight metal cladding.
- The sculpture could potentially be designed to allow access inside for maintenance equipment.
- The sculpture will be divided into panel sections as large as possible for transport and installation.
- Each panel would be constructed with cast-in mounting and hoisting hardware.
- The statue would be seamed on site with mortar adhesive.

Table 2.3 Summary of Decision Factors for Three Fabrication Options for the Mother Canada Statue

Option	Advantages	Disadvantages
Option 1 High-performance concrete blocks with partial steel frame	• Simplest design for construction. • Concrete is fitting for a memorial • Internal frame complexity is reduced due to structural nature of concrete. • Molds for individual pieces can easily be reproduced from a 3D model.	• Sculpture will be extremely heavy and will require the most robust foundation and structural members. • Blocks are cast with skin geometry on vertical wall resulting in additional work to remove pin holes from cast parts. • Block sizes are limited by weight due to increased shipping cost. • Internal maintenance of the structure would be more difficult.
Option 2 Ultra high performance fiber reinforced concrete panels clad over a full steel framework	• Concrete is fitting for a memorial. • Panels will be cast with the skin face down therefore high quality surface finish is very achievable with minimal post cast finishing. • Internal access would facilitate repairs and panel replacement. • Lighter weight design reduces shipping and installation costs and will require a smaller foundation. • Molds/panels can easily be reproduced from 3D model.	• Panel sizes will be limited by shipping constraints. • Will require very extensive QA/QC process to ensure panels, connection details and internal armature are all within tolerance. • Material costs are much higher than traditional concrete.
Option 3 Fabricated metal or composite panels clad over a full steel framework	• Lightest weight design will reduce framework and foundation requirements. • Internal access would facilitate repairs and panel replacement. • Lightest weight design reduces shipping and installation costs and will require a smaller foundation.	• Panel sizes will be limited by shipping constraints. • More frequent maintenance will be required as a result of it being a painted product. • Will require very extensive QA/QC process to ensure panels, connection details and

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Table 2.3 Summary of Decision Factors for Three Fabrication Options for the Mother Canada Statue

Option	Advantages	Disadvantages
	Molds/panels can easily be reproduced from 3D model.	internal armature are all within tolerance.

2.3 PROJECT ACTIVITIES

The following sections describe the activities within the construction, operation and maintenance, decommissioning and abandonment phases.

2.3.1 Construction

As previously described, the Project will be undertaken in two stages. In Stage 1, the site will be closed to the public in preparation for construction activities. This will be done in consultation with Parks Canada, and will include signage to indicate the temporary closure. Erosion and sediment controls will be installed on site ahead of any ground disturbance. Laydown areas and temporary facilities (e.g., portable worker bathrooms, temporary office trailer, waste containers) will be identified and installed. Power will be provided on site by generator; no line extensions are planned. Telecommunications will be provided through wireless connection. This Stage includes construction of a portion of the mobility impaired parking lot, however paving will not occur during this Stage. The bridge between the existing parking lot and the promontory will be constructed for access to the promontory area, and site preparation (*i.e.*, any required clearing or grading) will be undertaken. Once access is gained to the promontory, the new components will be constructed starting with Mother Canada and the observation deck and working back to the bridge with the Commemorative Ring of True Patriot Love built last. The Commemorative Ring consists of components such as prefabricated ring and maple leaf, buried cylindrical capsule, and pedestrian paving. Construction will be labour intensive with skid-steer and smaller powered equipment (e.g. Tampers, drills for rock anchoring).

A relatively small (approximately 25%) spatial extent of geological disturbance will occur in an area that has already been partially disturbed by current activities in CBHNPC. When completed, approximately 75% of the exposed bedrock surface will be visible and accessible.

Stage 2 construction will involve off-site fabrication of the Mother Canada statue, and transportation to site. Options for the fabrication of the Mother Canada statue are described in Section 2.2.7. The statue will be delivered to site via road; no marine-based transportation or construction is contemplated. Rock anchors will be required for the statue and will be installed using a self-propelled drilling vehicle. The statue will be installed on site through the use of cranes, scaffolding, and other equipment, including the installation of a form if required. The parking lot will be extended during this stage, including asphalt paving and concrete curbing, and a new site access location will be developed. Storm Water will be sheet-flow across parking lot to curb depressions. Oil and grit separators may be required prior to discharge to vegetated areas. Once all work is completed on the promontory, the bridge will be converted for

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pedestrian use (e.g., installation of railings). The modular washroom building will be placed on concrete foundation on site, and other amenities will be installed (e.g., waste receptacles, benches, boardwalk).

Construction equipment requirements will be determined based on the final fabrication and delivery methods chosen for the Mother Canada statue, and the preferences and constraints of the chosen contractors. Therefore equipment requirements will include, but not be limited to, the following:

- excavators/backhoe;
- low-boy trailer;
- cranes (crawler type or rubber track);
- self-powered drilling truck;
- tractor-trailers for transportation of statue components;
- grader;
- bulldozer;
- compaction roller;
- tandem trucks; and
- paving and curbing machinery.

2.3.1.1 Site Preparation

The existing bedrock peninsula will be the foundation for the Mother Canada statue, the Ring of True Patriot Love and associated pathway promenades and approximately 100 m of 1.2 m high concrete ring walls. Topsoil and loose rock will be removed by excavator and swept clean. Fissures and gaps in bedrock will be bolted as necessary and filled with fabric, gravel and filler, prior to placement of high strength reinforced cast-in-place concrete.

Boulders and high areas in the bedrock topography will be incorporated as much as possible to the design. Where necessary for constructability or safety reasons, erratic boulders or high points may be removed. Currently no blasting is planned. However, if blasting is necessary, mitigation will be implemented as described in Section 2.5.1.3 to reduce potential adverse effects.

Clearing limits for the parking lot and bathroom facilities will be delineated and kept to a minimum.

The earthworks will include excavation, removal of unsuitable material, embankment construction, culverts, trimming and rehabilitation of disturbed areas. Culverts may be required as part of general site drainage and will be considered and placed based on site topography.

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There are no watercourses on the site. Most of this work will be accomplished with tracked excavators, bulldozers, compactors and tandem trucks.

2.3.1.2 Installation/Construction of Physical Structures

Construction access to the Point will be by means of an elevated roadway designed to accommodate construction loads. This access will be constructed in such a manner as to incorporate both permanent abutments and piers for the elevated pedestrian walkway. Temporary piers may be used to accommodate temporary bridge-spans. A gate and wing fencing will be installed to enable access to the Point to be restricted during dangerous weather events or operational closures.

The base of the Mother Canada statue will be reinforced cast in place concrete anchored into the bedrock by means of drilling. The depth and materials will be determined based on structural engineering and geotechnical investigation.

The Mother Canada statue will be fabricated off-site in a pre-casting facility where materials and casting can take place in temperature and quality controlled conditions. The statue will be cast in sections sized for ease of transport. Various means of transporting components to the site are being evaluated based on existing highway geometry and bridge and highway loading capacity. Erection of the statue will likely require cranes. A full construction plan will be developed based on final design.

Suitable and specified gradations of select sub-base, base, concrete and asphalt concrete aggregate and sand will be obtained from existing pits and quarries outside of CBHNPC for the construction of the parking lot. These materials will be hauled and placed directly for subsequent use when required. Hot mix asphaltic concrete will be sourced from local permitted operators who have existing portable plants in the area.

The following preliminary materials volumes are estimated for the parking lot area:

- 245 m³ of asphalt;
- 365 m³ of type 1 gravel; and
- 850 m³ of type 2 gravel.

2.3.1.3 Temporary Ancillary Facilities

Construction staging, including offices, storage, and marshalling yard, will be located within the current Green Cove day use area and constructed mobility drop off parking area.

If required, the use of Black Brook campground for worker accommodation in recreational vehicle style trailers will be investigated during peak summer periods when commercial accommodation may be limited or scarce. Use of the camp area, its subsequent management

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and decommissioning upon completion of the Project will be the responsibility of contractors in accordance with criteria developed by Parks Canada.

2.3.1.4 Site Security

Mitigation measures such as temporary fencing and boarding to maintain site security and to protect the public will be implemented during construction. Appropriate workplace hazard signage will be used. Temporary construction fencing will be used to secure the construction site and any excavations will be fenced. Heavy equipment will be parked and secured in a common location on the site and tools and small equipment will be locked and secured in a storage facility.

2.3.1.5 Traffic Management

Traffic will be managed in accordance with Parks Canada standards and requirements. This includes adherence to the Nova Scotia Temporary Workplace Traffic Control Manual. In addition, the maximum cumulative traffic delay associated with work carried out will not exceed 20 minutes.

2.3.2 Operation and Maintenance

Upon completion of construction, the Foundation will return the site to Parks Canada to operate. An operations fund will be established by the Foundation for this purpose.

The NFNMC is expected to operate primarily from April through November. During dangerous weather events or when conditions on walkways and observation decks around the point are deemed unsafe, access to the point will be closed at the gateway leading out to the point. During the offseason, the site will not be maintained or cleared of snow. A closed gate at the Memorial Gateway will restrict access to Remembrance Point and its infrastructure. The Foundation will complete an Operational and Maintenance Environmental Protection Plan for NFNMC operations. This will be completed after one year of operation to ensure there has been time to evaluate operational procedures.

The current Green Cove site receives regular garbage collection. The site will be furnished with an additional two wildlife proof waste receptacles strategically located in the parking areas and near the washroom. Adjoining the waste receptacles will be recycling receptacles for visitors that will require regular pick up and disposal at a licensed, approved landfill or recycling station.

The Green Cove Day use area currently has no power or telecommunication services. Solar panels will be employed on the washroom facility for the purposes of lighting. There are no plans to provide heat or telecommunication service for the bathroom building. Energy reduction measures will be incorporated throughout the site to not only minimize operating costs but for environmental sustainability reasons reflective of the site's location within a National Park.

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Maintenance activities currently include trail surface repairs, minor vegetation clearing along trails and parking lot, surface upgrades (e.g. potholes and minor resurfacing), line painting on paved surfaces, and minor landscaping.

Operationally, a similar level of service is anticipated but will now also require:

- regular cleaning of the washroom;
- daily garbage collection;
- pumping out of toilet building(s); and
- regular pressure washing of walkways and statue.

It is also anticipated that the statue will require periodic application of de-icing and/or protective coatings. The details of this application are not yet known as it will depend on the material used for the statue. However, the considerations will apply to this maintenance activity as follows:

- environmentally safe sealants and other protective coatings will be used
- measures will be taken as necessary to avoid aerial dispersal, infiltration and/or runoff to the receiving terrestrial and aquatic environments, such as:
 - depending on the materials used, these may be applied by small-area spray techniques (e.g., boom truck, scaffolding) to reduce the spray radius; and
 - temporary stormwater diversions may be used for the period of spray-application to reduce the potential for runoff to the receiving environment.

Full details of the required maintenance schedule, include required treatment of the statue and other concrete structures will be included in the Operation and Maintenance plan, and will be developed in consultation with Parks Canada and other regulatory agencies as required.

It is anticipated that the statue and elevated walkway will require regular periodic technical inspections by qualified bridge inspectors timed per Parks Canada directive on bridge inspections.

2.3.3 Decommissioning and Abandonment

The Project is planned in perpetuity with no stipulated end-date. All materials and construction will be to support a service life of 75 years however ongoing maintenance and rehabilitation could be undertaken to extend the service life if appropriate.

Decommissioning and abandonment of the site will be undertaken in adherence to the regulations and requirements required at the time.

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In general, decommissioning of structures will include the removal of structures, and rehabilitation of the site. Project materials (e.g., paving, boardwalks, signage) would be removed and disposed of at an appropriate facility. A Landscape Plan will be developed that specifies native CBHNPC seed and plant species and method of planting to restore vegetative cover of disturbed areas.

2.4 EMISSIONS AND WASTE

2.4.1 Noise and Air Emissions

Construction will result in increased noise at the site. Rock drilling and pneumatic hammering are the loudest planned activities, which will be short-lived and infrequent. Blasting is not planned. If required, it will comply with regulations, and would be short-lived and infrequent. Section 2.5.1.3 presents additional information on potential blasting.

2.4.2 Construction Waste

A Waste Management Plan will be developed for construction-related waste. Opportunities to recycle waste materials will be investigated. Construction waste that cannot be recycled will be temporarily stored in on-site bins until full and then will be removed from site and disposed of outside of CBHNPC, in an appropriate manner at a local licensed landfill site.

Work area will be kept clean and free from food waste and garbage. Food waste and other animal attractants will be stored in wildlife proof containers and removed from site and disposed of at a local licensed landfill site.

If wood preservatives are used for construction purposes, Parks Canada Guidelines for the Use, Handling and Disposal of Treated Wood (2009) will be followed.

Waste material will be handled as required by Parks Canada and other regulatory bodies. Surplus indigenous material will be hauled in tandem trucks to an approved site for disposal.

2.5 ENVIRONMENTAL MANAGEMENT AND MITIGATION

This section describes general best management practices and design mitigation that will be implemented to prevent or reduce adverse environmental effects. Where Project design elements do not prevent adverse environmental effects, specific mitigation is proposed as presented in Section 7 to reduce adverse environmental effects on specific environmental components.

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2.5.1 Environmental Management Planning

The Green Cove site was chosen in part, because of its natural features and unique environmental characteristics. The Foundation is fully committed to working with Parks Canada in implementing all required mitigation and environmental management commitments.

An Environmental Protection Plan (EPP) will be prepared in support of the Project. The EPP will include best management practices for construction, operation and maintenance activities and will also incorporate specific mitigation commitments made by the Foundation and Parks Canada including mitigation prescribed in this DIA, and subsequent mitigation which may be identified following stakeholder and Aboriginal engagement, regulatory consultation, and detailed design planning.

Additional management plans will be developed to promote safe conditions and prevent and mitigate adverse environmental effects. These management plans, which may be incorporated into the EPP or serve as stand-alone documents, will include those described in Table 2.4.

These plans will be developed ahead of construction and are not included with the DIA as engineering design and contract-tendering has not yet been completed. The details required to complete these plans will depend on final engineering decisions, and the work-plans of various contractors.

Because the full details of project construction are not known at this time, completion of these plans to the satisfaction of the Cape Breton Field Unit Superintendent comprises an important step in confirming the conclusions of this DIA report, and forms a condition that must be met before the project can proceed. The Environmental Management Plan, in particular, will be structured to identify any project activities (not already addressed in full by this report) that could cause adverse environmental effects, identify specific mitigation measures to avoid or minimize these effects, and identify any residual effects that may result.

All workers on site will receive health and safety, and environmental orientation training including communication of protocols associated with working within a National Park. This will focus on site safety, important site features and vegetation to be preserved and specific regulations and controls for the Project. Workers will also receive orientation to the relevant environmental management plans and procedures.

During construction, a site inspector will oversee day-to-day activities and monitor compliance with health, safety and environmental protection plans. Incidents will be reported to Parks Canada immediately.

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Table 2.4 List of Management Plans to be developed prior to Construction

Plan	Description
Construction Plan	The Construction Plan will be developed once detailed engineering is complete and the work has been tendered to contractors. It will identify the following, at a minimum: • materials movement and storage on site; • construction activities and timing; • work progression; and • temporary facilities requirements and locations (e.g., laydown areas, parking).
Environmental Management Plan (EMP)	The EMP is an umbrella document that will detail commitments to environmental management and required mitigation outlined in the Detailed Impact Assessment and any terms and conditions of environmental assessment, or permitting approvals. The EMP will include: • Project-specific environmental protection measures and commitments; • the identification of environmental constraints; and • Management and construction monitoring plans.
Environmental Emergency Response and Contingency Plans	Environmental emergency response and contingency plans will be developed prior to the start of construction and be included in the appendix of the EMP to provide guidance on responding to unplanned or unexpected events. The Environmental Emergency Response Plan (ERP) will serve as a guideline for Project personnel to ensure a prompt and coordinated response to environmental emergencies. The Plan will apply to all phases of the Project and will include contingency plans for addressing emergencies that result from accidents or unplanned events that have potential for environmental damage (e.g., hazardous materials spill, equipment fire), or natural hazards (e.g., forest fire). The contingency plans will provide provisions and instructions for reporting accidents or unplanned events, and responsibilities of personnel. In addition, these plans will include procedures for initial response; containments; and clean-up.
Landscape Plan	This Plan will be submitted ahead of construction, to allow for site-specific conditions to be integrated to the plan. It will describe specific actions to be implemented to decrease the potential for environmental degradation as a result of construction activities (e.g. rehabilitation of temporary facilities; ground disturbance). The Landscape Plan may be integrated to a decommissioning and abandonment plan in the long-term. The landscape plan will specify the following at a minimum: • target grade requirements; • specifications for the removal of outside materials; • specifications for the retention and protection of <i>in-situ</i> landscape features (e.g., boulders); and • areas requiring revegetation including specification of species.

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Table 2.4 List of Management Plans to be developed prior to Construction

Plan	Description
Waste Management Plan	The Waste Management Plan will be included as part of the EMP. It will outline the appropriate procedures for managing project waste, including at a minimum: - the procurement, storage, and handling of hazardous materials; - identification of waste materials and volumes; - identification of existing, regulated waste facilities; and - transportation methods.
Erosion and Sediment Control Plan (ESCP)	The objective of the ESCP is to preserve the integrity of environmentally sensitive areas and maintain water quality by: - reducing the extent and duration of disturbance; - protecting exposed soil by diverting runoff to stabilized areas; - installing temporary and permanent erosion control measures; and - establishing an effective inspection and maintenance program. This Plan will provide guidance for reducing erosion of disturbed soils and transportation of sediments into sensitive resources during construction. The procedures developed will include best management practices and are designed to accommodate varying field conditions while maintaining appropriate standards for the protection of environmentally sensitive areas. The ESCP will consist of a detailed site drawing showing the location of required erosion and sediment control structures; best management practices; and monitoring requirements.
Blasting Plan	If required, a Blasting Plan will be developed. At a minimum, the blasting plan will: - indicate the location and timing of blasting; - detail a communication plan to be followed ahead of blasting; - specify mitigation to be followed; and - detail safe handling and regulatory requirements related to blasting materials.
Traffic Management Plan	The Traffic Management Plan will describe the management and control of construction traffic. It will be developed in accordance with Parks Canada standards, including adherence to the Nova Scotia Temporary Workplace Traffic Control Manual. The objectives of the Traffic Management Plan will be to manage project-related traffic in the Project area. The Plan will include: - activities during the pre-construction, construction, and post-construction phases of the Project; and - description of the best practices and mitigation measures to protect the public, construction workers, and the environment from project-related effects.

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Table 2.4 List of Management Plans to be developed prior to Construction

Plan	Description
Operation and Management Plan (OMP)	An OMP will be developed to manage the day-to-day operational activities of the site. The plan will include consideration of the following: • maintenance requirements and schedule; • operation activities and timing (e.g., site clean-up); • maintenance requirements of project components (e.g., cleaning and application of protective coatings); and • general maintenance of facilities (e.g., bathrooms). This includes specific activities and implementation strategies that are to be undertaken in the operational phase. Role and responsibilities should be identified.
Plan for Archaeological Resources	An Archaeological Resources Management Plan will be developed to define site management procedures for archaeological sites including site avoidance mitigation (e.g. controlled excavation), and archaeological monitoring during construction. The Plan will outline chance-find procedures to be followed if archaeological, historical, or palaeontological materials are discovered during construction activities so that unforeseen impacts to these resources can be avoided and/or minimized. Standard chance find procedures will include stopping work in the immediate vicinity of the find, having an appropriate technical specialist (e.g. archaeologist) review the find, and contacting the appropriate regulator(s) for further direction, as required.

2.5.1.1 General Mitigation Commitments

General protection measures include adherence to environmental protection legislation, including the *Canadian National Parks Act* and associated regulations. During the site preparation, construction, and operation the following mitigation measures will be implemented.

2.5.1.2 General Construction Mitigation

Temporary erosion and sediment control measures may include silt fences, inlet/outlet protection, check dams, drainage swales, filter berms, sediment traps, sediment basins, pumps, piping and drains and any other protection measure as deemed appropriate to maintain a stabilized site during the duration of construction and meet environmental requirements. A site specific erosion and sediment control plan will be developed, and included in the EPP.

- Storm-water drainage infrastructure will be used, where feasible, for areas scheduled for hard surfacing (e.g., pavement, cement walkways).

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- A Landscape Plan will be developed. Weed-free local fill that is properly covered during transport to avoid spillage will be used. Excavated soil will be stored in already disturbed areas and cover to avoid effect from wind or rain. All areas other than rock cuts disturbed by construction will be shaped, top soiled using suitable salvaged material from site, seeded, planted and fertilized.
- Work areas will be clearly marked and pedestrian or vehicle traffic outside of these areas will be reduced. Existing paths will be preferentially used to move equipment and people.
- Necessary measures will be taken to maintain site security and to protect the public (e.g., fencing, signage).
- Parks Canada's Guidelines and Specifications for Outdoor Lighting at Parks Canada (2008) will be followed.
- Useable timber will be cut into firewood lengths and provided to Parks Canada.
- Grubbed roots and limbs and tops will be chipped and stockpiled for use on site and surplus by Parks Canada.
- Topsoil will be salvaged and stockpiled for site rehabilitation on site, or if insufficient room exists, will be hauled and stockpiled in existing pits outside of CBHNPC.
- During construction, asphalt and concrete mixing sites, staging areas and refueling sites will be located at least 30 m from water bodies. These sites will be sited in consultation with Parks Canada.
- Staging areas will be decommissioned in accordance with approval from Parks Canada. Upon completion of construction the contractors will be responsible for all clean-up, and restoration.
- All environmental incidents will be reported immediately to Parks Canada and documented.
- Overnight storage of explosives within CBHNPC is not permitted.
- All equipment will be maintained in good working order and will meet environmental regulations.
- Special measures will be put in place for washing equipment to reduce the potential introduction of invasive species.
- Appropriate-sized spill kits and support equipment will be available and kept on-site as well as within equipment for use, if necessary. Contractors will be familiar with their use.
- Idling of machinery will be kept to a minimum; this will be communicated through the EPP.

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- Storage of hazardous materials (e.g., fuel, lubricants) will comply with Workplace Hazardous Materials Information System (WHMIS) requirements with appropriate material safety data sheets (MSDS) located at the storage site.

2.5.1.3 Blasting

Although not currently planned, the following mitigation measures are proposed if blasting is required.

- A Blasting Plan and mitigation measures will be developed in consultation with Parks Canada and will be detailed in the EPP.
- Blasting would be conducted in accordance with provincial and federal regulations and guidelines including DFO's Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Wright and Hopky 1998).
- Drilling and blasting will not be conducted between mid-May and mid-July to avoid disruption to the lobster fishery. The final blasting plan and mitigation measures will be developed in consultation with Parks Canada and will be detailed in the Construction EPP.
- Explosives will not be stored within the national park.

2.5.1.4 Waste Management

A Waste Management Plan will be developed in support of the Project which may include the following mitigation.

- Construction waste that cannot be recycled will be temporarily stored in on-site bins until full and then will be removed from site and disposed of outside of CBHNPC in an appropriate manner at a local licensed landfill site.
- Food waste and other animal attractants will be placed in wildlife proof containers and removed from site and disposed of at a local licensed landfill site.
- All surplus indigenous material will be hauled in tandem trucks to an approved site for disposal.
- If wood preservatives are used for construction purposes, the following guideline will be followed: Parks Canada Guidelines for the Use, Handling and Disposal of Treated Wood (2009).

2.5.1.5 Traffic Management

A Traffic Management Plan will be developed in support of the Project to promote safe transportation and minimize disruption to park visitor traffic which may include the following mitigation.

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- All deliveries to the site and transportation of construction waste will be managed within the legal loading requirements of the Cabot Trail. All loads will be properly covered during transport to avoid spillage of material.
- During construction activities, Parks Canada will be notified of proposed traffic disruptions in order to advise visitors.
- Required traffic delays will be scheduled for lower traffic times during the day and the week, and to minimize overlap with other traffic delays in the Park, where feasible.
- Delays will be kept to less than 20 minutes.

2.5.1.6 Operation and Maintenance

The EPP will include environmental protection procedures to be undertaken by Parks Canada during operations and maintenance of the NFNMC, including measures to be implemented during repairs, minor vegetation clearing along trails and parking lot and minor landscaping, surface upgrades, and cleaning and maintenance of the NFNMC infrastructure. The Operation and Maintenance EPP will also address waste management during operations.

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Existing Environment

3.0 EXISTING ENVIRONMENT

The following sections provide an overview of the existing biological, physical, and socio-economic environment of the Green Cove area. The information is based on available information (e.g., geographic information, provincial databases) as well as a site visit conducted by Stantec on September 30, 2014. Figure 2.1 shows the location of known environmental features.

The spatial boundaries for the Project to be assessed are defined below:

- **Project Development Area (PDA):** The PDA encompasses the area in which Project activities and components may occur and as such represents the area within which direct physical disturbance will occur as a result of the Project (*i.e.*, the Project footprint). The PDA is shown on Figure 2.1, and is approximately 1.4 hectares (ha). It encompasses the lands within CBHNP that have been identified by Parks Canada for construction of the project.
- **Local Assessment Area (LAA):** The LAA is the maximum area within which environmental effects from Project activities and components can be predicted or measured with a reasonable degree of accuracy and confidence.

For the Natural Resources VC, the Cultural Resources VC, and Marine Fish and Fisheries VC, the LAA consists of the PDA and adjacent areas where Project-related environmental effects are reasonably expected to occur based on available information and professional judgement. This includes a 30 m buffer around the PDA and a portion of the coastal waters to approximately 5.5 m depth off Green Cove (9.7 hectares).

For the assessment of the Visitor Experience VC, the LAA encompasses the CBHNP boundaries (951.7 km²) as shown on Figure 1.1.

- **Regional Assessment Area (RAA):** The RAA is the area within which residual environmental effects from Project activities and components may interact cumulatively with the residual environmental effects of other past, present, and future (*i.e.*, certain or reasonably foreseeable) physical activities. The RAA encompasses the PDA, LAA, and the surrounding region within the boundaries of CBHNP.

3.1 NATURAL RESOURCES

The Project is located within the Cape Breton Highlands Ecodistrict, which is in the Cape Breton Highlands Ecoregion of the Atlantic Maritime Ecozone (Neily *et al.* 2003). The characteristics of this ecological land classification are referred to where applicable in the subsections below. A terrestrial field survey completed in September 2014 revealed that the biophysical LAA consists of immature coastal white spruce forest, black crowberry barrens, and exposed shoreline with

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sparse vegetation cover. The following subsections provide additional information regarding current environmental conditions for various natural resources.

3.1.1 Climate

The climate of the Atlantic Maritime Ecozone is strongly influenced by the Atlantic Ocean, which produces cooler summers and warmer winters.

The following (Table 3.1) is a summary of the thirty-year climatic normals (Environment Canada 1981-2010), based on Environment Canada's climate database (Environment Canada 2014). The data is from the Ingonish Beach monitoring station, which is located approximately 12.8 km south of the PDA at an elevation of 7.9 m.

Table 3.1 Summary of Climatic Normals (Environment Canada 1981-2010)

	Low Range	High Range
Temperature Maximums	-1°C (February)	23.3°C (July)
Temperature Minimums	-9.7 °C (February)	13.6 °C (August)
Temperature Averages	1.9°C	10.5 °C
Precipitation	90.6 mm (June)	189.7 mm (November)
Wind Speeds (hourly)	46 km/hr (July)	80 km/hr (September)

3.1.2 Air Quality

The primary sources of air emissions in the immediate vicinity of the PDA are vehicle traffic on the Cabot Trail and, to a lesser degree, the operation of nearby marine vessels (e.g., fishing vessels).

Notable existing point sources of air emissions on Cape Breton Island include Nova Scotia Power's generating stations in Langan and Point Aconi, as well as various industrial facilities in Sydney (e.g., Imperial Oil's Sydney Terminal, the Sydney Airport).

The nearest ambient air monitoring station to the PDA is Station No. 30310, which is operated by Nova Scotia Environment in Sydney, approximately 68 km south of the PDA. A summary of this data is provided in Table 3.2.

Table 3.2 National Air Pollution Surveillance (NAPS) Summary of Annual Mean Hourly Data for Sydney, Nova Scotia – 2005 to 2008

Year	SO ₂ (ppb)	CO (ppb)	NO ₂ (ppb)	O ₃ (ppb)	PM _{2.5} ¹ (µg/m ³)
2005	3.0	0.2	-	24	5.3
2006	1.4	0.3	1.8	27	6.0
2007	2.0	-	-	30	5.0
2008	-	-	-	30	-

Note:

¹ Tapered Element Oscillating Microbalance (TEOM) – 1 hour periods for 2005 and 2006 24 hour periods for 2007

Sources: Environment Canada 2008, Environment Canada 2013

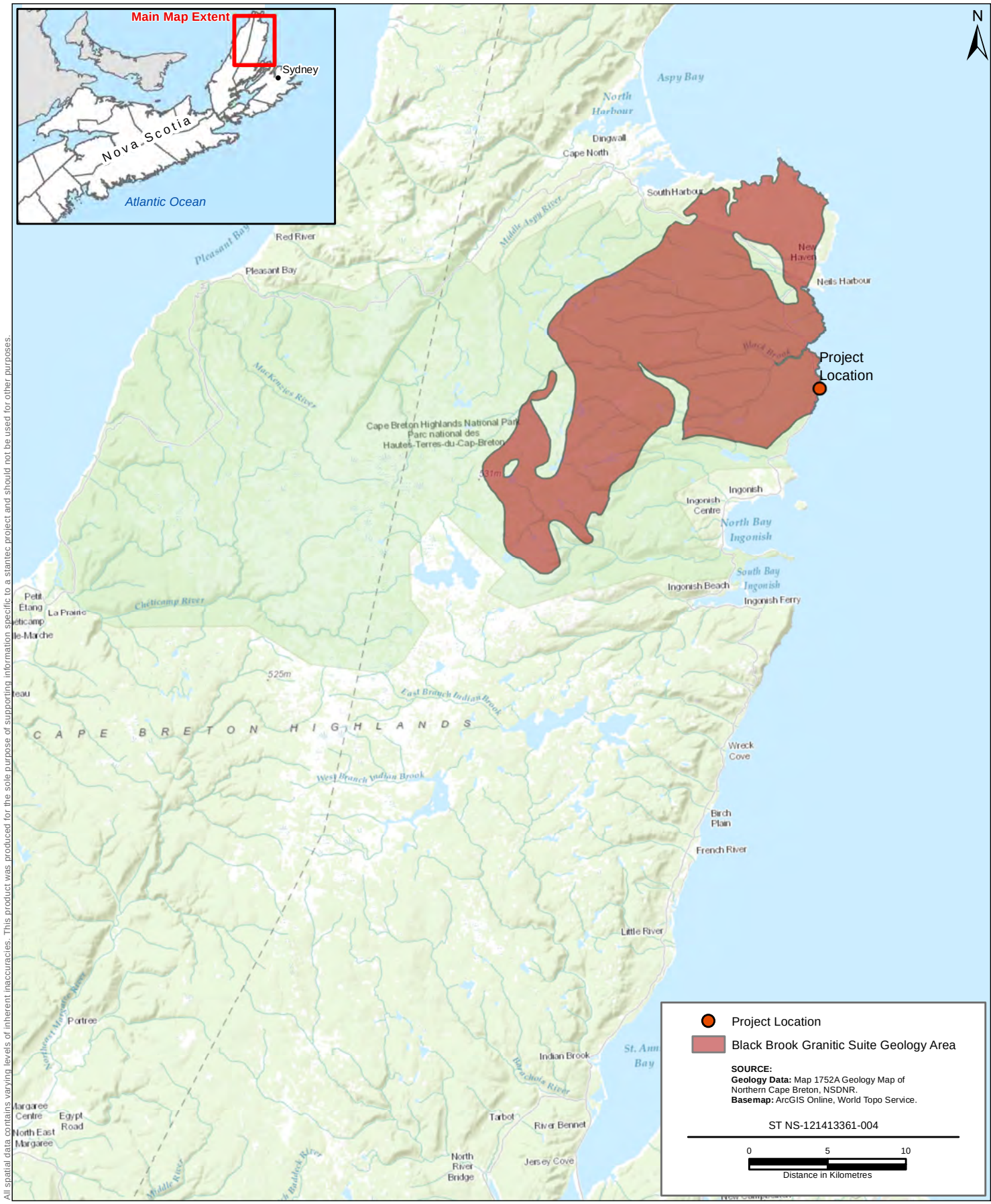
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3.1.3 Topography, Geology and Soils

The Cape Breton Highlands Ecoregion is strongly influenced by severe winds on exposed upper slopes and eroding coastlines (Wiken n.d.). Surface soils are well drained with moderately coarse sandy, to fine sandy loam.

Coarse grained, stony, glacial tills and coastal headlands are predominant in the Atlantic Maritime Ecozone, as are bedrock exposures. Granite is the primary base rock. At Green Cove, a granite outcropping known as the Black Brook Granitic Suite (Keppie 2000) is located on the eroding coastline. This bedrock formation is of particular interest to geoscientists as the granite is 375 million years old. The formation is approximately 260 km², and extends roughly 20 km inland 15 km north and 2 km south of Green Cove (Figure 3.1). Although it underlies the eastern third of the CBHNPC, the Green Cove location is one of few places that are accessible for public viewing (Barr *et al.* 2014, Barr 2014). Because of the unique geology, Green Cove is one of a small number of proposed geoheritage sites advocated by the Nova Scotia Department of Natural Resources (NSDNR) (Barr *et al.* 2014, Barr 2014).



PREPARED BY:	R Sutcliffe
REVIEWED BY:	C Shupe
CLIENT:	Never Forgotten National Memorial Foundation

Never Forgotten National Memorial (NFM) Complex, Phase I

Bedrock Geology

FIGURE NO.:	3.1
DATE:	Feb 23, 2015

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Phase 1 includes three separate areas, delineated based on the existing physical conditions. These three areas are illustrated on Figure 3.2, and are generally described below.



Figure 3.2 Phase 1 Development

3.1.3.1 Mainland

This area of the proposed development includes the western portion of the site that is situated between the Atlantic Ocean shoreline to the east, and the Cabot Trail to the west. Proposed development in this area includes the proposed parking areas, site access from Cabot Trail and ancillary buildings/structures.

It is understood that a small fishing village was once present in this area of the site. However, only archeological remnants of this former development remain, and the site is primarily forested. This area has some existing Parks Canada infrastructure, including paved access off of the Cabot Trail, paved visitor parking area, hiking trails and a bench monument. Other than these features, the proposed Phase 1 Development area is undeveloped and forested.

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The topography of this area slopes downward from a topographically high of about 10 m to 12 m at the Cabot Trail (west side) of the site, towards Atlantic Ocean shoreline to the east. With the exception of the existing access and parking area, this part of the site is primarily undeveloped and tree covered. Occasional rock outcropping and boulders are visible at surface in this area.

3.1.3.2 Outcrop

This area includes the knoll shaped rock outcrop feature that will be the site of the larger structures, including the showpiece monument and observation points. The only existing infrastructure currently in this area is a wooden boardwalk that extends from the existing visitor parking area to the top of the western side of the outcrop.

The topographically high for this knoll shaped outcrop is at an elevation of about 11 m to 12 m. The terrain consists of exposed bald rock at surface, with the exception of the western end which has some areas with minor soil cover with some grass/shrub vegetation growth at surface.

3.1.3.3 Shoreline

The two areas above are separated by a narrow strip of rugged shoreline, and will be connected as part of planned development via the pedestrian bridge.

The shoreline terrain in the Phase 1 Development Area appears more rugged than shoreline areas further north and south, and predominately consist of boulder sizes at surface. It is understood through discussions with Parks Canada personnel that these boulder sizes were placed in this area as part of the previous Cabot Trail construction and are not a result of natural deposition.

3.1.4 Hydrology

There are no known existing wetlands, surface waters, rivers or streams within the PDA. The nearest freshwater resource to the PDA is an unnamed watercourse located approximately 40 m to the north of the PDA. The watercourse was dry at the time of the September 30 survey, and is not likely fish habitat.

3.1.5 Vegetation

Vegetation on site is relatively sparse. Located inland from Green Cove, the forests include a variety of species common to the Acadian forest type. Examples include red spruce (*Picea rubens*), black spruce (*Picea mariana*), white spruce (*Picea glauca*), balsam fir (*Abies balsamea*), jack pine (*Pinus banksiana*), tamarack (*Larix laricina*), and eastern hemlock (*Tsuga canadensis*). Deciduous trees include yellow birch (*Betula alleghaniensis*), white birch (*Betula papyrifera*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), striped maple (*Acer pensylvanicum*), balsam poplar (*Populus balsamifera*), pin cherry (*Prunus pensylvanica*),

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speckled alder (*Alnus incana*), beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), and red oak (*Quercus rubra*). The most common plant species is bracken fern (*Pteridium aquilinum*).

Green Cove is situated at the outer periphery of an Environmentally Sensitive Site designated by Parks Canada for a jack pine (*Pinus banksiana*) stand. The stand is located slightly west of Green Cove and outside the LAA. No jack pine were found within the biophysical LAA.

A description of rare plants within the biophysical LAA is provided in Section 3.1.8.1.

3.1.6 Wildlife

A search of the CBHNPC database for mammal sightings within a 1 km radius of Green Cove generated the following results: 169 moose (*Alces alces*) (1970 - 1986) 19 coyotes (*Canis latrans*) (1986 - 2007) 28 black bear (*Ursus americanus*) (1969 - 2008) 7 Canada lynx (*Lynx canadensis*) (1959 - 2005) and 1 American marten (*Martes americana*) (2008) (Parks Canada, pers. comm. 2014). Other common species that are not recorded in the database but are known to occur in and around Green Cove include white-tail deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), snowshoe hares (*Lepus americanus*), red squirrels (*Tamiasciurus hudsonicus*) and various species of mice and other ground-surface dwellers.

The following four species of mammals were recorded during the field survey: gray seal (*Halichoerus grypus*), red squirrel, moose, and meadow vole (*Microtus pennsylvanicus*).

According to the CBHNPC database, there were 81 recorded sightings of bald eagles (*Haliaeetus leucocephalus*) within a 1 km radius of Green Cove between 1950 and 2003. No other bird species were documented for the area. Other common species that are not recorded in the database but are known to occur in and around Green Cove include black-capped chickadees (*Poecile atricapillus*), crows (*Corvus brachyrhynchos*), ravens (*Corvus corax*), dark-eyed juncos (*Junco hyemalis*), warblers and numerous other migratory species. Marine bird species known to occur near the site include gulls, thick-billed murre (*Uria lomvia*), barrow's golden-eye (*Bucephala islandica*), merganser, cormorants, and black guillemots (*Cepphus grille*) (Parks Canada, pers. comm. 2014).

Wildlife species of conservation concern are discussed in Section 3.1.8.2.

3.1.7 Marine Environment

The PDA is located on the northeastern coast of Cape Breton Island, which straddles the Cabot Strait portion of the southern Gulf of St. Lawrence and the Scotian Shelf region of the Atlantic Ocean.

The Cabot Strait supports a wide diversity of organisms including phytoplankton, invertebrates, fish, birds and marine mammals. A large number of marine species found in the Cabot Strait are either at the northern or southern edge of their range, including a diverse assortment of

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groundfish (e.g., cod and haddock) sharks and rays pelagic fish (e.g., herring and mackerel) as well as other species (e.g., Atlantic salmon). This is a function of highly variable environmental conditions that include cold water combined with ice coverage in winter, and warmer water in summer (DFO 2005). The Cabot Strait is also an important migratory route and a major summer feeding area for marine mammals, particularly cetaceans, moving in and out of the Gulf of St. Lawrence (DFO 2005, Hammill *et al.* 2001). Numerous species of marine mammals are found just off the coast, and are popular among tourists, including harbour seal, gray seal, hooded seal, harp seal, pilot whale, minke whale, and northern bottlenose whale. Occasional sightings of humpback and blue whale have been documented.

The diversity and abundance of intertidal species is low along the coast of the CBHNPC due to ice scouring, storm waves, cold water temperatures and little difference in water level between low and high tides (Parks Canada 2009).

3.1.8 Species of Conservation Concern.

The term "Species of Conservation Concern" (SOCC) is used herein to refer to all species that meet one or more of the following criteria:

- species listed by the Nova Scotia Department of Natural Resources (NSDNR) as "At Risk", "May Be At Risk", "Sensitive" to human activities or natural events (NSDNRa 2014);
- species ranked as "S1" (Extremely Rare), "S2" (rare), or "S3" (Uncommon) by the Atlantic Canada Conservation Data Centre (ACCDC) (2014);
- federally protected species listed as "Endangered", "Threatened", or of "Special Concern" on Schedule 1 of the *Species at Risk Act* (SARA);
- species assessed as "Endangered", "Threatened", or of "Special Concern" by the federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (2014); and
- species listed as "Endangered", "Threatened", or "Vulnerable" under the *Species at Risk Regulations* pursuant to the *Nova Scotia Endangered Species Act* (NS ESA).

A modelling exercise was performed to determine the likelihood of the presence of plant and wildlife SOCC within the terrestrial portion of the LAA. A list of all plant and wildlife SOCC that have been recorded within a radius of 5 km from the LAA was compiled by means of an ACCDC data search. The habitat requirements of these species were then compared to the range of environmental conditions within the terrestrial portion of the LAA, as indicated by the vegetation types present there, to determine if suitable habitat is available for these taxa.

In addition, historical databases maintained by the CBHNPC and field surveys conducted in support of this DIA were used to identify the potential presence of species of conservation concern as described below.

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3.1.8.1 Vegetation

Three plant SOCC were recorded during the September 2104 field survey: bastard's toadflax (*Comandra umbellata*), soapberry (*Shepherdia canadensis*), and running serviceberry (*Amelanchier stolonifera*).

Bastard's toadflax is listed as May be at Risk by NSDNR and as rare (S2) by ACCDC. Four shoots of bastard's toadflax were found a few metres north of the access trail on Green Cove Head, within the PDA (Figure 2.1). This species was associated with the black crowberry barrens vegetation type.

Soapberry is listed as Sensitive by NSDNR and as rare (S2) by ACCDC. It was found approximately 10 m northeast of the bastard's toadflax patch (Figure 2.1), within the PDA. The soapberry patch was approximately 1 m by 2 m in size and was also associated with the black crowberry barrens vegetation type.

Running serviceberry was identified at one location within the PDA during the survey (Figure 2.1), but could potentially also be present at other locations in the LAA. Due to timing of the field survey (September) it was difficult to assess the complete distribution of this species. This species is considered possibly uncommon (S3?) by ACCDC and is listed as Secure in Nova Scotia.

Although not a SOCC, jack pine considered a species of conservation interest locally as it is the most northerly known jack pine stand in Nova Scotia. Three mature jack pines were found at Green Cove, outside of the LAA, approximately 115 m, 123 m, and 192 m north of the PDA, respectively.

3.1.8.2 Mammals

The ACCDC data search revealed records of three mammal SOCC within 5 km of the LAA, including American marten (*Martes americana*), Canada lynx (*Lynx canadensis*) and eastern cougar (*Puma concolor*). All of these species are typically associated with large expanses of forest habitat. The LAA is located adjacent to a large expanse of relatively undisturbed forest that would provide suitable habitat for them. However, the LAA consists of a narrow band of upland habitat generally less than 150 m wide that is isolated from the much larger forest patch by a fairly busy highway. It is likely that the road and existing human presence in the LAA is sufficient to prevent these three mammal species from regularly using this area. Individuals of these species may occasionally visit the LAA, but it is unlikely to provide important habitat features for them such as denning sites or hunting areas.

3.1.8.3 Birds

Bird habitat modelling indicated that suitable habitat is present in the LAA for several bird SOCC that have been recorded within 5 km of the LAA (refer to Table 3.3).

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Table 3.3 Bird Species of Conservation Concern Recorded within 5 km of the Biophysical LAA Boundaries

Common Name	Scientific Name	Potentially Nesting in LAA*
Black guillemot	<i>Cepphus grylle</i>	No
Least sandpiper	<i>Calidris minutilla</i>	No
Semipalmated sandpiper	<i>Calidris pusilla</i>	No
Purple sandpiper	<i>Calidris maritima</i>	No
Spotted sandpiper	<i>Actitis macularia</i>	Yes
Semipalmated plover	<i>Charadrius semipalmatus</i>	No
Black-backed woodpecker	<i>Picoides arcticus</i>	Yes
Boreal chickadee	<i>Poecile hudsonica</i>	Yes
Gray jay	<i>Perisoreus canadensis</i>	Yes
Bay-breasted warbler	<i>Dendroica castanea</i>	Yes
Fox sparrow	<i>Passerella iliaca</i>	Yes
Pine grosbeak	<i>Pinicola enucleator</i>	Yes
Pine siskin	<i>Carduelis pinus</i>	Yes
*Based on habitat suitability within the RAA		

None of the species listed in Table 3.3 are listed by the federal *SARA* or provincial *Endangered Species Act*, however, they are considered SOCC because the Nova Scotia populations are listed as sensitive by the Nova Scotia Department of Natural Resources and/or ranked as uncommon (S3) by the AC CDC.

Three of the shorebird species (*i.e.*, least sandpiper, semipalmated sandpiper and semipalmated plover) could potentially be present in the LAA during migration. The LAA provides only marginally suitable foraging habitat for these species. Purple sandpipers could also potentially spend the late fall, winter and early spring months along the rocky shoreline of the LAA, and black guillemots could be present for much of the year in the coastal waters of the LAA.

For the coastal marine environment, the Roseate Tern and the Harlequin Duck are two provincially listed Endangered species. However, they are not known to reside in or frequent Green Cove and were not observed in the LAA during the survey.

3.2 CULTURAL RESOURCES

Prior to establishment of CBHNPC, Green Cove was the location of a small fishing community that included a small schoolhouse, residential houses and rudimentary docking facilities. Although there are no visible signs of these structures today, several community members from Ingonish and Neil's Harbour have traced their ancestry to this location. Based on initial cultural resource scans, it is unlikely that human remains, funerary objects, sacred objects, or objects of

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cultural patrimony would be discovered during construction of the NFNMC (Parks Canada, pers. comm. 2014).

Previous use of the area by Mi'kmaq of Nova Scotia is currently unknown. Parks Canada has commissioned a Mi'kmaq Ecological Knowledge Study (MEKS) to characterize historical and current use by the Mi'kmaq of Nova Scotia, as it would relate to the Project.

An archaeological field reconnaissance was undertaken in May, 2014 by Parks Canada. The results of the field reconnaissance indicate that, in general, there is low archaeological potential at the site. The area of the point was observed to be primarily exposed granite bedrock. The point is poorly pedogenic (the process whereby soil forms from unconsolidated rocks) with little soil cover except the landward side. This is an area of low potential for archaeological resources. The area of the current parking lot was previously disturbed and, as a result, it is unlikely that there would be archaeological resources disturbed during construction (Parks Canada, pers. comm. 2014).

3.3 CURRENT USE OF LAND AND RESOURCES FOR TRADITIONAL PURPOSES BY ABORIGINAL PERSONS

The Mi'kmaq of Nova Scotia have claimed un-extinguished Aboriginal Title and Treaty Rights throughout Nova Scotia, including federal land within CBHNPC. Parks Canada has commissioned an MEKS to provide information on historical and current use of the area by the Mi'kmaq of Nova Scotia. This study is expected to be available mid-2015. The MEKS will help inform consultation with the Mi'kmaq regarding this Project and provide additional context for potential environmental effects assessed in the DIA. Once the MEKS is available, the DIA will be updated as applicable to incorporate relevant information which can inform the assessment of Project effects on current use of lands and resources for traditional purposes. Parks Canada will reserve a decision on the DIA until this information has been considered.

3.4 VISITOR EXPERIENCE

CBHNPC attracts the second highest number of visitors of all Parks Canada sites in Atlantic Canada, recording an average of 183,000 visitors over the last five years (AL Arbic Consulting 2014). In 2009, the Green Cove site reported over 34,000 visitors from June to October.

The Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) conducts periodic traffic counts along the Cabot Trail. The closest traffic count to Green Cove is conducted 0.3 km south of New Haven Road, just South of Neil's Harbour, within CBHNPC. According to the latest available data, over 300,000 vehicles drive along the section of the Cabot Trail past Green Cove annually (AL Arbic Consulting 2014).

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Green Cove is currently accessible by a small access road and parking lot, the size of which is proportional to current demand. There are currently no visitor amenities such as washrooms or picnic tables at the site other than a garbage receptacle.

A meter wide boardwalk trail currently exists leading from a small 20 maximum stall parking lot to the start of the bedrock promontory through a rock-strewn area subject to high water events. The boardwalk is not disabled accessible and discharges visitors onto the bedrock outcropping with no formal trail or safety measures. The setting is such that under certain conditions (e.g., low tide, storm surges, rainfall events, winter ice cover) surrounding granite surfaces create precarious conditions and risk for those venturing further out to the point. In the past, there have been accidents resulting in fatalities at this location due to rogue waves. Signage on site currently warns of such events.

Throughout the summer months and beyond, the waters surrounding the PDA are frequented by yachts, sailboats, cruise ships, and Marine Atlantic ferries, all of which can be observed at varying distances from shore.

3.5 SOCIO-ECONOMIC ENVIRONMENT

3.5.1 Local Community Characteristics

The PDA is located in Green Cove, in the Municipality of Victoria County. Neighbouring communities are the fishing village of Neil's Harbour and the town of Ingonish (Figure 1.1). They are included under the federal census classification of Victoria Subdivision A, which occupies a total area of 1,633.41 km² in northeastern Cape Breton.

According to 2011 census data, Victoria Subdivision A (Subdivision A) has a population of 2,769, which amounts to a density of 1.7 residents per square kilometre. This is slightly less than the population density for Victoria County as a whole (2.5 residents per square kilometre), and is much lower than the provincial density average of 17.4 for Nova Scotia (Statistics Canada 2011).

Table 3.4 provides a summary of select socio-economic characteristics based on the most recent available federal census data.

Table 3.4 Summary of Selected Demographic, Income and Labour Characteristics

Characteristic	Victoria Subdivision A, SC* Inclusive of the PDA	Victoria County, Inclusive of Subdivisions A and B, SC*	Nova Scotia, Inclusive of Victoria County
Population in 2011	2,769	7,115	921,727
Population in 2006	3,046	7,594	913,462
Population Change from 2006 to 2011	-9.1%	-6.3%	0.9%
Median age of the population (years)	46.9	47.9	43.7
Median household income in 2005	\$48,433	\$53,112	\$46,605
Labour force participation rate in 2006	65%	61.4%	62.9%

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Table 3.4 Summary of Selected Demographic, Income and Labour Characteristics

Characteristic	Victoria Subdivision A, SC* Inclusive of the PDA	Victoria County, Inclusive of Subdivisions A and B, SC*	Nova Scotia, Inclusive of Victoria County
Employment rate	42.4%	45.3%	57.2%
Unemployment rate	34.8%	26.3%	9.1%
Note: * SC = "subdivision of county municipality" in Nova Scotia, which are geographic areas created as equivalents for municipalities by Statistics Canada, in cooperation with those provinces, for the purpose of disseminating statistical data.			

Sources: Statistics Canada 2006 and 2011

Table 3.5 summarizes labour force by industry in Subdivision A and the surrounding region.

Table 3.5 Summary of Labour Force by Industry, 2006

Occupation	Victoria Subdivision A, Inclusive of the PDA	Victoria County, Inclusive of Subdivisions A and B	Nova Scotia, Inclusive of Victoria County
Total experienced labour force 15 years and over	1,615	3,810	468,590
Management occupations	105 (6.5%)	295 (7.7%)	41,700 (8.9%)
Business, finance and administration occupations	175 (10.8%)	425 (11.2%)	79,440 (16.9%)
Natural and applied sciences and related occupations	10 (0.6%)	135 (3.5%)	25,025 (5.3%)
Health occupations	50 (3.1%)	235 (6.2%)	31,120 (6.6%)
Occupations in social science, education, government service and religion	85 (5.3%)	220 (5.8%)	39,350 (8.4%)
Occupations in art, culture, recreation and sport	35 (2.2%)	115 (3.0%)	12,740 (2.7%)
Sales and service occupations	385 (23.8%)	990 (26.0%)	122,870 (26.2%)
Trades, transport and equipment operators and related occupations	140 (8.7%)	515 (13.5%)	69,965 (14.9%)
Occupations unique to primary industry	530 (32.8%)	755 (19.8%)	24,490 (5.2%)
Occupations unique to processing, manufacturing and utilities	95 (5.9%)	145 (3.8%)	21,890 (4.7%)

Sources: Statistics Canada 2006

Primary sources of economic revenue for Victoria County include tourism, fishing and timber industries. The fishing industry in particular is noted to contribute considerably to primary sector employment in the region, with the majority of the fishing industry occurring in the northern part of the County (Stantec 2009).

Common themes identified through various community-based planning initiatives for Victoria County include the need to create employment opportunities (particularly year-round

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opportunities), making better use of community assets, reversing the decreasing population trend through retention and growth, better developing the tourism sector, and supporting environmental stewardship (CCE 2009, Stantec 2009).

3.5.2 Fisheries

The LAAs are located within Northwest Atlantic Fisheries Organization (NAFO) Division 4Vn (Division 4Vn), which extends from the western boundary of Victoria County to the northern boundary of Richmond County (DFO 2013b). The most important nearshore commercial fisheries in Division 4Vn are lobster, snow crab, rock crab, sea urchin and scallop. The largest number of licences held in Division 4Vn in 2009 and 2010 were for lobster and snow crab. Although shrimp also support a substantial fishery in Division 4Vn, they are harvested primarily in offshore waters outside of the LAA (Stantec 2013).

The coastal waters of Green Cove are well known and fished by commercial lobster and crab fishers in the local area. The nearshore lobster and crab fisheries in the LAA are included within the following administrative boundaries:

- **Lobster Fishing Area (LFA) 27**, which extends from Gabarus to Bay St. Lawrence (DFO 2014b) and applies to lobster and rock crab fisheries (DFO 2014c); and
- **Crab Fishing Area (CFA) 21**, which extends from Cape Smokey to Cape Egmont (Shotton 2001) and applies to the snow crab fishery.

The fishing seasons in LFA 27 are May 15 to July 15 for lobster and August 15 to December 31 for rock crab.

The portions of LFA 27 and CFA 21 within the LAA are encompassed by DFO Maritimes Statistical District 1 (District 1). Snow crab and lobster are the two most economically important species fished in District 1. In 2012, snow crab landings accounted for 59% of the live weight and 54% of the landed value of all commercial fisheries in District 1, while lobster landings accounted for 17% of the live weight and 33% of the landed value (DFO 2013a). Lobster stocks in LFA 27 are historically among the most productive in coastal Nova Scotia waters (Schaefer *et al.* 2004). Key commercial finfish species fished in District 1 include grey sole, halibut, and cod (DFO 2013a).

Fishers licensed to fish in certain fishing areas are not restricted to stay within a particular zone. Therefore, certain users may fish around Green Cove as one of several fishing grounds that they frequent.

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Consultation and Engagement

4.0 CONSULTATION AND ENGAGEMENT

This section provides a summary of the consultation and engagement undertaken including a summary of the issues raised. The purpose of stakeholder and Aboriginal engagement is to inform on proposed activities and to identify any issues of concern during the planning and design of the Project and continuing into construction. The consultation and engagement program conducted as part of the DIA process to date has been an important vehicle for the identification, scoping, and resolution or mitigation of potential issues or concerns, and for the exchange of information in respect of the Project.

The engagement process included members of the following groups:

- First Nations, Mi'kmaq;
- the general public and interested stakeholders; and
- government (municipal, provincial, and federal) and regulatory agencies.

4.1 OVERALL OBJECTIVES

The objectives of the public and Aboriginal stakeholder consultation program for this Project are to:

- provide the public, stakeholders, Aboriginal communities, and other interested parties with timely and accurate information to facilitate a clear understanding of the Project;
- gather and document comments, feedback and concerns regarding the Project from interested parties; and
- inform the public, stakeholders, Aboriginal communities, and other interested parties on how public input has informed and/or will inform planning, design and mitigation decisions.

Issues, questions, concerns or comments that were raised through consultation and engagement initiatives were documented so that they could be considered, as appropriate, in the scoping or conduct of the environmental assessment.

4.2 MEETINGS AND COMMUNICATION EVENTS WITH PUBLIC AND STAKEHOLDERS

Project information sharing and consultation has been ongoing since March 2014. Consultation to date has included delivery of a Project vision book, public meetings, website, and telephone conversations. Public meetings were held on March 1 and October 7, 2014 near the Project location.

The March 1, 2014 meeting was hosted by the local Member of Parliament (MP) in response to community concern over the Project.

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The community was notified of the October 7, 2014 meeting through social media and direct communication (e.g., phone calls, emails). Public and stakeholder feedback was received through verbal conversation during public meetings, website, and telephone conversations.

Stakeholders and community members who attended public meetings for the Project include:

- various government officials;
- municipalities;
- local veterans office;
- local fishers; and
- local residents.

4.3 SUMMARY OF KEY ISSUES

Through the engagement and consultation process, both positive comments and potential issues of concern have been recorded. Table 4.1 provides a summary of the key issues raised by stakeholders, and how the issues have been taken into consideration during the DIA. A more detailed list of comments received through discussion with community members and stakeholders, at public meetings, and via the Foundation website is provided in Appendix D.

Table 4.1 Summary of Key Issues Raised by Public Stakeholders

Key Issue Raised	Response and/or Action Taken
Project Design and Concept: Several comments were noted with regard to Project design and/or concept such as including soldiers who fought in recent wars providing names of the fallen soldiers requests for a design competition offers of sculpture services concern the proposed restaurant and gift shop (future phases) on site may put small business owners out of business and interest in having year-around accessibility.	Final Project design is ongoing, and will take these issues in to consideration. To date, plans for on-site food services have not been pursued further as a result of public input. Other design-related issues will be taken into account, along with engineering, constructability, environmental, and feasibility considerations.
Funding: Project funding was raised by the public looking to understand the cost and who will be paying for it.	The Foundation intends that all planning, design and construction costs are to be funded by private individuals or corporate entities, although in-kind support and possible government funding for aspects of the Project also remains a possibility. An operations fund will also be created by the Foundation for the ongoing operation and maintenance costs associated with the Project.
Alternative Locations: Concern was raised that Green Cove was not the ideal location for the proposed Project. Comments noted that the location of CBHNPC is a beautiful, natural site which should not be developed.	Project siting has occurred in close consultation with Parks Canada using specific criteria: • It was important to select a site on the eastern coast of Canada, with a geographic bearing that would allow the Mother Canada statue to be situated in a

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Consultation and Engagement

Table 4.1 Summary of Key Issues Raised by Public Stakeholders

Key Issue Raised	Response and/or Action Taken
	representative alignment to France, in order to underscore its relationship to the Vimy Ridge Memorial, and the Canada Bereft statue. • Site selection focused on areas that would be under the protection of government agencies in order to provide protection to the integrity of the infrastructure and message. • The site's natural characteristics were an important consideration, to underscore the solemnity of the memorial, and to enhance the aesthetic experience of visitors. • Various constructability, feasibility and environmental considerations were considered such as the size of the site the ability of the geography to support the infrastructure and the environmental impact. Based on a review of candidate sites against the above criteria, Green Cove was selected as the preferred alternative (refer to Section 2.1.4 for more information).
Geological Importance: Feedback was received on the site's special-geology with concern that access would be reduced, and that the formation would be covered up.	Given the concerns raised during consultation on the importance of the site's geological significance, the effects of the Project on unique geological features were included as part of the Natural Resources VC (Section 6.1).
Site Safety: Concern was also raised with regards to safety at the Green Cove location as waves during weather events is a potential concern.	Safety is being considered during design and planning for the site and is addressed in Section 2 of the DIA.
Environmental Concerns: Environmental concerns raised included conducting an archeological assessment of the area, understanding potential effects to the fishery.	Due to the unique nature of the site, and public interest, Parks Canada determined that the Project be assessed at the DIA level rather than as a less detailed Basic Impact Analysis. The selection of Valued Components (refer to Section 5.4.3) which form the basis of this DIA, reflects input received from the public. In particular, cultural resources (which includes consideration of archaeological resources) are discussed Sections 3.2 and 6.2 and fisheries are considered in Sections 3.5.2 and 6.4.
Consultation Opportunities: Community members noted the importance of understanding the consultation opportunities how broad the consultation will be, how the comments will be used and who will be consulted.	A summary of the consultation and engagement process is presented in Section 4. Additional opportunities for public input are described in Section 4.4 below.

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Consultation and Engagement

4.4 ADDITIONAL CONSULTATION OPPORTUNITIES

In addition to the two public meetings held to date, and ongoing opportunities to provide comment through the Project website, Parks Canada will post the draft DIA for a minimum of two weeks to seek public review and comment.

Public comments received will be reviewed, and adjustments to the draft DIA report will be made, if necessary. The final DIA report submitted from the Proponent will describe how public concerns and Parks Canada direction were addressed.

4.5 ABORIGINAL ENGAGEMENT

The Foundation is working with Parks Canada in consulting Aboriginal groups and communities about the Project. Consultation activities will be ongoing through the life of the Project.

In addition to pursuing policy objectives and promoting good governance, the federal government has a legal duty to consult with Aboriginal peoples relation to potential or established Aboriginal or Treaty rights of the Aboriginal peoples of Canada. The Mi'kmaq of Nova Scotia have claimed extinguished Aboriginal Title and Treaty Rights throughout Nova Scotia including federal land within the CBNHP.

Parks Canada has been consulting with the Assembly of Nova Scotia Mi'kmaq Chiefs, as represented by the Kwilmu'kw Maw-klusuaqn (KMK) Mi'kmaq Rights Initiative, since 2013. On August 27, 2014, a meeting was held in Ingonish with the Foundation, Parks Canada and the KMK representative. Feedback received through correspondence included the following:

- the memorial should acknowledge the contributions made by the Mi'kmaq of Nova Scotia to Canada's war efforts;
- there should be communications with Mi'kma'ki via community awareness workshops;
- a Mi'kmaq Ecological Knowledge Study (MEKS) should be completed;
- an archaeologist should be present during any digging; and
- an inventory of species at the site, including any Species of Conservation Concern should be developed and shared.

The foundation is working with Parks Canada and the KMK to implement these suggestions. As noted in Section 3.3, an MEKS is being undertaken for the Project. The results of the MEKS will inform consultation and may identify additional mitigation that should be implemented to address First Nations concerns, including potential effects on the current use of land for traditional purposes.

Aboriginal consultations led by Parks Canada will continue to be carried out in good faith in order to reach accommodation for the Mi'kmaq of Nova Scotia.

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Impact Assessment Methods and Scoping

5.0 IMPACT ASSESSMENT METHODS AND SCOPING

The following sections describe the regulatory framework for the impact assessment, including Parks Canada's DIA process the assessment methods used and the scope of the assessment.

5.1 REGULATORY FRAMEWORK

Section 67 of CEAA 2012 states that Parks Canada, as a federal authority, must not carry out a project on federal lands, or exercise any power or perform any duty that could permit a project to be carried out, in whole or in part, on federal lands, unless it determines that the carrying out of the project is not likely to cause significant adverse environmental effects.

This DIA has been prepared in order to evaluate the potential environmental effects (as defined in section 5 of CEAA 2012) and make a determination on the significance of any potential effects in accordance with CEAA 2012.

This DIA has been prepared with the intention that Parks Canada can rely substantially upon the information herein to make a determination under Section 67 that fulfills their legislated obligations under CEAA 2012.

5.2 DIA PROCESS OVERVIEW

Parks Canada's Interim Directive on Implementation of CEAA stipulates that the DIA process be applied to any proposed project that has potential to cause significant adverse effects and/or public concern with respect to ecological integrity, the integrity of cultural resources, or characteristics of the environment that are important to key visitor experience objectives.

The DIA process for evaluating a proposed project involves completion of the following six key steps (Parks Canada n.d.):

1. **Conceptual Proposal:** The proponent submits information on the need for and purpose of the project and a conceptual description of the project.
2. **Scoping:** Parks Canada develops a project-specific Terms of Reference (ToR) outlining expectations for the conduct of the DIA (Appendix A).
3. **Impact Analysis:** The proponent prepares a draft DIA report in accordance with the ToR.
4. **Draft Review and Completion:** Parks Canada conducts an internal review of the draft DIA, including participation by other jurisdictions, to confirm that the proponent has met the requirements of the ToR, that the assessment is robust in its analysis and proposes adequate mitigation, and that public and stakeholder feedback is taken into account.

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5. **Project Decision:** Parks Canada prepares an impact analysis determination based on potential for achieving desired environmental conditions or outcomes identified in the DIA. The project may be approved with conditions or rejected with explanation.
6. **Implementation of Monitoring and Follow-up:** Once the project is underway or has been completed, Parks Canada undertakes compliance monitoring to confirm that mitigation, and any required follow-up and monitoring are implemented as intended.

5.3 ENVIRONMENTAL IMPACT ASSESSMENT METHODS

Project-related environmental effects are assessed in the context of Valued Components (VCs). VCs are broad components of the biophysical and socio-economic environment that, if altered by the Project, could be of concern to regulatory authorities, the Mi'kmaq of Nova Scotia, interested stakeholders, and/or the general public.

In Section 6, environmental effects are assessed individually for each VC using the following methods as described below.

- Potential interactions with Project activities and components are identified for each VC. The potential environmental effects that may result from the interactions between the Project and the VC are then identified.
- The mitigation measures proposed to reduce or eliminate potential environmental effects are described.
- Residual environmental effects (*i.e.*, those environmental effects that remain after the planned mitigation measures have been applied) are characterized for each individual VC using specific analysis criteria (*i.e.*, magnitude, geographic extent, duration, frequency, reversibility, and ecological and socio-economic context).
- Monitoring and follow-up measures that are required to verify the environmental effects predictions or to assess the effectiveness of the planned mitigation are described, where applicable. Other monitoring (*e.g.*, compliance monitoring) may also be described, as applicable.

Parks Canada will use the information in this DIA to determine the significance of residual environmental effects on each VC, which will be taken into account during the Project Decision step of the DIA process.

5.4 SCOPE OF THE ASSESSMENT

The scope of the DIA is determined by:

- the Terms of Reference for the DIA, as prepared by Parks Canada (Appendix A);

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- the nature and extent of Project activities and components (Section 2);
- an understanding of the existing environment (Section 3);
- Aboriginal, public, and stakeholder input (Section 4);
- the experience and judgment of the Study Team; and
- consideration of the known environmental assessment requirements of other similar projects.

5.4.1 Scope of the Factors to be Considered

As per the ToR, the scope of the analysis in this DIA includes consideration of the following factors for each phase of the Project (*i.e.*, construction, operation and maintenance):

- evaluation of potential environmental effects of the Project including effects of malfunctions or accidents that may occur in relation to the Project;
- assessment of the potential effects of the environment on the Project;
- evaluation of any cumulative environmental effects likely resulting from the Project itself in combination with long term environmental change, other projects, and/or ongoing operations or activities that have been or will be carried out on or off the area;
- identification of planned opportunities for public engagement and Aboriginal consultation over the course of Project planning and analysis; and
- identification of the need for and requirements of any follow-up monitoring program.

5.4.2 Scope of the Project

Table 5.1 describes key Project phases, activities, and physical works to be assessed for environmental effects this list is applied as a standard list for the evaluation of each VC. An overview of the construction process is provided in Section 2.3.1.

Table 5.1 Project Activities and Components to be Assessed

Phase/Activity or Component	Description
Construction	
Stage 1	
Site Preparation (additional information provided in Section 2.3.1.1)	Includes site closure in consultation with PCA, and installation of signage. Includes the installation of erosion and sediment controls; identification of laydown areas; installation of temporary facilities; vegetation clearing; and grading/grubbing.
Installation/Construction of Physical Structures (additional information provided in Section 2.3.1.2)	Includes construction of portion of Mobility Impaired Parking Lot, construction of Bridge, Observation Deck, and Commemorative Ring. Includes installation of Mother Canada Statue, completion of Mobility Impaired Parking Lot, conversion of bridge for pedestrian use, installation of washrooms and amenities.

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Table 5.1 Project Activities and Components to be Assessed

Phase/Activity or Component	Description
Emissions and Waste	Project-related air and noise emissions and waste produced as a result of the Project.
Operation	
Operation (additional information provided in Section 2.3.2)	Includes presence of structures and visitors.
Maintenance (additional information provided in Section 2.3.2)	Includes waste management, facilities and structure maintenance and repair.

As the Project is planned in perpetuity with no stipulated end-date and a planned service life of 75 years, the regulatory framework, requirements, and potential environmental effects cannot be reasonably foreseen at this time.

Future decommissioning and abandonment of the site will be undertaken in adherence to the regulations and requirements required at the time. In general, decommissioning of structures will include the removal of structures, and rehabilitation of the site. Project materials (e.g., paving, boardwalks, signage) would be removed and disposed of at an appropriate facility. A Landscape Plan will be developed that specifies native CBHNPC seed and plant species and method of planting to restore vegetative cover of disturbed areas.

Decommissioning and abandonment will not be considered further in this DIA.

5.4.3 Selection of Valued Components (VCs)

Table 5.2 presents the VCs assessed in the DIA and includes the rationale for excluding certain aspects of the VCs identified by the ToR.

Table 5.2 Selection of VCs

Valued Component (per Section 4.3 of the ToR)	Consideration for Impact Assessment	Valued Component for Impact Assessment
Natural Resources	Natural Resources includes consideration of wildlife, mammals, birds, vegetation, topography, hydrology, freshwater and marine aquatic species, climatic effects, air quality, geology and soils, sensitive or unique ecological or biological features, and SOCC. Based on an understanding of existing conditions in the PDA and LAA, and proposed Project activities, potential Project interactions with the atmospheric environment, topography, hydrology, and freshwater species will be negligible. Standard mitigation practices will reduce the likelihood of residual environmental	The Natural Resources VC will consider the following potential environmental effects: • change in wildlife SOCC; • change in rare plants; and • change in unique geological features Marine fish are addressed under the Marine Fish and Fisheries VC.

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Table 5.2 Selection of VCs

Valued Component (per Section 4.3 of the ToR)	Consideration for Impact Assessment	Valued Component for Impact Assessment
	effects. Therefore, these aspects of the Natural Resource VC are not carried forward in the assessment. Potential project interactions with wildlife SOCC, rare plants and unique geological will be considered further. Potential interactions with marine species is addressed in the context of fisheries below.	
Cultural	The Cultural Resources VC considers issues related to archaeological, historic, architectural, or paleontological resources and is selected as a VC in recognition Parks Canada's Cultural Resource Management (CRM) Policy (2013) and the Guidelines for the Management of Archaeological Resources (2005)	The Cultural Resources VC will consider the following potential environmental effect: • change to cultural resources.
Visitor Experience	Visitor Experience refers to aesthetics, soundscape, lightscape, visitor safety, and recreational marine use, As described in Section 2, there are no planned work activities in the marine environment therefore there are not anticipated to be substantial Project-interactions with recreational marine use. Therefore, this aspect of the Visitor Experience VC is not carried forward in the assessment.	The Visitor Experience VC will consider the following potential environmental effects: • change in aesthetics; and • change in visitor access and experience.
Health and Socio-economic Conditions	As per the ToR, the consideration of potential effects on health and socio-economic conditions focuses on potential effects on local fisheries.	The Marine Fish and Fisheries VC will consider the following potential environmental effects: • change to commercial, recreational and Aboriginal fisheries.
Operational Sustainability	Operational sustainability as it relates to the environmental assessment is considered in Project planning. Section 2 details a number of environmental management planning tools that will be developed, including an EPP, which will include the operation and maintenance phase.	Not selected as a VC.
Aboriginal Use and Interest	The assessment of potential effects on Aboriginal use and interest will be informed by the MEKS that has been commissioned by Parks Canada, as well as through engagement and consultation with the Mi'kmaq of Nova Scotia. At this time, a	Not selected as a VC (to be revisited pending MEKS findings). Aboriginal fishing is considered in the context of Marine Fish and Fisheries.

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Table 5.2 Selection of VCs

Valued Component (per Section 4.3 of the ToR)	Consideration for Impact Assessment	Valued Component for Impact Assessment
	stand-alone VC is not included in this DIA. Aboriginal issues and concerns raised to date have been included where relevant throughout the DIA. Once the MEKS is completed and potential effects on current use of lands for traditional purposes is better understood, the DIA will be revisited to determine if a separate VC is required.	

The impact analysis is focused on the potential interactions and effects of Project on the following four VCs:

- Natural Resources;
- Heritage Resources;
- Visitor Experience; and
- Marine Fish and Fisheries.

In addition to the VCs listed above, potential effects of the environment on the Project are assessed in Section 7.

5.4.4 Cumulative Environmental Effects

The assessment of cumulative environmental effects considers whether there is potential for the residual environmental effects of the Project to interact cumulatively with the residual environmental effects of other past, present, and future (i.e., certain or reasonably foreseeable) physical activities in the vicinity of the Project.

Due to its location in a National Park, and also its distance from industrial activity, there are very few other projects and activities that might reasonably be expected to have residual environmental effects that would overlap temporally or spatially with those of the Project.

Other known projects and physical activities with the potential for cumulative environmental effects include the following:

- past, present and future recreation (e.g., hiking, skiing, beach use);
- existing linear infrastructure (e.g., transmission line, roads);
- past, present and future park maintenance activities; and
- proposed future bridge replacement projects in CBHNP.

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The uncertainty surrounding potential future phases of the NFNMC prevents their inclusion in the cumulative effects assessment in any meaningful way. If future phases receive funding and are planned to proceed, the effects of these future phases will be considered in combination with effects of Phase 1 as part of an updated EIA.

Cumulative effects are considered, as relevant, within each VC assessment where residual environmental effects of the Project may potentially interact with predicted environmental effects of the other projects and physical activities. Where Project residual effects are not predicted, there is no potential for cumulative environmental effects to occur as a result of the Project.

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6.0 ENVIRONMENTAL ASSESSMENT

The following sections present an assessment of potential Project-interactions with the identified VCs.

6.1 NATURAL RESOURCES

6.1.1 Potential Environmental Effects

The following Project activities and components have potential to interact with the Natural Resources VC:

- site preparation activities during construction (e.g., vegetation clearing and grubbing, earthworks, and foundation preparation, including potential blasting);
- installation of physical structures during construction;
- emissions and waste during construction and operation (e.g., noise emissions, surface runoff, and solid waste);
- presence of physical structures during operation; and
- vegetation management during operation and maintenance.

The resultant Project-environment interactions have potential to cause localized disturbance or loss of terrestrial habitat and associated harm to terrestrial species, bird collisions, and disturbance or loss of unique geological resources. The assessment of Project-related environmental effects on the Natural Resources VC therefore focuses on the following potential environmental effects:

- effects on vegetation;
- effects on wildlife; and
- change in unique geological features.

6.1.1.1 Effects on Vegetation

Site preparation activities during construction will result in the direct loss of approximately 0.2 ha of terrestrial vegetation habitat within the PDA.

Vegetation may be directly or indirectly disturbed due to the presence of Project personnel as well as the presence and operation of construction equipment and vehicles. These potential environmental effects could also occur as a result of the presence of increased visitors and pedestrian traffic at the site during the operation phase of the Project, as well as vegetation management activities during operation.

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Three vascular plant SOCC were recorded within the PDA during the September 30 field survey: soapberry (*Shepherdia canadensis*), running serviceberry (*Amelanchier stolonifera*), and four shoots of bastard's toadflax (*Comandra umbellata*) (Figure 2.1).

None of the plant species recorded during the field survey are listed under Schedule 1 of SARA or protected under the NS ESA. The Nova Scotia population of soapberry is considered Sensitive by NSDNR. This species is widespread and abundant across the boreal zone and somewhat southward in North America. It is restricted to relatively calcareous sites in Nova Scotia. Running serviceberry is considered Secure by NSDNR and its documented provincial range encompasses almost the whole province, though some reports may actually be hybrids. It is generally not of conservation concern elsewhere in its range. Potential Project-related mortality of soapberry and running serviceberry within the PDA is therefore not predicted to have population-level effects on these plant SOCC within Nova Scotia.

The Nova Scotia population of bastard's toadflax is listed as May Be At Risk. In Nova Scotia it is restricted to some dunes in Antigonish County and to northern Cape Breton (Dingwall, Jack Pine Trail, Aspy Bay South, Black Point). The species is uncommon and mostly restricted to coastal dunes in the Maritimes (though not entirely – there are a few inland locations). It is mostly not considered threatened elsewhere in its broad North American range. Due to its proximity to the PDA and location near the planned boardwalk, direct disturbance and mortality is possible.

6.1.1.2 Effects on Wildlife

According to the results of Project-specific habitat modelling no wildlife SOCC are considered likely to frequent the LAA. Individuals of wildlife species that reside in the LAA and immediately surrounding area may be temporarily displaced while construction is ongoing and will permanently lose natural habitat within the portions of the PDA that are cleared and/or developed (change in habitat quality, quantity and use), although most of this will occur in previously disturbed areas. Food waste can become a wildlife attractant if improperly managed during Project construction or operation.

According to the results of Project-specific habitat modelling, 13 bird SOCC are considered likely to occur in or around the LAA. However, none of these 13 bird SOCC, or the bird species recorded during the field survey, are listed under Schedule 1 of SARA or protected under the NS ESA. The Project has potential to cause a change in habitat quality, quantity and use for birds through the loss of natural nesting habitat and the creation of artificial nesting and perching habitats in and around Project infrastructure. This may attract non-native species, including pigeons and house sparrows, both of which are drawn to structural development. The Project also has potential to cause a change in risk of mortality or physical injury for birds. Clearing and grubbing activities could result in the destruction of birds' nests and/or eggs as well as direct harm to nesting birds and/or their young. The presence of physical structures during the operation phase could create an obstruction for birds in flight, especially during migration, at night or under foggy conditions, thereby increasing bird collision risk. No lighting of physical

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structures is proposed for the Project and artificial night lighting will therefore not adversely affect birds.

6.1.1.3 Change in Unique Geological Features

The PDA is entirely underlain by a geologically unique granite headland bedrock outcropping known as the Black Brook Granitic Suite (Figure 3.1). Site preparation activities and the installation of physical structures in the PDA will entail drilling, potential blasting, bolting, filling, and anchoring into bedrock, which will cause a change in unique geological features affecting this important formation. Access to the formation at the site will change due to Project presence.

The Point is approximately 0.4 ha in size, as compared with the 26,000 ha area occupied by the Black Brook Granitic Suite within and around CBHNPC. The change in unique geological features associated with the Project will therefore have a negligible effect on the formation in the region. Furthermore, the relatively small (25%) spatial extent of geological disturbance associated with the Project will occur in an area that has already been partially disturbed by current activities in CBHNPC. When completed, approximately 75% of the exposed bedrock surface will be visible and accessible.

Through Project design, planning, and engineering, consideration has been given to maintaining access to the geological features of the site. This includes integrating rock outcrops in to the design rather than moving boulders and other geological structures off-site. The geological importance of the site will be maintained as a focus point of visitor experience, and interpretive signage relating to the formation will be considered.

6.1.2 Mitigation

In addition to the standard mitigation measures and best management practices presented in Section 2.5, the following specific mitigation is proposed to address potential environmental effects on vegetation and wildlife, and geological features.

6.1.2.1 Mitigation for Effects on Vegetation and Wildlife

The following mitigation measures are proposed to reduce potential environmental effects on Vegetation, including rare plants.

- Vegetation management during operation and maintenance of the Project will be conducted in accordance with environmental protection procedures to be developed as part of the EPP.
- A Landscape Plan will be developed. Weed-free local fill that is properly covered during transport to avoid spillage will be used. Excavated soil will be stored in already disturbed areas and cover to avoid effect from wind or rain. All areas other than rock cuts disturbed by

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construction will be shaped, top soiled using suitable salvaged material from site, seeded, planted and fertilized.

- Work areas will be clearly marked and pedestrian or vehicle traffic outside of these areas will be reduced. Existing paths will be preferentially used to move equipment and people.
- Special measures will be put in place for washing equipment to reduce the potential introduction of invasive species.
- Mitigation and protocols will be put in place to protect the soapberry and bastard's toadflax, including flagging and barriers. Given its proximity to the boardwalk location, if it is determined that this species cannot be protected, alternative mitigation options will be explored with Parks Canada.
- Contractors will be required to take sufficient precautions to prevent pollution of water bodies with fuels, oils, paint, asphalt or other harmful materials.
- During Operation, signage will be in place to discourage visitors from leaving the walkway and disturbing natural areas.
- Signage will be in place to discourage visitors from feeding wildlife or littering during the operation phase of the Project.
- Nest surveys must be conducted at the appropriate time of year by a qualified biologist with knowledge of avian species.
- Project construction activities will be conducted in such a way as to avoid contravention of the *Migratory Birds Convention Act (MBCA)*. Clearing activities will not be carried out during the nesting period for migratory birds in the region (i.e., May 1 to August 1). If clearing activities cannot be undertaken outside this period, risk of impacting active nests or birds caring for pre-fledged chicks will be mitigated through the establishment of vegetated buffer zones around nests and avoidance of Project construction activities in the immediate area until nesting is complete and chicks have naturally migrated out of the area (Environment Canada, pers. comm. 2014).
- Activities such as cleaning, application and removal of protective coatings (e.g., paints), and demolition will not take place during the breeding season on structures where migratory birds are known to nest, since there is a risk of disturbing or destroying eggs or nestlings (Environment Canada, pers. comm. 2014).
- Measures will be taken as necessary to avoid infiltration and/or runoff of potential chemicals that could be used to preserve the monument to avoid interaction with the surrounding terrestrial and aquatic environments.

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6.1.2.2 Mitigation for Geological Features

- Mobilization of Project construction equipment around the rock outcrop will be done in such a way as to reduce surficial damage (scratches/gouges) to the rock surface to the extent feasible. A rubber tracked drill rig will be used for drilling whenever possible.
- The geological importance of the site will be reflected through existing signage.
- Propose that permits issued for construction stipulate the maximum permanent permissible geological disturbance of the exposed Black Brook Granitic Suite bedrock outcrop, which is to be no more than 25% (approximately 0.1 ha) of the existing exposed bedrock at mean water level at Green Cove Head.

6.1.3 Residual Environmental Effects Assessment

With application of the mitigation measures proposed in Section 6.1.2, the residual environmental effects on the Natural Resources VC are generally predicted to be adverse in direction, negligible to low in magnitude, spatially limited to the PDA or LAA, short-term to medium-term in duration, sporadic to continuous in frequency, reversible and to occur in a context of moderate resilience. An exception to this is the residual change in unique geological features during Project construction, which is predicted to be adverse in direction, low in magnitude, spatially limited to the PDA, permanent in duration, will occur only once, will be irreversible, and will occur in a context of moderate resilience.

Residual environmental effects are characterized in Table 6.1 according to the definitions provided below (Table 6.1).

Table 6.1 Characterization of Residual Environmental Effects for the Natural Resources VC

Direction	• Adverse (A) • Positive (P)
Magnitude	• Negligible (N) – no measurable change • Low (L) – a measurable change but within the range of natural variability will not affect population viability or sustainability of the resource • Moderate (M) – measurable change outside the range of natural variability but not posing a risk to population viability or sustainability of the resource • High (H) – measurable change that exceeds the limits of natural variability and may adversely affect the long-term population viability or sustainability of the resource
Geographic Extent	• Project Development Area (PDA) – effect is restricted to the PDA • Local Assessment Area (LAA) – effect is restricted to the LAA • Regional (R) – effect extends beyond the LAA to the surrounding region
Duration	• Short Term (ST) – effect extends for a portion of Project activities • Medium Term (MT) – effect extends throughout the entire duration of Project activities • Long Term (LT) – effect extends beyond Project activities • Permanent (P) – unlikely to recover to baseline

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Table 6.1 Characterization of Residual Environmental Effects for the Natural Resources VC

Frequency	• Once (O) – effect occurs once or less • Sporadic (S) – effect occurs sporadically at irregular intervals • Regular (R) – effect occurs on a regular basis and at regular intervals throughout the Project • Continuous (C) – effect occurs continuously
Reversibility	• Reversible (R) – will recover to baseline conditions after Project closure and reclamation • Irreversible (I) – permanent
Ecological and Socio-Economic Context	• Low resilience (L) – under baseline conditions, VC is rarely exposed to anthropogenic changes and is highly sensitive to them such changes could trigger large and lasting ecological effects • Moderate resilience (M) – under baseline conditions, VC occasionally exposed to anthropogenic changes and is sensitive to them such changes trigger small and short-term ecological effects • High resilience (H) – under baseline conditions, VC often experiences anthropogenic changes and is unaffected by them such changes trigger no detectable ecological effects

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Table 6.2 Residual Environmental Effects on Natural Resources

Project Phase	Residual Environmental Effects Characterization							
	Mitigation	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Effects on Vegetation								
Construction	- Implementation of the EPP including a Landscape Plan to minimize disturbance to vegetation and reduce risk of introduction of invasive species. - Flagging and barriers to protect known occurrences of bastard's toadflax and soapberry in the PDA. - Delineation of work areas including preferential use of existing paths to move people and equipment to reduce trampling of vegetation. - Nest surveys must be conducted at the appropriate time of year by a qualified biologist with knowledge of avian species. - Project construction activities will be conducted in such a way as to avoid contravention of the MBCA. Clearing activities will not be carried out during the nesting period for migratory birds in the region (i.e., May 1 to August 1). If clearing activities cannot be undertaken outside this period, risk of impacting active nests or birds caring for pre-fledged chicks will be mitigated through the establishment of vegetated buffer zones around nests and avoidance of Project construction activities in the immediate area until nesting is complete and chicks have naturally migrated out of the area (Environment Canada, pers. comm. 2014). - Activities such as cleaning, application and removal of protective coatings (e.g., paints), and demolition will not take place during the breeding season on structures where migratory birds are known to nest, since there is a risk of disturbing or destroying eggs or nestlings (Environment Canada, pers. comm. 2014).	A	L	PDA-LAA	MT	S-C	R	M

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Table 6.2 Residual Environmental Effects on Natural Resources

Project Phase	Residual Environmental Effects Characterization							
	Mitigation	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Operation	- Signage to encourage use of paths to reduce trampling of vegetation. - Signage to discourage visitors from littering and disturbing natural areas.	A	L	LAA	MT	S-C	R	M
Effects on Wildlife								
Construction	- Compliance with MBCA which may include: - scheduling clearing outside nesting period for migratory birds; and - establishment of vegetated buffer zones around nests (following nest surveys by qualified biologist) and avoidance of construction activities until nesting is complete; - Hazardous material management to prevent pollution of water bodies with fuels, oils, paint, asphalt or other harmful materials.	A	N-L	PDA	ST-MT	S-C	R	M
Operation	- Scheduling maintenance activities such as cleaning, application and removal of protective coatings (e.g., paints), outside breeding season on structures where migratory birds are known to nest. - Signage to discourage visitors from feeding wildlife or littering.	A	N-L	PDA-LAA	ST-MT	S-C	R	M

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Table 6.2 Residual Environmental Effects on Natural Resources

Project Phase	Residual Environmental Effects Characterization							
	Mitigation	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Change in Unique Geological Features								
Construction	- Mobilization of Project construction equipment around the rock outcrop to reduce surficial damage (scratches/gouges) to the rock surface to the extent feasible - Use of a rubber tracked drill rig for drilling whenever possible. Propose that permits issued for construction stipulate the maximum permanent permissible geological disturbance of the exposed Black Brook Granitic Suite bedrock outcrop, which is to be no more than 25% (approximately 0.1 ha) of the existing exposed bedrock at mean water level at Green Cove Head.	A	L	PDA	P	O	I	M
Operation	Signage to reflect the geological importance of the site.	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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6.1.4 Cumulative Environmental Effects Assessment

The Management Plan for the CBHNPC discusses various existing ecosystem stressors in the Park, including landscape fragmentation, invasive species, and pollution (Parks Canada 2010). The Project is not predicted to result in residual environmental effects that would further contribute to these ecosystem stressors. Environmental effects from other projects and activities are not anticipated to interact on a cumulative basis with the residual environmental effects for the Natural Resources VC. Any cumulative interaction would be negligible, limited to the LAA, sporadic, and reversible.

6.1.5 Monitoring and Follow-up

The following monitoring and follow-up activities are proposed with respect to the Natural Resources VC:

- The four shoots of bastard's toadflax and patch of soapberry will be monitored annually during construction and for 1 year post-construction, to determine whether they are adequately protected from anthropogenic disturbance or if adaptive management measures may be required.

6.2 CULTURAL RESOURCES

6.2.1 Potential Environmental Effects

The following Project activities and components have potential to interact with the Cultural Resources VC:

- site preparation activities (e.g., grubbing, earthworks, and foundation preparation, including potential blasting) during construction; and
- installation of physical structures during construction.

Any surface or subsurface Project-related disturbance within the Project area has the potential for interaction with archaeological and heritage resources. Potential changes to the context of built heritage resources are considered, with emphasis on the damage or removal of structures. Ground disturbance related to Project activities could lead to a change in the integrity of an archaeological or cultural resource. Archaeological resources could be directly affected by machinery, or the context of the materials may be altered through a change to the surrounding environment. The resultant Project-environment interactions have potential to cause damage or destruction to any heritage resources that might be present on site. The assessment of Project-related environmental effects on the Cultural Resources VC therefore focuses on the following potential environmental effect:

- change in cultural resources

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Preliminary archaeological investigations conducted on May 5, October 16, and October 27-29, 2014 of the proposed work area indicated a low potential for heritage resources on site due to the geology and previous disturbances (e.g., roadway construction).

An old road lane likely associated with the building of the Cabot Trail to access a borrow pit was observed during archaeological field reconnaissance. This feature is notable to Parks Canada, and has potential to be impacted or buried by Project construction activities (Parks Canada, pers. comm. 2014). The historical significance of this road lane is currently unclear.

Although no cultural resources were observed or are otherwise known to occur within the PDA or LAA, it is possible that previously unrecorded resources may, however, be present and have potential to be encountered during Project construction.

6.2.2 Mitigation

In addition to the standard mitigation measures and best management practices presented in Section 2.5, the following specific mitigation is proposed to address potential environmental effects on cultural resources.

- The old road lane will be surveyed and recorded by an archaeologist prior to any potential impacts on the feature from the Project.
- The locations of borrow pits and temporary work areas will be reviewed by a professional archaeologist to determine potential for presence of cultural resources.
- The EPP for the Project construction will include a contingency plan for chance encounters of archaeological resources during construction.
- Parks Canada will protect and manage any cultural resource which may be uncovered during the course of this work using its existing policies and guidelines including, but not limited to the CRM policy and the Parks Canada Guidelines for the Management of Archaeological Resources.
- Any confirmed heritage resources will be surveyed and recorded by a qualified archaeologist prior to impact or burial. Any changes to proposed construction methods (if applicable) will be evaluated for potential effects on cultural resources.

6.2.3 Residual Environmental Effects Assessment

With application of the mitigation measures, the residual environmental effects on the Cultural Resources VC are predicted to be adverse in direction, negligible to moderate in magnitude, spatially limited to the PDA, medium term to permanent in duration, sporadic in frequency, irreversible, and to occur in a context of moderate resilience.

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Residual environmental effects are characterized in Table 6.3 according to the definitions provided below (Table 6.3).

Table 6.3 Characterization of Residual Environmental Effects for the Cultural Resources VC

Direction	• Adverse (A) • Positive (P)
Magnitude	• Negligible (N) – no measurable change • Low (L) – small detectable change from baseline but will not result in loss of cultural knowledge • Moderate (M) – varies from baseline and may result in loss of cultural knowledge • High (H) – varies from baseline to a high degree and has serious implications for cultural knowledge
Geographic Extent	• Project Development Area (PDA) – effect is restricted to the PDA • Local Assessment Area (LAA) – effect is restricted to the LAA • Regional (R) – effect extends beyond the LAA to the surrounding region
Duration	• Short Term (ST) – effect extends for a portion of Project activities • Medium Term (MT) – effect extends throughout the entire duration of Project activities • Long Term (LT) – effect extends beyond Project activities • Permanent (P) – unlikely to recover to baseline
Frequency	• Once (O) – effect occurs once or less • Sporadic (S) – effect occurs sporadically at irregular intervals • Regular (R) – effect occurs on a regular basis and at regular intervals throughout the Project • Continuous (C) – effect occurs continuously
Reversibility	• Reversible (R) – will recover to baseline conditions after Project closure and reclamation • Irreversible (I) – permanent
Ecological and Socio-Economic Context	• Low resilience (L) – under baseline conditions, VC is rarely exposed to anthropogenic changes and is highly sensitive to them such changes could trigger large and lasting ecological effects • Moderate resilience (M) – under baseline conditions, VC occasionally exposed to anthropogenic changes and is sensitive to them such changes trigger small and short-term ecological effects • High resilience (H) – under baseline conditions, VC often experiences anthropogenic changes and is unaffected by them such changes trigger no detectable ecological effects

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Table 6.4 Residual Environmental Effects on Cultural Resources

Project Phase	Residual Environmental Effects Characterization							
	Mitigation	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Change In Cultural Resources								
Construction	- The old road lane will be surveyed and recorded by an archaeologist prior to any potential impacts on the feature from the Project. - Review of borrow pits and temporary work areas locations by a professional archaeologist to determine potential for presence of cultural resources. - Any changes to proposed construction methods (if applicable) will be evaluated for potential effects on cultural resources. - Implementation of Contingency Plan for change encounters of archaeological resources during construction. - Any confirmed Cultural Resources will be surveyed and recorded by a qualified archaeologist prior to impact or burial. - Management of cultural resource (if applicable) in accordance with Parks Canada's CRM policy and the Guidelines for the Management of Archaeological Resources.	A	N-L	PDA	P	S	I	M
Operation	N/A	A	N-M	PDA	MT-P	S	I	M

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6.2.4 Cumulative Environmental Effects Assessment for Cultural Resources

Previous disturbance of the site may have had an adverse effect on cultural resources, although the extent of this is unknown. Environmental effects from other projects and activities are not anticipated to interact with the residual environmental effects for the Cultural Resources VC. The residual environmental effects on the Cultural Resources VC are negligible due to planned mitigation. Therefore, any overlapping environmental effects with other projects and activities would be negligible, limited to the LAA, infrequent, and reversible.

6.2.5 Monitoring and Follow-up

- A Parks Canada representative will be on-site during all subsurface work. Should potential unidentified heritage resources be encountered during any Project activities, these activities will cease until such time that Parks Canada can assess and determine actions forward.
- When the Proponent undertakes work in which there will be soil disturbance, the Parks Canada Cape Breton Field Unit cultural resource manager will be notified and will assign appropriately trained Parks Canada personnel to monitor for exposed heritage resources.

6.3 VISITOR EXPERIENCE

6.3.1 Potential Environmental Effects

The CBHNPC Management Plan defines visitor experience as “the sum total of a visitor’s personal interaction with protected heritage places and people, an interaction that awakens the senses, affects the emotions, stimulates the mind, and leaves the visitor with a sense of attachment to these places” (Parks Canada 2010, p. 2).

All Project activities during construction, operation and maintenance have the potential to interact with the Visitor Experience VC due to aesthetic changes in the environment as well as changes in access and experience of the site. Positive changes relating to visitor safety and access are anticipated as a result of the Project.

The assessment of Project-related environmental effects on the Visitor Experience VC therefore focuses on the following potential environmental effects:

- change in aesthetics; and
- change in visitor access and experience impacting visitor connection and satisfaction.

6.3.1.1 Change in Aesthetics

Viewscape and visual resources are those natural and cultural features of the visible environment that elicit one or more sensory reactions and evaluations by the observer. Construction activities and the presence of Project structures during the operation

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phase will alter the viewscape and cause a change in aesthetics for visitors of CBHNPC. Visual effects during construction (e.g., presence of construction equipment and fencing) will be temporary and localized to the site.

Visual changes during operation, once the monument and associated infrastructure is in place, will be permanent for the duration of Project operation and perceptible from a greater distance (e.g., along portions of the highway, hiking trails and from the water). However, the degree of visibility for the LAA is relatively localized compared with other possible locations along of the Cabot Trail. Appendix C presents the results of a visual assessment that was undertaken to identify the approximate viewscape from various locations on the Cabot Trail, including from the vantage where it will be first noticeable travelling from the north, and from the south. As design of the Mother Canada statue is not completed, its presence is represented in the visual simulations by a coloured block representative of the height of the proposed statue.

It was noted from comments received from the public that some members of the public feel that the change in aesthetics will detract from the natural environment.

6.3.1.2 Change in Visitor Access and Experience

Once operational, the Project will cause a substantial change in visitor access and experience at Green Cove.

As discussed in Section 6.1.1.3, the PDA is entirely underlain by a geologically unique granite headland bedrock outcropping known as the Black Brook Granitic Suite (Figure 3.1). Potential changes to the geological feature, or to access, could also affect visitor experience. This is further discussed in Section 6.1.1.3.

The Project is intended to enhance visitor enjoyment of the site. It will also contribute to diversifying the overall visitor experience offered in CBHNP and serve as a tourist attraction, thereby contributing to a positive change in visitor experience. Access and public safety controls (e.g., railings) are not currently in place, and there is no accommodation for disabled access. Project components such as the semi-elevated walkway and mobility impaired parking area will improve the accessibility of the site for visitors. Additionally a washroom facility will be available.

However, it has also been noted through public consultations that there are some concerns that the change in aesthetics discussed above, as a result of the construction and presence of the monument, will detract from the enjoyment of the natural environment and adversely affect visitor experience for some park users.

The operation of heavy equipment working at the site will create increased noise that could detract from the visitor experience at Green Cove during construction. During the most noise-intensive activities, sound levels immediately adjacent to Project-related drilling activity will be about 130 dB, but will drop to 80 dB 15-30 m away. Although rock blasting is not currently

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planned, if it is required, it would be one of the loudest activities associated with construction. However, this would represent a very small portion of all construction-related noise. Each blast would be two seconds in length and similar to a thunderclap. Noise effects during construction will be temporary and localized.

During operation, a projected increase in visitors to the site and associated vehicle and pedestrian traffic, will result in a long term increase in ambient noise levels. However, these noise levels are expected to be consistent with use of the site as an attraction within CBHNP.

In 2009, the Green Cove site reported over 34,000 visitors from June to October (Parks Canada, pers. comm. 2014). Although the Project schedule has yet to be finalized, it is anticipated construction will coincide with this peak visitation period. This will require complete closures of the area during construction, thereby causing a temporary change in visitor access and experience. For the safety of visitors, access to other areas in Green Cove may also be restricted during construction. Any such closures will be temporary and localized.

Table 6.5, adapted from a visitation projection study (A.L. Arbic Consulting, 2014) shows projections of monthly visitation to the NFNMC demonstrating a substantial increase in the number of visitors to the Green Cove site but also showing that monthly visitation will largely mirror visitation patterns of the CBHNP itself.

Table 6.5 Projected Monthly Visitation to Green Cove

Projected Total Attendance (rounded)	Year 1		Year 3		Year 5		CHNP Average
	173,000		163,000		163,000		
Month	%	#	%	#	%	#	
January	0.0%	-	0.1%	163	0.1%	163	0%
February	0.0%	-	0.1%	163	0.1%	163	0%
March	0.0%	-	0.2%	326	0.2%	326	0%
April	0.0%	-	1.0%	1,630	1.0%	1,630	0%
May	0.1%	173	3.5%	5,705	3.5%	5,705	4%
June	0.3%	519	18.0%	29,340	18.0%	29,340	16%
July	33.0%	57,090	28.0%	45,640	28.0%	45,640	27%
August	30.0%	51,900	29.0%	47,270	29.0%	47,270	32%
September	20.0%	34,600	13.0%	21,190	13.0%	21,190	14%
October	9.0%	15,570	6.0%	9,780	6.0%	9,780	7%
November	7.5%	12,975	1.0%	1,630	1.0%	1,630	0%
December	0.1%	173	0.1%	163	0.1%	163	0%
Total	100%	173,000	100%	163,000	100%	163,000	100%

Source: adapted from A.L. Arbic Consulting, 2014

This projected increase in visitation will also contribute to a change in visitor experience through increased traffic in the area.

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6.3.2 Mitigation

In addition to the standard mitigation measures and best management practices presented in Section 2.5, the following specific mitigation is proposed to address potential environmental effects on visitor experience during Project construction and operation.

- Project design will take into consideration visual impacts and will complement the natural environment to the extent feasible (e.g., leaving large boulders in place where feasible; design that uses the natural landscape as much as feasible).
- A Project-specific Traffic Management Plan will be developed and implemented in association with the EPP for the Project.
- On-site signage during construction will inform visitors of the purpose of the construction and the anticipated construction schedule.
- It is recommended that a Parks Canada representative be present during construction to address any potential visitor issues/concerns that might be raised.

The Foundation will work with Parks Canada to maintain infrastructure and branding at the NFNMC in such a way that does not conflict with National Park standards.

6.3.3 Residual Environmental Effects Assessment

With application of the mitigation measures proposed in Section 6.3.2, the residual environmental effects on the Visitor Experience VC are generally predicted to be adverse in direction during construction; and potentially adverse or positive during operation. The residual effects are also predicted to be low to moderate in magnitude, spatially limited to the PDA or LAA, short-term to medium-term in duration, sporadic to continuous in frequency, reversible, and to occur in a context of moderate resilience. Positive residual environmental effects are predicted with respect to the CBHNPC the improved accessibility for mobility-impaired individuals during Project operation, and the improved experience of visitors seeking a tourist attraction. The Mother Canada statue will be visible beyond the LAA and will therefore cause a residual change in aesthetics and visitor experience for the surrounding region following its construction. A residual change in visitor access and experience will also extend to the surrounding region due to increased traffic in CBHNPC.

It is understood that CBHNPC visitors expecting and valuing a more natural viewscape near the Green Cove site could find the monument not consistent with their expectations and thus have an adverse effect on their experience. However, this change in viewscape is limited and unique in CBHNPC and would be considered highly localized in the context of other more natural views which are ubiquitous and unaffected.

Residual environmental effects are characterized in Table 6.6 according to the definitions provided below.

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Table 6.6 Characterization of Residual Environmental Effects for the Visitor Experience VC

Direction	• Adverse (A) • Positive (P)
Magnitude	• Negligible (N) – no measurable change • Low (L) – a measurable change but within the range of natural variability will not affect the viability of the attraction • Moderate (M) – measurable change outside the range of natural variability but not posing a risk to the viability of the attraction • High (H) – measurable change that exceeds the range of natural variability and may adversely affect the long-term viability of the attraction
Geographic Extent	• Project Development Area (PDA) – effect is restricted to the PDA • Local Assessment Area (LAA) – effect is restricted to the LAA • Regional (R) – effect extends beyond the LAA to the surrounding region
Duration	• Short Term (ST) – effect extends for a portion of Project activities • Medium Term (MT) – effect extends throughout the entire duration of Project activities • Long Term (LT) – effect extends beyond Project activities • Permanent (P) – unlikely to recover to baseline
Frequency	• Once (O) – effect occurs once or less • Sporadic (S) – effect occurs sporadically at irregular intervals • Regular (R) – effect occurs on a regular basis and at regular intervals throughout the Project • Continuous (C) – effect occurs continuously
Reversibility	• Reversible (R) – will recover to baseline conditions after Project closure and reclamation • Irreversible (I) – permanent
Ecological and Socio-Economic Context	• Low resilience (L) – under baseline conditions, VC is rarely exposed to anthropogenic changes and is highly sensitive to them such changes could trigger large and lasting ecological effects • Moderate resilience (M) – under baseline conditions, VC occasionally exposed to anthropogenic changes and is sensitive to them such changes trigger small and short-term ecological effects • High resilience (H) – under baseline conditions, VC often experiences anthropogenic changes and is unaffected by them such changes trigger no detectable ecological effects

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Table 6.7 Residual Environmental Effects on Visitor Experience

Project Phase	Residual Environmental Effects Characterization							
	Mitigation	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Change in Aesthetics								
Construction	- Project design will take into consideration visual impacts and will complement the natural environment to the extent feasible. - The Foundation will work with Parks Canada to maintain infrastructure and branding at the NFNMC in such a way that does not conflict with National Park standards.	A	M	LAA	ST-MT	S-C	R	M
Operation	N/A	P-A	M	R	MT	C	R	M
Change in Visitor Access and Experience								
Construction	- A Project-specific Traffic Management Plan will be developed and implemented in association with the EPP for the Project. - On-site signage during construction will inform visitors of the purpose of the construction and the anticipated construction schedule. - A Parks Canada representative will be present during construction to address potential visitor issues/concerns.	A	L-M	PDA-LAA	ST-MT	S-C	R	M
Operation	Improved access (including mobility impaired parking area), public safety controls and addition of a washroom facility will improve visitor experience at the site.	P-A	M	R	MT	C	R	M

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6.3.4 Cumulative Environmental Effects Assessment

Effects associated with bridge construction projects in the Park have the potential to overlap with effects from Project construction, resulting in adverse cumulative environmental effects on the Visitor Experience VC, particularly with regard to a potential increase in heavy traffic and potential traffic delays.

Mitigation measures described in Section 6.3.2, along with Parks Canada's own traffic management policies and procedures will serve to limit traffic delays. The Foundation will work closely with Parks Canada staff to coordinate construction activities in order to minimize potential adverse cumulative effects on visitor experience.

There could also potential adverse cumulative effects with regard to construction noise in the park affecting visitor experience. A positive cumulative effect on visitor experience could be realized through the improvement of infrastructure and accessibility in the Park.

6.3.5 Monitoring and Follow-up

The following monitoring and follow-up activities are proposed with respect to the Visitor Experience VC:

Monitoring of traffic counts and visitation numbers during Project construction and operation will provide relevant information with respect to the Visitor Experience VC. This information will be considered as applicable when planning future phases of development of the NFNMC (beyond the scope of the current Project – i.e., Phases 1 and 2). Occasional feedback surveys may also be used by the Foundation to solicit input from visitors regarding their experiences at the site.

6.4 MARINE FISH AND FISHERIES

6.4.1 Potential Environmental Effects

The Marine Fish and Fisheries VC considers potential Project interactions with commercial, recreational and Aboriginal (CRA) fisheries and the species (e.g., lobster and crab) on which they depend, which may occur in the marine portion of the LAA.

The following Project activities and components have potential to interact with the Marine Fish and Fisheries VC:

- potential pile driving, drilling and blasting associated with site preparation activities during construction; and
- emissions and waste (e.g., noise emissions, surface runoff, and solid waste) during construction and operation.

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The assessment of Project-related environmental effects on Marine Fish and Fisheries therefore focuses on the following potential environmental effects:

- effects on marine fisheries species; and
- change in fisheries related activities.

6.4.1.1 Effects on Marine Fisheries Species

Sound and vibration associated with pile driving, drilling and blasting (if required) on the land at Green Cove may be detected by fisheries species in the water below. However, given the separation distance and that there is no planned in-water work, effects are expected to be limited to potential temporary behavioral changes, rather than any physical injury to marine species. Surface runoff from the site during construction and operation could adversely affect marine habitat quality and use through increased sedimentation. Surface runoff will be managed and directed through sediment controls. Therefore it is unlikely to cause a change in risk of mortality or injury to marine species. Solid waste also has potential to adversely affect habitat quality and use for marine wildlife, including fish, marine birds, marine mammals, and sea turtles, if litter is allowed to enter the marine environment during Project construction or operation.

Lobsters are mainly nocturnal and are therefore averse to strong light (Beard and McGregor 2004). Light intensity has been found to strongly affect their burrowing and foraging behaviour (Mercaldo-Allen and Kuropt 1994). However, as noted above, no lighting of physical structures is proposed for the Project and artificial night lighting will therefore not affect the behaviour of lobster or other marine species.

6.4.1.2 Change in Fisheries Related Activities

Displacement of commercial fisheries resources from the marine portion of the LAA is not anticipated, as a result of construction-related noise, vibration or runoff from the land-based construction activities. Temporary construction noise and vibration are not expected to affect lobster or crab migration such that fisheries activities would be affected. Selective avoidance of the nearshore during construction may occur by individual fishers.

6.4.2 Mitigation

In addition to the standard mitigation measures and best management practices presented in Section 2.5, the following specific mitigation is proposed to address these potential environmental effects.

- As a precautionary measure, pile driving, drilling, and blasting (if required) will not occur during the active seasons for the inshore lobster and crab fisheries (May to July).
- Construction scheduling will be communicated to Fishers in advance of construction.

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- Implementation of standard construction mitigation to eliminate or reduce surface runoff to the marine environment.
- Storage of hazardous materials (e.g., fuel, lubricants) will comply with WHMIS requirements with appropriate material safety data sheets (MSDS) located at the storage site.
- Measures will be taken as necessary to avoid runoff of potential chemicals that could be used to preserve the monument to avoid interaction with the marine environment.
- Propose that no permits for marine based construction, transportation or other form of in-water work be issued for completion of the project.

There is potential for environmental effects on the Marine Environment adjacent to Cape Breton Highlands National Park. For project activities potentially impacting areas beyond PCA jurisdiction, expectations regarding mitigation measures and best management practices will be sought from the appropriate agency (e.g., DFO, Environment Canada). Measures recommended or prescribed by the department holding jurisdiction will be adopted and adhered to for this project.

6.4.3 Residual Environmental Effects Assessment

With application of the mitigation measures proposed in Section 6.4.2, the residual environmental effects, summarized in Table 6.8, on the Marine Fish and Fisheries VC are generally predicted to be negligible to low in magnitude, medium-term in duration, reversible, and to occur in a context of moderate resilience.

Residual environmental effects are characterized in Table 6.8 according to the definitions provided below (Table 6.9).

Table 6.8 Characterization of Residual Environmental Effects for the Natural Resources VC

Direction	• Adverse (A) • Positive (P)
Magnitude	• Negligible (N) – no measurable change • Low (L) – a measurable change but within the range of natural variability with respect to commercial fisheries, will not affect population viability or sustainability of the resource • Moderate (M) – measurable change outside the range of natural variability with respect to commercial fisheries, will not pose a risk to population viability or sustainability of the resource • High (H) – measurable change that exceeds the limits of natural variability with respect to commercial fisheries, may adversely affect long-term population viability or sustainability of the resource
Geographic Extent	• Project Development Area (PDA) – effect is restricted to the PDA • Local Assessment Area (LAA) – effect is restricted to the LAA • Regional (R) – effect extends beyond the LAA to the surrounding region

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Table 6.8 Characterization of Residual Environmental Effects for the Natural Resources VC

Duration	• Short Term (ST) – effect extends for a portion of Project activities • Medium Term (MT) – effect extends throughout the entire duration of Project activities • Long Term (LT) – effect extends beyond Project activities • Permanent (P) – unlikely to recover to baseline
Frequency	• Once (O) – effect occurs once or less • Sporadic (S) – effect occurs sporadically at irregular intervals • Regular (R) – effect occurs on a regular basis and at regular intervals throughout the Project • Continuous (C) – effect occurs continuously
Reversibility	• Reversible (R) – will recover to baseline conditions after Project closure and reclamation • Irreversible (I) – permanent
Ecological and Socio-Economic Context	• Low resilience (L) – under baseline conditions, VC is rarely exposed to anthropogenic changes and is highly sensitive to them such changes could trigger large and lasting ecological effects • Moderate resilience (M) – under baseline conditions, VC occasionally exposed to anthropogenic changes and is sensitive to them such changes trigger small and short-term ecological effects • High resilience (H) – under baseline conditions, VC often experiences anthropogenic changes and is unaffected by them such changes trigger no detectable ecological effects

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Table 6.9 Residual Environmental Effects on Marine Fish and Fisheries

Project Phase	Residual Environmental Effects Characterization							
	Mitigation	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context
Effects on Marine Fisheries Species and Fisheries Related Activities								
Construction	- As a precautionary measure, pile driving, drilling, and blasting (if required) will not occur during the active seasons for the inshore lobster and crab fisheries (May to July) - Construction scheduling will be communicated to Fishers in advance of construction - Implementation of the EPP to eliminate or reduce surface run-off to the marine environment and ensure proper storage and handling of hazardous materials - Propose that no permits for marine based construction, transportation or other form of in-water work be issued for completion of the project	A	N-L	LAA	MT	S	R	M
Operation	Measures will be taken as necessary to avoid runoff of potential chemicals that could be used to preserve the monument to avoid interaction with the marine environment.	A	N-L	LAA	MT	S	R	M

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6.4.4 Cumulative Environmental Effects Assessment

Environmental effects from other projects and activities are not anticipated to interact with the residual environmental effects for the Marine Fish and Fisheries VC. Therefore, there are no predicted cumulative effects on the Marine Fish and Fisheries VC.

6.4.5 Monitoring and Follow-up

No monitoring or follow-up is proposed with respect to the Marine Fish and Fisheries VC.

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Effects of the Environment on the Project

7.0 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

Potential effects of the environment on a project are a function of project or infrastructure design and the risks of natural hazards and influences of nature. These effects may result from climatic conditions, physical conditions, landforms, and general site characteristics that may act on the Project and result in adverse environmental effects.

Environmental conditions that can affect Project infrastructure will be addressed through engineering design and industry standards. Good engineering design involves consideration of environmental effects and stresses from the environment on the Project. Responsible and viable engineering designs consistently account for possible forces of the environment.

The environmental attributes that were considered for the potential to have an effect on the Project were determined based on regulatory consultation, a review of the known past and existing conditions, and consideration of Project infrastructure. The following environmental attributes were selected for consideration:

- extreme weather events (including rogue waves);
- icing seismic event and tsunami;
- climate change and sea level rise; and
- forest fire.

VCs likely to experience adverse environmental effects, as a result of effects of the environment on the Project include: Natural Resources Visitor Experience and the socio-economic environment.

7.1 EXTREME WEATHER AND ICING

Design, construction and planning of operation and maintenance of the Project consider the potential normal and extreme conditions that might be encountered in the Cape Breton coastal setting of Green Cove. In particular, heavy precipitation events (heavy rain or snow melt), or high seas and poor visibility could affect construction activities (e.g., cause delays, erosion) and visitor experience (e.g., site access). These delays and restricted access could have short term implications for Project schedule, but are not expected to cause substantial or long lasting effects.

The materials specified for the Project will be in compliance with all applicable codes and will maintain structural integrity at the anticipated minimum and ambient temperatures in the region to prevent adverse effects of the environment on the Project. Most construction equipment that would typically be in use at the Project site is fully weather-proofed and can operate in a range of conditions.

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Effects of the Environment on the Project

Forecasting of various storm and weather events for 100 year storms were undertaken for the Project. The forecasting has been plotted and is shown in Appendix E.

Another concern will be the formation of ice on the statue and its effect on structural weight, and public safety during thawing. Potential concerns from ice will be mitigated by access-design, regular maintenance (e.g., spray washing), and temporary and/or seasonal closures.

7.2 SEISMIC EVENT AND TSUNAMIS

The Project will be designed to meet the National Building Code of Canada which prescribes seismic forces for all regions of Canada. The intent of these design standards is to maintain the integrity of the structures based on the level of risk for an earthquake in the area. An earthquake with a magnitude substantively greater than the design-base seismic force could result in damage to the Project structures and potentially result in public safety concerns, adversely affecting visitor experience. However, design-base earthquake magnitude values are elected based on probability, and it would therefore be very unlikely that the design-base earthquake would be exceeded during the life of the Project. Likewise, based on the relatively low risk of earthquakes occurring in the region, the likelihood of a tsunami (seismic sea wave) is also relatively low. In the event of an earthquake or tsunami, emergency response plans for the CBHNPC would be implemented to ensure visitor safety.

7.3 CLIMATE CHANGE AND SEA LEVEL RISE

Sea level rise in the Maritimes has been occurring since the end of the last ice age, about 10,000 years ago. During the 20th century the sea level at Charlottetown, Halifax, and Sydney has risen at a rate of approximately 0.3 m/century, which included 0.2 m/century of crustal subsidence (Forbes *et al.* 1997). The rate of global mean sea level is accelerating in the 21st century due to global warming impacts, notably the melting of polar ice caps. The future global mean sea level rise will likely be greater than 1 m per century, well above 2007 projections from the Intergovernmental Panel on Climate Change (which were up to 0.59 m/century) (Solomon *et al.* 2007). The 2011 report from the Arctic Monitoring and Assessment Program (Arctic Monitoring and Assessment Program 2011) raised the potential global mean sea level rise at a range of 0.9 m to 1.6 m by 2100 if the melting of polar ice caps continues as predicted.

The period of construction is generally not considered as a period over which the effects of climate change can be considered. Projected climate changes may affect operation of the Project in many different ways. Those which could potentially have an adverse environmental effect include increased frequency and intensity of storm surges, increased frequency of extreme storms accompanied by strong winds, increased incidence of flooding and erosion, sea level rise and increased frequency of heavy precipitation events. Each of these, if not engineered and designed for, could result in damages to infrastructure.

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Effects of the Environment on the Project

7.4 FOREST FIRES

While there is potential for natural forest fire to occur in or near the Project, it is not likely to have a substantive effect on construction or operation of the Project. Nova Scotia has a forest fire control program in place to identify and control fires, reducing the potential magnitude and extent of any forest fire, and their effects on the Project. The facility structures will be constructed primarily of concrete which is not typically affected by fire. Emergency response capability, emergency response plans, and fire trained individuals and response equipment is planned in readiness for, and in response to, such events.

7.5 SUMMARY

The environment could potentially have an effect on the Project, during construction and operation, but this will be mitigated through careful design in accordance with factors of safety, best engineering practice, and adherence with applicable standards and codes. The mitigation measures and strategies described in Section 2.5 and the selection of materials that are able to withstand the environmental conditions that can be reasonably expected in the Project area will more than adequately address these concerns. Potential adverse effects from the Environment on the Project would be low in magnitude, limited to the PDA, short in duration, infrequent, and reversible.

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Accidents, Malfunctions, and Unplanned Events

8.0 ACCIDENTS, MALFUNCTIONS, AND UNPLANNED EVENTS

This section provides an assessment of selected accidents and malfunctions that could cause adverse environmental effects.

The accidents/malfunctions with potential environmental effects considered in this assessment include:

- hazardous materials spills; and
- vehicular accidents.

A preliminary screening was conducted on each VC to determine if any of the potential accident scenarios as described above were likely to affect the VC. The Natural Resources, Cultural Resources, Visitor Experience and Marine Fish and Fisheries VCs were identified as potentially being affected by accidents and malfunctions.

8.1 HAZARDOUS MATERIALS SPILLS

Hazardous materials such as fuels, lubricants, and hydraulic fluid will be used or stored in small quantities, during the Project construction phase. These types of materials will be most commonly used throughout the construction phase. However, accidental spills could occur during all Project phases, including maintenance activities, resulting in a release of the hazardous substance into the environment. Depending on the location of the spills, and type and quantity of material released, hazardous material spills could potentially affect natural resources, and visitor experience. There is no predicted probable large spill scenario any spill is likely to be small (e.g., several litres or less). Given the expected limited spill volume, spill scenarios, and anticipated effectiveness of response plans (including spill containment) and distance from the marine environment, it is not anticipated that spills would reach the marine environment and affect marine fish and fisheries.

The likelihood of spills can be reduced through proper equipment maintenance and inspection, and proper fuelling procedures. Spills, if they occur, would typically be small, localized and rapidly cleaned up. Spill prevention, preparedness, response and recovery procedures will be developed and included in the EPP for the Project.

Mitigation measures are identified in Section 2.5 and include that where possible, refuelling in the field will not occur within 30 m of waterbodies storage of hazardous materials will comply with WHMIS requirements with appropriate MSDS located at the storage site equipment will be kept in good working order, inspected regularly, and leaks will be repaired promptly and spill containment equipment (e.g., spill kits) will be available to construction crews and, in the event of an accident, will be put in place to attempt to prevent the spill from spreading to other environmental receptors.

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Accidents, Malfunctions, and Unplanned Events

8.2 VEHICULAR ACCIDENTS

The risk of vehicular accidents could increase in the Park due to increases to traffic during construction and operation, the movement of construction equipment, and changes to traffic patterns. Potential adverse effects will be reduced through the use of signage, speed limits for construction equipment, and Project design.

8.3 SUMMARY

Accidental events, as described above, have the potential to affect natural resources, visitor experience, cultural resources, or marine fish and fisheries. With consideration of mitigation and contingency planning, it is predicted that any resultant environmental effects would be negligible to low in magnitude, limited to the LAA, short in duration, infrequent, and reversible.

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Conclusion

9.0 CONCLUSION

This DIA examined the potential environmental effects associated with construction and operation of Phases 1 of the Never Forgotten National Memorial at Green Cove in Cape Breton Highlands National Park, Nova Scotia as proposed by the Never Forgotten National Memorial Foundation). The NFNMC will commemorate the more than 114,000 Canadian war dead still lost or buried overseas.

With the application of proposed mitigation measures, the residual effects of the Project on the environment (including natural resources, cultural resources, visitor experience, and marine fish and fisheries) are generally predicted to be negligible to moderate in magnitude and will be primarily localized within a previously disturbed area. These residual effects predictions are also applicable with respect to the effects of the environment on the Project and the effects of potential accidents and malfunctions.

The Project is not anticipated to result in residual adverse effects on the long-term population viability of species or sustainability of resources, substantial residual loss of cultural knowledge, or residual adverse effects on the long-term viability of Green Cove as a tourist attraction within CBHNP. Potential beneficial effects of the Project include positive changes in visitor access and experience.

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Statement of Limitations

10.0 STATEMENT OF LIMITATIONS

This report has been prepared by Stantec Consulting Ltd. (Stantec) for the sole benefit of the Never Forgotten National Memorial Foundation (the Foundation). The report may not be relied upon by any other person or entity, other than for its intended purposes, without the express written consent of Stantec and the Foundation.

This report was undertaken exclusively for the purpose outlined herein and was limited to the scope and purpose specifically expressed in this report. This report cannot be used or applied under any circumstances to another location or situation or for any other purpose without further evaluation of the data and related limitations. Any use of this report by a third party, or any reliance on decisions made based upon it, are the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

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If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

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