Hebron

Bull Arm Site
Environmental Protection Plan

for Hebron Project Activities

June 2011
(Updated August 2015)

Revision Log

Revision	Section	Description
D0	All	Issued for Use
D1	1.7.2	Replacement of references to Revision Control Record with Revision Log
		Replacement of references to Revision Request Initiation Forms (RRIFs) with Request for Transmittal/Issue (RFT)
		Updates to Appendices 1A and 1B, and Removal of Appendix 1C
D2	All	Minor text updates in order to ensure consistency of all Chapters, and that Project activities that have already been complete are captured as being complete.
	All	Updated text to better reflect current and future scopes of work (ex. GBS construction at the deep water site, and the Topsides Installation, Hook Up and Commissioning (IHUC)
	All	Revised personnel information throughout document to better reflect reporting relationships, as well as roles and responsibilities as they relate to Bull Arm site EPP implementation.
	1.6.4.4	Updated to include information on bund wall disposal (including permitting information).
	1.6.4.5	Removed information on Schedule A requirements
		Included information on ballasting and associated water treatment/ discharges.
	Appendix 1A	Included updated JEA and Environmental Planning Checklist
	2.8	Reviewed and updated 'Environmental Protection Measures' relevance tables to: ensure that the mitigation measures have the correct associated appendix numbers, the mitigations listed are still applicable, and the relevance is selected for the correct mitigation measures.
		Reviewed and updated 'Permits, Authorizations and Approvals' tables to ensure: legislation is relevant and up to date, links to permit applications are accurate, activities requiring regulatory approvals are up to date, agency contact information is up to date.
	2.8.8	Added section on HUC activities at the Topsides and deep water sites: Included list of activities, environmental concerns, environmental protection measures (including relevance table), area-specific measures, and permits and authorizations (including table). The information in this section was not known in this detail when the EPP was last issued (April 2012).
	2.8.9	Updated section to more accurately reflect the activities that need to be undertaken prior to site decommissioning.
	2.9.1	Updated response section to ensure consistency with Bull Arm Emergency Response Plan and Spill Prevention and Response Plans.
	2.9.2	Updated prevention section to include booming requirements for fueling of marine vessels
		Updated response section to ensure consistency with Bull Arm Emergency Response Plan and Spill Prevention and Response Plans
	2.9.6	Made section consistent with requirements outlined in Hebron Project Marine Traffic Procedure and Fishers Code of Practice and Emergency Response Plan.
	2.10.1	Removed paragraph on 'Fisheries Act Authorization Monitoring Program'. The Fisheries Act Authorization was rescinded therefore this monitoring program is no longer applicable.
	2.10.3	Updated blasting requirements as they relate to potential impacts on marine mammals.
	Appendix 2.A (1.3)	Removed TPH from list of constituents to be monitored in effluent settling basins on a weekly basis.

	Appendix 2.A (1.4)	Updated environmental protection measures to include requirements relating to: stockpiling, disposal of unsuitable material, land-based sediment control measures, water-based sediment control measures, and water accumulation in excavations (and associated dewatering). Included references to DFO guidance documents.
	Appendix 2.A (1.7)	Updated environmental concerns section to include reference to Schedule A in the Provincial Environmental Control Water and Sewage Regulations (2003).
		Updated environmental protection measures to include more detail on land based dewatering. Included reference to Schedule A requirements and DFO guidance documents.
		Removed TPH from list of constituents to be tested in effluent prior to discharging to Great Mosquito Cove.
	Appendix 2.A (1.11)	Updated site requirements for the handling, storage and disposal of explosive materials.
		Added ‘Guidelines for the Use of Explosives In or Near Canadian Waters” by Wright and Hopky as a required reference to be used in the planning and mitigation development for blasting activities near water.
		Updated requirement which previously stated that ammonium nitrite based explosives must not be used in or near water to “No use of ammonium nitrate-fuel oil mixtures to occur in or near water due to the production of toxic by-products (ammonia)” to align with Wright-Hopky guidance.
		Added requirement to conduct visual marine mammal surveys prior to blasting in or near water.
	3.8.2.1	Updated hazardous waste section to better reflect current site practices. Includes definition of ‘cradle to grave’ approach to waste management, hazardous waste storage and disposal, and regulatory requirements.
		Updated Table 3-6 (Treatment and Disposal Plan). Updates were made in the applicable regulations/ permits/ information column, as well as the site handling / shipping methodology column. Also added HUC effluents and electronic waste as waste types. Removed plastics as this waste stream is not being recycled at the Bull Arm site.

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1 INTRODUCTION

1.1 Purpose

The Hebron Project is a proposed oil and gas development located offshore Newfoundland and Labrador, approximately 340 km east of St. John's. This will be the fourth stand-alone development project on the Grand Banks. On behalf of the Hebron Project Proponents[1], ExxonMobil Canada Properties (EMCP) is leading the development of the Hebron Project. The Hebron production platform will be a Gravity Base Structure (GBS), supporting the Topsides. The GBS, as well as components of the Topsides and the entire platform assembly, will be built at the existing Bull Arm fabrication facility in Bull Arm, Trinity Bay. Installation, Hookup and Commissioning (HUC) of the Topsides Modules will also occur at site. An aerial photo of the existing Bull Arm facility can be seen in Figure 1-1.

The Department of Environment and Conservation (DOEC) required an Environmental Protection Plan (EPP) for the Bull Arm site prior to the start of any construction activity. EMCP is committed to developing and implementing an effective environmental management system to support the Project. A clear, comprehensive, well-structured EPP for the Bull Arm site for the construction phase of the Project is an important component of this system.

The EPP is intended to be a working document for use in the field by project personnel and contractors/ subcontractors, as well as at the corporate level for ensuring commitments made in policy statements are implemented and monitored. EPPs provide a quick reference for project personnel and regulators to implement appropriate environmental protection measures, monitor compliance, and to make suggestions for improvement.

The Hebron Project Bull Arm site EPP comprises five chapters:

- Chapter One: The Introduction chapter provides an overview of the Bull Arm site's natural environment, the site itself, Project activities, and describes the role and responsibilities to maintain and implement the EPP.
- Chapter Two: The Biophysical Environment chapter outlines environmental protection measures and contingency plans which are intended to mitigate potential negative effects on atmospheric, terrestrial, freshwater, and marine environments around the Bull Arm site throughout construction of the Project.
- Chapter Three: The Waste Management chapter outlines procedures to ensure that the collection, storage, transportation and disposal of all wastes generated by construction at the Bull Arm site will be conducted in a safe, efficient and environmentally compliant manner. This chapter also includes details on a site waste segregation program.

1ExxonMobil Canada Properties, Chevron Canada Limited, Petro-Canada Hebron Partnership, Statoil Canada Ltd, and Energy – Oil and Gas Inc.

- Chapter Four: The Socio-Economic Environment chapter addresses the socio-economic environment in the Bull Arm area, extending from Norman's Cove to Clarenville.
- Chapter Five: The Commercial Fisheries Environment chapter provides measures to be implemented during construction activities at the Bull Arm site to mitigate adverse impacts on commercial fish harvesting operations and ensure safe operation of both fishing and Project vessel traffic.

Figure 1 - 1 : Aerial Photo of Bull Arm Fabrication Site (July 2013)

1.2 Scope

The Bull Arm site EPP describes environmental protection procedures and contingency plans designed to protect the local/ regional terrestrial, freshwater, and marine environments, as well as the nearby communities and commercial fishers. These procedures will be followed during the onshore and near shore construction, installation and HUC phases of the Project at the Bull Arm site. Note that all activities associated with tow-out of the completed Hebron platform from the deep water site to the offshore location are beyond the scope of this EPP.

The EPP is designed to be an evergreen planning document and will be periodically updated throughout various stages of the Project.

All Project activities at the Bull Arm site are governed by agreements developed between EMCP and the prime Engineering, Procurement & Construction (EPC) contractors; Kiewit-Kvaerner Contractors (KKC) and WorleyParsons Canada Services Ltd. (WorleyParsons).

EMCP, in conjunction with the EPC contractors, has developed this EPP and will ensure it is maintained during the construction, installation and HUC phases. EMCP and its major contractors will also monitor the EPPs implementation to ensure that all Project activities are in compliance with the document's provisions. Furthermore, EMCP and/ or its major contractors will:

- Continue to meet, as necessary, with provincial and federal regulatory bodies to address environmental issues and ensure exchange of accurate and timely information, especially concerning permits and authorizations.
- Implement a community consultation program through the Project Community Relations Advisor.
- Implement environmental field programs.
- Develop and deliver an environmental orientation and education program for all EMCP, EPC contractor, and subcontractor personnel involved in the construction phase of the Hebron platform at the Bull Arm site.
- Support, where necessary, its contractors' applications for government permits, licenses, certificates and authorizations.
- Facilitate and participate, as necessary, in government on-site inspections.
- Implement internal environmental review/ approval procedure(s) for all applicable site development engineering plans and drawings.
- Monitor environmental effects in the vicinity of the site during the Project's duration.
- Review and approve all contractors' Environmental, Regulatory and Socio-economic (ER&S) plans and procedures as related to activities at the Bull Arm site.
- Report on the EPP in accordance with regulatory requirements.

KKC is the GBS EPC contractor and, as such, has commenced construction of the GBS. KKC is responsible for implementing provisions of the EPP relevant to its scope of work, including the following:

- Early works site refurbishment, and bund wall construction;
- Camp construction and operation;
- Site services;
- GBS construction at the dry dock;
- Bund wall removal, float-out channel enlargement, and ocean disposal of bund wall material;
- Establishment of temporary and permanent moorings at the dry dock and deep water sites, float-out of GBS to the deep water site and GBS ballasting;

- Float out of the completed Topsides modules to the deep water site;
- Mating of the Topsides and GBS; and
- GBS commissioning, support/ transport vessel operation and submergence testing.

WorleyParsons is the Topsides EPC Contractor and is responsible for implementing provisions of the EPP relevant to its scope of work, including the following:

- Construction of selected Topsides modules at the Topsides facility;
- Refurbishment and site services related to operation of the Topsides site;
- Refurbishment of the quay and pier for installation and HUC activities;
- Commissioning of the LQ in the Module Hall and then at the quayside;
- Conducting the module integration test of the drilling modules on the quay;
- Load in of all off-site modules (i.e. Drilling Equipment Set (DES), Drilling Support Module (DSM), Flare Boom, Life Boat Stations, Helideck, and Utilities and Process Module (UPM));
- Installation of the modules at the quayside and pier; and
- Commissioning of the Topsides modules at the pier.

Various provincial and federal government bodies will be involved during the construction, installation and HUC phases, primarily in a regulatory capacity with the issuance of permits, approvals, authorizations, and licenses as required by legislation. These regulatory bodies will be interacting primarily with both EPC contractors, specifically on all work scopes that require a provincial permit. The majority of permits acquired under federal legislation are held in EMCPs name.

This EPP will help ensure benefits to affected communities are realized, and that any negative effects to the environment are appropriately mitigated. As key stakeholders of the Project, commercial fish harvesters who use the Bull Arm area for their activities may be directly affected by Project activities. EMCP will ensure that fish harvesters, as well as the greater community, are kept informed about the Project and planned activities which may affect them and are consulted, as necessary, throughout the entire construction phase.

1.3 Objectives

The main objective of this EPP is to provide a mechanism to control, mitigate and minimize potential negative effects on the environment during the construction phase of the Hebron Project at the Bull Arm site, in accordance with EMCPs Environmental Policy that has been adopted from Exxon Mobil Corporation's Policy (Figure 1-2). Specific objectives of this EPP include:

- Document environmental concerns and appropriate environmental protection procedures pertinent to all personnel involved during construction, installation and HUC phases.
- Provide concise and clear instruction to all personnel regarding the procedures designed to protect the biophysical, socio-economic and commercial fisheries environments and minimize potential negative environmental impacts.
- Meet all regulatory requirements of the federal and provincial governments, and address the environmental concerns expressed by local residents and special interest groups.
- Ensure all commitments made by EMCP, particularly those made in the CSR, to minimize and mitigate environmental impacts, are satisfied.
- Provide a document with sufficient detail for the effective implementation of proposed environmental protection measures during Project construction, installation and HUC activities at the Bull Arm site.

It is Exxon Mobil Corporation's policy to conduct its business in a manner that is compatible with the balanced environmental and economic needs of the communities in which it operates. The Corporation is committed to continuous efforts to improve environmental performance throughout its operations.

Accordingly, the Corporation's policy is to:

- comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist;
- encourage concern and respect for the environment, emphasize every employee's responsibility in environmental performance, and foster appropriate operating practices and training;
- work with government and industry groups to foster timely development of effective environmental laws and regulations based on sound science and considering risks, costs, and benefits, including effects on energy and product supply;
- manage its business with the goal of preventing incidents and of controlling emissions and wastes to below harmful levels; design, operate, and maintain facilities to this end;
- respond quickly and effectively to incidents resulting from its operations, in cooperation with industry organizations and authorized government agencies;
- conduct and support research to improve understanding of the impact of its business on the environment, to improve methods of environmental protection, and to enhance its capability to make operations and products compatible with the environment;
- communicate with the public on environmental matters and share its experience with others to facilitate improvements in industry performance;
- undertake appropriate reviews and evaluations of its operations to measure progress and to foster compliance with this policy

Figure 1 - 2: Exxon Mobil Corporation’s Environmental Policy

1.4 Abbreviations

Abbreviation	Term
CSR	Comprehensive Study Report
DES	Drilling Equipment Set
DSM	Drilling Support Module
DOEC	Department of Environment and Conservation
EMCP	ExxonMobil Canada Properties
EPP	Environmental Protection Plan
E&R	Environmental & Regulatory
ER&S	Environmental, Regulatory and Socio-economic
GBS	Gravity Base Structure
GMC	Great Mosquito Cove
HUC	Hookup and Commissioning
JEA	Job Environmental Analysis
KKC	Kiewit-Kvaerner Contractors
LQ	Living Quarters
MSE	Mechanically Stabilized Earth
MOF	Mechanical Outfitting Facility
NEAL	Northeastern Contractors Ltd -Apply Leirvik Partnership (Living Quarters Contractor)
RFT	Request for Transmittal
SBR	Sequential Batch Reactor
SSH	Safety, Security & Health
SSH&E	Safety, Security, Health & Environment
TCH	Trans-Canada Highway
UPM	Utilities and Processing Module
WorleyParsons	WorleyParsons Canada Services Ltd.

1.5 Overview of Setting & Project Activities

1.5.1 Environmental Setting

1.5.1.1 Baseline

Location

Bull Arm is located on the west side of Trinity Bay, near the northern part of the Avalon Peninsula Isthmus. The Bull Arm site is located in Great Mosquito Cove. The nearest settlement is Sunnyside, approximately 4 km from Great Mosquito Cove on the north end of Bull Arm. The nearest large community is Clarenville, 35 km north on the TransCanada Highway (TCH). St. John's is approximately 165 km to the east.

Bull Arm is approximately 16 km long and averages 1.3 km wide, running north-south. It has water depths up to 100 m near Great Mosquito Cove and up to 150-180 m closer to Trinity Bay.

Meteorology and Climatology

The area is characterized by a maritime climate, with frequent wind, fog, and precipitation. Fog generally blows westerly from Placentia Bay across the isthmus. The 30-year average high and low temperatures in Sunnyside are 4.8 ºC and -4.7 ºC respectively for January, with a highest mean temperature of 15.4^{o}C in August. Environment Canada recorded annual rainfall at 1126.1 mm and snowfall at 149.4 cm.

Terrestrial Environment

The Avalon Peninsula and area has a varied topography and geology shaped by glacial movement and sediment deposition. Bull Arm has a wide relief, with hill peaks reaching 215 m above sea level with moderately steep slopes ranging from 20-70 degrees. The hills and cliffs range from 30-100 m above sea level.

Glacial movement shaped Bull Arm and surrounding area in a northwest to southeast direction. The shores of Bull Arm are barren, consisting of exposed bedrock covered by thin layers of soil and vegetation. The bedrock geology in the area consists of igneous rock on the west side of Bull Arm with sandstone, siltstone, and conglomerates on the east.

Soil in the Sunnyside/ Bull Arm area consists of moderately fine to moderately coarse glacial till. Some organic soils are present, derived from mosses and sedges, found most commonly in depressions or slight slopes. Most of the organic soil is shallow, rarely exceeding 2 m in depth.

The Great Mosquito Cove area has rolling slopes with 3-15% coverage by stone. The soils on steep slopes are more susceptible to erosion once organic overburden has been taken away. The stones may be a good source

of clean fill if needed. There is no permanent cultivation or pasture due to the slope, large volume of stones, excessive water, and shallowness of the soil.

Vegetation and landscape development in the Bull Arm area has been heavily impacted by fire. Compared to nearby coastal ecosystems, Bull Arm supports dominant heath vegetation. Most of the forest cover has been decreased due to fires, poor regeneration, competition from hardier plants, and marginal climate. The forests are not suitable for commercial use due to exposure, moisture problems, low soil fertility and shallow soil which impedes root growth. The exposed barren regions show growths of kalmia, pockets of fir and birch, and mosses.

Freshwater resources in the area include brook trout and brown trout in watersheds draining into Bull Arm. Atlantic salmon have not been reported and there is very little angling activity. Small streams flowing into Bull Arm have steep gradients which hinder movement of anadromous species. Most species of fish seem to be brook trout or other salmonids. Arctic char, three-spined sticklebacks and American eels have been taken from the area as well. The western areas of the cove drain into Placentia Bay through tributaries to Arnold's Cove Brook. Atlantic salmon and brook trout were collected in these watersheds.

The ponds and streams have been described as clear and fresh. Analyses of the water from Little Mosquito Pond have shown all parameters to meet Health Canada acceptable concentrations. The full range of metals, nutrients, and related tests were carried out.

The Little Mosquito Pond area is classified as moderately sensitive to acid precipitation. Pond water has a pH of 6.5 and low alkalinity (25-20 µ eq/L $CaCO_3$). Pond water also has an elevated salinity, with sodium and chloride levels around 100-125 µ eg/L. Calcium, magnesium, and sulphate levels are 50, 50-100, and 50 µ eq/L respectively.

With respect to wildlife, the deep water and steep shores of Bull Arm are suitable for marine birds. At the head of Bull Arm, near Sunnyside, the land is less steep, with shallow water and gravel flats with gravel bars at stream mouths. The gravel provides good resting areas for different species of gull as well as terns. Tens of thousands of birds may roost in the area between January and March.

Osprey and the spotted sand-piper are known to occur in Bull Arm. Bull Island, at the mouth of the arm, can see sea duck populations in the spring. Other water birds may frequent Bull Arm including loons, eider ducks, and murres. Bald eagle nests have also been located along the cliffs, which are important habitat for that species. Great Mosquito Cove, located in a barren region, is not productive for waterfowl, though species such as the ring-necked duck inhabit some of the bodies of water.

Moose can also be common in certain areas. While there is minimal support for moose near the isthmus, forested valleys provide good habitat. Most of the habitat can be found on the Bull Arm side of the isthmus. However, hunting activity is expected to be low due to the inaccessibility of the appropriate

habitats. Other large game includes caribou and black bear, although the Bull Arm area is outside the typical distribution of these species. There are no endangered land mammals or birds known to frequent the area.

Inland, hummocky terrain has formed numerous ponds, small lakes, and bogs in topographic depressions. With no major water courses in the area, drainage is poor with small, low-velocity streams flowing in irregular patterns until they reach the coast and the sea.

Bedrock and surficial aquifers may be considered unconfined and the water table surface generally mirrors changes in topographic relief. The water table fluctuates seasonally, generally rising in the spring and dropping during winter and summer, although some seasonal fluctuations may vary.

Marine Environment

The near shore bathymetry of the Bull Arm site is characterized by a gradually sloping seabed to depths ranging from 9-27 m. Little Mosquito Cove reaches a maximum depth of approximately 16 m. The coastline approaching Great Mosquito Cove drops sharply to depths of 30-88 m. In the cove itself, depths increase dramatically from 13 to 33 m at only 300 m offshore. At the mouth of the cove, deep water ranges from 51-132 m near the centre of Bull Arm. Much of the coastline is steep bedrock and jagged outcrops.

Results of geophysical surveys near Great Mosquito Cove reveal a rugged seafloor with numerous shoals. A natural trench with a depth of approximately 45 m extends from the northwest end of the cove into deeper water. The bottom drops off sharply from both the north and south shorelines. On the north side 14 and 15 m depths can be found less than 10 m from shore. On the south side the bottom drops off with a slope of 200 m. Overall, the central and outer regions of the cove are characterized by deep water (>35 m), while towards the head of the cove depths are often less than 15 m.

The east and northeast shores of Newfoundland are influenced by the Labrador Current as it flows south from Baffin Island, Hudson Bay, and the Labrador Sea. This current generally enters on the north side of east-coast bays (such as Trinity Bay) and exits on the south. The complex and irregularly shaped topography of Bull Arm's coastline causes most of the inshore flow to be locally controlled and the wind-driven currents to be channeled by coastal features. Nearly all year long, the wind has a westerly component with a north-south orientation.

The tide variation is about 0.9 m, but is mixed and semi-diurnal. Only minor currents associated with tides occur with a maximum tidal variation of 1 m at the mouth of Bull Arm and 1.5 m at the head. Waves at a maximum of 1.5 m are generated by easterly / southeasterly winds, but exposure is reduced proceeding inward towards Sunnyside, resulting in low to moderate wave energy.

Trinity Bay has water depths greater than 200 m resulting in thermal stratification in late winter / early spring. A similar, but smaller scale situation occurs in Bull Arm, where depths of 200-300 m have been recorded in the

outer portions. In the winter, water temperatures are fairly homogenous with a temperature of -1.50º to -1.00º C.

Salinity measurements in the waters of Trinity Bay reveal a well-mixed surface layer with salinity less than 32 ppt. The influence of the Labrador Current causes bottom waters to have low temperatures (below 0ºC). Salinities here range from 32.7 to 33.3 ppt. Salinity in Great Mosquito Cove may range from 27.2 to 31.8 ppt depending on depth. Due to the Cove's shallow nature and wind-generated circulation there is no clear stratification in the water column. Salinity values in the inshore deep water sites are in the same range as the shallower Great Mosquito Cove sites. Deep waters in Bull Arm suggest a similar influence by the Labrador Current on Trinity Bay; however, there is no evidence of a saline deep layer.

Biologically, strong blooms in April and May near Sunnyside show chlorophyll α values near 5.5 mg/L at 10 m depths. Concentrations are generally higher in shallow waters but can fluctuate monthly. In sheltered areas such as Great Mosquito Cove a similar situation would be expected. The lack of stratification mentioned above suggests little vertical mixing of nutrients in fall months.

The seabed in Bull Arm tends to be rocky in the outer portions, with mud and sand further inside the Arm. Some areas may be muddy or exhibit a silt-like texture.

Easterly winds frequently cause Trinity Bay to be filled with offshore pack-ice, which is likely to move into Bull Arm. Although this ice does not prove too dangerous to normal shipping it should be accounted for when travelling by water in and out of the bay during this time of the year.

The marine habitat itself in the area consists of bedrock and rubble shorelines with areas of steep cliff. The majority of habitat is a level gravel and mud mixture. Dense kelp inhabits some areas within Great Mosquito Cove itself, with exposed bedrock covering some areas as well. Habitats are generally a mixture of substrates.

Benthic samples collected in Great Mosquito Cove show a diverse community including polychaetes, amphipods and molluscs. Some scallop and mussel beds have also been observed. Shellfish and large crustaceans populating Great Mosquito Cove are rock crab and toad crab.

Many species of fish are common in Bull Arm. These include cod, capelin, herring, salmon, and mackerel. Halibut may be present in deeper waters of the outer arm. Wolfish, eelpout, lumpfish, skate, and cunners may also be observed. These fish occupy three habitat types identified in Great Mosquito Cove: shallow water, rocky bottom, near shore soft bottom with minimal microalgal cover and kelp beds. There is a commercial inshore fishery in Bull Arm which is described in more detail in Chapter 5 of the EPP.

Certain marine mammals have also been sighted in Bull Arm. These include grey seals, harbour porpoises, minke whales, and pothead whales. Concentrations of humpback whales are also frequently spotted in Bull Arm especially during the summer months. Based on the Committee on the Status

of Endangered Wildlife in Canada (COSEWIC) list of vulnerable, threatened, and endangered species, the harbour porpoise is considered threatened and the humpback whale is considered vulnerable. The leatherback turtle, occasionally sighted in Trinity Bay, is considered endangered. More information on species at risk that may occur at the Bull Arm site can be found in Chapter 2, Section 1.21.

Historic Resources

Bull Arm and the Avalon Peninsula Isthmus are very interesting regions archaeologically. Paleo-Eskimo sites are known at Old Perlican (at the tip of the Bay de Verde Peninsula), Sunnyside, and Stock Cove, as well as some islands in Placentia Bay. Beothuk sites have been recorded at Dildo Pond (southeast corner of Trinity Bay) and Placentia Bay. Maritime Archaic and other prehistoric sites, components, and isolated finds have been reported in Sunnyside, Stock Cove, Dildo Pond, Come By Chance, Arnold's Cove and other areas in Placentia Bay and Avalon Peninsula. The suggestion is that many native cultural groups frequented the area, using the isthmus to travel between Placentia Bay, Trinity Bay, and the Avalon Peninsula.

These groups most likely exploited sea mammals in Trinity Bay, arctic hare in the area, small mammals and coastal fish, as well as certain bird species, caribou, and salmon in rivers draining into Placentia Bay.

Little Mosquito Cove and Great Mosquito Cove have moderate potential for the presence of prehistoric sites, since they are located between Sunnyside and Stock Cove. Portions of the coves possess attributes which would have favored native hunters and fishers. Land-based food and resources are near-by and readily available. Abundant fresh water and shelter from winds would have helped settlement and long-term living in the area.

Underwater surveys conducted during the Hibernia Development Project in 1989 found evidence of European travel in the form of ceramics, bowls, and other tools on the south side of the Cove. This may indicate a shore station or exploration party. Minor sites have been found on the north side in Peddle's Cove, the northwest corner of Great Mosquito Cove, and a small bay on the south side of Great Mosquito Cove. These probably relate to temporary settlements or work sites, or small wharves and boat activity. There is potential in both Mosquito Cove, and inland as far as Sunnyside, for European wrecks and artifacts that came to trade with natives.

The lack of substantial artifacts and evidence indicates that Great Mosquito Cove and other areas of Bull Arm were used periodically over a long period of time by many different groups, but occupation was not extensive.

For further information, refer to the Hebron Project CSR, September 2011, and the Hibernia Development Project Platform Construction Site EPP, July 1993 (document reference NBAG-0169).

1.5.2 Bull Arm Schedule

Early works activities (*e.g.,* re-establishment of bund wall, dry dock construction, building refurbishment) concluded in late 2012. GBS construction began in late 2012 and Topsides construction activities commenced in early 2013. HUC activities are expected to commence in 2016, and first oil is anticipated in 2017.

1.5.3 Existing Site Conditions

The Bull Arm facility encompasses an area of 2,833 hectares and existing site conditions include: a 10 km paved internal roadway connected to the TCH; electrical power distribution system connected to the provincial island grid; communications systems; on-site water supply, treatment, and distribution system for domestic water, firefighting water, and industrial water; and a stand-alone sanitary waste collection and treatment system. The main site areas are described further below.

Camp Site and Site Wide Utilities: The camp was originally designed to accommodate 3,500 workers for the Hibernia project. Dormitories no longer exist at the site; however, several other buildings within the "camp site" area still exist. These buildings were not used for the Hebron Project. Throughout late 2012 and into mid-2013 a pre-fabricated camp was constructed. The facility includes a separate kitchen and dining hall; as well as fitness and recreation amenities.

Dry Dock Site: This area has a 40,000 m^2 dry dock excavated to 16 m below sea level as well as marine support infrastructure and associated construction facilities.

Topsides Site: This site covers an area of 120,000 m^2 and it has complete facilities to support the construction of select modules, and Topsides installation and HUC activities.

Back Cove Site: This industrial area comprises 1,200 m^2 of shop space, a ferry dock, and 150 m of water depth near shore.

Deep Water Site: This site is located in Bull Arm with a water depth of 180 m; the water depth in Bull Arm increases towards the mouth of the arm, where it reaches approximately 250 m as it enters Trinity Bay. There are nine onshore mooring points; the mooring arrangement configuration which secures the GBS at the DWS is shown below in Figure 1-3.

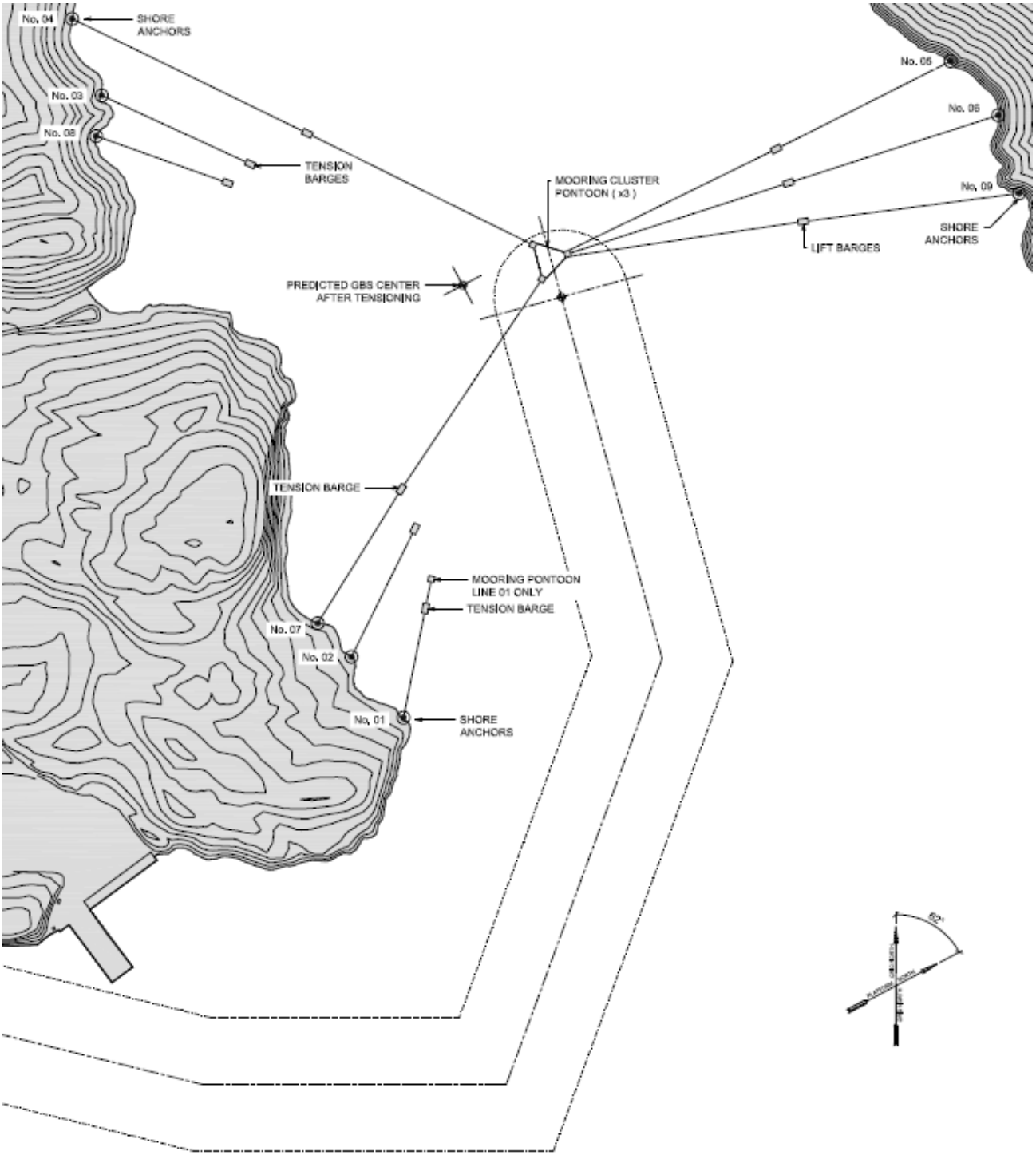

Figure 1 - 3: Hebron Mooring Point Configuration

1.5.3.1 Camp Site and Site Wide Utilities

Access Roads

The existing road system within the Bull Arm facility consists of a paved two lane road within a 30 m wide right of way. In 2012, as part of the Early Works program, all site access roads were repaved.

Site Buildings/ Facilities

All site buildings/ facilities have been assessed for integrity and condition; some buildings have been refurbished to meet Project requirements while some, such as the Topsides Administration building, have been deemed unusable for the duration of construction.

Electrical Power Distribution System

The existing electrical system at the site consists of a radial fed 25kV three phase distribution feeder supported on single wooden pole structures; the feeder is connected to the provincial electrical grid. Major upgrades were undertaken in 2012 at the Topsides electrical substation due to power transformer failures and subsequent power cable failures. These failures necessitated the replacement of two power transformers and the electrical feeder cables supplying the blast and paint shop and module hall.

Water Supply, Treatment, and Distribution System

Little Mosquito Pond services the entire Bull Arm site and is used for domestic water, firefighting water, and process water. A Water Use License from the Water Resources Division of DOEC has been issued to KKC. The system is comprised of a refurbished water treatment (chlorination) plant and a water distribution system which includes a network of underground water lines, and refurbished Back Cove pump houses to meet the water demand for Hebron construction.

In 2012, as was done during the Hibernia Project, a temporary sandbag dam outfitted with an overflow pipe was constructed at the outlet of Little Mosquito Cove Pond to increase the water reservoir capacity in order to ensure supply is met during peak demands while maintaining adequate flow in the outflow stream.

Sanitary Sewer Collection and Treatment System

Upgrades to the existing sewage treatment facility were completed in 2013. Upgrades to the sewage treatment plant at the Bull Arm site were undertaken in a phased approach. Phase I consisted of modifications required to operate the system as an aerated lagoon: a relatively low rate aerobic wastewater treatment process that is commonly used in both municipal and industrial applications. Phase II consisted of the installation of the Sequential Batch Reactor (SBR): a biological wastewater treatment process widely used in the

treatment of municipal and industrial wastewater that operates on a fill and draw basis. This process involves the mixing of raw wastewater with activated sludge which is then aerated and allowed to settle, followed by discharge of the supernatant. The effluent from the decanting SBR is then treated with the UV disinfection system and discharged from the plant.

The building contains ancillary equipment associated with the SBR treatment process including blowers, control panel and motor control centre, UV disinfection, and sludge digesters. There is also a small lab/ storage room in the building.

The treatment plant is located on the west side of the GBS/ dry dock area along the access road to the site. A Permit to Operate has been issued to KKC from Service NL which specifies specific parameters that the plant is to operate within compliance.

Other Facilities

Several other facilities that currently exist at the common area are as follows:

- Medical clinic / fire hall
- Dormitories and core dining / recreational facilities
- Kitchen/ dining hall building
- Generator utility building
- Sewage lift station/ emergency generator building

1.5.3.2 Dry Dock Area and Associated Marine Infrastructure

The existing dry dock site includes marine infrastructure and buildings. The existing buildings include the following:

- Sewage Treatment Plant
- Mechanical Outfitting Facility (MOF)
- Equipment Workshop
- Heated Warehouse
- Rebar/ Prefabrication Shop
- Batch Plants (located at the DWS)
- GBS Office Complex

The existing marine infrastructure of the Bull Arm facility is spread out in several areas within the dry dock, Topsides, Back Cove (Figure 1-5), and deep water site.

The dry dock where GBS construction took place is oval shaped and is approximately 40,000 m^2 in area, 200 m in diameter, and 16.5 m below low tide level. The bund wall was constructed as part of the Early Works program

to isolate the dry dock from the marine environment. There are five quays located inside and outside of the dry dock area: North quay, South quay, Aggregate quay, TC6 Loadout quay and the Cement quay. An aerial photo of the GBS Dry Dock area can be found below in Figure 1-4.

Figure 1 - 4: GBS Dry Dock Area (July 2013)

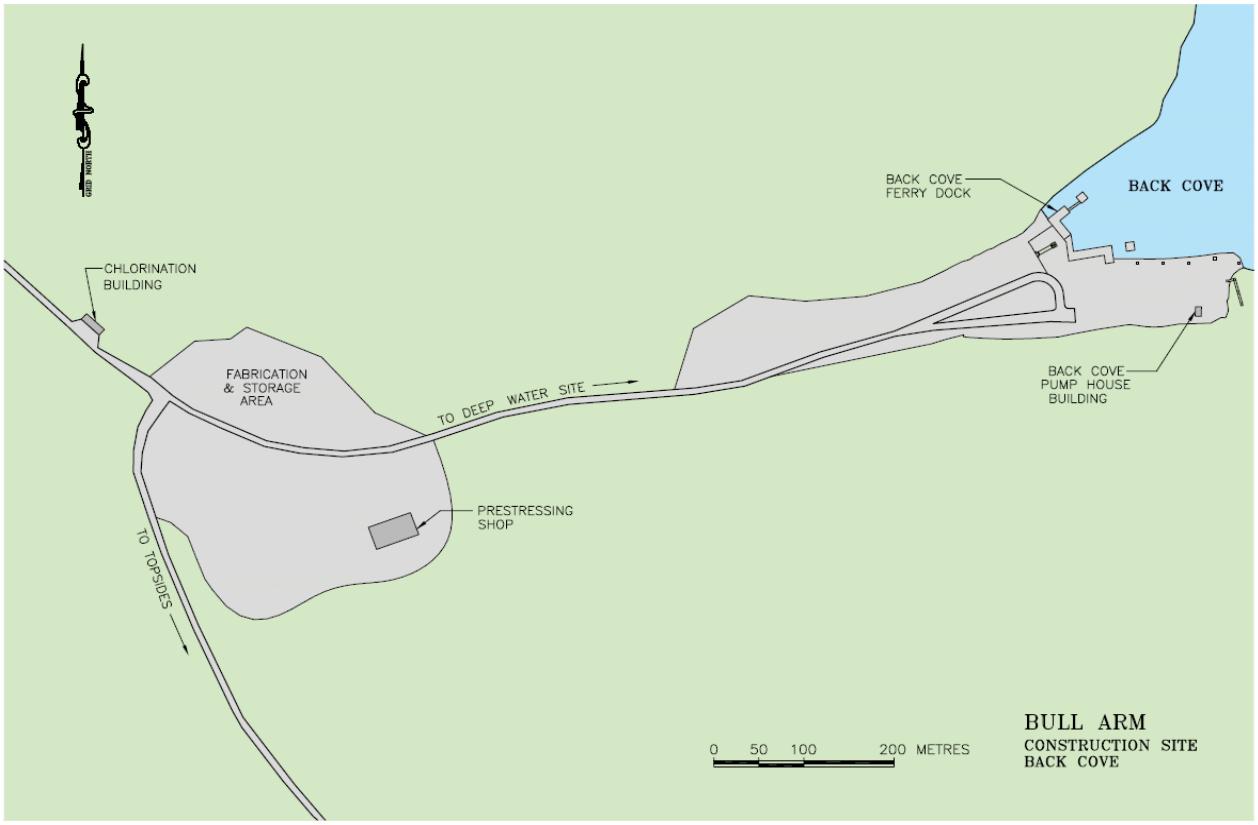

Figure 1 - 5: Back Cove Site

The Topsides area was designed for construction, installation and HUC activities associated with the Topsides modules. The site includes several buildings (Figure 1-6). These buildings are arranged on a two tiered site with the administration building (not utilized during Hebron Project) located on the upper level, with the construction facilities and laydown areas located on the lower level adjacent to the Topsides quay and pier. The Topsides quay is 200 m long with 10 m of water depth at the face, and a 140 m long, 47 m wide pier. The quay and pier were remediated in 2014 in order to safely store and transport the Topsides modules for installation and HUC activities. These are also shown in Figure 1-6.

1.5.3.3 Back Cove and Deep Water Site

The Back Cove site has a ferry dock used to access the GBS at the deep water site. A general layout of the Back Cove site is shown in Figure 1-5.

Nine GBS mooring point structures are positioned along the shores of Bull Arm around the deep water site; six of these mooring points were initially built during Hibernia platform construction, and three additional mooring points were required for the Hebron Project. The six original mooring points are mass reinforced concrete blocks with a steel lined passage through the middle to a reinforced anchor plate at the back of the block. All anchor blocks

are founded on bedrock and secured with post tensioned rock anchor bolts. The three new mooring points are a rock faced anchor type configuration, consisting of steel plates anchored to the prepared rock face. A layout showing the nine GBS mooring points and deep water site is given in Figure 1-3.

Figure 1 - 6: Topsides Site Layout

1.5.4 Project Phases

The various Project phases that will be carried out during near shore construction, installation, and HUC at the Bull Arm facility are described in the sections below. Some of the phases may be concurrent with or overlap with other Project phases.

1.5.4.1 Early Works Program/ Infrastructure Upgrades

A significant part of the Early Works Program involved constructing a bund wall to isolate the dry dock area from the marine environment. The bund wall consisted of a rockfill berm with a cement-bentonite slurry core as an impermeable seal to create the dry dock. The berm material was supplied by a provincial off-site supplier. Once the area was pumped dry, some areas in the floor of the dry dock were blasted to ensure the required depth for GBS construction.

The material source for the rockfill bund wall is a ¾" minus aggregate core encased by a 4" minus rock. The abovementioned cement-bentonite seal sat directly within the ¾" core. Upon completion of bund wall construction, dewatering commenced to pump approximately 800,000 m^3 of seawater from inside the bund wall. Following dewatering, access roads into the dry dock were re-established and construction support infrastructure (offices, cranes, laydown areas, etc.) was refurbished.

Other work during the Early Works program focused on refurbishing the Bull Arm facility to enable it to be used without interruption during Hebron construction, installation and HUC activities

The majority of the work was the responsibility of KKC and consisted of the following:

- Roads/ parking lots: Rehabilitated asphalt paved roadways and parking lots.
- Buildings: Conducted upgrades to buildings that were deemed necessary for the Hebron project scope including associated electrical, mechanical, architectural, structural, and telecommunications systems upgrades.
- Sanitary sewage: Flushed sanitary sewers and conducted a camera investigation of their integrity; repaired manhole frames, covers, and tops; inspected, upgraded, and reactivated sewage treatment plant.
- Water supply: Evaluated existing water treatment and fire protection systems, flushed and re-commissioned the distribution system, and completed miscellaneous minor repairs.
- Site drainage: Cleaned out ditching to improve site drainage and to prevent erosion and sedimentation.
- Electrical distribution: Installed new emergency generator at the camp area and switchgear for the deep water site/ GBS.

- Laydown areas: Re-graded laydown areas.

Topsides Area:

- Building assessment and upgrades: Upgraded Topsides buildings required for the scope of work including associated electrical, mechanical, architectural, structural, fire protection and telecommunications systems.
- Topsides pier assessment: A company subcontracted to WorleyParsons conducted assessments of the Topsides pier in the summer of 2012 and winter of 2013; assessments consisted of a diving program and advancing land and marine-based boreholes to collect geotechnical data for the module travel path, module storage areas, and pier integrity.
- Topsides pier and quay remediation: Based on the results from the Topsides pier assessment, a pier and quay remediation program was completed in 2014. Remediation was required for the safe storage and transport of modules during installation and HUC. Activities included items such as pier slab thickening and crack repair, installing resting beams, repairing fenders and ladders, installing new bollards and a barge landing ramp, removing the pier electrical substation, relocating the lift station, site grading, installing lifting tower foundations, repairing scouring under the pier, etc.

GBS Dry Dock Area:

- GBS quay: Replaced wheel guard; graded and resurfaced deck; repaired fenders.
- Transition quay: Excavated and placed tremie concrete to relieve stress on sheet pile; replaced tie rods and deadman; installed tie rods for cap beam.
- FPSO quay: Replaced wheel guard; installed ladder and fenders; conducted surveys.
- Mooring quay: Removed quay and short sheet piling at south abutment.
- Rebar load-out quay: Inspected and repaired sheet piles (in dry); installed new wheel guards; repaired, cleaned and recoated bollards; re-graded deck surface; corrected drainage.
- Load transfer quay: Quay area has been barricaded to reduce potential safety risk to site personnel; there is no planned use for this quay for Project activities.
- Load-out quay: Load-out quay was partially removed for the construction of the north ramp and refurbished to former condition after dry dock construction just prior to flooding the dry dock.
- Aggregate quay: Inspected sheet pile, installed new wheel guards, replaced fenders and repaired ladders.

- Wooden quay (dry dock): There are no future plans for the dry dock wooden quay; it has been barricaded off to reduce potential safety risk.
- Mechanically Stabilized Earth (MSE) wall: Constructed MSE wall to support re-establishment of dry dock South access ramp; the MSE wall remained in place after dry dock flooding.

Back Cove and Deep Water Site:

- Ferry dock (Back Cove): Refurbished existing dock, constructed new wooden cribs with ballast, installed new wheel guard, installed wood fender support, installed existing fenders, constructed gangways, installed new ladders, and installed new bollard bases.
- GBS Mooring Points: Refurbished six original mooring points and constructed three new mooring points.

Site Operation:

Operation of the Bull Arm facility includes provision of: site wide services, site security, road maintenance/ snow clearing, domestic water, fire water, process water, sewage collection and treatment, accommodations and meals, electrical power, telecommunications, and facilities management.

1.5.4.2 GBS Construction at Dry Dock

Dry construction of the GBS included the installation of steel partitions, called skirts. These skirts underlie the GBS base slab and were prefabricated offsite and transported to the dry dock for installation. The base slab, including mechanical outfitting and the cantilevered base slab roof, was constructed in the dry dock along with portions of the storage cell walls and ice walls. Mechanical and marine outfitting proceeded in the lower levels of the GBS with installation of: permanent and temporary access systems, ballasting systems, grouting systems, safety systems, electrical and instrumentation systems, corrosion protection, and structures for marine towing and mooring.

1.5.4.3 Topsides Construction, Installation, Hookup and Commissioning

The Topsides design is based on the concept of an integrated UPM deck. The UPM will contain the processing and utilities systems, switchgear, instrument rooms, workshops, etc. Space will be provided on the integrated deck for the installation of the remaining Topsides modules.

The LQ module is being constructed at multiple locations across the province with final assembly occurring at Bull Arm. Remaining modules will be fabricated at other locations. Modules fabricated off-site will be shipped to the Bull Arm facility by marine vessel and offloaded to the Topsides quay and pier for installation and HUC. A temporary power installation program will occur at the site prior to the commencement HUC activities.

1.5.4.4 GBS Float-Out to Deep Water Site

After the base slab and lower portions of the GBS walls were completed, the dry dock was cleared of infrastructure and filled with seawater to the level of Great Mosquito Cove. Removal of the bund wall including rock removal allowed passage of the GBS out of the basin to the deep water site where it is moored and undergoing further construction. Excavated bund wall material was disposed at an approved location in GMC; this work was authorized under a Disposal at Sea permit from Environment Canada.

1.5.4.5 GBS Construction at Deep Water Site

In order to secure the GBS at the deep water site in Bull Arm, nine deep water moorings were used; six original deep water moorings were refurbished for use, and an additional three mooring points were newly constructed. The "wet" GBS construction process will be similar to the slip-forming completed in the dry dock, using a floating concrete batch plant, work barges, and other support vessels.

At the deep water site the GBS walls will be extended to full height. Once these walls are constructed and mechanical outfitting of the caisson is completed, a concrete roof slab will be built. This will be followed by construction of the central shaft to support the integrated Topsides facility.

Support and transport barges are required at the floating construction site. Barges are used to locate construction offices, tool cribs and other support buildings. Another barge accommodates the floating concrete batch plant and is designed to prevent release of untreated washwater and spoiled concrete into the environment. Washwater is containerized and transported to shore where it is tested and, if necessary, treated prior to discharging to the marine environment.

A series of transport barges are used to ferry cement, aggregate, reinforcing bars, steel embedment, and mechanical outfitting to the deep water site. These barges are moored to each other and to the GBS with a series of attachment points which move progressively upwards as the structure is built. Critical components of the arrangement are detachable in the case of severe inclement weather conditions. Tugs move transport barges to and from the deep water site. Three passenger ferries are used to transfer personnel to and from shore and the deep water site. Electricity is supplied to the GBS flotilla through two 25 kV power cables resting on the seabed. Fresh water is supplied to the GBS flotilla through two 150 mm diameter HDPE water lines weighted to hold in place.

Seawater ballast will be added to the GBS throughout construction at the deep water site. This water must be added to ensure the freeboard of the GBS is maintained to allow access to the stair towers. Immediately before solid ballast is installed, there will be approximately 35,000 m^3 of water in all annulus, oil storage and tri-cell compartments (approximate total of 238,000 m^3). If required, this water will be treated to control the increase in pH due to

prolonged exposure to the concrete walls of the compartments. During the solid ballast installation, all compartments will be individually de-ballasted so they can be cleaned and prepared to receive solid ballast.

A final stage in the "wet" GBS construction phase will be to ballast the completed structure using a combination of solid ballast and seawater until the required depth is reached. Solid ballast will be brought to the site on bulk carrier barges. A pumping system will then be used to transfer and drop the ballast into the cells. In the storage cells the material will be leveled and capped with a non-structural slab of concrete. Once completed, the ballasted GBS will undergo submergence testing and be prepared for mating with the Topsides.

1.5.4.6 Topsides/ GBS Mating, Hookup and Commissioning

After all modules have been integrated, installed and commissioned at the Topsides assembly pier, the completed Topsides platform will be loaded onto specialized barges in catamaran configuration and floated to the deep water site. After the Topsides platform is in position over the shaft, the GBS will be de-ballasted during mating, and this will lift the Topsides off the barges. HUC and preparation for the tow-out to the offshore Hebron field will continue over the subsequent one to two month period.

1.5.4.7 Platform Tow-Out from Deep Water Site

The completed Hebron Platform (GBS and Topsides) will be towed to its permanent site, 340 km offshore, using six to ten ocean-going tugs traveling along a pre-determined route which will have been thoroughly surveyed beforehand for bathymetry, submerged hazards, etc. The high performance tugs will be arranged in a similar configuration to that used for Hibernia tow-out.

After de-ballasting the GBS to ensure the necessary under keel clearance, the Hebron Platform will be released from its moorings at the deep water site and the tow will begin. During towing there will be tugs running ahead of the platform with other tugs following for back up if needed.

The tow of the platform to the offshore site may require 10 to 14 days. As the accuracy of weather forecasts falls off substantially after about 72 hours, the tow is designed to have a series of intermediate way points where the structure can be safely held. The first way point after leaving the deep water site is at the point where the semi-protected waters of Bull Arm meet the open ocean. Subsequent way points are located near the edge of the Grand Banks and near the Hebron field prior to final approach.

1.5.4.8 Decommissioning of the Bull Arm Site

After the Hebron Platform has been towed out from the deep water site the Bull Arm facility will be decommissioned. This will involve removal of Project equipment, materials, and wastes from the site. An environmental survey will be conducted and affected areas will be cleaned up. Decommissioning

activities will be carried out in consultation with applicable government agencies. Relevant stakeholders will also be consulted and kept informed of the work.

1.6 Organization and Responsibilities

EMCP and its EPC contractors are fully committed to undertaking this Project in an environmentally responsible and acceptable manner which meets or exceeds the EPP and regulatory requirements. The key to successful implementation of the Bull Arm site EPP is through a strong environmental policy and a rigorous, self-regulatory environmental compliance monitoring program.

The Project will monitor itself for compliance with: laws, regulations, guidelines, permits, and authorizations, commitments made in the CSR, contractual commitments, and internal environmental policies and standards which are contained or referenced in this EPP. The primary function of the self-regulatory environmental compliance monitoring program is to ensure that mitigation measures that are specified in this EPP are implemented. The program will ensure that the importance and sensitivity of the environmental concerns/ issues are clearly understood and properly addressed. Self-regulatory compliance monitoring does not replace site visits and inspections by regulatory agencies.

The principal agents of the self-regulatory environmental compliance monitoring program are the Project ER&S team comprised of staff of EMCP, KKC and WorleyParsons. This team is fully apprised of Project environmental issues and concerns, and the local socio-economic context. In addition, the team has a comprehensive knowledge of the EPP, all relevant laws, regulations, permits, approvals, guidelines, CSR commitments, and internal environmental policies.

The EMCP ER&S team will act as the contact with various stakeholders, including regulatory agencies (for permits/ approvals in EMCPs name), commercial fish harvesters, and the broader public. Members of the respective EPC contractor E&R teams may obtain environmental permits on behalf of their organizations and will be in charge of discussions with government bodies or agencies on environmental and regulatory issues for permits held in their name. Key positions having responsibilities for managing and implementing the EPP are summarized below.

EMCP GBS Construction Site Manager:

Based at Bull Arm, this individual oversees GBS construction, quality & safety. The GBS Construction Site Manager reports directly to the EMCP Hebron GBS Project Manager.

EMCP Bull Arm Environment and Regulatory (E&R) Lead:

Based at Bull Arm, this individual reports directly to the EMCP GBS Construction Site Manager and, functionally, to the EMCP ER&S Manager on all ER&S matters. This individual is responsible for the following:

- Monitoring implementation of this EPP
- Managing various environmental studies and monitoring programs
- Participating in community interaction/ fisheries liaison for Project activities at the Bull Arm site
- Liaising with commercial fish harvesters who could potentially be affected by the Project
- Monitoring the implementation of the Hebron Project Fisheries Code of Practice and the Site Marine Traffic Procedure
- Working collaboratively with the site based EPC contractor E&R teams to ensure that all ER&S issues are managed to the satisfaction of EMCP

EMCP Community Relations Advisor:

This individual is based at the Hebron Information Centre and is a member of the Project ER&S team. The Community Relations Advisor oversees the community relations program and is the initial point of contact for the public at the site. This individual will monitor and support implementation of the Socio-economic Environment chapter of this EPP. This position reports to the EMCP GBS Construction Site Manager.

KKC Receptionist/ Administrative Assistant:

This individual is based at the Hebron Information Center at Bull Arm. The Receptionist/ Administrative Assistant will provide administrative support to the Community Relations Advisor as well as cover receptionist duties at the Hebron Information Centre.

KKC Site GBS Construction Manager:

As the senior KKC representative at site, the GBS Construction Manager reports to the Project Director and directs the onsite construction, and Safety, Security, Health & Environment (SSH&E), teams. The KKC Construction Manager reports directly to the KKC GBS Project Director.

KKC Site SSHE Manager

As the site SSHE Manager, roles and responsibilities include exercising line accountability to Project Director for Health, Safety, Security, Emergency Response, Training and E&R reporting. This individual communicates safety and environmental expectations and desired results to project personnel while supporting site policies, procedures and work practices, supports development, implementation, monitoring, verification and closeout of work site actions as prescribed through incident investigation work place assessments and audits and through Lessons Learned for the project.

KKC Site Environment Lead:

Based at Bull Arm, this individual is part of the Project ER&S team; this position supports the KKC Site GBS Construction Manager and reports to the KKC SSH&E Manager. This individual is responsible for execution of all permits under the GBS construction and site operations contract, and will act

as the KKC contact person with regulatory agencies and specialists on site. The KKC Site Environment Lead will also coordinate environmental requirements with GBS engineering disciplines, KKC Marine Operations and site operations personnel and specialists.

WorleyParsons Site Construction Manager:

This individual is responsible for the on-site construction, SS&H, and ER&S teams. The WorleyParsons Construction Manager reports directly to the WorleyParsons LQ, Installation and HUC Delivery Managers.

WorleyParsons Topsides E&R Manager:

This individual is based in St. John's and reports directly to the Topsides SSH&E Director. This position is responsible for providing leadership to the WorleyParsons E&R group, developing/ monitoring E&R plans and procedures, ensuring implementation of the EPP, and overseeing other E&R aspects of Topsides construction activities.

WorleyParsons Site E&R Advisor:

Based at the Bull Arm site, this individual is part of the Project ER&S team and reports to the WorleyParsons Topsides E&R Manager and, on site, to the WorleyParsons Site Construction Manager. This position is responsible for developing/ implementing E&R plans and procedures, interacting with Project personnel on environmental procedures and requirements, and overseeing other E&R aspects of Topsides construction activities.

WorleyParsons Topsides Environment and Regulatory Advisor:

Based in St. John's, this individual is part of the Project ER&S team and reports to the WorleyParsons Topsides E&R Manager. This position also provides site coverage on an as need basis. This position is responsible for developing E&R plans and procedures, preparing and submitting permit/ approval applications, interfacing with federal and provincial regulators on various environmental topics, preparing and submitting applicable reports to regulators, and overseeing other E&R aspects of Topsides construction activities.

Provincial, Federal, and Municipal Government Representatives:

These representatives visit the site periodically to ensure compliance with applicable government regulations and permits, as per the mandates of their respective agencies. They provide information and advice directly to the GBS and Topsides E&R Managers and/ or site E&R representatives.

1.6.1 Mechanisms/ Responsibilities for Implementation

Environmental & Regulatory Compliance Assessments

EPC Contractor compliance assessments are an integral part of ensuring compliance with regulatory and/ or Project specific requirements established by laws, regulations, permits, approvals and/ or internal Project commitments including compliance with commitments made in this EPP. The EMCP ER&S

team implements an annual Environmental & Regulatory Compliance Assessment plan based on scheduled work and associated project environmental risks. Any observations or non–conformance findings are tracked to closure by the EPC contractors.

EPC Contractors are also required to complete compliance assessments on major subcontractors and provide EMCP ER&S team any charters, summary reports, findings, etc.

Job Environmental Analysis (JEA)/ Environmental Planning Checklist

For each new work package that has potential for adverse environmental impact, an in-depth JEA or Environmental Planning Checklist (the Checklist) will be conducted prior to the work commencing. The intent of the JEA/ Checklist is to identify potential ER&S hazards, aspects and appropriate mitigation measures as provided in applicable sections of this EPP. The development of JEA/ Checklist documentation is the responsibility of the individual company or contractor performing the work (See Appendix 1A). Each JEA/ Checklist shall be formally reviewed by a respective EPC E&R representative and front line supervisors. The KKC JEA and WorleyParsons Environmental Planning Checklist document review will integrate scientific principles, technological practices, and construction methods to arrive at appropriate mitigation measures for environmental protection. The review also provides a forum for discussing and agreeing upon improved methods and practices.

Regular Scheduled ER&S Meetings

Regular meetings are held between EMCP, KKC and WorleyParsons ER&S groups. The construction, installation and HUC groups may attend, depending on the scope of work, to review any ER&S aspects and/ or EPP implementation items. Meetings focus on upcoming work scopes that may have ER&S impacts or aspects so that the entire team is in alignment with the proposed work execution approach. These meetings serve to anticipate and resolve ER&S concerns before they arise, or to effectively deal with them should they occur. Non-compliance items identified during routine monitoring activities are tabled for discussion and resolution. In addition, the meetings provide an opportunity to keep all ER&S team members informed of upcoming work activities.

EPC E&R representatives meet with individual work teams to discuss and review their individual work activities at the work face to ensure there is an understanding of the expectations for ER&S performance.

Toolbox Meetings

Toolbox or “tailgate” meetings are short, informal meetings that are held with field crews and supervisors at the beginning of each work shift or prior to a significant work scope commencing. Discussion involves the work task assignment for the day and any associated safety and ER&S concerns,

hazards or positive observations. These meetings also provide the opportunity to discuss ER&S concerns and applicable mitigation measures that apply.

Employee Orientation

As part of the Hebron Project orientation program a comprehensive site orientation is presented to all personnel that arrive at the Project site. New workers at the Site are presented with general information, rules, and procedures to assist them in performing their work safely and with minimal impact to the environment. This site orientation includes elements of this EPP such as spill response and reporting, environmental protection procedures, proper storage and handling of materials, encounters with wildlife and rare/ endangered species, waste management, and emergency response. A deep water site orientation is also provided; in addition to the site orientation each EPC contractor has their own worksite/ discipline specific orientation which also covers relevant ER&S issues.

ER&S Training

EPC Contractors are responsible for conducting additional, more detailed ER&S Training sessions with site and Project personnel. Additional training will be deemed appropriate by EPC Contractor E&R groups and may consist of kick off meetings with new subcontractors, awareness sessions with site management, etc. EPC Contractors are responsible for tracking ER&S training and reporting numbers to EMCP ER&S group.

Environmental Monitoring

Compliance monitoring is an essential component of the Project site activities. This monitoring occurs on an on-going basis by representatives of the EPC E&R management team and construction personnel to ensure site activities are in compliance with environmental permits, approvals and applicable environmental regulations and legislation. Every aspect of the operation is subject to inspection by ER&S site personnel.

The basis for environmental monitoring at the Project site is embodied in this EPP. Conditions of regulatory permits and approvals may also define the scope of monitoring activities.

Non-conformance

Non-conformance with this EPP shall be documented and addressed during daily meetings with the contractor responsible for mitigation measures by the appropriate ER&S representative and documented as per respective EPC contractor incident reporting processes. Corrective actions shall be identified, target dates shall be agreed upon, and responsibilities shall be assigned to appropriate personnel. This documentation shall be distributed to other members of the Project ER&S team, and written notice of agreed corrective action will be forwarded to the responsible contractor so that issues are resolved to the satisfaction of the Project ER&S team.

If serious non-conformance items are noted that require immediate attention, or if agreed corrective action is not implemented in a timely and effective manner, then appropriate resources shall be contracted by EMCP to immediately undertake the required action.

1.6.2 EPP Maintenance

Responsibilities (staff and departmental)

Site Personnel:

- Familiarize themselves with this EPP
- Have knowledge of incident reporting procedures

EPP Holders:

- Keep copies of this EPP up-to-date by ensuring all revisions are entered on the document's Revision Log
- Familiarize themselves and their personnel with this EPP, including all revisions
- Initiate changes to improve and update the plan by submitting Request for Transmittal / Issue (RFT) to the EPP Document Control Coordinator

EPP Document Control

- Hebron Document Control manages document control for the EPP
- Receives RFTs
- Forwards RFTs to the EMCP ER&S Advisor for screening and approval
- Distributes approved revisions to EPP holders

EMCP Bull Arm E&R Lead:

- Reviews and screens RFTs
- Periodically reviews and revises the EPP to ensure the document remains current
- Submits screened RFTs to the EMCP ER&S Manager, and GBS and Topsides Project Managers as applicable
- Approves RFTs in consultation with the EMCP ER&S Manager, and GBS and Topsides Project Managers as applicable
- Forwards approved RFTs and associated Revision Log to the EPP Document Control Coordinator
- Conducts a review of the EPP on an as-needed basis
- Determines if EPP holders and their staff are familiar with the EPP and its procedures

EPP Revisions

This EPP is a controlled document and revisions may only be processed by the EPP Document Control Coordinator. It is anticipated that most of the revisions to this EPP will be initiated by the Bull Arm site ER&S team, or at the Project office in St John's. EMCP staff, provincial and federal government agencies, contractors, and other stakeholders may also request revisions to the EPP. EPP holders may request revisions by forwarding a completed RFT to the EPP Document Control Coordinator. External reviewers should contact the EMCP E&R Advisor; these RFTs will be screened and reviewed. Requests that have been approved by senior members of the ER&S team will be sent to the EPP Document Control Coordinator for processing and distribution to EPP holders.

EPP Revision Procedures

The EMCP Bull Arm E&R Lead must approve, in writing, any revisions. The EPP Document Control Coordinator will issue the approved revisions to all holders of controlled copies of the EPP. Each revision will be accompanied by a Revision Log that:

- Provides revision instructions
- Lists the sections being superseded

Upon receiving a revision, EPP Holders shall:

- Read the text of the revision
- Check the Revision Log to ensure that all the pages have been received
- Remove and destroy the superseded pages
- Insert the revised pages in the proper place
- Page check the manual, using the updated table of contents to ensure the manual is complete and current
- Enter the revision number and the date entered into the EPP's Revision Log
- Incorporate the revision into the area of responsibility, as appropriate
- Ensure that their personnel are familiar with the revisions
- Acknowledge receipt of revisions by forwarding a signed and dated acknowledgement form to the EPP Document Control Coordinator

Appendix 1A
Job Environmental Analysis (KKC) / Environmental Planning Checklist (WorleyParsons)

Environmental Planning Checklist

Section 1: Description of Work:		
	Originator:	
	Subcontractor:	
	Date:	
	Work Identifier:	

Section 2: Plans and Procedures			
Which of the following apply to the planned work?			Identify the sections of the plan/procedure that pertain to the work:
1	Waste Management	☐	
2	Spill Prevention and Response	☐	
3	Discharge Management	☐	
4	Fuelling	☐	
5	Chemical Management	☐	
6	Other:	☐	

Section 3: Hazardous Chemicals and Controlled Products ☐ **N/A**			
List all hazardous chemical / controlled substances to be used during the work	MSDS Attached	Approved for Site	Reviewed with Workforce
1	☐	☐	☐
2	☐	☐	☐
3	☐	☐	☐
4	☐	☐	☐
5	☐	☐	☐
6	☐	☐	☐

Section 4: Waste Management ☐ **N/A**					
Non Hazardous Waste generated	☐Wood	☐Metal	☐C&D	☐Office/Food	☐Other:

Hazardous Waste generated	Type/Class	Hazardous Waste generated	Type/Class
1		7	
2		8	
3		9	
4		10	
5		11	
6		12	

Approved waste containers available	☐Wood	☐Metal	☐C&D	☐Office/Food	☐Other	☐ Haz Waste

Section 5: Emergency Preparedness and Response ☐ **N/A**			
Can a release occur during the planned work?	☐ Y ☐ N	Is there an Emergency Plan applicable to the work?	☐ Y ☐ N
What is the largest volume of fluid that can spill?	_____ L	Are spill kits required?	☐ Y ☐ N
Does the work involve using hazardous material?	☐ Y ☐ N	Are fire extinguishers required?	☐ Y ☐ N
Does the work generate hazardous waste?	☐ Y ☐ N	Does a containment boom need to be deployed?	☐ Y ☐ N
Does ERT need to be notified before work starts?	☐ Y ☐ N	Is there special equipment needed to respond?	☐ Y ☐ N
Are workers trained in EPR?	☐ Y ☐ N	Are there special hazards present?	☐ Y ☐ N

Section 6: Water and Waste Water Management ☐ **N/A**	
How will the water be controlled?: ☐ Pumps ☐ Tanks ☐ Sumps ☐ Vac Truck ☐ Tanker ☐ Manually ☐ Other:	
Will testing be required prior to release of water?: ☐ Y ☐ N	Will hold time be required? ☐ Y ☐ N If yes, how long?:
What parameters will be tested?: ☐Schedule A ☐ TSS ☐ Turbidity ☐ TPH ☐ Chlorine ☐ pH ☐ Other:	
What sampling strategy will be used?: ☐ Grab ☐ Continuous ☐ Batch ☐ Other:	
What lab or equipment will be used?:	Who will collect the samples?:
Erosion/Silt control: ☐Hay bales ☐Silt fence ☐Filter systems ☐Filter bags ☐Silt Curtains ☐Energy dissipation ☐Other:	

Section 7: Mobile and Stationary Equipment							☐ **N/A**
List the equipment that will be used in the execution of the planned work:							
Equipment Description	Full Containment	Spill Kit	Spill Pan	Equipment Description	Full Containment	Spill Kit	Spill Pan
1	☐	☐	☐	7	☐	☐	☐
2	☐	☐	☐	8	☐	☐	☐
3	☐	☐	☐	9	☐	☐	☐
4	☐	☐	☐	10	☐	☐	☐
5	☐	☐	☐	11	☐	☐	☐
6	☐	☐	☐	Additional Equipment listed on attached sheet	☐ Yes	☐ N/A	

Section 8: Fueling and Maintenance	☐ **N/A**
Who will do the fueling : ☐ KKC ☐ Self perform ☐ Other :	
Will there be maintenance of equipment?	☐ Yes ☐ No
Has a designated maintenance area been established?	☐ Yes ☐ No
Notes:	

Section 9: Working Near Water	☐ **N/A**
What is the closest point to open water?	_____ meters
Any special requirements identified (permits, approvals, procedures, plans)?	☐ Yes ☐ No
Is there a plan to address siltation, erosion, and water quality?	☐ Yes ☐ No
Is a water quality monitoring strategy required?	☐ Yes ☐ No
Notes:	

Section 10: Environmental Regulatory Permits	☐ **N/A**
Are environmental regulatory permits or approvals required for the planned work?	☐ Yes ☐ No
Have all conditions listed in the permits and approvals been listed in the work pack?	☐ Yes ☐ No
Are copies of the permits/approval included in the work pack?	☐ Yes ☐ No
Are copies available at the work face?	☐ Yes ☐ No
Is notification required to the regulators prior to commencing work?	☐ Yes ☐ No
If required who will notify the regulator ☐ N/A	Name: Position:

List of Environmental Permits and Approvals	Regulatory Body	Expiry Date (dd/mmm/yyyy)

Section 11: Additional Notes:	☐ **N/A**

Section 12: Submission, Review, and Approvals					
Subcontractor Job Planner		Signature		Date	
Subcontractor E&R		Signature		Date	
Subcontractor Discipline Lead		Signature		Date	
WPF E&R		Signature		Date	
WPF Discipline Lead		Signature		Date	

Job Scope: _____ **Job Name:** _____

Prepared By: _____ **Date:** _____

Area of Concern:	Non-hazardous Waste Generation
Potential Hazard	Preventive Actions

Area of Concern:	Hazardous/Special Waste Generation
Potential Hazard	Preventive Actions

Area of Concern:	Spills to the Environment
Potential Hazard	Preventive Actions

Applicable Standard Operating Procedure and Permit Reference

(Write the title of the appropriate SOP and the Permit Reference# if applicable)

SOP #1_____
SOP #2_____
SOP #3_____
SOP #4_____
SOP #5_____

Permit #1_____
Permit #2_____
Permit #3_____
Permit #4_____
Permit #5_____

This Environmental Analysis had been reviewed and discussed with the following:		
Date	**Printed Name**	**Signature**

FIELD CHANGE ADDITIONS/DELETIONS

Prepared By: _____ **Date:** _____

Issued By: _____

Change No.	**Change Description**

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Appendices

Appendix 2A General Mitigation Measures

2 BIOPHYSICAL ENVIRONMENT

2.1 Purpose

The Biophysical Environment chapter of the Bull Arm site Environmental Protection Plan (EPP) outlines environmental protection mitigation measures and contingency plans which are intended to avoid, minimize and mitigate potential negative effects on the atmospheric, terrestrial, freshwater and marine environments within the Bull Arm site lease boundaries throughout construction, installation, hookup and commissioning (HUC) activities associated with the Hebron Project.

2.2 Scope

The Biophysical Environment chapter of the EPP provides details of the environmental protection mitigation measures and contingency plans to be used at all onshore and marine areas at the Bull Arm site during Project activities. Project activities are described in detail in Chapter 1, Section 1.6.3.

Section 8 of this chapter discusses the major anticipated site activities, the associated specific needs for environmental protection, and introduces mitigation measures with web links to applicable provincial and federal regulations, policy, and guidelines. Section 9 contains contingency plans for accidental and unplanned events that may affect or be associated with Project activities at the Bull Arm site. These contingency measures have also been incorporated into respective Engineering, Procurement and Construction (EPC) spill prevention and response plans for the Gravity Base Structure (GBS) and Topsides areas.

2.3 Objectives

The main objective of the Biophysical Environment chapter is to provide clear environmental protection measures that are to be considered and implemented during Hebron project work at the Bull Arm site. There may be additional measures required as conditions of permits or approvals.

2.4 Abbreviations

Abbreviation	Term
ATVs	All-terrain vehicles
CCG	Canadian Coast Guard
CCME	Canadian Council of Ministers of the Environment
CEPA	Canadian Environmental Protection Act

Abbreviation	Term
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSR	Comprehensive Study Report
CSZ	Construction Safety Zones
DFO	Fisheries and Oceans Canada
DOEC	Newfoundland and Labrador Department of Environment and Conservation
DSM	Drilling Support Module
EEM	Environmental Effects Monitoring
EMCP	ExxonMobil Canada Properties
EPC	Engineering, Procurement and Construction
EPP	Environmental Protection Plan
E&R	Environment and Regulatory
ER&S	Environmental, Regulatory & Socio-economic
GMC	Great Mosquito Cove
HUC	Hookup and commissioning
KKC	Kiewit-Kvaerner-Contractors (GBS Contractor)
LQ	Living Quarters
MSDS	Material Safety Data Sheets
SAR	Species at Risk
SARA	Species at Risk Act
SPMT	Self-Propelled Modular Transporters
STP	Sewage Treatment Plant
TCH	Trans-Canada Highway
WHMIS	Workplace Hazardous Materials Information System

2.5 References

Document Number	Title
EMCP, 2011	The Hebron Project Comprehensive Study Report (CSR), September 2011
GD-PPD-026-1	*Leachable Toxic Waste, Testing and Disposal*, policy of the DOEC Pollution Prevention Division
GDPPD-028-1	*Guidance Documents Dredge Spoils Disposal*, policy of the DOEC Pollution Prevention Division
NBAG-0169	Hibernia Development Project Platform Construction Environmental Protection Plan, July 1993
Southall et al, 2007	Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations. *Aquatic Mammals*, 33: 411-521.

2.6 Overview the Bull Arm Site and Project Activities

2.6.1 Existing Site

The Bull Arm site extends from the Trans-Canada Highway (TCH) to the eastern shoreline of Bull Arm. The site consists of a 10 km paved internal roadway connected to the TCH, an electrical power distribution system connected to the provincial island grid, communications systems, on-site water supply, treatment, and distribution systems for domestic, firefighting, and industrial water, and a stand-alone sanitary waste collection and treatment system. The facility is comprised of three major fabrication areas and a re-established camp area capable of accommodating a large construction workforce. The main site areas are as follows:

Dry Dock Site: This consists of a 40,000 m^2 dry dock excavated to 16 m below sea level, as well as marine support infrastructure and associated fabrication facilities.

Topsides Site: This site covers an area of 120,000 m^2 and it has complete facilities to support the construction of select modules, and installation, HUC and load out of the Topsides.

Deep Water Site: This site is located in Bull Arm with a water depth of 180 m with nine on-shore mooring points (see Chapter 1, Figure 1-3). The water depth in Bull Arm increases towards the mouth of the arm where it reaches approximately 250 m as it enters Trinity Bay. This area will support GBS construction as well as Topsides/ GBS mating and HUC.

Back Cove: This site is comprised of a ferry dock and an industrial area with 1,200 m^2 of shop space.

Camp Area: The camp was originally designed to accommodate 3,500 workers for the Hibernia project. Dormitories no longer exist at the site; however, several other buildings within the “camp site” area still exist. These buildings are not used for the Hebron Project. Throughout late 2012 and into mid-2013 a pre-fabricated camp was constructed to house Project workforce who do not live within daily commuting range of the site. The facility includes a separate kitchen and dining hall as well as fitness and recreational amenities.

2.6.2 Project Activities

Early works activities (e.g., re-establishment of bund wall, dry dock construction, building refurbishment) concluded in late 2012. Following completion of early works activities, construction of the GBS began in late 2012, and then moved to the deep water site in summer 2014 where construction continued.

The LQ module is being constructed at multiple locations across the province with final assembly occurring at Bull Arm. Remaining modules will be fabricated at other locations. Modules fabricated off-site will be shipped to the Bull Arm facility by marine vessel and offloaded to the Topsides quay and pier for installation and HUC. A temporary power installation program will occur at the site prior to the commencement HUC activities.

2.7 Organization and Responsibilities

The ExxonMobil Canada Properties (EMCP) Senior Project Manager is responsible for providing overall direction for the Project and its Environmental, Regulatory and Socio-economic (ER&S) management system, including the Bull Arm EPP. The EMCP ER&S Manager reports to the Senior Project Manager and is responsible for directing the EPP.

At the Bull Arm site, the Project ER&S team will obtain and execute select permits and approvals, conduct compliance monitoring, provide guidance to site EPC E&R representatives and be the point of contact for matters associated with the EPP, including regulatory agencies, commercial fishers and the broader public.

A detailed outline of responsibilities and the maintenance of the EPP is provided in Chapter 1, Section 1.7.

2.8 Environmental Protection Measures

This section comprises the core of the EPP (biophysical), and provides practical, specific guidance for mitigation measures, and where/ when they should be applied.

2.8.1 Early Works Program

2.8.1.1 Refurbishment of Infrastructure and Facilities

The Early Works program focused on refurbishment of the Bull Arm facility to enable it to be used during Project activities. Refer to Chapter 1, Section 1.6.4.1 of this EPP for activities associated with the refurbishment of infrastructure and facilities.

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to the refurbishment of infrastructure and facilities are listed in Table 2-1, and provided in Appendix 2A.

Table 2-1: Environmental Protection Measures – Refurbishment of Infrastructure and Facilities

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Testing	•
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	•
2A.5	Dust Control	•
2A.6	Trenching	•
2A.7	Dewatering – Work Areas/ Dry Dock	
2A.8	Marine Vessels	
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Concrete Production	
2A.13	Linear Developments	
2A.14	Vehicular Traffic	•
2A.15	Works in/ around Marine Environment	•
2A.16	Construction Camp	•
2A.17	Surveying	
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	•
2A.20	Precasting	
2A.21	Species at Risk	•
2A.22	Site Cleanup and Rehabilitation (Onshore)	•
2A.23	Site Cleanup (Deep Water Site)	
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive and Special Areas	
2A.26	Pile Driving	
2A.27	Avifauna Management	•
2A.28	Water Supply	•

Area-Specific Measures

In addition to the environmental protection measures listed above, requirements listed in specific Government permits, approvals and authorizations were followed. Refer to specific permits, approvals and authorizations for more details.

Permits and Authorizations

Table 2-2 is a summary of the various permits and authorizations that pertain to refurbishment of infrastructure and facilities.

Table 2-2: Permits, Authorizations and Approvals for the Refurbishment of Infrastructure and Facilities

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Environment and Conservation					
Water Resources Division	Alteration to a Body of Water (Schedule A to J). This application form is required as well as the appropriate Schedule application form (see below).	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Any activity in or near any body of water. Permit required for any infilling of any water bodies including marine infilling.	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Water Resources Division	Water Use License	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Freshwater or seawater withdrawal for use during Project activities	Water Resource Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Service NL, Government Service Centers	Certificate of Approval – Water & Sewer Distribution System	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Installing, repairing or operating a water or sewage system	Water Resources Act; Environmental Control Water and Sewage Regulations	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Water Resources Division	Application for Permit to Construct a Non-Domestic Well	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	A permit is required to construct a well for non-domestic uses. A non-domestic well is defined as a drilled well intended to supply water for any application other than a single family dwelling, or for the purpose of geothermal heating and cooling.	Water Resources Act, SNL 2002 cW-4.01, Section 58	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Natural Resources					
Forestry Resources Branch	Commercial Cutting/ Operating Permit	http://www.nr.gov.nl.ca/forestry/permits/licence.stm	Removing trees, of any quantity from Crown Land	Forestry Act; Cutting of Timber Regulations	Forest Resources 97 Manitoba Drive, Suite 206 Clarenville, NL, A5A 1K3 Tel: (709) 466-7439
Forestry Resources Branch	Burning Permit	http://www.nr.gov.nl.ca/forestry/permits/licence.stm	Site Clearing and Construction Activities	Forestry Act; Forest Fire Regulations	Forest Resources 97 Manitoba Drive, Suite 206 Clarenville, NL, A5A 1K3 Tel: (709) 466-7439
Wildlife Division	Authorization to Control Nuisance Animals	http://www.nr.gov.nl.ca/forestry/permits/w_licence.stm		The Wildlife Act	Forest Resources 97 Manitoba Drive, Suite 206 Clarenville, NL A5A 1K3 Tel: (709) 466-7439
Service NL					
Service NL	Certificate of Approval – Water Supply >4,500 L/day	http://www.gs.gov.nl.ca/licenses/index.html		Water Resources Act	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Fire and Life Safety Approval	http://www.servicenl.gov.nl.ca/licenses/building/flspr.html	All buildings on site, including temporary trailers.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Building Accessibility Registration or Exemption	http://www.servicenl.gov.nl.ca/licenses/building/baer.html http://www.servicenl.gov.nl.ca/licenses/building/badr.html	All buildings on site, including temporary trailers.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Electrical Installation Permit	http://www.servicenl.gov.nl.ca/licenses/electrical/index.html	Electrical repairs or new installations	Electrical Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	GAP Registration	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Installing and operating all aboveground and underground tanks containing gasoline and associated products	Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Service NL	Used Oil Tank Certificate of Approval	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Installing and operating all used oil tanks	Used Oil Control Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Mobile Fuel Storage Tank Relocation Approval	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Relocating a pre-registered GAP tank	Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Elevator Certificate	http://www.servicenl.gov.nl.ca/licenses/elevating/index.html	Operating an elevator	Amusement Ride and Elevating Devices Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Department of Tourism, Culture and Recreation					
Tourism, Culture and Recreation	Compliance Standard – Historic Resources Act	http://www.tcr.gov.nl.ca/tcr/pao/index.html	Construction and operation.	Historical Resources Act	Provincial Archaeology Office Department of Tourism, Culture and Recreation 2rd Floor, West Block Confederation Building P.O. Box 8700 St. John's, NL A1B 4J6 Tel: (709) 729-2462 Fax: (709) 729- 0870 Email: pao@gov.nl.ca
Tourism, Culture and Recreation	Archaeological Investigation Permit	http://www.tcr.gov.nl.ca/tcr/pao/index.html		Historical Resources Act	Provincial Archaeology Office Department of Tourism, Culture and Recreation 2rd Floor, West Block Confederation Building P.O. Box 8700 St. John's, NL A1B 4J6 Tel: (709) 729-2462 Fax: (709) 729- 0870 Email: pao@gov.nl.ca
Environment Canada – Atlantic Canadian Wildlife Services					
Canadian Wildlife Services	Scientific Permit	N/A	Required for releasing stranded and deceased seabirds	Migratory Birds Convention Act and Regulations	Environment Canada – Atlantic Canadian Wildlife Services 17 Waterfowl Lane Sackville, New Brunswick E4L 1G6 permi.atl@ec.gc.ca

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Fisheries and Oceans					
Department of Fisheries and Oceans	Project Review Form	http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/index-eng.html	Required for work in and near water	Fisheries Act	Fisheries Protection Program Fisheries and Oceans Canada P.O. Box 5667 St. John's, Newfoundland and Labrador A1C 5X1 Telephone: 709-772-4140 Fax: 709-772-5562 Email: FPP-NL@dfo-mpo.gc.ca

2.8.1.2 Dry Dock Re-establishment

The temporary dry dock was re-established at the Bull Arm site in Great Mosquito Cove (GMC). The bund wall consisted of a rockfill berm with a cement-bentonite slurry core which acted as an impermeable seal to create the dry dock. The berm aggregate material was supplied by an off-site supplier, and shipped to site by a third party shipping company via a series of self-offloading vessels.

Upon completion of bund wall construction activities, a dewatering campaign commenced to pump approximately 800,000 m^3 of seawater from inside the enclosure. Following dewatering, access roads into the dry dock were re-established and the construction support infrastructure (offices, cranes, laydown areas, etc.) was refurbished. Some areas in the floor of the dry dock were blasted to ensure the required depth for GBS construction.

Significant activities associated with re-establishing the dry dock included the following:

- Construction of a bund wall
- Blasting (upon dewatering completion)
- Dewatering of dry dock
- Preparation of dry dock area
- Production of concrete; onshore concrete batch plant
- Vessel traffic
- Relocation of fish contained within the dry dock
- Establishment of a safety zone
- Completion of various surveys (*e.g.,* geophysical, geological, geotechnical, environmental, Remotely Operated Vehicle (ROV))

Environmental Concerns

The main environmental concerns associated with re-establishing the dry dock included:

- Sedimentation
- Air emissions
- Bilge water disposal
- Onshore site runoff
- Disposal/ discharge of storm water, domestic water, fire water and industrial water

- Elevated suspended solids
- Fish mortality as a result of dry dock dewatering
- Substrate disturbance
- Loss of sub tidal habitat and organisms
- Potential localized water column contamination
- Proper waste disposal and segregation
- Lights
- Noise (including underwater)
- Potential physical impacts (*e.g.,* blasting)

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to the re-establishment of the dry dock are listed in Table 2-3, and presented in Appendix 2A.

Table 2-3: Environmental Protection Measures – Dry Dock Re-establishment

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Testing	•
2A.3	Quarrying and Aggregate Removal	•
2A.4	Excavations, Embankment and Grading	•
2A.5	Dust Control	•
2A.6	Trenching	
2A.7	Dewatering – Work Areas/ Dry Dock	•
2A.8	Marine Vessels	•
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	•
2A.12	Concrete Production	•
2A.13	Linear Developments	
2A.14	Vehicular Traffic	•
2A.15	Works in/ around Marine Environment	•
2A.16	Construction Camp	
2A.17	Surveying	•
2A.18	Equipment Operations	•

Appendix	Standard Mitigation Measures	Relevance
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	•
2A.20	Precasting	•
2A.21	Species at Risk	•
2A.22	Site Cleanup and Rehabilitation (Onshore)	•
2A.23	Site Cleanup (Deep Water Site)	
2A.24	Fish Relocation during Dry Dock Dewatering	•
2A.25	Sensitive and Special Areas	•
2A.26	Pile Driving	•
2A.27	Avifauna Management	
2A.28	Water Supply	

Area-Specific Measures

To reduce sediment loading during re-establishment of the bund wall the following mitigation measures were implemented:

- The bund wall was constructed using ¾" minus and 4" minus aggregate and a turbidity barrier was installed on the seaward side of the bund wall stretching across GMC. Additionally, a mackerel fishing seine was deployed further seaward from the turbidity barrier. The intent of this extra turbidity measure was to allow the net to become fouled with marine growth creating a natural silt barrier. This method was adopted from the Hibernia construction phase and proved once again effective for Hebron bund wall construction.
- Chemistry of rock and till material was tested prior to placement in the bund wall.
- Minimal movement of anchors was observed as a best practice in order to reduce re-suspension of sediments.
- Where applicable, adherence to Canadian Council of Ministers of the Environment (CCME) Environmental Quality Guidelines for the protection of aquatic life when considered in conjunction with existing ambient water quality and site-specific factors.
- Settlement basins were constructed for concrete wash water.
- A trench was constructed on top of the bund wall to allow extra settling time for effluent pumped from the dry dock.
- Use of best practices, continuous improvement programs and best available technology.

In addition to the environmental protection measures listed above, requirements listed in specific Government permits, approvals and authorizations were followed. Refer to specific permits, approvals and authorizations for more details.

Permits and Authorizations

Table 2-4 is a summary of the various permits, authorizations and approvals that pertain to the re-establishment of the dry dock.

Table 2-4: Permits, Authorizations and Approvals for Re-establishment of the Dry Dock

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Environment and Conservation					
Water Resources Division	Alteration to a Body of Water (Schedule A to H). This application form is required as well as the appropriate Schedule application form (see below).	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Any activity in or near any body of water. Permit required for any infilling of any water bodies including marine infilling.	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Water Resources Division	Schedule F - Stream Modification or Diversion	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	New road construction	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Water Resources Division	Schedule H - Other Alterations	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Other works within 15 meters of a Body of Water.	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Department of Government Services					
Service NL	Certificate of Approval for Waste Management System	http://www.gs.gov.nl.ca/licenses/index.html	Site waste management plan/contract	Environmental Protection Act, 2006	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Tourism, Culture and Recreation					
Tourism, Culture and Recreation	Compliance Standard – Historic Resources Act	http://www.tcr.gov.nl.ca/tcr/pao/index.html	Construction and operation.	Historical Resources Act	Provincial Archaeology Office Department of Tourism, Culture and Recreation 2rd Floor, West Block Confederation Building P.O. Box 8700 St. John's, NL A1B 4J6 Tel: (709) 729-2462 Fax: (709) 729- 0870 Email: pao@gov.nl.ca
Tourism, Culture and Recreation	Archaeological Investigation Permit	http://www.tcr.gov.nl.ca/tcr/pao/index.html		Historical Resources Act	Provincial Archaeology Office Department of Tourism, Culture and Recreation 2rd Floor, West Block Confederation Building P.O. Box 8700 St. John's, NL A1B 4J6 Tel: (709) 729-2462 Fax: (709) 729- 0870 Email: pao@gov.nl.ca
Transport Canada					
Transport Canada	Navigable Waters Protection Act (NWPA)	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Wharf Construction or any activity affecting navigable waters.	Navigable Waters Protection Act	Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca
Transport Canada	Marine Traffic Control Plan	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Bund Wall		Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Transport Canada	Marine Navigation Permits	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Bund Wall		Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca
Transport Canada	Marine Traffic Control Authorization	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Bund Wall		Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca
Transport Canada	Marine Mooring Approvals	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Bund Wall		Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca
Fisheries and Oceans Canada (DFO)					
DFO Fisheries Protection Program	Section 35(2) Fisheries Act Authorization regarding fish protection and pollution prevention	http://www.nfl.dfo-mpo.gc.ca/e0005354	Any activity that results in potential damage to fish	Fisheries Act, Section 35(2)	Manager – Regulatory Review Fisheries Protection Program Fisheries and Oceans Canada PO Box 5667 80 East White Hills Road St. John's NL, A1C 5X1 Admin Phone: 709-772-2443 Office Fax: 709-772-5562 General Inquires: FPP-NL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: FPP-NL@dfo-mpo.gc.ca

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
DFO Fisheries Protection Program	Letter of Advice *If an Authorization is being issued for a particular project component that also requires the application of mitigation measures normally detailed within a Letter of Advice, those mitigation measures will be listed in the Authorization and therefore a Letter of Advice will not be issued*	http://www.nfl.dfo-mpo.gc.ca/e0005354	Any activity that affects fish or fish habitat that is not covered under a Section 35(2) Fisheries Act Authorization	Fisheries Act	Manager – Regulatory Review Fisheries Protection Program Fisheries and Oceans Canada PO Box 5667 80 East White Hills Road St. John's NL, A1C 5X1 Admin Phone: 709-772-2443 Office Fax: 709-772-5562 General Inquires: FPP-NL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: FPP-NL@dfo-mpo.gc.ca
DFO	Experimental, Scientific, Educational or Public Display License (Fish Relocation Program)	http://www.nfl.dfo-mpo.gc.ca/e0005354	Dry Dock Dewatering	The Fisheries Regulations, Section 52	Manager – Regulatory Review Fisheries Protection Program Fisheries and Oceans Canada PO Box 5667 80 East White Hills Road St. John's NL, A1C 5X1 Admin Phone: 709-772-2443 Office Fax: 709-772-5562 General Inquires: FPP-NL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: FPP-NL@dfo-mpo.gc.ca
DFO	Release or Introductions and Transfer License (Fish Relocation Program)	http://www.nfl.dfo-mpo.gc.ca/e0005354	Dry Dock Dewatering	The Fisheries Regulations, Section 56	Manager – Regulatory Review Fisheries Protection Program Fisheries and Oceans Canada PO Box 5667 80 East White Hills Road St. John's NL, A1C 5X1 Admin Phone: 709-772-2443 Office Fax: 709-772-5562 General Inquires: FPP-NL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: FPP-NL@dfo-mpo.gc.ca
Environment Canada					
Environment Canada	Ocean Dumping Permit (Disposal At Sea)	http://www.ec.gc.ca/default.asp?lang=En&n=12AF79B6-1	Application requires the site selection for dumping, volume of dredge and dump, chemical analysis of sediment according to CEPA Regulations.	Canadian Environmental Protection Act (CEPA)	Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097
Environment Canada	Compliance Standard – *Fisheries Act*, Section 36(3), Deleterious Substances	http://www.ec.gc.ca/default.asp?lang=En&n=12AF79B6-1	Any project-related water run-off or discharge	Fisheries Act	Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097

2.8.2 Site Services and Maintenance during Construction (i.e. Site Operations)

Operation of the Bull Arm facility includes provision of site wide services which consists of the following: snow clearing; dust control, waste management, fuel delivery, provision of domestic, fire and process water, sewage collection and treatment, accommodations and meals, electrical power, telecommunications, facilities management, security, and medical services.

Environmental Concerns

The main environmental concerns associated with site operations include:

- Release of fines into bodies of water
- Handling of petroleum product
- Spill prevention and response
- Proper segregation and removal of wastes
- Sewage treatment
- Effluent discharge
- Freshwater use
- Storm water management

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to site services and maintenance during construction are listed in Table 2-5, and presented in Appendix 2A.

Table 2-5: Environmental Protection Measures –Site Services and Maintenance during Construction

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Testing	•
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	•
2A.5	Dust Control	•
2A.6	Trenching	
2A.7	Dewatering – Work Areas/ Dry Dock	

Appendix	Standard Mitigation Measures	Relevance
2A.8	Marine Vessels	
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Concrete Production	
2A.13	Linear Developments	•
2A.14	Vehicular Traffic	•
2A.15	Works in/ around Marine Environment	
2A.16	Construction Camp	•
2A.17	Surveying	•
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	
2A.20	Precasting	
2A.21	Species at Risk	
2A.22	Site Cleanup and Rehabilitation (Onshore)	
2A.23	Site Cleanup (Deep Water Site)	
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive and Special Areas	
2A.26	Pile Driving	
2A.27	Avifauna Management	
2A.28	Water Supply	•

Area-Specific Measures

In addition to the environmental protection measures listed above, the following have been implemented during site operations:

- Requirements listed in specific Government permits, approvals and authorizations (refer to specific permits, approvals and authorizations for more detail).
- Regular monitoring of effluent for constituents in Sections 5 and 6 and Schedule A of the Environmental Control Water and Sewage Regulations, 2003 under the Water Resources Act.
- Canadian Drinking Water Quality Guidelines and Provincial Drinking Water Quality Guidelines will be referenced for bacteriological, disinfection, chemical and physical properties.

Permits and Authorizations

Table 2-6 is a summary of the various permits, authorizations and approvals that pertain to site services and maintenance during construction.

Table 2-6: Permits, Authorizations and Approvals for Site Services and Maintenance during Construction

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Environment and Conservation					
Environmental Assessment Division	Release from Environmental Assessment	http://www.env.gov.nl.ca/env/env_assessment/index.html	General	Environmental Protection Act; Environmental Assessment Regulations	Environmental Assessment Department of Environment and Conservation P.O. Box 8700 St. John's, NL, A1B 4J6 Toll Free: 1-800-563-6181 Tel: (709) 729-4211 Fax: (709) 729-5518
Water Resources Division	Alteration to a Body of Water (Schedule A to H). This application form is required as well as the appropriate Schedule application form (see below).	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Any activity in or near any body of water. Permit required for any infilling of any water bodies including marine infilling.	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Water Resources Division	Schedule H - Other Alterations	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Other works within 15 meters of a Body of Water.	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Water Resources Division	Certificate of Approval for Site Drainage	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Water run-off from the project site.	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Water Resources Division	Water Use Authorization	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Water withdrawal for use during construction and/or operation	Water Resource Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Water Resources Division	Application for Permit to Construct a Non-Domestic Well	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	A permit is required to construct a well for non-domestic uses. A non-domestic well is defined as a drilled well intended to supply water for any application other than a single family dwelling, or for the purpose of geothermal heating and cooling.	Water Resources Act, SNL 2002 cW-4.01, Section 58	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Pollution Prevention Division	Approval for Plant Process	http://www.env.gov.nl.ca/env/department/branches/divisions/pollution.html	A certificate of approval may be required for any industrial or processing works. Submit plans for each process for approval, i.e. concrete production, rebar, etc.)		Pollution Prevention Department of Environment and Conservation 4th Floor, West Block Confederation Building P.O. Box 8700 St. John's, NL, A1B 4J6 Tel: (709) 729-2555 Tel: (709) 729-2556 Fax: (709) 729-6969
Pollution Prevention Division	Certificate of Approval for prime power generating facilities	http://www.env.gov.nl.ca/env/department/branches/divisions/pollution.html	A certificate of approval is required for prime power generating facilities having a total installed capacity greater than 100kW and for standby generating facilities having a total installed capacity greater than 100kW and which operate or are anticipated to operate more than 500 hours per year.		Pollution Prevention Department of Environment and Conservation 4th Floor, West Block Confederation Building P.O. Box 8700 St. John's, NL, A1B 4J6 Tel: (709) 729-2555 Tel: (709) 729-2556 Fax: (709) 729-6969
Department of Natural Resources					
Mines and Energy Branch	Magazine License	http://www.nr.gov.nl.ca/mines&en/permits/		Explosives Act	Department of Natural Resources Natural Resources Building 50 Elizabeth Avenue P.O. Box 8700 St. John's, NL A1B 4J6
Mines and Energy Branch	Explosives Transportation Permit	http://www.nr.gov.nl.ca/mines&en/permits/		Explosives Act	Department of Natural Resources Natural Resources Building 50 Elizabeth Avenue P.O. Box 8700 St. John's, NL A1B 4J6
Department of Government Services					
Service NL	Certificate of Approval – Sewage Treatment Plant	http://www.gs.gov.nl.ca/licenses/index.html	Effluent Discharge	Water Resources Act; Environmental Control Water and Sewage Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Service NL	Certificate of Approval – Water Supply >4,500 L/day	http://www.gs.gov.nl.ca/licenses/index.html		Water Resources Act; Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Certificate of Approval – Storage and Handling of Gasoline and associated products.	http://www.gs.gov.nl.ca/licenses/index.html		Environmental Protection Act	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Certificate of Approval – Water & Sewer Distribution System	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html		Water Resources Act; Environmental Control Water and Sewage Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Permit for Flammable and Combustible Liquid Storing and Dispensing (Above or Below Ground) and for Bulk Storage (above ground only)	http://www.gs.gov.nl.ca/licenses/index.html		Environmental Protection Act; Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Used Oil Storage Tank System Application	http://www.gs.gov.nl.ca/licenses/index.html	All Waste Oil Tanks	The Used Oil Control Regulations, Section 19	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Storage Tank System Application	http://www.gs.gov.nl.ca/licenses/index.html	All Storage Tanks on Site.	Environmental Protection Act; Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Mobile Fuel Storage Tank Relocation	http://www.gs.gov.nl.ca/licenses/index.html	Relocation of tanks at site		Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Compliance Standards – National Fire Code, National Building Code and Life Safety Code	http://www.gs.gov.nl.ca/licenses/index.html	All Buildings on Site.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Service NL	Building Accessibility Exemption	http://www.gs.gov.nl.ca/licenses/index.html	All Building on Site	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Statutory Declaration for Registration of Boiler and Pressure Vessel Fittings Fabricated in Newfoundland and Labrador	http://www.gs.gov.nl.ca/licenses/index.html		Public Safety Act; The Boiler, Pressure Vessel and Compressed Gas Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Certificate of Approval for Plant Registration for Power, Heat, Refrigeration, Compressed Gas or Combined Plant	http://www.gs.gov.nl.ca/licenses/index.html			Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Permission for Development	http://www.gs.gov.nl.ca/licenses/index.html	Was required for initial development at Bull Arm	Urban and Rural Planning Act, 2000	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Highway Access Permit	http://www.gs.gov.nl.ca/licenses/index.html	Changes to highway assess/entrance	Urban and Rural Planning Act, 2000	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Development of Protected Road Corridor Permit	http://www.gs.gov.nl.ca/licenses/index.html	Any work taking place within 400m of the TCH.	Urban and Rural Planning Act, 2000	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Certificate of Approval for a Waste Management System	http://www.gs.gov.nl.ca/licenses/index.html	Early Works	Environmental Protection Act, 2006	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Compliance Standard – Occupational Health and Safety	http://www.gs.gov.nl.ca/ohs/index.html	Project-related employment	Occupational Health and Safety Acts and Regulations	Occupational Health & Safety 15 Dundee Avenue Mount Pearl, NL A1N 4R6 Tel: (709) 729-2706 Fax: (709) 729-3445
Department of Transportation and Works					

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Transportation and Works	Compliance Standard – Storing, handling and transporting dangerous goods	http://www.env.gov.nl.ca/env/department/legislation.html	General	Dangerous Goods Transportation Act and Regulations	Transportation and Works P.O. Box 8700 Confederation Building Prince Philip Drive St. John's, NL A1B 4J6 Telephone: 1-709-729-2300 Email: tw@gov.nl.ca
Department of Tourism, Culture and Recreation					
Tourism, Culture and Recreation	Compliance Standard – Historic Resources Act	http://www.tcr.gov.nl.ca/tcr/pao/index.html	Construction and operation.	Historical Resources Act	Provincial Archaeology Office Department of Tourism, Culture and Recreation 2rd Floor, West Block Confederation Building P.O. Box 8700 St. John's, NL A1B 4J6 Tel: (709) 729-2462 Fax: (709) 729- 0870 Email: pao@gov.nl.ca
Tourism, Culture and Recreation	Archaeological Investigation Permit	http://www.tcr.gov.nl.ca/tcr/pao/index.html		Historical Resources Act	Provincial Archaeology Office Department of Tourism, Culture and Recreation 2rd Floor, West Block Confederation Building P.O. Box 8700 St. John's, NL A1B 4J6 Tel: (709) 729-2462 Fax: (709) 729- 0870 Email: pao@gov.nl.ca
Town of Sunnyside, Arnold's Cove and Come By Chance					
	Construction/Development Plan	http://www.ma.gov.nl.ca/ma/department/legislation.html	Usually a letter from council	Municipal Act	Department of Municipal Affairs Main Floor (West Block) Confederation Building P.O. Box 8700 St. John's, NL A1B 4J6 Email: MAinfo@gov.nl.ca
Transport Canada					
Transport Canada	Compliance with the applicable regulations under the Transportation of Dangerous Good Act	http://www.tc.gc.ca/eng/tdg/safety-menu.htm	Storage, Handling and Transportation of fuel and chemicals	Dangerous Goods Transportation Act and Regulations	Atlantic 1-866-814-1477
Transport Canada	Review and Approval for all Stream Crossings (NWPA)	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	(any stream crossings)	Navigable Waters Protection Act	Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Transport Canada	Oil Pollution Emergency Plan	http://www.tc.gc.ca/eng/marinesafety/oep-ers-regime-menu-1780.htm	Oil Handling Facility	Canada Shipping Act, Part 8	Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca
Fisheries and Oceans Canada (DFO)					
DFO Fisheries Protection Program	Letter of Advice	http://www.dfo-mpo.gc.ca/habitat/habitat-eng.htm	Any activity that affects fish or fish habitat that is not covered under a Section 35(2) Fisheries Act Authorization	Fisheries Act	Manager – Regulatory Review Fisheries Protection Program Fisheries and Oceans Canada PO Box 5667 80 East White Hills Road St. John's NL, A1C 5X1 Admin Phone: 709-772-2443 Office Fax: 709-772-5562 General Inquires: FPP-NL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: FPP-NL@dfo-mpo.gc.ca
Environment Canada					
Environment Canada	Compliance Standard – *Fisheries Act*, Section 36(3), Deleterious Substances	http://www.dfo-mpo.gc.ca/acts-loi-eng.htm#1	Any project-related water run-off or discharge	Fisheries Act	Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097
Environment Canada	Scientific Research Permit (Wildlife Permit)	http://www.env.gov.nl.ca/env/forms/parks/permit_application.pdf	Bird Handling associated with stranded birds.		Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097
Canadian Wildlife Service	Compliance Standard, Migratory Birds Convention Act and Regulations	http://www.ec.gc.ca/alef-ewe/default.asp?lang=En&n=2140D763-1	Any activities which could result in the mortality of migratory birds and endangered species and any species under federal authority.	Migratory Birds Convention Act and Regulations	Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097
Industry Canada					
Industry Canada	Communications License	http://www.ic.gc.ca/eic/site/sd-preprod.nsf/eng/h_00023.html	General		Industry Canada John Cabot Building, 10th Floor 10 Barter's HillP.O. Box 8950 St. John's, NL, A1B 3R9 Telephone: 709-772-4866 Fax: 709-772-5093

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Industry Canada	Radio Station License	http://www.ic.gc.ca/eic/site/sd-preprod.nsf/eng/h_00023.html	Use of radios on site		Industry Canada John Cabot Building, 10th Floor 10 Barter's HillP.O. Box 8950 St. John's, NL, A1B 3R9 Telephone: 709-772-4866 Fax: 709-772-5093
Canadian Wildlife Service					
Environment Canada Canadian Wildlife Services	Bird Handling/Salvage Permit		The handling of birds on vessels or on the Project site	The Leach's Storm Petrel: General Information and Handling Instructions	Canadian Wildlife Services P.O. Box 6227 Sackville, NB E4L 1G6 Tel: (506) 364-5044 Email: permi.atl@ec.gc.ca

2.8.3 GBS Construction at Dry Dock Site

Construction of the base slab was completed in late 2013, and center shaft construction concluded in 2013. The reinforced concrete walls and center shaft were built by slip-forms. Slip-forming is a process of continually pouring high-strength concrete, reinforced by steel, into a form that moves vertically with the assistance of hydraulic or screw jacks.

Activities associated with GBS construction at the dry dock include:

- Concrete batch plant operation
- Slip-forming
- Marine vessel traffic, loading, and unloading

Environmental Concerns

The main environmental concerns associated with GBS construction at dry dock included:

- Release of fines, petroleum product, hazardous materials, and other deleterious substances into the near shore and marine environment
- Air emissions
- Waste segregation, storage and disposal

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to the GBS construction at dry dock are listed in Table 2-7, and presented in Appendix 2A.

Table 2-7: Environmental Protection Measures – GBS Construction at Dry Dock Site

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Monitoring	
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	•
2A.5	Dust Control	•
2A.6	Trenching	
2A.7	Dewatering – Work Areas/ Dry Dock	•
2A.8	Marine Vessels	•
2A.9	Pumps and Generators	•

Appendix	Standard Mitigation Measures	Relevance
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Concrete Production	•
2A.13	Linear Developments	
2A.14	Vehicular Traffic	•
2A.15	Works in/ around Marine Environment	•
2A.16	Construction Camp	
2A.17	Surveying	•
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	
2A.20	Precasting	•
2A.21	Species at Risk	
2A.22	Site Cleanup and Rehabilitation (Onshore)	•
2A.23	Site Cleanup (Deep Water Site)	
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive and Special Areas	
2A.26	Pile Driving	
2A.27	Avifauna Management	
2A.28	Water Supply	

Area-Specific Measures

In addition to the environmental protection measures listed above, requirements listed in specific Government permits, approvals and authorizations will be followed. Refer to specific permits, authorizations and approvals for more details.

Permits and Authorizations

Table 2-8 is a summary of the various permits, authorizations and approvals pertaining to the GBS construction at the dry dock site.

Table 2-8: Permits, Authorizations and Approvals for GBS Construction at Dry Dock Site

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Government Services					
Service NL	Registration – Storage and Handling of Gasoline and associated products	http://www.gs.gov.nl.ca/licenses/index.html		Environmental Protection Act and the Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Permit for Flammable and Combustible Liquid Storing and Dispensing (Above or Below Ground) and for Bulk Storage (above ground only)	http://www.gs.gov.nl.ca/licenses/index.html		Environmental Protection Act; Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Used Oil Storage Tank System Application	http://www.gs.gov.nl.ca/licenses/index.html	All Waste Oil Tanks	The Used Oil Control Regulations, Section 19	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Storage Tank System Application	http://www.gs.gov.nl.ca/licenses/index.html	All Storage Tanks on Site.	Environmental Protection Act; Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Mobile Fuel Storage Tank Relocation	http://www.gs.gov.nl.ca/licenses/index.html	Relocation of tanks at site		Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Certificate of Plant Registration for Power, Heat, Refrigeration, Compressed Gas or Combined Plant	http://www.gs.gov.nl.ca/licenses/index.html			Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Department of Transportation and Works					
Transportation and Works	Compliance Standard – Storing, handling and transporting dangerous goods	http://www.tc.gc.ca/eng/tdg/safety-menu.htm	General	Dangerous Goods Transportation Act and Regulations	Transportation and Works P.O. Box 8700 Prince Philip Drive Confederation Building St. John's, NL A1B 4J6 Telephone: 1-709-729-2300 Email: tw@gov.nl.ca
Transport Canada					
Transport Canada	Compliance with the applicable regulations under the Transportation of Dangerous Good Act	http://www.tc.gc.ca/eng/tdg/safety-menu.htm	Storage, Handling and Transportation of fuel and chemicals	Dangerous Goods Transportation Act and Regulations	Atlantic 1-866-814-1477

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Transport Canada	Navigable Waters Protection Act (NWPA)	http://www.tc.gc.ca/eng/quebec/nwp-menu-1424.htm	For construction within Navigable Waters	Navigable Waters Protection Act (NWPA)	Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca
Environment Canada					
Environment Canada	Compliance Standard – *Fisheries Act*, Section 36(3), Deleterious Substances	http://www.dfo-mpo.gc.ca/acts-loi-eng.htm#1	Any project-related water run-off or discharge	Fisheries Act	Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097

2.8.4 Living Quarters Module Construction

LQ Module construction commenced in 2013 and is anticipated to be completed in late 2015. The LQ module is being constructed at multiple locations across the province with final assembly occurring at Bull Arm. Remaining modules will be fabricated at other locations.

The principal environmental concern associated with LQ module construction is releasing petroleum products, hazardous materials and other deleterious substances to land. The majority of the work activities are conducted inside.

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to the LQ Module construction and assembly are listed in Table 2-9, and presented in Appendix 2A.

Table 2-9: Environmental Protection Measures – LQ Module Construction

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Monitoring	•
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	
2A.5	Dust Control	•
2A.6	Trenching	
2A.7	Dewatering – Work Areas/ Dry Dock	
2A.8	Marine Vessels	•
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Concrete Production	
2A.13	Linear Developments	
2A.14	Vehicular Traffic	•
2A.15	Works in/ around Marine Environment	
2A.16	Construction Camp	
2A.17	Surveying	
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	
2A.20	Precasting	
2A.21	Species at Risk	•

Appendix	Standard Mitigation Measures	Relevance
2A.22	Site Cleanup and Rehabilitation (Onshore)	
2A.23	Site Cleanup (Deep Water Site)	
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive or Special Areas	
2A.26	Pile Driving	
2A.27	Avifauna Management	•
2A.28	Water Supply	

Area-Specific Measures

In addition to the environmental protection measures listed above, requirements listed in specific Government permits, approvals and authorizations will be followed. Refer to specific permits, approvals and authorizations for more details.

Permits and Authorizations

Table 2-10 is a summary of the various permits, authorizations and approvals pertaining to the LQ Module construction.

Table 2-10: Permits, Authorizations and Approvals for LQ Module Construction

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Service NL					
Service NL	Fire and Life Safety Approval	http://www.servicenl.gov.nl.ca/licenses/building/flspr.html	All buildings on site, including temporary trailers.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Building Accessibility Registration or Exemption	http://www.servicenl.gov.nl.ca/licenses/building/baer.html http://www.servicenl.gov.nl.ca/licenses/building/badr.html	All buildings on site, including temporary trailers.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Electrical Installation Permit	http://www.servicenl.gov.nl.ca/licenses/electrical/index.html	Electrical repairs or new installations	Electrical Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	GAP Registration	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Installing and operating all aboveground and underground tanks containing gasoline and associated products	Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Used Oil Tank Certificate of Approval	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Installing and operating all used oil tanks	Used Oil Control Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Mobile Fuel Storage Tank Relocation Approval	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Relocating a pre-registered GAP tank	Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Service NL	Elevator Certificate	http://www.servicenl.gov.nl.ca/licenses/elevating/index.html	Operating an elevator	Amusement Ride and Elevating Devices Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Department of Transportation and Works					
Transportation and Works	Compliance Standard – Storing, handling and transporting dangerous goods	http://www.assembly.nl.ca/legislation/sr/statutes/d01.htm	General	Dangerous Goods Transportation Act and Regulations	Transportation and Works P.O. Box 8700 Prince Philip Drive Confederation Building St. John's, NL A1B 4J6 Telephone: 1-709-729-2300 Email: tw@gov.nl.ca
Transport Canada					
Transport Canada	Compliance with the applicable regulations under the Transportation of Dangerous Good Act	http://www.tc.gc.ca/eng/tdg/safety-menu.htm	Storage, Handling and Transportation of fuel and chemicals	Dangerous Goods Transportation Act and Regulations	Atlantic 1-866-814-1477
Environment Canada – Atlantic Canadian Wildlife Services					
Canadian Wildlife Services	Scientific Permit	N/A	Required for releasing stranded and deceased seabirds	Migratory Birds Convention Act and Regulations	Environment Canada – Atlantic Canadian Wildlife Services 17 Waterfowl Lane Sackville, New Brunswick E4L 1G6 permi.atl@ec.gc.ca

2.8.5 Pier and Quay Assessment, Pier and Quay Remediation, and Temporary Power Installation

In order to safely transport, store and commission the Topsides Modules a number of required activities were identified.

In 2012 and 2013, pier and quay assessments were completed; these assessments consisted of advancing numerous land and marine-based boreholes to determine the extent of remediation required.

A pier and quay remediation program was completed in 2014. The following activities were completed as part of this program: this program consisted of numerous activities such as, but not limited to:

- Removal of the pier substation
- Removal of underground utilities
- Site grading
- Installation of lifting tower foundations
- Installation of piles and concrete pad for the barge landing ramp
- Repair of scouring under the pier caisson
- Removal and installation of bollards, fenders, wheel guards, beacon light, and ladders
- Removal of concrete blocks
- General repair of pier (ex. cracks, slab thickening, and installation of fender support frame and Supercone fenders)

In 2015, temporary power will be installed in various areas on site such as the Module Hall for LQ commissioning, quayside for LQ commissioning, quay for the Module Integration Test (MIT) for the DES-DSM, and pier for Topsides HUC. Temporary power installation will consist of various electrical activities and civil works such as excavating trenches, installing cables, backfilling and grading. As well as grading required in the temporary trailer and MIT areas. After HUC activities are completed, the temporary power will be decommissioned and removed.

Environmental Concerns

The principal environmental concern associated with pier and quay assessment/ remediation, and temporary power installation is the release of fines, petroleum products, hazardous materials and other deleterious substances to land or water. The majority of these work activities are conducted near or in the marine environment.

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to pier and quay assessments/ remediation, and temporary power installation are listed in Table 2-11, and presented in Appendix 2A.

Table 2-11: Environmental Protection Measures – Pier and Quay Assessment, Pier and Quay Remediation, and Temporary Power Installation

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Monitoring	•
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	•
2A.5	Dust Control	•
2A.6	Trenching	•
2A.7	Dewatering – Work Areas/ Dry Dock	•
2A.8	Marine Vessels	
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Concrete Production	
2A.13	Linear Developments	
2A.14	Vehicular Traffic	•
2A.15	Works in/ around Marine Environment	•
2A.16	Construction Camp	
2A.17	Surveying	
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	•
2A.20	Precasting	
2A.21	Species at Risk	•
2A.22	Site Cleanup and Rehabilitation (Onshore)	
2A.23	Site Cleanup (Deep Water Site)	
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive or Special Areas	
2A.26	Pile Driving	•
2A.27	Avifauna Management	•
2A.28	Water Supply	•

Area-Specific Measures

In addition to the environmental protection measures listed above, requirements listed in specific Government permits, approvals and authorizations will be followed. Refer to specific permits, approvals and authorizations for more details.

Permits and Authorizations

Table 2-12 is a summary of the various permits, authorizations and approvals pertaining to pier and quay assessments/ remediation, and temporary power installation.

Table 2-12: Permits, Authorizations and Approvals for Pier and Quay Assessments/ Remediation, and Temporary Power Installation

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Service NL					
Service NL	Fire and Life Safety Approval	http://www.servicenl.gov.nl.ca/licenses/building/flspr.html	All buildings on site, including temporary trailers.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Building Accessibility Registration or Exemption	http://www.servicenl.gov.nl.ca/licenses/building/baer.html http://www.servicenl.gov.nl.ca/licenses/building/badr.html	All buildings on site, including temporary trailers.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Electrical Installation Permit	http://www.servicenl.gov.nl.ca/licenses/electrical/index.html	Electrical repairs or new installations	Electrical Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	GAP Registration	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Installing and operating all aboveground and underground tanks containing gasoline and associated products	Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Used Oil Tank Certificate of Approval	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Installing and operating all used oil tanks	Used Oil Control Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Mobile Fuel Storage Tank Relocation Approval	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Relocating a pre-registered GAP tank	Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Environment and Conservation					
Department of Environment and Conservation	Permit to Alter a Body of Water	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Work in and near a body of water.	Water Resources Act	Department of Environment and Conservation Water Resources Management Division PO Box 8700, St. John's NL A1B 4J6 Attention: Manager, Investigations Section Email: waterinvestigations@gov.nl.ca Fax: 709-729-0320
Department of Environment and Conservation	Water Use License	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Extracting seawater for work activities	Water Resources Act	Department of Environment and Conservation Water Resources Management Division PO Box 8700, St. John's NL A1B 4J6 Attention: Manager, Investigations Section Email: waterinvestigations@gov.nl.ca Fax: 709-729-0320
Department of Fisheries and Oceans					
Department of Fisheries and Oceans	Project Review Form	http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/index-eng.html	Required for work in and near water	Fisheries Act	Fisheries Protection Program Fisheries and Oceans Canada P.O. Box 5667 St. John's, Newfoundland and Labrador A1C 5X1 Telephone: 709-772-4140 Fax: 709-772-5562 Email: FPP-NL@dfo-mpo.gc.ca

2.8.6 Topsides Module Load In and Installation

Several modules will be fabricated at other locations and will be transported by marine vessels to the Topsides site. The UPM will be offloaded on the Pier while all other modules will be offloaded on the quay and stored in various areas on site until ready to be installed on the UPM. Module offloading, transportation and installation onto the UPM will be conducted by using a combination of self-propelled modular transporters (SPMTs), barges and/ or lifting towers.

Environmental Concerns

The principal environmental concern associated with Topsides module load in and installation is the release of petroleum products to land or water from SPMTs and/ or lifting equipment.

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to the Topsides module load in and installation are listed in Table 2-13, and presented in Appendix 2A.

Table 2-13: Environmental Protection Measures – Topsides Module Load In and Installation

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Monitoring	•
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	
2A.5	Dust Control	•
2A.6	Trenching	
2A.7	Dewatering – Work Areas/ Dry Dock	
2A.8	Marine Vessels	•
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Concrete Production	
2A.13	Linear Developments	
2A.14	Vehicular Traffic	•
2A.15	Works in/ around Marine Environment	•
2A.16	Construction Camp	

Appendix	Standard Mitigation Measures	Relevance
2A.17	Surveying	
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	
2A.20	Precasting	
2A.21	Species at Risk	•
2A.22	Site Cleanup and Rehabilitation (Onshore)	
2A.23	Site Cleanup (Deep Water Site)	
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive or Special Areas	
2A.26	Pile Driving	
2A.27	Avifauna Management	•
2A.28	Water Supply	

Area-Specific Measures

In addition to the environmental protection measures listed above, requirements listed in specific Government permits, approvals and authorizations will be followed. Refer to specific permits, approvals and authorizations for more details.

Permits and Authorizations

Table 2-14 is a summary of the various permits, authorizations and approvals that pertain to module load in and Installation.

Table 2-14: Permits, Authorizations and Approvals for Topsides Module Load In and Installation

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Service NL					
Service NL	Fire and Life Safety Approval	http://www.servicenl.gov.nl.ca/licenses/building/flspr.html	All buildings on site, including temporary trailers.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Building Accessibility Registration or Exemption	http://www.servicenl.gov.nl.ca/licenses/building/baer.html http://www.servicenl.gov.nl.ca/licenses/building/badr.html	All buildings on site, including temporary trailers.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Electrical Installation Permit	http://www.servicenl.gov.nl.ca/licenses/electrical/index.html	Electrical repairs or new installations	Electrical Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	GAP Registration	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Installing and operating all aboveground and underground tanks containing gasoline and associated products	Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Used Oil Tank Certificate of Approval	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Installing and operating all used oil tanks	Used Oil Control Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Mobile Fuel Storage Tank Relocation Approval	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Relocating a pre-registered GAP tank	Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Environment and Conservation					
Department of Environment and Conservation	Permit to Alter a Body of Water	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Work in and near a body of water.	Water Resources Act	Department of Environment and Conservation Water Resources Management Division PO Box 8700, St. John's NL A1B 4J6 Attention: Manager, Investigations Section Email: waterinvestigations@gov.nl.ca Fax: 709-729-0320
Department of Fisheries and Oceans					
Department of Fisheries and Oceans	Project Review Form	http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/index-eng.html	Required for work in and near water	Fisheries Act	Fisheries Protection Program Fisheries and Oceans Canada P.O. Box 5667 St. John's, Newfoundland and Labrador A1C 5X1 Telephone: 709-772-4140 Fax: 709-772-5562 Email: FPP-NL@dfo-mpo.gc.ca
Transport Canada					
Transport Canada	Notice of Works	https://www.tc.gc.ca/eng/programs-632.html	Required for Topsides overhang on Pier	Navigation Protection Act	St. John's, NFLD Office 10 Barter's Hill John Cabot Building, 9th Floor P.O. Box 1300 St. John's, NL A1C 6H8 Telephone: 506-851-3113 NPPATL-PPNATL@tc.gc.ca

2.8.7 Marine Activities

2.8.7.1 Bund Wall Removal, Dredging, and Ocean Disposal

After the base slab, cantilever and lower portions of the walls of the GBS were completed, the dry dock was cleared of infrastructure and filled with seawater to the level of GMC. Removal of the bund wall included dredging by a cutter suction dredger to enable passage of the GBS out of the dry dock to the deep water site, where it is moored and undergoing further construction. The excavated bund wall material was disposed of at an approved marine disposal location in GMC. A Disposal At Sea Permit, issued by Environment Canada, was required for the disposal of the bund wall material.

Environmental Concerns

The principal environmental concern associated with bund wall removal, dredging, and ocean disposal was the release of fines, petroleum product, and other substances into the marine environment. Environmental consequences in GMC may have included impacts on fish and fish habitat and commercial fish harvesting activities.

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to bund wall removal, dredging, and ocean disposal are listed in Table 2-15, and presented in Appendix 2A.

Table 2-15: Environmental Protection Measures – Bund Wall Removal, Dredging and Ocean Disposal

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Monitoring	
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	•
2A.5	Dust Control	•
2A.6	Trenching	•
2A.7	Dewatering – Work Areas/ Dry Dock	
2A.8	Marine Vessels	•
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	•

Appendix	Standard Mitigation Measures	Relevance
2A.12	Concrete Production	
2A.13	Linear Developments	
2A.14	Vehicular Traffic	
2A.15	Works in/ around Marine Environment	•
2A.16	Construction Camp	
2A.17	Surveying	
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	
2A.20	Precasting	
2A.21	Species at Risk	•
2A.22	Site Cleanup and Rehabilitation (Onshore)	•
2A.23	Site Cleanup (Deep Water Site)	
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive and Special Areas	
2A.26	Pile Driving	
2A.27	Avifauna Management	
2A.28	Water Supply	

Area-Specific Measures

In addition to the environmental protection measures listed above, requirements listed in specific Government permits, approvals and authorizations will be followed. Refer to specific permits, approvals and authorizations for more details.

Permits and Authorizations

Table 2-16 is a summary of the various permits, approvals and authorizations that pertain to bund wall removal, dredging, and ocean disposal.

Table 2-16: Permits, Authorizations and Approvals for Bund Wall Removal, Dredging and Ocean Disposal

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Environment and Conservation					
Water Resources Division	Alteration to a Body of Water (Schedule A to H). This application form is required as well as the appropriate Schedule application form (see below).	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Any activity in or near any body of water. Permit required for any infilling of any water bodies including marine infilling.	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Water Resources Division	Schedule H - Other Alterations	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Other works within 15 meters of a Body of Water.	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Department of Government Services					
Service NL	Certificate of Approval for Waste Management System	http://www.gs.gov.nl.ca/licenses/index.html	Site waste management plan/contract	Environmental Protection Act, 2006	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Department of Advanced Education and Skills					
Advanced Education and Skills	Occupational Health and Safety Manual	http://www.gs.gov.nl.ca/ohs/index.html	General	Occupational Health and Safety Act and Regulations	15 Dundee Avenue Mount Pearl, NL A1N 4R6 Tel: (709) 729-2706 Fax: (709) 729-3445

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Transport Canada					
Transport Canada	Marine Traffic Control Plan	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Bund Wall		Regional Manager, Navigable Waters Protection Program Transport Canada Cabot Place, Suite 740, P.O. Box 1300 100 New Gower Street St. John's, NL, A1C 6H8 Phone: 709-772-2284 Fax: 709-772-3072 E-mail: nwpa-lpen-nltn@tc.gc.ca
Transportation and Works	Compliance with the applicable regulations under the Transportation of Dangerous Good Act	http://www.tc.gc.ca/eng/tdg/safety-menu.htm	General	Dangerous Goods Transportation Act and Regulations	Atlantic 1-866-814-1477
Transport Canada	Marine Navigation Permits	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Bund Wall	Navigable Waters Protection Act (NWPA)	Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca
Transport Canada	Marine Traffic Control Authorization	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Bund Wall		Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca
Transport Canada	Marine Mooring Approvals	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Bund Wall	Navigable Waters Protection Act (NWPA)	Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Transport Canada	Navigable Waters Protection Act (NWPA)	http://www.tc.gc.ca/eng/quebec/nwp-menu-1424.htm	For Construction within Navigable Waters		Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca
Fisheries and Oceans Canada (DFO)					
DFO Fisheries Protection Program	Section 35(2) Fisheries Act Authorization	http://www.nfl.dfo-mpo.gc.ca/e0005354	Any activity that results in potential damage to fish	Fisheries Act, Section 35(2)	Manager – Regulatory Review Fisheries Protection Program Fisheries and Oceans Canada PO Box 5667 80 East White Hills Road St. John's NL, A1C 5X1 Admin Phone: 709-772-2443 Office Fax: 709-772-5562 General Inquires: FPP-NL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: FPP-NL@dfo-mpo.gc.ca
DFO Fisheries Protection Program	Letter of Advice - If an Authorization is being issued for a particular project component that also requires use of mitigation measures normally detailed within a Letter of Advice, those mitigation measures will be listed in the Authorization and a Letter of Advice will not be issued.	http://www.nfl.dfo-mpo.gc.ca/e0005354	Any activity that affects fish or fish habitat that is not covered under a Section 35(2) Fisheries Act Authorization	Fisheries Act	Manager – Regulatory Review Fisheries Protection Program Fisheries and Oceans Canada PO Box 5667 80 East White Hills Road St. John's NL, A1C 5X1 Admin Phone: 709-772-2443 Office Fax: 709-772-5562 General Inquires: FPP-NL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: FPP-NL@dfo-mpo.gc.ca
DFO	Experimental, Scientific, Educational or Public Display License	http://www.nfl.dfo-mpo.gc.ca/e0005354	Dry Dock Dewatering	The Fisheries Regulations, Section 52	Manager – Regulatory Review Fisheries Protection Program Fisheries and Oceans Canada PO Box 5667 80 East White Hills Road St. John's NL, A1C 5X1 Admin Phone: 709-772-2443 Office Fax: 709-772-5562 General Inquires: FPP-NL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: FPP-NL@dfo-mpo.gc.ca

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
DFO	Introductions and Transfer License	http://www.nfl.dfo-mpo.gc.ca/e0005354	Dry Dock Dewatering	The Fisheries Regulations, Section 56	Manager – Regulatory Review Fisheries Protection Program Fisheries and Oceans Canada PO Box 5667 80 East White Hills Road St. John's NL, A1C 5X1 Admin Phone: 709-772-2443 Office Fax: 709-772-5562 General Inquires: FPP-NL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: FPP-NL@dfo-mpo.gc.ca
Environment Canada					
Environment Canada	Compliance Standard – *Fisheries Act*, Section 36(3), Deleterious Substances	http://www.ec.gc.ca/default.asp?lang=En&n=12AF79B6-1	Any project-related water run-off or discharge	Fisheries Act	Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097
Environment Canada	Disposal at Sea Permit for Dredge Spoils	http://www.ec.gc.ca/default.asp?lang=En&n=12AF79B6-1	Any disposal of bund wall materials at approved marine disposal site.	Fisheries Act	Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097

2.8.7.2 Marine Vessel Activity and Deep Water Site Construction

GBS Tow-Out to Deep Water Site

After completion of GBS construction in the dry dock and bund wall removal, the GBS was floated out of the dry dock to the deep water site, where it is moored and construction is continuing.

Deep Water Site Construction

A series of transport barges are used to transport cement, aggregate, reinforcing bars, steel embedment, and mechanical outfitting to the deep water site. These barges are moored to each other and to the GBS with a series of attachment points which move progressively upwards as the structure is built. Tugs will move transport barges to and from the deep water site. Ferries or large crew boats are used to transfer personnel from shore to the deep water site.

The GBS is moored to shore via nine anchoring points. A series of barges that make up the Flotilla are moored to either the GBS or to each other; the flotilla arrangement consists of lay-down and work barges. There are three primary service support barges: an access barge with offices and lunchrooms, a power barge for power distribution and generation, and a batch plant barge where the concrete for the GBS construction is mixed.

The site is serviced from the shore side electrical grid via underwater electrical cables. Diesel generator units mounted on the power barge and batch plant barges also have the capability of supplying back-up power generation (in case of shore based power failure). Fresh water is supplied from shore via an underwater pipeline.

At peak operation there were approximately 1400 persons onboard the GBS and Flotilla. Lifesaving, firefighting and emergency evacuation/ abandonment plans have been developed to adequately service that number of personnel. An environmental management plan has been developed which outlines the mitigations and procedures to be followed in the event of a petroleum product or other hazardous material is released to the environment.

Environmental Concerns

The principal environmental concerns associated with marine vessel activity during deep water site construction include:

- Release of petroleum product, hazardous materials, and other deleterious substances into the marine environment
- Air emissions
- Impacts to commercial fish harvesting

- Effects on navigable waters

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to marine vessel activity during deep water site construction are listed in Table 2-17, and presented in Appendix 2A.

Table 2-17: Environmental Protection Measures – Marine Vessel Activity during Deep Water Site Construction

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Testing	•
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	
2A.5	Dust Control	
2A.6	Trenching	
2A.7	Dewatering – Work Areas/ Dry Dock	
2A.8	Marine Vessels	•
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Concrete Production	•
2A.13	Linear Developments	
2A.14	Vehicular Traffic	
2A.15	Works in/ around Marine Environment	•
2A.16	Construction Camp	
2A.17	Surveying	
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	
2A.20	Precasting	
2A.21	Species at Risk	
2A.22	Site Cleanup and Rehabilitation (Onshore)	
2A.23	Site Cleanup and Rehabilitation (Deep Water Site)	
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive and Special Areas	
2A.26	Pile Driving	
2A.27	Avifauna Management	

Appendix	Standard Mitigation Measures	Relevance
2A.28	Water Supply	

Area-Specific Measures

In addition to the environmental protection measures listed above, requirements listed in specific Government permits, approvals and authorizations will be followed. Refer to specific permits, approvals and authorizations for more details. The Commercial Fisheries section of this EPP shall be implemented for all marine activities.

Permits and Authorizations

Table 2-18 is a summary of the various permits, approvals and authorizations pertaining to marine vessel activity during deep water site construction.

Table 2-18: Permits, Authorizations and Approvals for Marine Vessel Activity During Deep Water Site Construction

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Transport Canada					
Transport Canada	Navigable Waters Protection Act (NWPA)	http://www.tc.gc.ca/eng/quebec/nwp-menu-1424.htm	Wharf Construction or any activity affecting navigable waters.	Navigable Waters Protection Act	Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca
Transport Canada	Oil Pollution Emergency Plan	http://www.tc.gc.ca/eng/marinesafety/oep-ers-regime-menu-1780.htm	Oil Handling Facility	Canada Shipping Act, Part 8	Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca
Transport Canada	Application for a Water Lease	http://www.tc.gc.ca/eng/marine-menu.htm	Submit application for anchorage within a Canadian Port		Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca
Transport Canada	Vessel Safety Inspection Certificate	http://www.tc.gc.ca/eng/acts-regulations/regulations.htm	Inspection of foreign vessels, tugs and barges must be done before they can work in Canadian Waters		Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca
Canada Customs and National Revenue	Approval for Vessel Admission	http://www.cbsa-asfc.gc.ca/publications/menu-eng.html	Permit is required before foreign vessels are permitted to work in Canadian Waters		1-800-461-9999
Canada Boarder Service Agency	Application for Vessel Temporary Admission to the Coasting Trade of Canada	http://www.cbsa-asfc.gc.ca/publications/menu-eng.html	All vessels entering Canada, including Canadian vessels are subject to the provisions of the Customs Tariff. In addition, foreign and non-duty paid vessels are subject to restrictions contained in the Coasting Trade Act.	The Coasting Trade Act	1-800-461-9999

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Fisheries and Oceans Canada (DFO)					
DFO Fisheries Protection Program	Letter of Advice	http://www.dfo-mpo.gc.ca/habitat/habitat-eng.htm	Any activity that affects fish or fish habitat that is not covered under a Section 35(2) Fisheries Act Authorization	Fisheries Act	Manager – Regulatory Review Fisheries Protection Program Fisheries and Oceans Canada PO Box 5667 80 East White Hills Road St. John's NL, A1C 5X1 Admin Phone: 709-772-2443 Office Fax: 709-772-5562 General Inquires: FPP-NL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: FPP-NL@dfo-mpo.gc.ca
Canadian Wildlife Service					
Environment Canada Canadian Wildlife Services	Bird handling/Salvage Permit		The handling of birds on vessels or on Project sites	The Leach's Storm Petrel: General Information and Handling Instructions	Canadian Wildlife Service Ginaud Doiron Phone: 506-364-5068 Email: Ginaud.Doiron@ec.gc.ca

2.8.7.3 GBS Construction at Deep Water Site

The GBS is secured at the deep water site in Bull Arm by deep water moorings. The arrangement consists of six concrete block type moorings with chain winches for maintaining tension; these moorings were initially built for the Hibernia platform construction in 1994. Three additional moorings are required for Hebron construction; these moorings are rock-face anchors whereby steel plates are fixed to the rock face via drilled rock anchors and grouted to the rock face. Refer to Chapter 1 Figure 1-3 for an illustration of the Hebron mooring configuration at the deep water site.

The GBS construction process at the DWS is similar to the slip-forming completed at the dry dock; however, it requires a floating concrete batch plant, office barges, a power barge, work barges, and other support vessels.

At the deep water site, the GBS walls will be extended to full height and a concrete roof slab will be built. This will be followed by construction of the central shaft to support the integrated Topsides facility.

During the GBS construction phase at the DWS, ballast will be installed using a combination of solid ballast and seawater in order to reach the required depth. During solid ballast (slurry) installation, the GBS will be maintained at even keel by the concurrent addition and or removal of water ballast. Water ballast will be added to the GBS via sluicing through the temporary water ballast system and removed by pumping back to the ocean.

Environmental Concerns

The principal environmental concerns associated with GBS construction at the deep water site include:

- Release of petroleum product, hazardous materials, and other deleterious substances into the marine environment
- Waste management
- Disturbance to commercial fish harvesting activities
- Air emissions
- Effects on navigable waters

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to GBS construction at the deep water site are listed in Table 2-19, and presented in Appendix 2A.

Table 2-19: Environmental Protection Measures – GBS Construction at Deep Water Site

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Testing	•
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	
2A.5	Dust Control	•
2A.6	Trenching	
2A.7	Dewatering – Work Areas/ Dry Dock	
2A.8	Marine Vessels	•
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Concrete Production	•
2A.13	Linear Developments	
2A.14	Vehicular Traffic	
2A.15	Works in/ around Marine Environment	•
2A.16	Construction Camp	
2A.17	Surveying	•
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	
2A.20	Precasting	•
2A.21	Species at Risk	•
2A.22	Site Cleanup and Rehabilitation (Onshore)	
2A.23	Site Cleanup and Rehabilitation (Deep Water Site)	•
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive and Special Areas	•
2A.26	Pile Driving	
2A.27	Avifauna Management	•
2A.28	Water Supply	

Area-Specific Measures

In addition to the environmental protection measures listed above, requirements listed in specific Government permits, approvals and authorizations will be followed. Refer to specific permits, authorizations and approvals for more details. The Commercial Fisheries section of this EPP shall be followed for all marine activities.

Permits and Authorizations

Table 2-20 is a summary of the various permits, authorizations and approvals pertaining to GBS construction at deep water site.

Table 2-20: Permits, Authorizations and Approvals for GBS Construction at Deep Water Site

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Transport Canada					
Transport Canada	Permit to Store, Handle and Transport Dangerous Goods	http://www.tc.gc.ca/eng/tdg/safety-menu.htm	Storage, Handling and Transportation of fuel and chemicals	Dangerous Goods Transportation Act and Regulations	Atlantic 1-866-814-1477
Transport Canada	Navigable Waters Protection Act (NWPA)	http://www.tc.gc.ca/eng/marinesafety/debs-arctic-acts-regulations-nwpa-1308.htm	Wharf Construction or any activity affecting navigable waters.	Navigable Waters Protection Act	Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca
Environment Canada					
Environment Canada	Compliance Standard – *Fisheries Act*, Section 36(3), Deleterious Substances	http://www.ec.gc.ca/default.asp?lang=En&n=12AF79B6-1	Any project-related water run-off or discharge	Fisheries Act	Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097

2.8.8 HUC Activities at the Bull Arm Topsides Site and Deep Water Site

Various HUC activities will occur at the Bull Arm Topsides site. Activities include:

- Partial commissioning of the LQ module in the Module Hall
- Partial commissioning of the LQ module at the quayside
- Partial commissioning of the DES at the quay
- MIT of the DES and DSM at the quay
- Commissioning of Topsides modules at the pier

Environmental Concerns

The main environmental concerns associated with Topsides module load in and installation include:

- Discharge of various effluents produced during commissioning such as chlorinated cooling and firewater
- Release of contaminants to the marine environment through drilling and open drains
- Potential discharges of firefighting foams during testing activities
- Release of petroleum products, hazardous substances or deleterious substances to land or water from various temporary and permanent equipment
- Effects on navigable waters
- Disturbance to commercial fish harvesting activities

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to the Topsides Module Load In and Installation are listed in Table 2-21, and presented in Appendix 2A.

Table 2-21: Environmental Protection Measures – HUC Activities at Bull Arm Topsides Site and Deep Water Site

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Monitoring	•
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	

Appendix	Standard Mitigation Measures	Relevance
2A.5	Dust Control	•
2A.6	Trenching	
2A.7	Dewatering – Work Areas/ Dry Dock	•
2A.8	Marine Vessels	
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Concrete Production	
2A.13	Linear Developments	
2A.14	Vehicular Traffic	•
2A.15	Works in/ around Marine Environment	•
2A.16	Construction Camp	
2A.17	Surveying	
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	
2A.20	Precasting	
2A.21	Species at Risk	•
2A.22	Site Cleanup and Rehabilitation (Onshore)	
2A.23	Site Cleanup and Rehabilitation (Deep Water Site)	
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive or Special Areas	
2A.26	Pile Driving	
2A.27	Avifauna Management	•
2A.28	Water Supply	•

Area-Specific Measures

In addition to the environmental protection measures listed above, requirements listed in specific Government permits, approvals and authorizations will be followed. Refer to specific permits, approvals and authorizations for more details.

Permits and Authorizations

Table 2-22 is a summary of the various permits, authorizations and approvals pertaining to HUC activities at the Bull Arm Topsides site and deep water site.

Table 2-22: Permits, Authorizations and Approvals for HUC Activities at the Bull Arm Topsides Site and Deep Water Site

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Service NL					
Service NL	Fire and Life Safety Approval	http://www.servicenl.gov.nl.ca/licenses/building/flspr.html	All buildings on site, including temporary trailers.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Building Accessibility Registration or Exemption	http://www.servicenl.gov.nl.ca/licenses/building/baer.html http://www.servicenl.gov.nl.ca/licenses/building/badr.html	All buildings on site, including temporary trailers.	Building Accessibility Acts and Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Electrical Installation Permit	http://www.servicenl.gov.nl.ca/licenses/electrical/index.html	Electrical repairs or new installations	Electrical Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	GAP Registration	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Installing and operating all aboveground and underground tanks containing gasoline and associated products	Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Used Oil Tank Certificate of Approval	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Installing and operating all used oil tanks	Used Oil Control Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070
Service NL	Mobile Fuel Storage Tank Relocation Approval	http://www.servicenl.gov.nl.ca/licenses/env_protection/fuel/index.html	Relocating a pre-registered GAP tank	Storage and Handling of Gasoline and Associated Products Regulations	Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: (709) 466-4060 Fax: (709) 466-4070

Department of Environment and Conservation					
Department of Environment and Conservation	Permit to Alter a Body of Water	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Work in and near a body of water.	Water Resources Act	Department of Environment and Conservation Water Resources Management Division PO Box 8700, St. John's NL A1B 4J6 Attention: Manager, Investigations Section Email: waterinvestigations@gov.nl.ca Fax: 709-729-0320
Department of Fisheries and Oceans					
Department of Fisheries and Oceans	Project Review Form	http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/index-eng.html	Required for work in and near water	Fisheries Act	Fisheries Protection Program Fisheries and Oceans Canada P.O. Box 5667 St. John's, Newfoundland and Labrador A1C 5X1 Telephone: 709-772-4140 Fax: 709-772-5562 Email: FPP-NL@dfo-mpo.gc.ca
Transport Canada					
Transport Canada	Notice of Works	https://www.tc.gc.ca/eng/programs-632.html	Required for seawater extraction and effluent discharges	Navigation Protection Act	St. John's, NFLD Office 10 Barter's Hill John Cabot Building, 9th Floor P.O. Box 1300 St. John's, NL A1C 6H8 506-851-3113 NPPATL-PPNATL@tc.gc.ca

2.8.9 Site Decommissioning

After the Hebron Platform has been towed from the deep water site location, the Bull Arm facility will be decommissioned. This will involve removal of project related materials, equipment, and wastes from the site. In addition, an environmental site assessment (land and marine) will be carried out to identify any potential environmental issues that may need to be resolved or corrected. This assessment will be at a minimum, conducted at the Phase I level, as defined by the Canadian Standards Association.

Environmental Concerns

The principal environmental concerns associated with site decommissioning include:

- Release of petroleum product, hazardous materials, and other deleterious substances to the environment
- Waste management
- Air emissions
- Disturbance to commercial fish harvesting activities
- Impacts to navigable waters

Project related debris that may have accumulated on the seabed of the deep water site or around the Topsides/ GBS quays will be identified and removed where warranted. This work will be done in consultation with relevant government agencies and stakeholder groups to ensure potential negative effects are properly mitigated.

An environmental site assessment will be required on the land in order to identify any potential or actual contamination resulting from construction activities, followed by clean-up which may involve excavation, groundwater removal/ treatment, and re-instatement.

Environmental Protection Measures

Standard Mitigation Measures

Standard mitigation measures relevant to site decommissioning are listed in Table 2-23, and presented in Appendix 2A.

Table 2-23: Environmental Protection Measures – Site Decommissioning

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials	•
2A.2	Sewage Treatment, Disposal and Compliance Monitoring	•

Appendix	Standard Mitigation Measures	Relevance
2A.3	Quarrying and Aggregate Removal	
2A.4	Excavations, Embankment and Grading	
2A.5	Dust Control	•
2A.6	Trenching	
2A.7	Dewatering – Work Areas/ Dry Dock	
2A.8	Marine Vessels	•
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Concrete Production	
2A.13	Linear Developments	
2A.14	Vehicular Traffic	•
2A.15	Works in/ around Marine Environment	•
2A.16	Construction Camp	
2A.17	Surveying	
2A.18	Equipment Operations	•
2A.19	Drilling – Geotechnical Drilling in the Marine Environment	•
2A.20	Precasting	
2A.21	Species at Risk	•
2A.22	Site Cleanup and Rehabilitation (Onshore)	•
2A.23	Site Clean-up and Rehabilitation (Deep Water Site)	•
2A.24	Fish Relocation during Dry Dock Dewatering	
2A.25	Sensitive and Special Areas	
2A.26	Pile Driving	
2A.27	Avifauna Management	•
2A.28	Water Supply	•

Area-Specific Measures

In addition to the environmental protection measures identified above, specific conditions of all Government permits, authorizations and approvals shall be followed. The Commercial Fisheries section of this EPP shall be followed for all marine activities. Additionally, coordination with applicable government agencies for cleanup may be required.

Permits and Authorizations

Table 2-24 is a summary of the various permits, authorizations and approvals pertaining to site decommissioning. Refer to specific permits, approvals and authorizations for more detail.

Table 2-24: Permits, Authorizations and Approvals for – Site Decommissioning

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Environment and Conservation					
Water Resources Division	Alteration to a Body of Water (Schedule A to H). This application form is required as well as the appropriate Schedule application form (see below).	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Any activity in or near any body of water. Permit required for any infilling of any water bodies including marine infilling.	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Water Resources Division	Schedule H - Other Alterations	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Other works within 15 meters of a Body of Water.	Water Resources Act	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Water Resources Division	Application for Abandoned Well Sealing	http://www.env.gov.nl.ca/env/waterres/regulations/appforms/index.html	Sealing of a groundwater well.	Water Resources Act, SNL 2002 cW-4.01, Section 58	Water Resources Management Division Department of Environment and Conservation P.O. Box 8799 4th Floor, West Block Confederation Building St. John's, NL A1B 4J6 Tel: (709) 729-2563 Fax: (709) 729-0320 Email: water@gov.nl.ca
Department of Transportation and Works					
Transportation and Works	Compliance Standard – Storing, handling and transporting dangerous goods	http://www.tc.gc.ca/eng/tdg/safety-menu.htm	General	Dangerous Goods Transportation Act and Regulations	Transportation and Works P.O. Box 8700 Prince Philip Drive Confederation Building St. John's, NL A1B 4J6 Telephone: 1-709-729-2300 Email: tw@gov.nl.ca

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Department of Human Resources Labour and Employment					
Human Resources Labour and Employment	Compliance Standard – Occupational Health and Safety	http://www.tc.gc.ca/eng/tdg/safety-menu.htm	Project-related employment	Occupational Health and Safety Acts and Regulations	Occupational Health & Safety 15 Dundee Avenue Mount Pearl, NL A1N 4R6 Tel: (709) 729-2706 Fax: (709) 729-3445
Transport Canada					
Transport Canada	Compliance with the applicable regulations under the Dangerous Goods Transportation Act and Regulations	http://www.tc.gc.ca/eng/tdg/safety-menu.htm	Storage, Handling and Transportation of fuel and chemicals	Dangerous Goods Transportation Act and Regulations	Atlantic 1-866-814-1477
Transport Canada	Navigable Waters Protection Act (NWPA)	http://www.tc.gc.ca/eng/marinesafety/debs-arctic-acts-regulations-nwpa-1308.htm	Decommissioning of GBS infrastructure or any activity affecting navigable waters.	Navigable Waters Protection Act	Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca
Transport Canada	Hull, Barge Inspections	http://www.tc.gc.ca/eng/marinesafety/menu.htm	Decommissioning of GBS infrastructure or any activity affecting navigable waters.		Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca
Transport Canada	Marine Vessel Classifications Approval	http://www.tc.gc.ca/eng/marine-menu.htm	Decommissioning of GBS infrastructure or any activity affecting navigable waters.		Marine Safety Services Transport Canada John Cabot Building, 9th Floor, 10 Barter's Hill St. John's, NL, A1C 6H8 Phone: 709-772-5166 Fax: 709-772-0210 E-mail: nwpa-lpen-nltn@tc.gc.ca
Transport Canada	Marine Traffic Control Plan	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Decommissioning of GBS infrastructure or any activity affecting navigable waters.		Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca

Regulatory Agency	Permit and/or Regulatory Approval	Link to Permit Applications	Activity Requiring Regulatory Approval	Legislation Requiring Compliance	Agency Contact Information
Transport Canada	Marine Navigation Permits	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Decommissioning of GBS infrastructure or any activity affecting navigable waters.		Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca
Transport Canada	Marine Traffic Control Authorization	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	Decommissioning of GBS infrastructure or any activity affecting navigable waters.		Regional Manager, Navigable Waters Protection Program Transport Canada Dartmouth District Office, P.O. Box 1013 45 Alderney Drive, 11th Floor Dartmouth, NS, B2Y 4K2 Phone: 902-426-2726 Fax: 902-426-7585 E-mail: nwpdar@tc.gc.ca
Environment Canada					
Environment Canada	Compliance Standard – *Fisheries Act*, Section 36(3), Deleterious Substances	http://www.ec.gc.ca/default.asp?lang=En&n=12AF79B6-1	Any project-related water run-off or discharge	Fisheries Act	Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097
Environment Canada	Compliance Standard – *Fisheries Act*, Section 36(3), Deleterious Substances	http://www.ec.gc.ca/default.asp?lang=En&n=12AF79B6-1	Any project-related water run-off or discharge	Fisheries Act	Environment Canada 6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097

2.9 CONTINGENCY PLANS

Contingency plans have been developed for the Bull Arm facility to deal with incidents and unplanned situations that could negatively impact the environment. These plans undergo frequent review and revision, in consultation with relevant parties, in response to emergency situations that may arise or to experience gained during mock emergency exercises. Spill prevention is incorporated into operation of the Bull Arm site during Hebron Project activities.

Outlines of contingency plans for on-land and in-water fuel and hazardous material spills, wildlife encounters, discovery of historic resources, fires and explosions, vessel accidents, and extreme weather events are presented in the following sections. Environmental concerns and environmental protection measures consisting of training, prevention, response-action plans and resource lists, are also described.

The objectives of these contingency plans are to minimize:

- Danger to persons;
- Environmental pollution;
- Area affected by a spill or fire;
- Degree of disturbance to the area and watercourses during clean-up; and
- Degree of disturbance to wildlife.

Notwithstanding contingency plans, all contractors and subcontractors will adopt a policy to implement preventative measures as it is the first line of defense against the possibility of incidents.

2.9.1 Fuel and Hazardous Material Spills on Land

Environmental Concerns

The use, storage, handling, and transfer of fuel can pose a risk of spills and leaks. Spills and leaks of other hazardous materials are also of concern; however, products associated with equipment maintenance (e.g. concrete additives, hydraulic fluids, lubricating oil, solvents, anti-freeze, etc.) are used in relatively small quantities. Storage and transfer is usually limited to double-walled tanks, intermediate bulk containers (205 litre or smaller) thereby limiting the magnitude and risk posed from potential spills.

The uncontrolled release to the environment of fuels and hazardous materials can negatively impair the quality of air, soil, and water (freshwater and marine), and harm vegetation, wildlife, aquatic organisms, historic resources and human health and safety.

Environmental Protection Measures

Personnel Training

All workers employed by contractors and subcontractors shall be required to attend the Bull Arm site orientation, which includes an environmental section, prior to commencing work at the Bull Arm site. All personnel handling hazardous chemicals shall be trained in Workplace Hazardous Materials Information System (WHMIS).

Supervisory staff members, including the members of the Project ER&S team, shall be trained in spill response. They shall be trained in spill clean-up procedures and how to mobilize the necessary equipment and personnel. Clean-up equipment will be present in specific areas of the site. Personnel responsible for fuelling equipment or vessels from mobile tanker trucks will receive additional dedicated spill prevention training.

The Bull Arm Emergency Response Team (ERT) and KKC Marine Operations Team have been trained by the Marine Institute to carry out actual deployment and operation of spill response equipment. Practice drills (deployment and communications exercises) are led by the Site ERT, with involvement and support from the E&R Groups, to maintain a state of readiness for an emergency. As appropriate, workers who routinely handle hazardous materials shall be trained and/ or certified under the Dangerous Goods Transportation Act and Regulations.

Prevention

All personnel using equipment such as hoses, safety equipment and containment reservoirs (i.e. tanks, drums, vessels, etc.) shall conduct daily inspections of this equipment. This will help identify problems such as equipment damage and leaks so that corrective measures can be implemented. The results of these inspections shall be recorded and any problems shall be reported to maintenance personnel immediately. In general, small, stationary equipment powered by diesel or gasoline shall be placed in secondary containment. Mobile equipment shall be parked away from drains, when possible.

Response

In the event of a fuel or hazardous material spill, the following procedures shall apply:

- If safe to do so, the individual shall make a reasonable attempt to isolate the source and immediately stop the leakage without compromising his/ her health and safety or that of others.
- Spill location, type of fuel or hazardous material (if known), volume, and terrain condition at the spill site shall be determined and reported immediately to the respective EPC Environmental representative who shall **immediately** assess the situation and request the appropriate level of assistance required to remediate the spill. . EPC E&R personnel will also immediately inform the on-site EMCP E&R Lead or the EMCP GBS Site Construction Manager.
- Any spill or leak of fuel or hazardous materials on land shall be immediately reported to the EMCP E&R Lead and respective EPC E&R representative.
- Spills that are minor in nature can be responded to and cleaned up by the appropriate groups at site. Typically response measures include deploying various components of spill response kits (e.g. absorbal, absorbent pads and socks, etc.) All contaminated soil and spent spill response materials will be compiled in hazardous waste bags or containers, which are labelled and placed in the hazardous waste storage area. The EPC E&R representative, or alternate, is required to assess the cleanup efforts to determine if adequate.
- All spills, regardless of quantity, are reported on an EMCP stipulated incident form (i.e. P-20).
- Spills greater than 70 L on land, or any spilled amount that has potential to enter water frequented by fish shall be reported to the **24 hour Environmental Emergencies line** by calling **(709) 772-2083** or **(800) 563-9089**. EPC Environmental representatives are responsible for informing the EMCP E&R Lead, or alternate, prior to contacting the 24 hour Environmental Emergencies line. By calling this number, the caller is routed to the appropriate federal or provincial authority, depending on the nature of the spill. Required pertinent information includes:
  - Name of reporter and phone number
  - Date and time of spill or leak
  - Date and time of detection of spill or leak
  - Type of product spilled or leaked
  - Amount of product spilled or leaked
  - Location of spill or leak
  - Source of spill or leak
  - Type of accident (*i.e.,* collision, rupture, overflow)

- Owner of product and phone number
- If the spill or leak is still occurring
- If the spill or leaked product is contained, and if not, where it is flowing
- Wind velocity and direction
- Temperature
- Proximity to bodies of water, water intakes, and facilities
- Tidal action where applicable
- Snow cover and depth, terrain, and soil conditions

♦ The respective E&R representative shall proceed to the spill location and will either temporarily assume the role of "On-Scene Commander" or coordinate with the ERT On-Scene Commander in place. He/ she will assess the situation and direct the cleanup in coordination with the On-Scene Commander as appropriate.

♦ The ERT will be called into action by the On-Scene Commander if he/she deems it necessary, depending on spill location and severity. A "CODE 1" level of response is warranted by a spill that is uncontrollable or could not be handled by on-scene construction crews or the Site Services team. A CODE 1 response can be initiated by stating **"CODE 1, CODE 1, CODE 1"** on 2 way radio, Channel 1 or by contacting the ERT phone number (through Security dispatch): **709-730-0911**

♦ For any spills beyond the ERT/ Marine Operations response capability, authorized site personnel will mobilize East Coast Response Corporation (ECRC) for further assistance. The emergency number for ECRC is (613)-930-9690

♦ The On-Scene Commander and the respective EPC Environment representative (or authorized designate), in consultation with regulatory authorities, if applicable, shall:

- Assemble at the spill response equipment containers location or an alternate safe location as directed by the On-Scene Commander
- In the case of a CODE 1, the On-Scene Commander will brief the ERT and marine crew (if applicable) on the spill situation
- Assess site conditions and environmental impact of various cleanup procedures
- Assess potential and means for fuel recovery
- All members shall be provided with personal protective equipment (PPE) i.e. life vests, rubber gloves, boots, as appropriate which is stored in the Spill Response storage areas and mobile emergency response trailers

- Refer to the product Material Safety Data Sheet (MSDS) if available for any additional PPE that may be required
- The team will transport necessary equipment to the spill location to start clean-up
- Attempt to contain the spill by ditching, deploying absorbent materials, etc.
- Deploy on-site personnel to mobilize pumps and empty drums or other appropriate storage to the spill site
- Protect streams, rivers, brooks and drainage systems leading to water bodies by deploying additional boom, absorbent materials or creating sand/ gravel berms
- Keep any wildlife away, if necessary, using barricades or noise generating devices
- Dispose of all contaminated soil and used spill response material through an appropriately licensed waste disposal contractor
- Mark the boundaries of the spill area for future monitoring and clean-up if needed
- Take all necessary precautions to ensure that the incident does not re-occur

Following a regulatory reportable environmental incident and response, the respective EPC E&R representative will prepare a letter summarizing the regulatory reportable incident no later than 30 days from the date of the incident. This letter is required to be reviewed by the EMCP ER&S group prior to the EPC E&R representative providing to the regulator. Letters may be submitted to federal regulators and other provincial regulators if requested.

Resource List

Spill response equipment shall be maintained on the dry dock and Topsides sites in designated storage areas. Two mobile spill response trailers are located on site and strategically placed in the areas of increased work activity and associated increased spill risk. Type and quantities of equipment needed will be determined based on the volume of oil at the site and recommendations from ECRC personnel. For any spills beyond the ERT response capability, authorized site personnel will mobilize ECRC for further assistance. The emergency call number for ECRC is (613)-930-9690.

2.9.2 Fuel and Hazardous Material Spills to a Water Body

Environmental concern

Fuel and hazardous materials spills to a water body could occur during all Project phases at the Bull Arm site. A fuel or hazardous materials spill or accidental release into a water body is of great concern because it can negatively impact air and water quality, have harmful effects on biota, represent a health and safety risk to humans, and impact the socio-economic conditions of the area, including potential effects on commercial fisheries.

Environmental Protection Measures

Personnel Training

All personnel handling fuel and other hazardous materials shall be trained as described in Section 2.9.1. All workers employed by contractors and subcontractors shall be required to attend the Bull Arm site orientation, which includes an environmental section, prior to commencing work at the site. All personnel handling hazardous chemicals shall be trained in WHMIS. Persons in charge of fuel and hazardous materials transfer operations to, from, and between vessels shall also be qualified in accordance with provisions of the Vessel Pollution and Dangerous Chemicals Regulations (http://laws-lois.justice.gc.ca/eng/regulations/SOR-2012-69/index.html) under the Canada Shipping Act.

Prevention

The following routine prevention procedures shall be followed:

- Fuel transfer lines and hoses will be equipped with properly functioning and approved check valves and shut-off valves, perform routine inspections on all such equipment.
- Marine fuel transfer hoses will have a bursting pressure of four times the working pressure, and will have undergone a hydrostatic test equal to one and one half times the working pressure at least once during the previous twelve months.
- Fuel transfer operations will be attended continuously by qualified personnel, one located on shore and one located on vessel. Attending personnel will be in visual and audible contact, by radio if necessary, and will stop fuel flow immediately should a leak or line bust occur.
- Prior to each vessel fuelling, module load in, installation and HUC, the operations will be assessed based upon pre-defined criteria to help determine the requirements of boom deployment
- Booming requirements do not apply to small vessels that are routinely fuelled by use of a small fuel container.

- If an instance arises where an operation could be affected by deployment of a boom, the situation shall be assessed from a risk perspective by the respective EPC E&R representative; alternatives for other mitigations will be investigated.

Response Action

All fuel transfer operations between ship and shore or between ships are to be in accordance with the Vessel Pollution and Dangerous Chemicals Regulations under the Canada Shipping Act. The same procedures identified in Section 2.9.1 will apply to spill clean-up and reporting procedures;

- Any spill or leak of fuel or hazardous materials in the marine environment shall be immediately reported to the ECMP E&R Lead and respective EPC E&R representative. Any spill in water or any spilled amount that can enter water frequented by fish shall be reported to the **24 hour Environmental Emergencies line** by calling **(709) 772-2083** or **(800) 563-9089**. Required pertinent information includes:
  - Name of reporter and phone number
  - Date and time of spill or leak
  - Date and time of detection of spill or leak
  - Type of product spilled or leaked
  - Amount of product spilled or leaked
  - Location of spill or leak
  - Source of spill or leak
  - Type of accident (i.e., collision, rupture, overflow, other)
  - Owner of product and phone number
  - If the spill or leak is still occurring
  - If the spill or leaked product is contained, and if not, where it is flowing
  - Wind velocity and direction
  - Temperature
  - Proximity to bodies of water, water intakes, and facilities
  - Tidal action where applicable; and
  - Snow cover and depth (if applicable), terrain, and soil conditions
- Refer to Section 2.9.1 for reporting, notification and CODE 1 activation protocols.

- Spills to water that are minor in nature can be responded to and cleaned up by the appropriate groups at site. Typically response measures include deploying various components of spill response kits by utilizing an on-site work boat if available (e.g. absorbent pads and socks, etc.). All spent spill response materials will be compiled in hazardous waste bags or containers, which are labelled and placed in the hazardous waste storage area. The EPC E&R representative, or alternate, is required to assess the cleanup efforts to determine if adequate.
- All spills, regardless of quantity, are reported on an EMCP stipulated incident form (i.e. P-20).
- A marine spill necessitates immediate on-site response. Therefore, spill equipment will be stored near easily accessible quays with dedicated boats, and trained emergency response people will be available during every shift. In organizing a cleanup of shoreline pollution, site conditions and the impact of various containment and cleanup procedures, including the following, will be assessed:
  - If on-site equipment is not adequate, immediately mobilize additional containment and cleanup equipment and personnel in consultation with the Canadian Coast Guard
  - If the area has less than 1/10th ice cover and currents are relatively weak (less than 0.5 knots), deploy containment boom and recover as much fuel as possible with work boats, pump, and sorbents
  - Protect all beaches by deployment of floating boom if possible
  - Dispose of all contaminated debris, cleaning materials, and absorbents through an appropriately licensed waste disposal contractor
- The procedure for a shoreline pollution cleanup will include:
  - Assemble at the spill response equipment containers location or as directed by the On-Scene Commander
  - The On-Scene Commander will brief the ERT on the spill situation
  - Assess site conditions and environmental impact of various cleanup procedures
  - Assess potential for fuel containment and recovery
  - All members shall be provided with personal protective equipment (PPE) i.e. life vests, rubber gloves, boots, as appropriate
  - Consult the MSDS for the product spilled to ensure the correct precautions are being followed to protect clean-up crews
  - If conditions necessitate/ permit deploy the containment boom using the marine operations work skiff

- Deploy on-site personnel to mobilize pumps and empty drums or other appropriate storage to the spill site
- Deploy on-site personnel to build containment dykes and commence pumping the contained material into containers
- Apply absorbents if necessary
- If appropriate, use a water hose or other means to concentrate product in a location easily accessible for clean-up
- Protect beaches by deploying additional boom or absorbent materials
- If wildlife are observed in the area attempt to keep them away using boats or noise generating devices
- Dispose of all contaminated debris, cleaning materials, and absorbents through an appropriately licensed waste disposal contractor
- Locate, map, and stake the boundaries of contaminated beach and landfill for future monitoring and treatment
- Assess and appropriately treat any areas disturbed by cleanup activities
- Take all necessary precautions to ensure that the incident does not re-occur

♦ Following a regulatory reportable environmental incident and response, the respective EPC E&R representative will prepare a letter summarizing the regulatory reportable incident no later than 30 days from the incident. This letter is required to be reviewed by EMCP ER&S group prior to the EPC E&R representative providing to the provincial regulator. Letters may be submitted to federal regulators and other provincial regulators, if requested.

Resource List

Spill response equipment shall be maintained on the dry dock and Topsides sites in designated storage areas. Two mobile spill response trailers are located on site and strategically placed in the areas of increased work activity and associated increased spill risk; there is an oil boom stored in an enclosed trailer to the east of the FPSO quay, the boom setup is fitted with a quick connect paravein and access ramp for quick vessel deployment. Type and quantities of equipment needed are determined based on the volume of oil at the site and recommendations from ECRC personnel. For any spills beyond the ERT response capability, authorized site personnel will mobilize ECRC for further assistance. The emergency call number for ECRC is (613)-930-9690.

2.9.3 Wildlife Encounters

Environmental Concerns

Wildlife encounters pose a risk for stress or injury to both the wildlife and site personnel. Control measures and a site Wildlife and Habitat Protection Plan have been put in place to minimize the risk to wildlife and site personnel.

Environmental Protection Measures

Personnel Training

All personnel will be advised during environmental orientation of the appropriate procedures to use in the event of wildlife encounters. In order to reduce wildlife encounters, all personnel will be instructed in proper waste management, as described in respective EPC contractor environmental management plans and waste management plans.

Prevention

Respective EPC E&R representatives are responsible to ensure that the following measures relating to food preparation, storage and waste disposal are implemented:

- All camp site and working areas shall be kept clean of food scraps and garbage.
- Waste materials shall be kept in appropriate containers and periodically collected for disposal by approved methods.
- Hunting, trapping, and fishing shall be prohibited at the Bull Arm facility.
- Inspections of the work areas shall be carried out regularly by respective EPC E&R personnel to determine compliance with their respective Environmental Management and Waste Management Plans.

Response Actions

All Project personnel will abide by the following rules regarding wildlife encounters:

- No attempts to chase, catch, divert, follow or otherwise harass wildlife by vehicles, ATV, aircraft, or on foot will be made by any person at the Project site.
- Equipment, vehicles and vessels will always yield the right-of-way to wildlife.
- No personal pets, domestic or wild, will be allowed on the site. However, if a dog is required for deterrence purposes, approval shall first be obtained from the respective Construction Site Manager.

- When animals (e.g. moose, black bear, caribou or otter) pose a threat or a problem in the Project area, the respective EPC E&R representative will be responsible for all subsequent action. Appropriate response action will be determined by this individual, in consultation with the DOEC Wildlife Division. All action must comply with DOECs regulations and permits.
- A report detailing the displacement of an animal will be prepared by the respective EPC E&R representative and provided to applicable personnel. This written report will be submitted to the EMCP E&R Lead, and also forwarded to the appropriate regulatory authority. Table 2-25 identifies appropriate regulatory notifications for encounters with wildlife.

Table 2-25: Regulatory Notifications for Wildlife Encounters

Type of Wildlife	Example	Government Contact
Terrestrial	Moose, coyotes, foxes, bears	Report stranded or deceased terrestrial animals to: Department or Natural Resources 709-466-7439
Nuisance Animals or Problem Wildlife	Bears, beavers, foxes	Report to: Department of Natural Resources 709-729-4180 or 709-685-7273 (standby)
Marine	Fish (cod, capelin, herring)	Report fish kills to: Canadian Coast Guard 709-772-2083 or 1-800-563-9089 (24 hours) Provide a written report of the occurrence, as soon as feasible, to the regulatory agency indicated by the Coast Guard or agency directed to by the Coast Guard (i.e. Department of Fisheries and Oceans).
	Mammals and turtles (grey seals, harbour porpoises, minke whales, humpback whale, leatherback turtles)	Report deceased, stranded or entangled marine mammals and turtles to: Canadian Coast Guard 709-772-2083 or 1-800-563-9089 (24 hours) Report stranded or entangled whales and turtles to: Whale Release and Stranding NL 1-888-895-3003 Report stranded or entangled seals to: DFO 709-772-5598 Provide a written report of the occurrence, as soon as feasible, to the regulatory agency indicated by the Coast Guard or agency directed to by the Coast Guard (i.e. DFO).
Avian	Birds (osprey, spotted sandpiper, loons, murres)	Injured, stranded or dead birds are not regulatory reportable, however, they are reported annually to Canadian Wildlife Services by the KKC/WorleyParsons Environment & Regulatory Groups (required under the Salvaged Bird Permit). For guidance on injured or stranded birds contact: Salmonier Nature Park

Type of Wildlife	Example	Government Contact
		709-685-0223 or 709-229-7888 Report oiled birds to: Canadian Wildlife Services 709-772-5585 Report bird nests to: Canadian Wildlife Services 709-772-4297

2.9.4 Historic Resources

Environmental Concerns

Undiscovered archaeological sites such as structures, tools, butchered animal bone, graves, pottery or shipwrecks may be disturbed or discovered during construction activities.

Environmental Protection Measures

Personnel Training

All personnel shall be informed through the environmental orientation program of the historic resources potential of the Bull Arm facility vicinity and of their responsibility to report any suspected findings.

Prevention

All areas containing known or suspected historic resources shall be avoided.

Response

In the event of the discovery of a historic artifact or archaeological site, the following measures shall apply:

- All historic resources, including archaeological objects and sites of archaeological or historic interest or significance discovered on the site shall be deemed to be the property of the Crown and shall not be disturbed. Upon discovery of a suspected archaeological resource, site personnel shall report to their supervisor, who will report to EPC E&R representatives. All reasonable precautions shall be taken to prevent the removal of artifacts or damaging sites. Personnel may be held liable for prosecution under Section 35.1 and 35.2 of the Historic Resources Act, 1990 (http://assembly.nl.ca/Legislation/sr/statutes/h04.htm) for all contraventions.
- All work shall cease in the immediate area of the discovery until the Provincial Archaeologist (709-729-2462), has been consulted by EMCP and advice is provided on the acceptable procedure to follow. No work

shall resume in the area until it is authorized by the Provincial Archaeologist (or designate) within the Department of Tourism, Culture and Recreation.

- Archaeological materials encountered shall be reported to the EPC Environment representative with the following information:
  - Nature of activity resulting in the discovery
  - Nature of material discovered
  - The precise location of the find
  - Names of persons witnessing the discovery

2.9.5 Fires and Explosions

Environmental Concerns

Construction activities may increase the risk of fire and explosion which could spread to the surrounding forest, result in property damage, and/ or pose a risk to human health and safety. Depending on the nature and extent of the incident, it may also result in impacts to the local and regional airshed and result in consequential damage to the soil and water.

Environmental Protection Measures

Response Capability

The Bull Arm facility is equipped with a dedicated ERT providing 24 hour coverage for all site operations. The members of the ERT have undergone extensive training, including but not limited to: spill response and HAZMAT training, confined space rescue, high angle rescue, work at heights, firefighting, and cold water rescue. The response team is equipped with two fire apparatus (pumper trucks), an emergency rescue vehicle, a 4x4 pickup truck, and other necessary support equipment.

Prevention

EPC E&R personnel shall ensure that contractors, subcontractors, and their employees follow all precautions necessary to prevent fires and explosions when working at the site. These include but are not limited to:

- Proper storage and approved disposal of all flammable waste, products and materials.
- Approved storage and handling of all petroleum products and other hazardous materials.
- Smoking and other sources of ignition shall not be permitted within 10 m of areas used to store and handle flammable products and wastes.

- Providing adequate, full time coverage of emergency response resources at the site. Equipment shall be easily accessible, properly maintained and in good condition (in accordance with the manufacturer's recommendations and Provincial legislation), and all members of the emergency response team shall have received proper training.

Response Action Plan

Non-forest Fires and Explosions

Anyone who observes an emergency situation for which they believe emergency assistance is required is expected to remain calm and stay safe. The following measures shall be followed in the event of a non-forest fire (localized fires/ explosions associated with equipment, in buildings, etc.):

- Sound the fire alarm.
- Contact ERT on Channel 1 or through Security at 709-463-0911.
- The trained ERT located on-site shall respond to all fire alarms and assume responsibility for extinguishing the fire on arrival at the incident site.

Should fire threaten surrounding forested areas, the steps outlined below shall be followed.

Forest Fires

- In the event of a forest fire, priority shall be to take immediate steps to contain or extinguish the fire.
- Fire should be reported immediately to the respective EPC E&R representative, the Forest Management District office in Clarenville (709-466-7439) and ultimately to the Forest Management Regional office in Gander (709-256-1450). The following information will be provided:
  - Name of the reporter and phone number
  - Date and time of detection of the fire
  - Size of the fire
  - Location of the fire
- The RCMP Clarenville detachment (709-466-3211) will also be notified immediately.

2.9.6 Vessel Accidents

Environmental Concerns

There exists the potential that vessels involved in Project activities may run aground, become involved in collisions with structures or other vessels, or

sink due to inclement weather or other reason. Negative environmental effects may result if fuel, hazardous cargo or materials, or other physical/ chemical substances are released to the environment as a result of a vessel accident. The priority concern is for the health and safety of all crew members and passengers.

Environmental Protection Measures

Personal Training

All crew members shall be familiar with emergency measures for both life threatening and potentially polluting situations.

Prevention

The following preventative measures shall be followed:

- All Project vessels shall travel within the vessel traffic lane designated by Canadian Coast Guard within Trinity Bay and Bull Arm unless alternate instruction is provided by the Marine Traffic Controller or designate.
- Vessels will follow designated passage way when transiting in the area of the Bull Arm site. Navigational aids (ex. lighting) are in place to guide vessels when transiting in this area.
- All vessel captains and Marine Operations personnel are provided with and fully understand the applicable marine traffic procedure fisheries code of practice.
- All stationary hazards such as moored platforms or vessels shall be clearly marked with buoys, in accordance with the Canada Shipping Act
- All vessels shall have dedicated on-board safety equipment such as fire extinguishers and life rafts in accordance with Transport Canada requirements.
- Project related vessels shall be aware of the designated Construction Safety Zones and use a safe shipping route to its port destination in Trinity Bay.
- All vessels bound for Bull Arm shall comply with all provisions of Transport Canada Shipping Act, 2001 and applicable associated regulations.

Response

The following measures shall be followed in the event of a vessel accident:

- The order of priority for action will be for the protection of human life, prevention of pollution of the environment and prevention of shipping lane impediment.

- The ship's captain will immediately contact the Canadian Coast Guard, Environmental Emergencies, through which the appropriate agencies will be notified and specific action taken.
- All vessels will deploy necessary safety and spill response equipment such as fire extinguishers, life rafts, etc.

2.9.7 Extreme Weather and Oceanographic Conditions

Environmental Concerns

The Bull Arm facility is subject to extreme weather and oceanographic conditions that may impact on facilities, equipment, and construction activities at the Bull Arm facility. These may give rise to the uncontrolled release of fuels, hazardous liquids, or other materials and result in negative impacts to the receiving local and regional biophysical environment.

Prevention

- Project site operations personnel shall frequently check weather forecasts to be aware of approaching storms and bad weather conditions. Contact Bull Arm Inclement Weather Hotline at 1-855-733-7616 for Site operating status.
- Forecasts of poor weather, approaching storms, or otherwise poor meteorological and oceanographic conditions that may affect Project activities and equipment shall be communicated to the Marine Traffic Controller or designate and appropriate action coordinated to protect the integrity of the facilities and equipment. Delay or stoppage of certain activities may be required.
- Actions taken to prevent potential negative impact on the environment upon notification of approaching inclement weather such as parking vehicles / equipment indoors, when feasible and ensuring waste bins have lids, when applicable.

2.10 ENVIRONMENTAL MONITORING AND REPORTING

2.10.1 Compliance Monitoring

Environmental compliance monitoring programs refer to activities used to ensure compliance with all regulatory and self-imposed environmental requirements. Environmental compliance monitoring assures regulators and the public that environmental regulations and standards are followed.

Site Environmental Compliance Monitoring

During Project activities at the Bull Arm site, as required by regulation, or as may be prescribed in the EPP and consistent with EMCP standards, EMCP conducts Environment & Regulatory Compliance Assessments (RCAs). RCAs are an integral part of ensuring EPC Contractor compliance with regulatory or Project specific requirements established by laws, regulations, permits, approvals and/ or internal Project commitments. Components of the RCAs will incorporate compliance reporting requirements for applicable federal and provincial regulations governing activities at the Bull Arm site. These regulatory instruments include, but are not limited to:

- Fisheries Act, Section 36 (http://laws.justice.gc.ca/eng/F-14/index.html) prohibits the discharge of deleterious substances into any type of water frequented by fish.
- Fisheries Act Authorization, Section 35(2) prohibits serious harm to fish. To obtain an Authorization the proponent must submit an Application for Fisheries Act Authorization to the Manager of Regulatory Review.
- Migratory Birds Convention Act, Section 35 (http://laws.justice.gc.ca/eng/M-7.01/index.html) prohibits the deposit of oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds.
- Vessel Pollution and Dangerous Chemicals Regulations (http://laws-lois.justice.gc.ca/eng/regulations/SOR-2012-69/index.html) under the Canada Shipping Act details how fuel transfers between ship and shore or between ships are conducted.
- Hazardous Products Act (http://laws.justice.gc.ca/eng/H-3/index.html) is the basis for WHMIS, which promotes proper labelling of controlled products and requires workers to receive education and training safe storage, use and handling of controlled products.
- Water Resources Act sets out requirements for the Permit to Alter a Body of Water.
- Canadian Environmental Protection Act (http://laws.justice.gc.ca/eng/C-15.31/index.html) sets out Disposal at Sea requirements.
- DOEC Guidance Documents Dredge Spoils Disposal (GD-PPD-028-1) and Leachable Toxic Waste, Testing and Disposal (GD-PPD-026-1) detail the testing and disposal requirements of dredged materials from marine construction activities. The removal and disposal of dredge spoils from within the marine/ freshwater environment requires testing as per GD-PPD-026-1 and approval from Service NL.
- Environmental Control Water and Sewage Regulations (http://assembly.nl.ca/Legislation/sr/regulations/rc030065.htm) contains

requirements for waste water discharge, which requires testing of the water from any on-land settling ponds prior to discharge.

2.10.2 Environmental Effects Monitoring

Environmental Effects Monitoring (EEM) programs verify environmental effects predictions and the effectiveness of mitigation measures, as well as facilitate the identification of any unforeseen environmental problems that may arise, thereby allowing them to be addressed in a timely and effective manner.

Near Shore Environmental Effects Monitoring Program

EMCP will implement a near shore EEM program to verify impact predictions in the marine environment in Bull Arm.

The Hebron EEM program design is based on: planned construction activities in Bull Arm, Hebron Project baseline surveys conducted in 2011 – 2012, and the EEM program developed in consultation with federal and provincial government and area fishers for the Hibernia Project (1992 – 1997). A series of Hebron Project surveys during 3Q2011 and 4Q2011 and throughout 2012, determined baseline marine environmental quality prior to leasing the site and commencing construction. The marine EEM program associated with the Hebron Project work at the Bull Arm Fabrication site will be undertaken over the four to five year construction period (2013-2017) in Bull Arm, Trinity Bay.

The strategy of the EEM program is to focus upon those attributes which have been used in the environmental assessment to predict potential environmental effects and address specific environmental risks posed by site construction activities. This approach will allow effective environmental monitoring of the project.

2.10.3 Marine Mammals

If underwater blasting is identified as being necessary, blasting will be done in accordance with Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations (Southall et al., 2007), and blasting procedures will include the following:

- Undertake a blast impact assessment prior to blasting to determine appropriate marine mammal and sea turtle exclusion zones and ensure that a 100 kPa charge is not exceeded.
- Evaluate the sound levels in the water column to determine a safety zone for marine mammals.
- Assess the feasibility of using a bubble curtain to reduce sound levels.

- Utilize received sound levels of 180 dB re 1 µPa (rms) for cetaceans and sea turtles, and 190 dB re 1 µPa (rms) for phocids, modelled as 2.7 and 0.99 km for a 100 kPa charge, respectively, as a guide for these zones.
- Monitor sound levels during blasting at the shoreline and in the water to modify exclusion zones based on in-field measurements. These zones will be monitored by a trained observer for 30 minutes prior to and during blasting operations in the marine environment, and blasting operations will be temporarily suspended or halted if a marine mammal or sea turtle is sighted within or about to enter the zone. Activities will not resume until the animal(s) has left the zone or it has not been re-sighted for 30 minutes.
- Depending on the size of the designated safety zone, more than one trained observer placed in different areas of the safety zone may be needed to adequately monitor the zone. Monitoring techniques will be reviewed and approved by DFO prior to blasting operations.

Appendices

Appendix 2A
General Mitigation Measures

1 General Mitigation Measures

1.1 STORAGE, HANDLING AND TRANSFER OF PETROLEUM PRODUCTS AND OTHER HAZARDOUS MATERIALS

A variety of petroleum products and other potentially hazardous materials will be used to support land- and marine-based activities during Project activities at the Bull Arm facility. Gasoline, diesel fuel, heating oil, grease, motor oil and hydraulic fluids may all be needed for equipment. Other potentially hazardous materials that may be used routinely include:

- Propane;
- Explosives;
- Acetylene;
- Form oil;
- Paints;
- Epoxies;
- Concrete additives;
- Antifreeze; and
- Cleaners and solvents.

Environmental Concerns

When transporting, storing, handling, transferring, or using petroleum products or other hazardous materials, the uncontrolled release to the environment through spills and leaks is of utmost concern. This may result in contamination of air, soil, marine, and/ or freshwater (both surface and ground water). Adverse effects on human health and safety, terrestrial, aquatic and marine habitat and species may occur as a consequence of air, soil, and water quality degradation.

Applicable Regulations, Codes and Standards/ Environmental Protection Procedures

The storage handling and transfer of petroleum products and other hazardous materials shall also be in accordance with the following:

- Transportation of Dangerous Goods Regulations (http://laws.justice.gc.ca/eng/T-19.01/)
- CAN/CSA – B149.1 Natural Gas and Propane Installation Code
- CAN/CSA – B149.2 Propane Storage and Handling Code

- National Fire Code of Canada, Part 3 Indoor and Outdoor Storage
- Explosives Act and its Regulations (http://laws.justice.gc.ca/en/E-17/index.html)
- NFPA 30 – Flammable and Combustible Liquids Code
- Fire and Protection Services Regulations 45/12
- WHMIS – Newfoundland and Labrador Regulations 1149/96

  (http://assembly.nl.ca/Legislation/sr/regulations/rc961149.htm)
- Storage and Handling of Gasoline and Associated Products Regulations 58/03 (http://www.assembly.nl.ca/legislation/sr/regulations/rc030058.htm)
- CSA – B139 Installation Code for Oil-Burning Equipment
- Used Oil Control Regulations 82/02 (http://www.assembly.nl.ca/legislation/sr/regulations/rc020082.htm)

During the marine phase of construction in Bull Arm, petroleum products and other hazardous materials shall be stored, transported, transferred and handled in accordance with the following:

- Canada Shipping Act, 2001 (http://laws.justice.gc.ca/eng/C-10.15/index.html) and Supporting legislation, including the Vessel Pollution and Dangerous Chemicals Regulations (http://laws-lois.justice.gc.ca/eng/regulations/SOR-2012-69/index.html) under the Canada Shipping Act, 2001.

On land petroleum products and other hazardous materials shall be stored, transported, transferred and handled in accordance with the following:

- Used Oil Control Regulations (http://www.assembly.nl.ca/legislation/sr/regulations/rc020082.htm)
- Storage and Handling of Gasoline and Associated Products (GAP) Regulations (http://assembly.nl.ca/Legislation/sr/regulations/rc030058.htm)
- Heating Oil Storage Tank (HOST) Systems Regulations, 2003 (http://assembly.nl.ca/Legislation/sr/regulations/rc030060.htm) under the Environmental Protection Act shall be respected for storing and handling petroleum or a derivative of it (in the case of tanks smaller than 2500 litres and connected to heating appliances)

For on-land storage and handling of other hazardous materials that are not regulated by the above regulations, the following regulations and standards shall be consulted and the appropriate ones respected, depending on the nature of the material:

- National Fire Code of Canada, Part 3 Indoor and Outdoor Storage
- Dangerous Goods Transportation Act and Regulations

Furthermore, the following environmental protection procedures shall be followed:

Transport of Petroleum Products and Other Hazardous Materials

The transport of petroleum products and other hazardous materials shall be undertaken in compliance with the Dangerous Goods Transportation Act and Regulations and supporting legislation. All trucks entering the Site transporting materials regulated by the Dangerous Goods Transportation Act shall have the appropriate placards and documentation in place, and all drivers must be able to show proof of certification of training in the transportation of dangerous goods as required by the above-noted Act. Security staff and the EPC E&R representatives shall be trained in the requirements of the Act.

Storage of Fuel and Other Hazardous Materials

The bulk fuel area currently consists of three storage tanks (22,730L gasoline, 22,730L diesel, 45,460L gasoline) located on a concrete slab which has a containment wall built into the perimeter. The slab is covered by a canvas style dome tent, and spill kits and fire extinguishers are located at the front of the fueling area. The following conditions shall apply to all storage areas designated for fuel and other hazardous materials.

- On-land storage of petroleum products and other hazardous liquids shall be in above-ground tanks that are either double-walled or utilize dyking provisions as detailed in the GAP regulations, NFCC, and NFPA 30.
- For storage of waste oils, other waste petroleum products, and spent hazardous materials, consult the applicable EPC contractor Waste Management and Environmental Management Plans.
- The floating concrete batch plant barge, power barge and other support barges shall be equipped with on deck double-walled fuel storage tanks.
- Petroleum products and other hazardous materials shall only be handled by persons who are trained and qualified in handling these materials.
- Storage units for petroleum products and other hazardous materials shall be in hazardous waste containers designed for that purpose. The units shall be clearly marked and situated to ensure they are not damaged by moving vehicles and equipment. The markers shall be visible under all weather and lighting conditions.

- Storage areas shall be equipped with suitable venting and explosive proof lighting.
- Spill kits and applicable firefighting equipment will be readily accessible and in close proximity to all fuel and hazmat storage areas.
- All storage tank systems shall be inspected on a regular basis.
- All GAP regulated tanks (i.e. all petroleum product tanks other than those of <2500 litre capacity that are connected to heating appliances) shall comply with the monitoring requirements outlined in the GAP Regulations. EPCs or subcontractors will determine specific personnel who are responsible for tank monitoring. Tank monitoring records will be available on site and kept for at least 2 years.
- Marine storage shall be in compliance with the Canada Shipping Act Oil Pollution Prevention Regulations. The storage areas shall be inspected to verify compliance with the Oil Pollution Prevention Regulations.
- Contracted suppliers of petroleum products and other hazardous materials for the Bull Arm site shall comply with provisions of this EPP.
- Smoking and ignition sources shall be prohibited within 10 m of all areas used to store petroleum products and other hazardous materials.
- Hot Work certificates shall be required before undertaking hot work within 10 m of all areas used to store petroleum products and other hazardous materials.
- For all land-based operations, petroleum products and other hazardous materials shall be stored on level terrain at least 100 m from any surface body of water unless otherwise approved by an EPC E&R representative. Additionally, the Field Level Hazard Assessment form has been updated to include requirements for work near water.
- Weekly inspections of all petroleum product and other hazardous materials storage areas shall be documented.

Fuel Transfer

The following procedures shall apply to the transfer of petroleum products:

- In all cases transfer of petroleum products from one reservoir to another shall be attended for the duration of the operation by a competent person as determined by their employer. The attendant shall be trained in the requirements of the spill contingency plan and WHMIS. All reasonable precautions shall be taken to avoid the discharge of petroleum products to land or water.
- Equipment used for fuel transfer shall be equipped with properly functioning and approved check valves that are spaced to prevent

backflow of fuel in the case of failures. Transfer conduits shall have a bursting pressure of not less than four times its maximum working pressure.

- Spill kits will be readily accessible and in close proximity to all fuel transfer operations.
- Fast Rescue Craft and/ or work skiff crews will be notified prior to fuel transfers to ensure they can be prepared to assist with spill response in the case of an incident.
- Fuel transfer operations between ship and shore or between ships shall be conducted in accordance with the Canada Shipping Act - Oil Pollution Prevention Regulations. Project vessels receiving fuel shall be boomed prior to start of refueling operations. Two-way communication shall be maintained between the fuelling source and the facility being refueled in order to direct the immediate shutdown of the transfer operation in case of an emergency. All fuel transfers shall be recorded in the vessel's Oil Record Book.
- No fuel bunkering will be permitted for non-project vessels.
- If fuel transfer operations take place between sunset and sunrise, adequate lighting shall be provided in the area to ensure that if a spill occurs it can be easily detected. Fuel transfers during non-daylight hours should be minimized.
- Daily inspections of hydraulic and fuel systems on all operating machinery shall be carried out and records kept during the duration of near shore construction. Leaks shall be repaired immediately.
- Exposed pipelines shall be protected from vehicular collision damage by the installation of guard rails.
- Prior to all major fuelling operations, the Site ERT and respective EPC E&R representatives shall be notified.

Equipment Fuelling

The following procedures shall apply to the fuelling of equipment such as generators and mobile equipment:

- Fuelling and lubrication of equipment shall occur in such a manner as to minimize the possibility of contamination to soil or water.
- When refueling equipment, operators shall:
  - Use leak-free containers and reinforced rip and puncture-proof hoses and nozzles;
  - Be in attendance for the duration of the operation; and
  - Seal all storage container outlets except the outlet currently in use.

- Regular inspections shall be made on machinery hydraulic and fuel systems. Leaks shall be repaired immediately.
- Fuelling or servicing of mobile equipment on land shall not be normally be allowed within 30 m of watercourses, bodies of water or ecologically sensitive areas unless risks are assessed, documented, and mitigated.
- Fuelling attendants shall be trained in spill response and fuelling requirements.

Hazardous Materials

Use of hazardous materials must comply with established safety practices and procedures. All materials/ products that are WHMIS controlled and/ or may pose a hazard to people or the environment, regardless of quantity, and that are no longer usable shall be designated as hazardous wastes/ waste dangerous goods and is subject to the provisions of respective waste management and environmental management plans.

The following procedures shall apply to hazardous materials other than petroleum products:

- Hazardous materials shall be used only by personnel who are trained and qualified in the handling of these materials and only in accordance with manufacturers' instructions and government regulations, as outlined in the MSDS.
- For controlled products, WHMIS regulations are in force throughout the Bull Arm facility, as are provisions of the Dangerous Goods Transportation Act and Regulations. All employees involved with hazardous materials shall be appropriately trained.
- All hazardous wastes shall be managed (i.e. handled, stored, removed and disposed of) in an acceptable manner in accordance with government regulations and requirements, as discussed in the respective Waste Management and Environmental Management Plans.
- MSDS must be available on-site prior to receipt of any hazardous materials; any material that arrives at site without the required MSDS will be quarantined in the warehousing area until the corresponding MSDS is acquired.
- Chemical Management Systems are in place at the Bull Arm site and shall be followed when applicable.

Form Oil Use

- When possible, form oils shall be applied to forms in-situ by spraying.
- If form oils must be applied to forms before they are placed then this shall be done in one designated area approved by the EPC E&R

representative. If rollers must be used then oil absorbent cloths shall be placed under the forms to capture and contain excess form oil that splashes or runs off the forms during application.

- Waste or excess form oil that is not to be kept for future use shall be managed in accordance with provisions of in the respective waste management and environmental management plans.

Permits and Authorizations

The permits and authorizations pertaining to storage of petroleum products and other hazardous materials will likely be required. Conditions of all permits, authorizations, licenses and approvals shall be respected.

1.2 SEWAGE TREATMENT, DISPOSAL AND COMPLIANCE TESTING

Introduction

Secondary treatment is provided for all sewage originating from the site through the Sewage Treatment Plant (STP). The main purpose of secondary treatment is to reduce the biochemical oxygen demand of the effluent, capture solids and to the extent possible, lower the concentration of such compounds as ammonia and phosphorous in the process.

There is an existing STP located at the Bull Arm site which has undergone extensive refurbishment and testing to ensure it meets Provincial operating standards. A Permit to Operate has been obtained from Service NL for the STP.

Environmental Concerns

The accidental release of untreated sewage is a concern to human health, drinking water quality, and freshwater and marine ecosystems.

Environmental Protection Procedures

- The sewage disposal system shall comply with the requirements outlined in the Federal Wastewater System Effluent Regulations, and the Permit to Operate (*Permit No. SS12-101207B*) issued by Service NL.
- The health inspector with Service NL is the approved authority for sewage flows less than 4546L/ day; the general sanitization of the site is under the jurisdiction of the health inspector who will perform periodic inspections.
- Portable latrines used in work areas shall be routinely inspected and properly maintained. Sewage removed from the facilities shall be

transported to a sewage lift station for subsequent pumping to the STP. Sewage removed from the facilities may also be removed and treated off-site by a licensed company, if necessary. All human fecal waste must be contained and disposed of in a manner that meets all environmental and health requirements. Any concerns must be brought to the immediate attention of the respective EPC E&R representative.

- Sewage generated at the deep water site will be transported back to shore, in appropriate containers, disposed to the site lift station, and treated via the STP. If this is not feasible, sewage can be disposed off-site for treatment by a licensed company.

Monitoring at the Sewage Treatment Plant

As a condition of the STP Permit to Operate, the treated effluent is monitored in order to determine compliance with Provincial regulations. The frequency of sampling and the constituents to be sampled are identified by Service NL in the STP Permit to Operate.

Disposal of Sewage Sludge

Sewage sludge, which accumulates at the bottom of the plant, must be pumped out as required. Disposal of this material shall comply with provisions of applicable waste management and environmental management plans.

The following kitchen practices are critical to ensuring proper functioning of the sewage treatment plant.

- All food waste must be scraped into waste bins for disposal with the solid waste stream from the kitchen
- Oils must be placed in plastic buckets for disposal with the solid waste stream and under no circumstances poured down sinks or drains
- All practical means must be used to minimize disposal of oil, grease and food down sink drains

1.3 QUARRYING AND AGGREGATE REMOVAL

Environmental Concerns

The principal concerns for quarry development and associated aggregate removal include the potential for sedimentation of marine and freshwater systems, loss of terrestrial habitat and historic resources, noise, dust and quarry development/ reclamation plans.

Environmental Protection Measures

The following measures shall be implemented to minimize the potential effects of quarrying activities and subsequent aggregate removal:

- A Quarry Permit Letter was obtained from the Department of Natural Resources for a pre-existing quarry area from the Hibernia construction phase; this permit was closed in 2014 as the above-mentioned quarry has not been, and is not anticipated to be used for Hebron construction activities.
- Quarry areas shall be developed in a controlled manner so as to minimize potential environmental effects. The following protection measures shall be implemented to minimize disturbance and facilitate rehabilitation:
  - A buffer zone of undisturbed vegetation shall be maintained between quarries and watercourses, bodies of water and ecologically sensitive areas.
  - The quarry area, stockpile area and limits of clearing shall be staked and/ or flagged to prevent over-extension of the development, thereby minimizing the extent of the operation (corner posts at least 1 m high will be installed to mark the quarry area).
  - Cutting and operating permits shall be obtained from the Department of Natural Resources prior to any clearing for quarrying purposes. Clearing/ removal of trees shall be restricted to the minimum areas needed for the quarry. Only the area necessary for one year's production may be cleared.
  - Canadian Wildlife Service recommends that any clearing of vegetation be done outside the migratory bird breeding season, from May to mid-July annually. During the bird nesting season, bird surveys must be conducted prior to undertaking any vegetation removal. If a nest is found, the nest site and immediate area's vegetation should be left undisturbed until nesting is completed.
  - Disposal of cleared un-merchantable timber, slash and cuttings by burning shall be in compliance with the Forest Fire Regulations (http://www.assembly.nl.ca/Legislation/sr/Regulations/rc960011.htm), Sections 3, 4 and 5 and a Permit to Burn. At no time shall a fire be left unattended.
  - Vegetation and organic soils that become mixed with quarried rock shall be removed when practical to do so.
  - Upon completion of excavation of a quarry, cliff faces or benches shall be left at a height of less than 5 m, when practical and safe to do so and in accordance with provisions of the quarry permit. Available

material left over from quarrying and stockpiled overburden shall be used to minimize slopes and face heights.

- Following sloping, the topsoil and any organic materials shall be re-spread over the disturbed area to promote natural re-vegetation by adjacent seed sources.
- In order to prevent sedimentation of bodies of water, watercourses and ecologically sensitive areas, a settling pond shall be established, if required, and cleaned on a regular basis, as required, to ensure that the retention capacity is maintained at all times. See DFO Factsheet entitled Temporary Settling (Detention) Basins (http://www.nfl.dfo-mpo.gc.ca/e0005554) for acceptable designs.

♦ The release of sediment laden water into a waterbody, watercourse or ecologically sensitive area, due to construction activities, shall not exceed more than 30 mg/L as per the NL Environmental Control Water and Sewage Regulations (2003).

♦ Effluent from settling basins shall be monitored for pH, Total Suspended Solids (TSS), nitrate and ammonia for each batch release or once weekly if discharge is continuous.

♦ Monthly reports containing the environmental compliance monitoring and sampling information, including laboratory reports and spreadsheets (Excel or compatible), shall be forwarded to the Director, Pollution Prevention Division in digital format (pdf) or hardcopy, within 30 calendar days of the reporting month. The email address for electronic reports is statenv@gov.nl.ca.

♦ All compliance records and other documents required in the EPP shall be retained for a period not less than three years beginning on the day they were created. These records shall be made available upon request for review by officials of the DOEC.

♦ Dust from aggregate storage and handling shall be controlled with water as required during times when temperatures are above freezing.

1.4 EXCAVATIONS, EMBANKMENT AND GRADING

Excavation, embankment and grading of common rock and other materials may be required at various locations within the Project.

Environmental Concerns

The principal environmental concerns associated with excavation, embankment and grading are potential effects on water quality, fish and fish habitat, terrestrial habitat and historic resources due to ground disturbance.

Environmental Protection Measures

All work shall be conducted in a manner which controls potential sedimentation of watercourses and bodies of water in or adjacent to the work areas as outlined in the following procedures:

- Topsoil and excavated overburden and bedrock shall be stored in separate stockpiles for later use during rehabilitation.
- Any unsuitable material shall be disposed of in an approved disposal area.
- Excavation, embankment and grading shall be done only upon completion of grubbing and stripping. Where engineering requirements do not require grubbing and stripping (e.g., within the buffer zone of a stream crossing), filling shall occur without any disturbance of the vegetation mat or the upper soil horizons.
- Excavation, embankment and grading in the vicinity of stream crossings shall be done in a manner that ensures erosion and sedimentation of watercourses and bodies of water is minimized.
- Land-based sediment control measures (e.g. hay bales, silt fencing, etc.) may be required to be deployed if conducting earthworks activities in close proximity to the water that poses sedimentation hazards. This requirement will be determined by EPC E&R representatives.
- Water-based sediment control measures (e.g. sediment curtain) may be required to be deployed if conducting significant earthworks activities in close proximity to the water that poses sedimentation hazards. This requirement will be determined by EPC E&R representatives.
- Any water accumulated in excavations must meet the parameters and limits in Schedule 1 of the Environmental Control Water and Sewage Regulations prior to discharging to a water body. If dewatering of excavations occurs on land, erosion protection measures may be required as determined by EPC E&R representatives.
- Additional guidance can be provided by DFO's Projects Near Water website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) and Guidelines for the Protection of Freshwater Fish Habitat in Newfoundland and Labrador (http://www.dfo-mpo.gc.ca/Library/240270.pdf). A Project Review Form may be required to be submitted to DFO by EPC contractor environmental representatives for activities that do not meet the requirements outlined on this website.
- A buffer zone of undisturbed vegetation shall be maintained between construction areas and all watercourses, bodies of water and ecologically sensitive areas.

1.5 DUST CONTROL

Environmental Concerns

The environmental concerns associated with dust include human health effects and potential effects on aquatic ecosystems, waterfowl and vegetation.

Environmental Protection Measures

Dust from construction activities shall be controlled where possible by using frequent applications of fresh water. Should additional measures be necessary, all control agents will be risk assessed and approved for use by EPC contractor environmental representatives prior to use; petroleum liquids shall not be used for dust control.

1.6 TRENCHING

Environmental Concerns

Where excavation for the construction of water lines or any other infrastructure is undertaken, potential runoff of sediment-laden water could result in effects on marine or freshwater fish and fish habitat, water quality and historic resources.

Environmental Protection Measures

The following measures shall be implemented to minimize the potential effects of trenching:

- Topsoil and excavated overburden and bedrock shall be stored in separate stockpiles for later use during rehabilitation.
- Any unsuitable material shall be disposed of in an approved disposal area.
- Land-based sediment control measures (e.g. hay bales, silt fencing, etc.) may be required to be deployed if conducting earthworks activities in close proximity to the water that poses sedimentation hazards. This requirement will be determined by EPC E&R representatives.
- Water-based sediment control measures (e.g. sediment curtain) may be required to be deployed if conducting significant earthworks activities in close proximity to the water that poses sedimentation hazards. This requirement will be determined by EPC E&R representatives.

- Any water accumulated in excavations must meet the parameters and limits in Schedule A of the Environmental Control Water and Sewage Regulations prior to discharging to a water body. If dewatering of excavations occurs on land, erosion protection measures may be required as determined by EPC E&R representatives.
- Additional guidance can be provided by DFO's Projects Near Water website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html). Guidelines for the Protection of Freshwater Fish Habitat in Newfoundland and Labrador can also be found on the website (http://www.dfo-mpo.gc.ca/Library/240270.pdf). A Project Review Form may be required to be submitted to DFO by EPC contractor environmental representatives for activities that do not meet the requirements outlined on this website.

1.7 DEWATERING – WORK AREAS/ DRY DOCK

Excavations and trenches on the Topsides and Dry Dock sites may become infilled with water from rain, surface runoff or groundwater infiltration and may require dewatering. Other activities, such as pile driving or drilling, may also produce large volumes of water that will have to be managed and sampled prior to releasing to the marine environment.

The GBS dry dock site is situated in GMC; the cove is 1.5 km long and has an average width of 500 m. The GBS dry dock area is approximately 16.5 m deep and has a diameter of 180 m. Upon re-establishing the dry dock, the inner cove was enclosed by a rock bund wall consisting of a ¾" minus core encased on both sides by a 4" minus stone; on the seaward side there is a 900 mm minus armour stone (rip rap) to protect the bund wall against wave action and potential undermining and sedimentation. Upon installation of an impermeable cement-bentonite core the area inside the berm was pumped dry, this dewatering operation resulted in approximately 800,000m^3 of seawater pumped over the bund wall into Great Mosquito Cove. All pumps were fitted with a specified screen size to protect fish entrainment within the pump; this operation was subject to an approval from DFO prior to commencing.

Environmental Concerns

The major concerns associated with dewatering were sedimentation and direct fish mortality and/ or habitat destruction for freshwater and marine fish species. To develop restriction and control on dewatering activities, a protocol was established to ensure that dewatering was conducted with minimal impact on natural watercourses, bodies of water, or ecologically sensitive areas and met or exceeded the requirements of Schedule A in the Provincial Environmental Control Water and Sewage Regulations, 2003

(http://assembly.nl.ca/Legislation/sr/ regulations/rc030065.htm) under the provincial Water Resources Act (http://www.assembly.nl.ca/legislation/sr/tableregulations/tableofregulations_w04-01.htm).

During initial dewatering of the dry dock a series of mitigation measures were utilized to prevent silt laden water from being discharged into GMC. The majority of the water inside the bund wall enclosure was pumped straight into GMC while testing showed all constituents in compliance with Provincial regulations. When the water depth inside the berm enclosure decreased to less than approximately two meters, siltation levels began to increase; pumps were then re-directed to a large elongated settling trench that was constructed along the top of the bund wall. The discharge of the settling trench then flowed through a water filtration unit consisting of a series of bag and sand filters before being discharged into GMC.

Upon the completion of initial dewatering, subsequent ongoing maintenance dewatering commenced, this process continued in the dry dock until the first phase of GBS construction was complete and the dry dock was ready to be re-flooded. Maintenance dewatering followed a similar process in that it utilized the same type of filtration and settling trench combination setup as for the dewatering process.

An additional mitigation measure deployed specifically for bund wall construction and initial dewatering utilized a vinyl coated polyester fabric turbidity curtain installed on the seaward side of the bund wall to prevent sedimentation from entering GMC. A mackerel seine fishing net was utilized as an additional in-water mitigation; the idea of this mitigation was to allow the net to bio-foul which created a natural barrier to any further silt that surpassed the primary curtain. This method was proven a best practice during the Hibernia construction phase; the net, anchors and floats were procured from, deployed and maintained by Bull Arm area fishers.

Environmental Protection Measures – Work Areas

- Where practical, clean water shall be discharged to vegetated areas to further reduce any potential effects on watercourses. Additionally, mechanisms for energy dissipation shall be implemented to prevent scouring and erosion of the discharge location (impervious geotextile mats, perforated end of pipe, discharge to small settling sump, etc.).
- Where practical, discharged water shall be encouraged to follow natural surface drainage patterns.
- Direct return water from activities such as pile driving or drilling to settling ponds. Samples are required to be collected and compared against the limits in Schedule A of the Environmental Control Water and Sewage Regulations prior to discharge to a water body. If sampling results are

below the limits in Schedule A then the return water can be directed to a water body. If sampling results are above the limits in Schedule A then the return water may be required to settle for time in the sediment pond, additional treatment, or disposed off-site by a licensed company.

- Additional guidance can be provided by DFO's Projects Near Water website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html). Guidelines for the Protection of Freshwater Fish Habitat in Newfoundland and Labrador can also be found on the website (http://www.dfo-mpo.gc.ca/Library/240270.pdf). A Project Review Form may be required to be submitted to DFO by EPC contractor environmental representatives for activities that do not meet the requirements outlined on this website.

Environmental Protection Measures – Dry Dock

- Measures shall be employed to prevent the alteration, disruption and destruction of fish habitat.
- Water pumped from excavations or work areas, or any runoff or effluent directed out of the project site shall have sediment removed by settling ponds, filtration or other suitable treatment before discharging to a watercourse, waterbody or other ecological sensitive area.
- Any effluent directed out of the Project site shall be tested for pH and total suspended solids (TSS) before being discharged to any watercourse, water body or other ecological sensitive area. Effluent discharge shall be tested for each batch release or once weekly if discharge is continuous and comply with Schedule A of the provincial Environmental Control Water and Sewage Regulations, 2003 (http://assembly.nl.ca/Legislation/sr/ regulations/rc030065.htm) under the provincial Water Resources Act (http://www.assembly.nl.ca/legislation/sr/tableregulations/tableofregulations_w04-01.htm).
- Monthly reports containing the environmental compliance monitoring and sampling information, including laboratory reports and spreadsheets (Excel or compatible), shall be forwarded to the Director, Pollution Prevention Division, in digital format (pdf) or hardcopy, within 30 calendar days of the reporting month. The email address for electronic reports is statenv@gov.nl.ca.
- All compliance records and other documents required in the EPP shall be retained for a period not less than three years beginning on the day they were created. These records shall be made available upon request for review by officials of the DOEC.
- Contingency measures shall be implemented to deal with storm events and high run-off in order to minimize adverse environmental effects from these events. Erosion prevention and sediment containment materials

such as silt fence material, riprap, straw bales, filter fabric and designated equipment shall be available to address contingency/emergency situations. To date, straw bales and siltation fencing have been deployed in various areas on the Site, in addition to the construction of rock check dams in areas of significant drainage.

All contractors on site shall follow the above environmental protection procedures to ensure water control at site. Any water discharged into a waterbody, watercourse or ecologically sensitive area, due to construction activities, shall comply with applicable discharge guidelines as presented in the Newfoundland and Labrador Environmental Control Water and Sewer Regulations under the Water Resources Act for applicable analysis parameters (pH and Total Suspended Solids).

1.8 MARINE VESSELS

This section of the EPP is intended to provide general guidance for project supervision and environmental staff to prevent or minimize potential effects in the biophysical environment. All Site personnel, contractors and subcontractors shall follow all provisions in the Hebron Project Marine Traffic Procedure.

Environmental Concerns

Project vessel traffic has the potential to interfere with local fishing boats and other vessel traffic. The potential exists for vessels to collide, run aground and/ or sink. Such events may lead to the accidental release of fuel and other hazardous materials to the marine environment. The release of ballast or bilge water could introduce non-indigenous species or deleterious substances into Trinity Bay.

- All vessel activities will be governed in accordance with Sections 5 and 6 of the Pollutant Discharge Reporting Regulations, the Vessel Pollution and Dangerous Chemicals Regulations under the Canada Shipping Act and Section 5 of the Vessel Traffic Service Zones Regulations as required by the Canada Shipping Act, 2001.
- KKC has established Construction Safety Zones (CSZ) at the GMC site and at the DWS in Bull Arm. EMCP has established an overall Project agreement with commercial fishers using the Bull Arm area that addresses safe operations and compensation. This agreement ensures safe and effective communications and operation for both Project and fisher vessels.
- Marine traffic associated with Project construction will be provided a copy of the Hebron Marine Traffic Procedure and follow a charted vessel traffic lane when approaching and departing the Bull Arm site.

- EMCP, in conjunction with KKC have consulted with the Bull Arm area fish harvesters to discuss and agree on an appropriate Marine Traffic Procedure for the safe and efficient operation of Project marine traffic and fishing vessel operations in the near shore Project area.
- Communications will be maintained directly at sea by all Project vessels via marine radio to facilitate information exchange with the Bull Arm Marine Traffic Controller, the fishers and the Fisheries Liaison Advisor. Relevant information about marine operations occurring outside the Safety Zones will also be publicized, when appropriate, using established communications mechanisms, such as Notices to Shipping (Continuous Marine Broadcast and NavTex) and CBC Radio's (Newfoundland and Labrador) Fisheries Broadcast.
- Project vessel masters will observe the following basic rules:
  - Demonstrate they have appropriate safety and emergency procedures on board.
  - Advise the Bull Arm site Marine Traffic Controller of their time of departure from their port of origin and their estimated time of arrival.
  - Travel at the recommended speed within the traffic lanes as cited in the Marine Traffic Procedure and within Bull Arm, see Canadian Hydrographic Chart L/C4851.
  - Notify the Marine Traffic Controller of their progress at sea or, if stopping at other ports enroute, update their estimated time of arrival.
  - Relevant Canadian Hydrographic Charts or electronic charting systems must be on board prior to leaving their port of origin; these charts must be kept on board at all times.
  - Implement best management practices designed to achieve zero discharge of oily waste while at the site and along the Project shipping route.
  - All Project-related vessels shall have onboard an up to date SOPEP as well as valid contractual arrangements with a certified spill response organization in the event of a serious marine spill.
  - Notify the Canadian Coast Guard and the Bull Arm Marine Traffic Controller of any releases or spills of substances (emergencies) immediately and identify the location.
- Project-related vessels may discharge wastes according to the KKC Vessel Waste Management Guidelines and in compliance with MARPOL regulations 9.10-01, 9.1.2, 96(1)(b) and the Vessel Pollution and Dangerous Chemicals Regulations. The discharge of bilge or oil contaminated water into surrounding waters is prohibited, as is the offloading of international wastes from visiting (non-Project) vessels.

- The bunkering of fuel for visiting (non-Project) vessels is prohibited. Project vessels and barges taking on fuel at Bull Arm must follow the procedure outlined in the document Procedure – Fuelling of Marine Vessels and also follow the Booming Criteria matrix for fuelling.
- All crewmembers will be familiar with emergency procedures for both life threatening and potentially polluting situations.
- All stationary hazards, such as moored platforms or vessels, will be clearly marked according to the Navigable Waters Protection Act approvals and/or Part B, Rule 42, Clauses (d) and (g) of the Collision Regulations under the Canadian Shipping Act.
- All vessels will comply with the Canadian Shipping Act, 2001 Ballast Water Control and Management Regulations SOR/2011-237.
- All vessels must comply with the EPC's Waste Management Plans and Environmental Management Plans.

1.9 PUMPS AND GENERATORS

Environmental Concerns

A variety of water pumps, hoses, and generators are in frequent use in many areas of the site. Environmental concerns are associated with any release of deleterious substances such as fuel, coolant, and lube, from the pumps and/ or generators into bodies of water.

Environmental Protection Measures

- Refer to Section 1.1 of this Appendix for petroleum storage related to pumps and generators.
- Drip pans shall be placed underneath small stationary equipment such as pumps and generators. Spill kits will be kept in close proximity of where pumps and generators are in use.
- All equipment shall be inspected routinely for leaks and drips.

All releases from primary containment including spills to soil, water, concrete, inside buildings, in secondary containment, etc. shall be reported immediately to direct supervisors and the respective EPC E&R representative. Upon detection of a leak, if safe to do so, the equipment (i.e., pump, generator, etc.) should be shut down immediately and corrective action taken to repair the leak and clean up any contaminated soil and/ or water.

1.10 NOISE CONTROL

Environmental Concerns

A variety of noises associated with Project activities can negatively affect wildlife distribution and abundance. Noises associated with blasting are temporary in nature and noises associated with drilling are considered long-term, but localized.

Environmental Protection Measures

Measures shall be implemented wherever possible to minimize potential effects arising from a variety of noise sources, including:

- Adherence to all applicable permits and approvals.
- All equipment shall have exhaust systems regularly inspected and mufflers will be operating properly.
- Avoid unnecessary revving of engines and use of airbrakes.
- Operate equipment at and within load tolerances and ratings and focus maintenance efforts on lubrication and replacement of worn parts.
- Low level flying of aircraft should be avoided in areas where wildlife is present.

1.11 BLASTING

Environmental Concerns

The general environmental concerns associated with on-land blasting include:

- Destruction of vegetation outside excavation limits;
- Noise disturbances to wildlife;
- Disturbance of archaeological resources; and
- Dust generation.

Blasting in or near bodies of water can affect organisms with swim bladders (fish) but may also affect a variety of aquatic animals including shellfish, marine mammals, otters, seabirds and waterfowl. The introduction of sediment into the water column is also a concern for marine/ freshwater water quality and related effects on aquatic life.

Environmental Protection Measures

The handling, transportation, storage and use of explosives and all other hazardous materials shall be conducted in compliance with all applicable laws, regulations, orders of the DOEC and Service NL, Sections 5 and 7 of the Explosives Act, and Sections 5, 6, 7 and 15 of the Dangerous Goods Transportation Act and Regulations. The following measures shall be implemented to minimize the effect of the use of explosives and blasting:

- Explosives shall be used in a manner that will minimize damage or defacement of landscape features, trees, ecologically sensitive areas such as wetlands, and other surrounding objects by controlling through the best methods possible (including precisely calculated explosive loads and adequate stemming), the scatter of blasted material beyond the limits of activity. Outside of cleared areas, inadvertently damaged trees shall be cut, removed, and salvaged if merchantable. Fly rock that inadvertently enters a waterbody, watercourse or any ecologically sensitive area, and that can be recovered without further damage to the environment shall be removed. Instances where larger fly rock (boulders) enters these areas, or where fly rock enters deep bodies of water, recovery may not be practical.
- Blasting patterns and procedures shall be used which minimize shock or instantaneous peak noise levels.
- Time delay blasting cycles or blasting mats shall be used, if necessary, to control the scatter of blasted material.
- Blasting shall not occur in the vicinity of fuel storage facilities.
- Blasters' Safety Certificates shall be obtained prior to drilling and blasting.
- Use of explosives shall be restricted to authorized personnel who have been trained in their use.
- Explosives are brought to site by a licensed contractor. While onsite, all explosives are stored in a locked storage area in the proximity of the work. All waste containing residual explosive materials are disposed of offsite.
- The immediate area of the blast site shall be surveyed within one hour prior to a blast and operations will be curtailed if sensitive animals (e.g. black bears, caribou, Harlequin ducks) are observed within 500 m. Environmental personnel shall conduct pre-blast monitoring where knowledge and competency is required to see and identify species of concern. Additionally, any individual animal sightings by other personnel shall be reported to the respective EPC Environmental representative.

- All blasting associated debris, such as explosive boxes and used blasting wire, must be collected for proper disposal as soon as possible following blasting activity.
- If blasting is necessary within the vicinity of an archaeological site, precautions shall be taken to ensure that blasted material and shock waves do not disturb any part of the site. If necessary, protective covering shall be applied to the site under the supervision of an approved archaeologist. Blasting shall not be undertaken in these areas without notifying the respective EPC E&R representative.

Blasting in Close Proximity to Bodies of Water

- If blasting is required in or near a waterbody, it shall be undertaken in compliance with the required Water Resources permits from the DOEC. "Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters" (Wright and Hopky, 1998) will be used as a reference during work planning and in developing mitigations that may be required. A copy of this reference shall be kept at the E&R office at the Topsides and GBS construction sites and made available to all contractors that may take part in blasting activity.
- Drilling and blasting activities shall be undertaken in a manner that ensures the magnitude of explosions is limited to that which is absolutely necessary. A blasting plan shall be submitted to DFO in advance of work in close proximity to bodies of water.
- For multiple charges, time delay detonators should be used to reduce the overall detonation to a series of single explosions separated by minimum delay. Time delays for discrete explosions should be greater than 25 ms.
- Large charges should be subdivided into a series of smaller charges with minimum delay detonation.
- The on-land set-back distance from the blast site to the body of water or the set-back distance around the blast site in the body of water are based on the maximum weight of charge to be detonated at one instant in time and the type of fish or fish habitat in the area of the blast. Blast holes must be stemmed with angular gravel to grade or to streambed/ water interface to confine the blast. Angular gravel should have a particle size of approximately one twelfth the diameter of the hole.
- Blasting mats should be placed atop the holes to minimize scattering of blast debris around the area.
- No use of ammonium nitrate-fuel oil mixtures occurs in or near water due to the production of toxic by-products (ammonia).
- Prior to commencing marine blasting activities, a visual survey must be completed to ensure there are no marine mammals within 500 m of the

blasting site. If concentrations of fish or marine mammals are detected in this 500 m buffer zone, described blasting may proceed only once the fish or marine mammals have left the area. Blasting activities are not to be carried out in the marine environment within 500 meters of marine mammals or no visual contact from an observer using 7x35 power binoculars.

- No explosive is to be detonated in or near fish habitat that produced or is likely to produce an instantaneous pressure change (i.e. overpressure) greater than 100 kPa (14.5 psi) in the swim bladder of a fish.
- The installation of bubble/ air curtains is a demonstrated effective means of mitigation. When bubble curtains are used they should surround the blast site and be started up only after the fish have been moved outside of the surrounded area.
- Detonation of small scarring charges (i.e. detonator caps or short lengths of detonating cord) set off one minute prior to the main charge, or the use of noise generators may be used to move the fish out of the area
- Prior to blasting, a blast impact assessment will be undertaken to determine appropriate marine mammal and sea turtle exclusion zones and ensure that a 100 kPa charge is not exceeded
- The sound levels in the water column will be evaluated to determine a safety zone for marine mammals
- Received sound levels of 180 dB re 1 µPa (rms) for cetaceans and sea turtles, and 190 dB re 1 µPa (rms) for phocids, modelled as 2.7 and 0.99 km for a 100 kPa charge, respectively, will be used as a guide for these zones
- No detonation of explosive that produces, or is likely to produce, a peak particle velocity greater than 13 mm/s in a spawning bed during the period of egg production
- Sound levels during blasting will be monitored at the shoreline and in the water to modify exclusion zones based on in-field measurements. These zones will be monitored by a trained observer for 30 minutes prior to and during blasting operations in the marine environment, and blasting operations will be temporarily suspended or halted if a marine mammal or sea turtle is sighted within or about to enter the zone. Activities will not resume until the animal(s) has left the zone or it has not been re-sighted for 30 minutes.

Depending on the size of the designated safety zone, more than one trained observer placed in different areas of the safety zone may be required to adequately monitor the zone. Monitoring techniques and results of acoustic modelling will be reviewed and approved by DFO prior to blasting operations.

1.12 CONCRETE PRODUCTION

Environmental Concerns

The major concern relating to concrete production activities is the effects of washwater released to the environment. Concrete waste water may contain hazardous materials such as cement, concrete additives, and form oil.

Cement is very alkaline and washwater from spoiled or excess concrete or from the cleaning of the batch plant mixers and mixer trucks, conveyors and pipe delivery systems can be expected to have very high pH which may exceed the acceptable limit, as determined by the provincial regulation of discharges to a body of water. Similarly, spoiled or excess concrete or washwater could contain concrete additives and agents, some of which are toxic to aquatic species. Aggregates, particularly the finer sand fractions may be washed from spoiled or excess concrete or discharged in washwater. Uncontrolled release of such washwater, chemicals and sediments could adversely affect aquatic life and aquatic habitat.

Environmental Protection Measures

- Washwater from the cleaning of mixers, mixer trucks and concrete delivery systems shall be directed to a dedicated concrete wastewater settling basin. In the event that water from the closed settling system is to be released, it shall be tested prior to batch release or once weekly if continuous discharge, for parameters related to any concrete additives to be used in the production of concrete (e.g. sodium hydroxide), pH and total suspended solids. The water to be released shall also meet the limits specified in Schedule A of the Environmental Control Water and Sewage Regulations and shall adhere to those portions of the Fisheries Act regarding fisheries protection and pollution prevention (Sections 34 to 42). Release shall be via runoff control procedures.
- If water to be released does not meet discharge criteria, it will be further treated until the discharge criteria have been met.
- Monthly reports containing the environmental compliance monitoring and sampling information, including laboratory reports and spreadsheets (Excel or compatible), shall be forwarded to the Director, Pollution Prevention Division, in digital format (pdf) or hardcopy, within 30 calendar days of the reporting month. The email address for electronic reports is statenv@gov.nl.ca.
- All compliance records and other documents required in the EPP shall be retained for a period not less than three years beginning on the day they were created. These records shall be made available to upon request for review by officials of the Department of Environment and Conservation

- The settling basin shall be cleaned on an as required basis to ensure that adequate retention capacity is maintained at all times.
- An onsite interim holding/processing area for off-spec or excess concrete has been designated; excess and off-spec concrete will be cured to the inert stage and stored at Laydown D for future re-use by the Site Owner. Re-use of waste concrete will be a first consideration wherever practicable.

Batch Plant Operation from a Barge

- Floating batch plant has been designed to prevent release of untreated washwater and spoiled concrete into the environment.
- Washwater is containerized and transported to shore, where it is monitored and treated before the clarified water is discharged to the marine environment. Should the water be unacceptable for discharge into the marine environment, it will be transported to shore and disposed of by an approved third party contractor. Following the initial inspection and prior to each batch plant operation, the batch plant and barge shall be inspected by the respective EPC environmental representative for potential environmental risks.
- Regular inspections of the barge to check for and correct any leaks/ potential leaks in piping/ fittings.
- The batch plant barge could be outfitted with a raised combing around the deck edge, with rapidly closable scuppers to prevent leaks from going overboard. Secondary containment shall be installed under high risk fittings/ flanges/ valves.
- Boom the high risk areas of the barge. Booms can be made with tab & slot fittings on the ends so they create a better barrier.
- All batch plant workers must be familiar with oil spill reporting procedures. Spill kits must be on the barge at all times. All fuel spills will be handled in accordance with respective EPC Spill Prevention and Response Plans and fuelling procedures.
- In the event of a spill, all batch plant operation must cease until clean-up is performed. Priority in the event of a spill will be the safety of all crew members.
- All workers must be familiar with Section 2.9.7 – Vessel Accidents Contingency Planning. Priority in the event of an accident involving the barge or batch plant will be the safety of all crew members.

1.13 LINEAR DEVELOPMENTS

Environmental Concerns

Linear developments encompass a diverse range of standard construction related activities such as ditching, right-of-way clearing and grubbing, roads, pipelines and transmission line construction. Environmental concerns associated with linear developments include potential sedimentation/erosion, and the loss of vegetation and fish/wildlife habitat.

Environmental Protection Measures

In addition to environmental protection procedures stated below, reference may be made to Gosse et al., 1998, pp 84-88.

Drainage

Drainage discharge locations shall be determined in consultation with the respective EPC E&R representatives.

- Roads shall be adequately ditched so as to allow for adequate drainage.
- Any roadside ditches built shall discharge onto vegetated or forested areas, never directly into a waterbody.
- Wherever possible, ditches shall be kept at the same gradient as the road.
- The location of all culverts shall be marked with a post so they can be easily located during snow removal operations or if they become covered from debris accumulation.
- Reference should be made to Gosse et. al. (1998) – Guidelines for the Protection of Freshwater Fish Habitat in Newfoundland and Labrador.

1.14 VEHICULAR TRAFFIC

Environmental Concerns

Direct physical disturbances from vehicular movements can adversely affect both terrestrial and aquatic environments as well as historic resources. During Project activities, the level of activity involving equipment movement, types of equipment and supply, etc. requires various infrastructures such as roads, to conduct the work efficiently and in an environmentally acceptable manner.

Environmental Protection Measures

- ATVs shall not be allowed on the site except as required by the Contractor (or their subcontractors) in the performance of the work.
- Where possible, the use of ATVs shall be restricted to designated trails, thus minimizing ground disturbance. ATV use shall comply with Provincial All-Terrain Vehicle Use Regulations (http://www.assembly.nl.ca/Legislation/sr/Regulations/rc961163.htm) and the Environmental Guidelines for Stream Crossings by All-Terrain Vehicles (http://www.env.gov.nl.ca/env/waterres/regulations/appforms/chapter3a_2.pdf).
- Vehicle movements shall be restricted to developed areas such as access roads.
- Appropriate speed limits and road signage have been established on Site and are enforced to minimize environmental disturbance and accidents.
- During winter when the ground is covered with snow, snow machines and track-heavy equipment (dozers), whether equipped with low impact tread or not, will not be used for equipment movement and supply outside of established roadways, pathways or trailways.
- Equipment and vehicles will yield the right-of–way to wildlife. Any attempt to interfere with the natural movement of wildlife shall be considered harassment and dealt with accordingly.
- All Project vehicles, including ATVs, will be properly inspected and maintained in good working order including all exhaust systems, mufflers and any other pollution control devices.

DFO has provided recommended mitigation measures for ATV use:

- Use established hard roads and trails whenever possible;
- Avoid wetlands, shorelines and water bodies;
- Avoid driving along beaches and stream banks;
- Cross streams at bridges;
- If a stream must be crossed as a result of an emergency or safety concern:
  - Cross where the approach is stable and has a low slope;
  - Cross at right angles to the stream;
  - Cross where the streambed is made of bedrock or large rubble;
  - Avoid areas with vegetated, silty or sandy bottoms; and

- Keep ATV's in good repair, free of mud, grease, oil and other harmful substances that could impair water quality.

1.15 WORKS IN/ AROUND MARINE ENVIRONMENT

Environmental Concerns

Potential activities that will take place in or around the marine environment include the following:

- Pier and quay assessments (e.g. geotechnical drilling).
- Pier and quay remediation (e.g. pier slab thickening and crack repair, installing resting beams, repairing fenders and ladders, installing new bollards and a barge landing ramp, removing the pier electrical substation, relocating the lift station, site grading, installing lifting tower foundations, repairing scouring under the pier, etc.).
- Construction and subsequent removal of the bund wall.
- Float-out of the partially constructed GBS out of the dry dock.
- Construction of GBS at DWS.
- Temporary power installation for HUC activities (e.g. excavating, installing cables, backfilling and grading).
- Module load in and installation;
- Topsides HUC activities including:
  - LQ commissioning in the Module Hall
  - LQ commissioning quayside
  - DES-DSM MIT
  - Topsides commissioning at the pier;
- Topsides float-out to the deep water site; and
- Mating and HUC of GBS/ Topsides.

To open the bund wall, to allow passage of the GBS, bund wall materials were removed and disposed of in an approved marine location within GMC. The associated environmental concerns and mitigation measures that were associated with these activities are described below.

The principal environmental concerns with works in and around the marine environment (e.g. pier and quay assessments/ remediation, temporary power installation, module load in and installation, and HUC) include the release of fines, petroleum products, process effluents and other deleterious materials

into the water, which may disturb marine wildlife and affect water quality. Marine construction activities can also disturb near shore terrestrial habitat and cause seabirds, waterfowl and marine mammals to avoid the area.

Environmental Protection Measures

- Infilling shall be conducted in strict compliance with federal and provincial permits/authorizations/ approvals, Letters of Advice and/ or Fisheries Act Authorizations issued by DFO, Permit for the Alteration of a Waterbody under the Newfoundland and Labrador Water Resources Act (http://www.assembly.nl.ca/legislation/sr/statutes/w04-01.htm), and the Navigation Protection Act (http://laws-lois.justice.gc.ca/eng/acts/n-22/FullText.html) issued by TC.
- Topsides Installation and HUC activities (i.e. Topsides overhang on the pier, seawater uptake and effluent discharges) shall be conducted in compliance with any federal correspondence resulting from the Notice of Works submission under the Navigation Protection Act http://laws-lois.justice.gc.ca/eng/acts/n-22/FullText.html).
- All effluent discharges associated with HUC will be managed in accordance with Topsides contractor and HUC subcontractor Discharge Management Plan and Procedure. Effluent discharges will also comply with requirements in federal (i.e. Section 36(3) of the Fisheries Act) and provincial (i.e. Environmental Control Water and Sewage Regulations) legislation, and any deviations accepted by Environment Canada.
- Ocean disposal of bund wall materials and/or dredged marine material was carried out according to conditions specified in the Environment Canada Disposal at Sea permit.
- Clean blasted rock will be used for infilling. Armour stone protection will be placed progressively to minimize erosion and to prevent the loss of infill material in susceptible areas. All ballast material will be taken from an approved quarry site.
- All work carried out below the high water mark must be conducted during periods at low water.
- Project vessels shall follow Canadian regulations for environmental protection including but not limited to Regulations under the Canada Shipping Act, Fisheries Act and the Canadian Environmental Protection Act. Restrictions on discharges include, but are not limited to, wastes (e.g., galley waste, contaminated rags, debris, or similar refuse), bilge water, garbage, pollutant, or other deleterious substance into Canadian waters.
- All international vessels transiting to the Bull Arm site must discharge ballast water prior to entering Canadian Waters.

- During operations at the DWS, de-ballasting will be required to complete the slipforming operation. De-ballast water quality will be monitored.
- A Permit to Alter a Body of Water from DOEC is required for work within 15 m of freshwater bodies that flow into a coastal waterbody; all permit conditions shall be complied with.
- DFO Project Review may be required for work activities near water.
- The operation of heavy equipment will be confined to dry, stable areas.
- The timber cribbing used for construction will consist of untreated wood (or preservatives safe for the marine environment).
- Silt curtains will be used where appropriate to reduce sedimentation into the marine environment during infilling.
- Requirements for silt curtains and containment booms will be determined by the risk assessment process during pre-work planning.
- All equipment will have muffled exhausts to minimize noise.
- All equipment will be serviced and fuelled on land at least 30m from the marine environment or in designated areas designed for spill containment. Any exception must be approved by the EMCP Site Environmental Advisor.
- All vehicles must be clean and in good repair. Regular mechanical inspections for leaks on all equipment will be made and repairs undertaken immediately.
- A Fuel and Other Hazardous Material Spill Contingency Plan (Sections 2.9.1 and 2.9.2) will be in place and appropriate emergency spill equipment available on-site.

1.16 CONSTRUCTION CAMP

Environmental Concerns

Throughout late 2012 and into mid-2013 a pre-fabricated camp was constructed to house Project workforce who do not live within daily commuting range of the site. The facility includes a separate kitchen and dining hall; fitness facilities are also located within the kitchen/ dining area.

Environmental Protection Measures

- Clearing limits will be clearly marked prior to the commencement of clearing activities.
- Buffer zones around watercourses/ bodies will be clearly flagged prior to the start of construction activities.

- Sedimentation measures will be implemented where necessary (e.g. sedimentation ponds, silt fences, etc.).
- Location of sediment traps/check dams to intercept runoff will be determined in the field, and in consultation with the Environment Coordinator.
- Check dams will be implemented, as required, to reduce runoff velocity in work areas. To date, there has been a series of check dams installed in various drainage areas throughout the Site. A temporary sandbag dam was constructed at the outflow of Little Mosquito Pond to raise water levels to ensure capacity to maintain water demand construction and camp activities while maintaining a sufficient flow in Back Cove Brook.
- Natural vegetation will be left undisturbed, where possible.
- Natural ground cover, where possible, is to remain undisturbed where ground preparation is required to level areas/ pads for placement of living accommodations. Grubbing is to be minimized.
- Natural vegetation and/or groundcover removed will be stored in designated sites for either use as erosion control and/ or reclamation purposes.
- Erosion control measures will be undertaken on all exposed/disturbed soil and, where necessary, erosion control matting may need to be placed on all exposed slopes susceptible to erosion.
- All equipment will be inspected and maintained (exhaust systems, mufflers etc.) to minimize noise levels in the area.

1.17 SURVEYING

Surveying activities may include:

- Vegetation removal
- Traversing
- Establishing targets, permanent benchmarks and transponder stations

Environmental Concerns

Surveying activities may disturb vegetation, wildlife, and historic resources.

Environmental Protection Measures

Vegetation Removal

- Width of survey lines will be limited to that which is absolutely necessary for line of sight and unobstructed passage.

- Whenever possible, cutting lines to the edge of open areas will be avoided.
- Trees and shrubs will be cut flush with the ground wherever possible, with stumps not to exceed 15 cm.
- Cutting of survey lines will be kept to a minimum.
- All trees not exactly on transit lines shall be left standing and trees partly on line should be notched (notch not to exceed 1/3 tree's diameter) instead of removed, to allow sighting.
- Discretion should be used when large trees are encountered. For example, trees 30 cm at diameter breast height (dbh) or larger should, whenever possible, not be cut. On grid lines, trees of 30 cm diameter or larger shall be left intact and shall be traversed to continue the line.
- Commercial cutting and operational permits are required from the provincial Department of Natural Resources for cutting of any trees from Crown Land (e.g. Bull Arm Site).
- No attempt to harass or disturb wildlife will be made by any person.
- Vehicles will yield the right-of-way to wildlife.
- There will be no cutting in areas designated as sensitive without notification and approval of the respective EPC Environmental representative.
- Archaeological sites and features will not be disturbed during survey work. Any historic resource discoveries will be reported as per Section 2.9.4.

Traversing

- ATVs will not be allowed off the right-of-way except as approved by the respective EPC environmental representative.
- No attempt to harass or disturb wildlife will be made by any person. Should significant numbers of wildlife occupy the area of activity, work must cease and the respective EPC E&R representative will be notified immediately.
- No motorized vehicles will enter the areas designated as sensitive without notification and approval of the respective EPC environmental representative.
- The extent of activities in sensitive areas will be minimized.
- Walking in sensitive areas will be restricted to established walking paths, if available.

Establishing Targets, Permanent Benchmarks and Transponder Locations

- A driven T-bar, well embedded to readily identify each benchmark location will be used.
- No attempt to harass or disturb wildlife will be made by any person.
- Access to sensitive areas is to be approved by the respective EPC E&R representative
- Standard iron bars and sledge hammers are to be used to establish benchmarks.
- Heavy equipment will not be used to access sensitive areas.
- Survey crews must have a briefing on the recognition of historic resources prior to commencing work.

1.18 EQUIPMENT OPERATIONS

A variety of equipment will be used on-site during Project activities could be sources of noise, air emissions, and leaks or spills.

Environmental Concerns

Noises associated with construction activity may negatively affect wildlife. Air emissions may have air quality implications. Accidental leaks or spills of fuel or other hazardous materials may affect soils, water, fish, vegetation and wildlife.

Environmental Protection Measures

- All approvals, authorizations and permits for project activities will be followed.
- Noise control procedures will be put in place during construction
- All equipment will have exhaust systems regularly inspected and mufflers will be operating properly.
- All equipment (e.g., diesel generators, etc.) will meet the requirements of the provincial Sections 16 and 20 of the Air Pollution Control Regulations under the Environmental Protection Act (http://www.assembly.nl.ca/Legislation/sr/Regulations/rc040039.htm).
- All equipment used during construction will follow the environmental protection procedures outlined in this EPP. In the case of an accidental event resulting from the use of equipment (e.g., a fuel spill), the appropriate contingency plans (Section 2.9.1 and 2.9.2) will be implemented.

- Regular maintenance inspections for leaks will be made on all equipment. All site equipment shall undergo preventative maintenance checks and daily pre-operational inspections. If problems are identified the equipment will be taken out of service and mitigated to prevent release of hydrocarbons into the environment (drip tray, spill pan, absorbent material, etc.).

1.19 DRILLING – GEOTECHNICAL DRILLING IN OR NEAR THE MARINE ENVIRONMENT

Marine drilling will be required during geotechnical investigations to determine foundation conditions - assess stability, and underlying seabed for project infrastructure. Drilling may be conducted either over the side of a pier or from a barge of suitable size. KKC has conducted geotechnical drilling near the shoreline to assess rock face integrity for the additional mooring point anchor installation work; a subcontractor to WorleyParsons also conducted assessments of the Topsides pier in summer 2012 and winter 2013 including land and marine-based boreholes to collect geotechnical data for Topsides module travel path, module storage areas and pier/ quay integrity.

Environmental Concerns

The environmental concerns associated with this type of geotechnical drilling in a marine environment include marine pollution from the release of drill cuttings and other drilling related debris, fuel or other hazardous material; noise generated by drill operations; and disturbance of aquatic ecosystems (marine communities and/or individual species) caused by increased turbidity near the ocean floor in the area proximal to the drill collar location.

Environmental Protection Measures

- All drilling activity should where feasible utilize best environmental techniques and environmental products possible, such as biodegradable or water-based drilling fluids.
- Potential drilling sites in the marine environment must be inspected by a respective EPC E&R representative.
- The drill rig must be inspected for mechanical soundness prior to mobilization onto the initial drill setup (ice in winter). Barges used to support drilling during ice free conditions must be inspected for sea-worthiness prior to drill mounting onto barge. The drill crew must also keep a daily log of inspections for sea-worthiness and mechanical soundness of barge and drill. During winter, daily logs will note the general stability of the drill rig and overall assessment of the surrounding sea ice.

- All fuel, lubricants and other hydrocarbons shall be stored, handled and transported according to Appendix 2A, 1.1 Storage, Handling and Transfer of Fuel and Other Hazardous Materials. Only necessary quantities are to be stored at the drill rig at any time.
- A spill containment boom shall be deployed around the barge drilling until it is removed from the collar location.
- Disposal of drilling materials and all solid wastes shall be undertaken according to solid waste handling and disposal procedures in Chapter 3 of this EPP, Waste Management.
- Drilling equipment must have muffled exhaust to minimize generated noise.
- Turbidity of the ocean floor caused by the release of drill water will be localized to the area proximal to the base of the drill casing and cease after drilling is complete.
- Operations shall be suspended when weather conditions exceed the capabilities of the drill, moorings and boom to operate in a safe and effective manner. Guidelines relating to drilling, moorings and boom performance capabilities shall be established by the construction group and drill crew, with consultation of the respective EPC E&R representative and the drilling foreman.
- The respective EPC E&R representative will ensure the drill crew is familiar with the spill reporting and response procedures. Spill response equipment will be in close proximity to the drill rig. All spills will be handled in accordance with Sections 2.9.1. and 2.9.2.
- In the event of a spill, all drilling activity must cease until clean-up is performed. Priority in the event of a spill will be the safety of all crew members.
- A Permit to Alter a Body of Water from DOEC is required for work within 15 m of freshwater bodies that flow into a coastal waterbody; all permit conditions shall be complied with.
- All workers must be familiar with Section 2.9.6 – Vessel Accidents Contingency Planning. Priority in the event of an accident involving the barge or drill will be the safety of all crew members.

1.20 PRECASTING

Environmental Concerns

Both wooden and metal formwork will be constructed in the fabrication hall and yard. With regards to wooden formwork, the active faces will be treated with form oils. During precasting activity, both metal and wooden formwork

will be prepared prior to each concrete pour with form oil (a hydrocarbon-based product). Many of these substances are known to be toxic or possibly pose occupational hazards. The implementation of a WHMIS program is directly applicable to the use of these materials in precasting activities.

The major concern regarding the use of these substances is their release to the environment through spillage and use. Precasted units are often subjected to high and/or low pressure washing after removal from formwork for curing or cleaning purposes. This washwater may contain cement, concrete additives, and form oil.

Cement is very alkaline and washwater from cleaning or curing precast units will probably breach the upper acceptable limit for pH (pH 9.0) under the Provincial Environmental Control Water and Sewage Regulations, 2003. Washwater may also contain concrete additives and agents, and form oil, many of which are toxic to aquatic species. Aggregates, particularly the finer sand fractions can be expected to be washed from precast units in the washwater. Such washwater, chemicals and sediments can affect aquatic life and aquatic habitat.

Environmental Protection Measures

The following protection measures are intended to minimize the potential impact of the discharge of these substances in association with precasting activities.

Storage and Use of Epoxies, Paints and Form Oil

- All form oil which is stored in bulk will be contained in above-ground, double-walled tanks or smaller containers inside dyked secure areas (Section 2.9.1).
- All epoxies, paints and form oils which are stored in drums and smaller containers will be stored in a designated, enclosed area protected from contact with vehicles and stored in compliance with WHMIS protocols.
- The application of form oil to formwork will be done in a manner which minimizes the amount used and ensures that incidental or accidental release to the environment is minimized.

Washwater and Runoff Control

Runoff from the precast area and yard, and washwater from the cleaning and curing of precast units, will be directed to appropriate settling/holding basins.

- Settling basin effluent will be tested prior to batch release or once weekly if continuous discharge, for pH, TSS, nitrate, ammonia, phenol and metals.
- Monthly reports containing the environmental compliance monitoring and sampling information, including laboratory reports and spreadsheets

(Excel or compatible), shall be forwarded to the Director, Pollution Prevention Division, in digital format (pdf) or hardcopy, within 30 calendar days of the reporting month. The email address for electronic reports is statenv@gov.nl.ca;

- All compliance records and other documents required in the EPP shall be retained for a period not less than three years beginning on the day they were created. These records shall be made available upon request for review by officials of the DOEC.
- The settling basin effluent discharge will meet contaminant levels specified in Schedule A of the Provincial Environmental Control Water and Sewage Regulations, 2003 and will adhere to those portions of the Federal Fisheries Act regarding fish protection and pollution prevention (Sections 34 – 42).
- The settling basin will be cleaned as directed by the Environmental representative to ensure that adequate retention capacity is maintained at all times.

1.21 SPECIES AT RISK

A Species at Risk (SAR) is defined as a species which is extirpated, endangered, threatened or of special concern. SAR refers to those species listed federally under the Species at Risk Act (SARA) and / or assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). As shown below in Table 2-20, a number of SAR may occur or could migrate through project areas, and may be affected by project activities:

Table 2-26: Species at Risk (SAR) that may be present at Bull Arm

Common Name	Scientific Name	SARA Status	COSEWIC Status
Fishes			
Atlantic Cod (NL Population)	*Gadus morhua*	No status	Endangered
American Plaice	*Hippoglossoides platessoides*	No status	Threatened
American Eel	*Anguilla rostrata*	No status	Threatened
Northern Wolffish	*Anarhichas denticulatus*	Threatened	Threatened
Spotted Wolffish	*Anarhichas minor*	Threatened	Threatened
Atlantic Wolffish	*Anarhichas lupus*	Special Concern	Special concern
Porbeagle	*Lamna nasus*	No status	Endangered
Blue Shark	*Prionace glauca*	No status	Special concern
Shortfin Mako	*Isurus oxyrhinchus*	No status	Threatened
White Shark	*Charcarodon charcarias*	Endangered	Endangered
Basking Shark	*Cetorhinus maximus*	Special concern	No status
Mammals			
Fin Whale	*Balaenoptera physalus*	Special Concern	Special concern
Blue Whale	*Balaenoptera musculus*	Endangered	Endangered
Killer Whale	*Orcinus orca*	No status	Special concern
North Atlantic Right Whale	*Eubalaena glacialis*	Endangered	Endangered
Harbour Porpoise	*Phocoena phocoena*	Threatened	Special concern
Sea Turtles			
Leatherback Sea Turtle	*Dermochelys coriacea*	No status	Endangered
Loggerhead Sea Turtle	*Caretta caretta*	No ststus	Endangered
Birds			
Barrow's Goldeneye	*Bucephala islandica*	Special concern	Special concern
Ivory Gull	*Pagophila eburnean*	Endangered	Endangered
Harlequin Duck	*Histrionicus histrionicus*	Special concern	Special concern
Red Knot	*Calidris canutus rufa*	Endangered	Endangered
Eskimo Curlew	*Numenius borealis*	Endangered	Endangered
Chimney Swift	*Chaetura pelagica*	Threatened	Threatened
Olive-sided Flycatcher	*Contopus cooperi*	Threatened	Threatened
Red Crossbill	*Loxia curvirostra percna*	Endangered	Endangered
Rusty Blackbird	*Euphagus carolinus*	Special concern	Special concern
Short-eared Owl	*Asio flammeus*	Special concern	Special concern
Lichens			
Boreal Felt Lichen	*Erioderma pedicallatum*	Special concern	Special concern

Environmental Concerns

A significant concern regarding species at risk is that activities related to project development and operation could potentially result in a decline in abundance or a change in distribution of an at-risk population.

A significant adverse environmental effect would be one that results in an unmitigated or non-compensated loss of habitat, mating behaviour, or feeding ability (i.e. loss of food source).

Other issues relating to species at risk include:

- Management of waste water in compliance with Schedules A and B of the Environmental Control Water and Sewage Regulations, 2003.
- Following procedures under pertinent DFO factsheets, such as Effect of Silt on Fish and Fish Habitat and Blasting – Fish and Fish Habitat Protection.
- Control of emissions and fuel consumption.
- Proper storage and disposal of chemicals, wastes, and oils under Part IV, Sections 13 – 17 of the Provincial Environmental Protection Act and Division 3 – Disposal at Sea of the Canadian Environmental Protection Act.
- Monitoring of project activities in accordance with sections 34 to 42 of the Fisheries Act, namely Fish Habitat Protection and Pollution Prevention.
- Adherence to guidelines and regulations presented within Sections 34 to 42 of the Species at Risk Act and the Provincial Endangered Species Act.
- Adhere to the Statement of Canadian Practice on Mitigation of Seismic Sound in the Marine Environment.

Environmental Protection Measures

During the marine construction phase at the Bull Arm site, petroleum products and other chemicals/materials which have potential toxic effects or the potential to harm habitats will be stored and handled in accordance with the Canada Shipping Act (http://laws.justice.gc.ca/eng/C-10.15/index.html), specifically the Vessel Pollution and Dangerous Chemicals Regulations (http://laws-lois.justice.gc.ca/eng/regulations/SOR-2012-69/index.html) under the Canada Shipping Act. On land, proper storage of hazardous materials is important to inhibit spills to soil or water. Related regulations can be found under the Storage and Handling of Gasoline and Associated Products Regulations http://assembly.nl.ca/Legislation/sr/regulations/rc030058.htm, the Heating Oil Storage Tank Regulations, and the Used Oil Control Regulations under the Provincial Environmental Protection Act.

For measures to be implemented to reduce the impact on species at risk refer to Appendix 2A – Section 1.11 Blasting.

1.22 SITE CLEANUP AND REHABILITATION (ONSHORE)

Clean-up activities will include general site clean-up and maintenance. Buildings and shops will be prepared for “moth-balling”. All fuels and hazardous materials will be removed and disposed of using approved practices. Erosion control measures will be implemented where appropriate.

Potential Environmental Effects

The main environmental interaction associated with site demobilization is the disposal and/or removal and possible accidental discharge of fuel and hazardous materials into the freshwater and marine environment. Furthermore, there may be potential effects associated with the implementation of erosion control and/or slope stabilization procedures, but these would be restricted to the duration of the activities themselves. Noise is potentially a concern for wildlife, particularly seabirds and marine mammals.

Minor and temporary sedimentation would occur during retrieval of anchor chains and other cables from the bottom of GMC and Bull Arm.

A systematic environmental evaluation of the site will be conducted following demobilization of equipment, materials, and personnel from the site in accordance with The Canadian Council of Ministers of the Environment (CCME) guidance document entitled Subsurface Assessment Handbook for Contaminated sites (http://www.ccme.ca/publications/list_publications.html#link4) and in accordance with the Provincial Guidance Document for the Management of Impacted Sites.

1.23 SITE CLEANUP (MARINE)

Clean-up activities will include identification and removal of project related debris at marine work locations such as the deep water site, FPSO quay, Back Cove pier, and Topsides pier and quay.

Environmental Protection Procedures

ROV surveys of the sea bed in areas used during construction of the Hebron platform will identify project-related debris that is left behind after the tow-out of the GBS. A debris removal program will be implemented.

1.24 FISH RELOCATION DURING DRY DOCK DE-WATERING

Environmental Concerns

The major concerns associated with de-watering at the dry dock site were sedimentation and direct fish mortality and/or habitat destruction for marine fish and shellfish species. The fish relocation activities commenced upon the

water level inside the bund wall receding to a level of 10m water depth. The Program was completed by a third party contracted company.

Baseline data and experience with fish relocation during construction of the Hibernia dry dock indicate that the key species would be flounder, lobster, and some pelagic species. Similar species types were captured and relocated during the Hebron Program; a range of species including flounder, rock cod, toad crab, cunner, rock crab, ocean pout, sculpin, urchins, starfish, eel pout and tom cod. Methods of capture were chosen with the intent to limit fish mortality and included lobster pots, crab (whelk) pots, char traps, angling, dip nets and cod pots. The fish relocation was executed and managed by experienced professionals in the field; the field team consisted of a Senior Biologist, Junior Biologist, field technician, and a KKC boat operator and marine operations staff. The program resulted in more than 3000 fish species being relocated safely back to the waters of GMC. All species were relocated as quickly as possible in aerated coolers to the open waters of Great Mosquito Cove to minimize fish mortality and increase survival rates.

1.25 SENSITIVE AND SPECIAL AREAS

Capelin beaches (e.g., Bellevue Beach) and eelgrass beds were identified in the near shore study area as sensitive and special areas. Bellevue Beach is also an important staging area for the Red Knot, a species considered as endangered under COSEWIC.

Eelgrass has been assessed by DFO, and in eastern Canada, DFO has determined that eelgrass has characteristics which meet the criteria of an Ecologically Significant Species (ESS) (DFO 2009h). These criteria include the following:

- By its structure, it creates habitat that is used preferentially by other species;
- It physically support(s) other biota, and provides either settlement substrate or protection for this associated community; and
- It is abundant enough and sufficiently widely distributed to influence the overall ecology of that habitat.

DFO (2008c) indicates that Bellevue Beach continues to be a key spawning beach for capelin with egg deposition.

Environmental Protection Procedures

- Project marine vessels entering into Trinity Bay will have to respect traffic lanes, see Canadian Hydrographic Chart L/C4851; and
- Non-project marine vessels entering the project area will have to avoid designated construction safety zones.

1.26 PILE DRIVING

Environmental Concerns

Pile driving has the potential to produce impulsive sound levels high enough to temporarily disturb marine birds, fish, marine mammals and sea turtles occurring in close proximity at a localized scale.

Environmental Effects

The environmental effects of pile driving on marine birds are not well known, but these activities will occur in a small area that has been previously disturbed by construction activities associated with other projects. There are no known marine bird nesting colonies located within Bull Arm, Trinity Bay, nor are there any known concentrations of foraging marine birds that could potentially be affected by pile driving activities.

Environmental Protection Procedures

- A trained observer will monitor a designated radius near pile driving activities for at least 30 minutes prior to activation of the pile driver.
- Acoustic modeling will be conducted prior to construction activities in the near shore Project area to reflect actual pile driving scenarios.
- If a marine mammal or sea turtle is detected within the designated zone (conservatively assume 180 and 190 dB re 1 uPa (rms), for cetaceans and seals, respectively) pile driving will not occur until the animal(s) have left the safety zone, or it has not been re-sighted for 30 minutes.
- Pile driving activities will be halted if a marine mammal or sea turtle enters into the safety zone and will not be resumed until the animal has left the zone or 30 minutes have passed since the sighting. If there is a concentration of marine birds within the observation zone, bird scaring techniques may be used.
- For sea turtles, the 180 dB zone will be used.
- The use of a bubble curtain or other avoidance measures around pile driving activities will be implemented in consultation with DFO.

1.27 AVIFAUNA MANAGEMENT

Proper management of avifauna within defined project areas includes protection and reduction of harm to species of birds that typically use the near shore/coastal marine and offshore environments. These may be waterfowl (i.e. ducks/geese), cormorants, petrels, gannets, larids (i.e. gulls, terns, skuas and jaegers), murres, puffins, and raptors (i.e. eagles, osprey, and hawks).

Environmental Concerns

Main environmental concerns would be the destruction of bird habitat/nesting grounds, disruption of flight patterns and causes of mortality. There are a number of issues pertaining to avifauna management:

- Protection of migratory/non-migratory birds under the Migratory Birds Convention Act.
- Mitigation of causes of a decline in population, or frequency/use of habitation in an area.
- Monitoring of nesting sites and feeding grounds/habits.
- Compliance, if applicable, to the Species at Risk Act or Endangered Species Act.
- Following of procedures in blasting/construction and vehicle operation to avoid harm to local avifauna.
- Obstruction of flight pathways or waterways.
- Avoidance of collisions with project vehicles and structures.
- Compliance with Air Pollution Control Regulations, Waste Management Regulations, and other relevant regulations under the Provincial Environmental Protection Act and Canadian Environmental Protection Act.

Environmental Protection Measures

- Occasional surveys and monitoring programs. An avifauna survey was conducted specifically prior to construction of the additional mooring points at the DWS.
- Avoidance of clearing of vegetation during the migratory bird breeding and nesting season and avoiding active nest sites if discovered during clearing.
- Explosives shall be used in a manner that will minimize damage or defacement of landscape features, trees, ecologically sensitive areas such as wetlands, and habitat objects by controlling through the best methods possible (including precisely calculated explosive loads and adequate stemming).
- Blasting patterns and procedures shall be used which minimize shock or instantaneous peak noise levels.
- The immediate area of the blast site shall be surveyed within one hour prior to a blast and operations will be curtailed if sensitive avifauna is observed within 500 m.
- EPP to address discharge of all chemicals to the environment.

- Vehicle movements shall be restricted to developed areas such as access roads. There is currently an active Osprey nest at the Bull Arm site, located adjacent to Laydown D; there has been a 200m buffer zone delineated around the nest and a barrier installed to ensure vehicles and construction activity maintains a safe distance, especially during nesting season.
- Whenever possible, vessels associated with the project should maintain a steady course and speed. Concentrations of marine birds, if any occur, should be avoided. All aircraft will maintain an altitude of at least 500 m from concentrations of birds.
- Cliff nesting raptors (e.g. eagles) can occur in the Project area. The startle effect that helicopters have on nesting raptors can be detrimental. Therefore, a 600m horizontal buffer from cliff faces should be observed. Under no circumstances should nesting raptors be approached.
- For tree nesting raptors (e.g., osprey), aircraft pilots will be made aware of known nest locations. A 600m buffer zone will be established around these areas to prohibit aircraft traffic.
- Development of protocols for regular searches of birds that may become stranded on vessels and facilities, or have been disoriented by lights and project activities.
- EPC's respectively hold a bird handling and salvage permit with the Canadian Wildlife Service (CWS) of Environment Canada. A report is provided to CWS each year to summarize strandings, releases and salvages during that particular construction year; this report is renewed annually.

1.28 WATER SUPPLY

Environmental Concerns

Construction and operation of water supply intake structures within bodies of water has the potential to cause entrainment of fish. Construction of groundwater wells can lead to a negative impact on the surrounding groundwater. Also, disturbance of banks or water edges may lead to siltation of water supplies, adversely affecting the water environment.

Other concerns may include:

- Potable water should meet all the Guidelines for Canadian Drinking Water Quality. Potable water should also be provided through a local water supply and distributed to key points as the project develops.
- Measures shall be employed to prevent the alteration, disruption and destruction of fish habitat.

- Any intake lines in freshwater bodies, if used, should be properly screened to avoid entrainment of fish, as per DFO Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO 1995).
- Construction and placement of intake lines, pumps, and other work should consider The Effects of Silt on Fish and Fish Habitat (http://www.nfl.dfo-mpo.gc.ca/e0005459).
- Observance of all relevant guidelines under Section 39 of the Provincial Water Resources Act.
- Water used for human use and consumption is healthy, clean, and free of contaminants.

Environmental Protection Measures

- Any streambanks/ water edges should be stabilized properly to prevent erosion and siltation, under DFO guidelines Streambank Stabilization (http://www.nfl.dfo-mpo.gc.ca/e0005524).
- Water extraction rates shall be established to address concerns for drawdown or potential effects on the water table/fresh water source (i.e. ponds).
- Preventing contamination of water source by establishing an equipment and work-free radius around the source.
- Regular chemical testing and biological sampling of water.
- Water extracted from marine or freshwater bodies used for Project activities requires a Water Use License under the Water Resources Act.

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3 WASTE MANAGEMENT

3.1 Purpose

The main purpose of waste management planning is development of a framework for the proper handling and disposal of wastes. Effective waste management will enable the minimization of potentially adverse impacts on the environment, compliance with the regulatory requirements for waste management, and establishment of consistent and efficient roles and responsibilities to be undertaken by the various site contractors. The intent is to afford a high degree of control over the handling of waste and to implement the intent of the "Three R's" namely reduction, recovery/ reuse and recycling of wastes. Ultimately this will help to minimize adverse environmental effects.

3.2 Scope

This chapter of the Bull Arm Site Environmental Protection Plan (EPP) provides waste management measures and contingency plans designed to protect the local environment of the Bull Arm site and contribute to the goal and objectives of the Provincial Waste Management Strategy. These procedures and plans will be implemented throughout the onshore and near shore construction, installation, hookup and commissioning (HUC) phases of the Project at the Bull Arm site. Waste management practices at site will be reviewed and updated as necessary throughout the Project phases to accommodate the dynamics of design and construction as it progresses.

3.3 Objectives

The main objective of waste management planning for the site is to provide a mechanism to control, collect and dispose of waste generated during the near shore construction, installation and HUC phases at the Bull Arm site in accordance with ExxonMobil Canada Properties (EMCP) Waste Management Policy and the Provincial Waste Management Strategy. Other objectives include:

- Reduce volumes of wastes through established plans and procedures.
- Prevent and reduce adverse impacts on the environment including wildlife and wildlife habitat.
- Reduce waste disposal costs.
- Maximize waste re-use and recycling opportunities.
- Protect the environmental integrity of soil, marine, surface and ground water.
- Ensure due diligence by contractors, subcontractors, vendors and management.

- Protect the health and safety of all site personnel (including: contractors, subcontractors / vendors and visitors).
- Maximize the efficient use of resources.
- Avoid costly clean-up after construction is complete.
- Prevent and reduce adverse impacts on fish and fish habitat.

General strategies that have been adopted to achieve the objectives are:

- Proactive Procurement Policy: Tender/ bid documents issued to subcontractors from Engineering, Procurement and Construction (EPC) contractors will notify prospective bidders of the environmental sensitivity of the site and solicit the use of environmentally suitable materials, equipment and products. The policy will read as follows:

  "Vendors are advised of the environmental sensitivity of the Place of the Work and the need to use and provide environmentally suitable materials and products. At the purchasing stage, the possibility of material substitution with more environmentally friendly alternatives and reduced packaging will be examined for all materials that are hazardous to handle, generate hazardous wastes/ waste dangerous goods or otherwise have the potential to create environmental problems."

- Strategic material substitution: At the purchasing stage, the possibility of less hazardous material substitution will be examined for all materials that are hazardous to handle, generate hazardous wastes/ dangerous goods or create environmental problems.
- Strategic chemical substitution: A policy will be adopted, to use substitute chemicals that are cost effective and accomplish the same result as the original chemicals, with less toxicity or hazardous wastes/ dangerous goods generation in the process. Prior to coming to site, chemicals are reviewed for substitutions by the WorleyParsons Canada Services Ltd. (WorleyParsons)/ Kiewit-Kvaerner Contractors (KKC) E&R groups.
- Waste segregation: All site contractors and subcontractors, including catering and KKC Site Services Department, will be required to implement category-wise segregation of all waste streams to make it easier to reuse, recycle, recover (Three R's), and dispose of the various wastes. Waste segregation policies will be implemented in line with the plans and procedures outlined by Eastern Waste Management. The Project orientation contains sections in waste management, including segregation. All waste categories will be analyzed and the principles of the three R's will be applied.
- Reduction initiatives: Reducing the raw material consumption is the first step to reduce waste generation. To practice this principle all processes and material used will be evaluated on the basis of possible reduction in raw material usage.

- Recovery/ reuse initiatives: Recovery of usable material or energy as a by-product is a part of the three R's of the waste minimization process. All opportunities for on-site reuse of waste materials will be highly encouraged (e.g., waste concrete and waste wood).
- Recycling initiatives: Recycling is the next option considered for the successful management of the waste streams. Wherever possible, implement provincial recycling programs and facilitate recycling of used oil, beverage containers, tires, steel, copper and aluminum, etc. and reuse of the material in other applications.
- Disposal: Disposal becomes the final option when the three R's are no longer applicable or practical. Hazardous wastes will be stored on-site at a designated storage area and the respective EPC contractor and/ or subcontractor will arrange for transportation to a licensed facility for possible recovery, treatment and disposal as required.

3.4 Abbreviations

Term	Definition
AFFF	Aqueous Film Forming Foam
C&D	Construction and Demolition Waste
DOEC	Newfoundland and Labrador Department of Environment and Conservation
EMCP	ExxonMobil Canada Properties
EPC	Engineering, Procurement and Construction
EPP	Bull Arm Site Environmental Protection Plan for Hebron Project Activities
EWM	Eastern Waste Management
GAP	Storage and Handling of Gasoline and Associated Products Regulations, 2003 under the Environmental Protection Act
GBS	Gravity Base Structure
HEF	High Expansion Foam
HWSA	Hazardous Waste Storage Area
HUC	Hookup and Commissioning
KKC	Kiewit-Kvaerner Contractors
MMSB	Multi-Materials Stewardship Board
Robin Hood Bay	Robin Hood Bay Waste Management Facility
TDG	Transport of Dangerous Goods
TWTA	Temporary Waste Transfer Area
WHMIS	Workplace Hazardous Materials Information System
WorleyParsons	WorleyParsons Canada Services Ltd.

3.5 References

Document Number	Title
EMCP, 2011	The Hebron Project Comprehensive Study Report, September 2011
GD-PPD-026-1	Leachable Toxic Waste, Testing and Disposal
GDPPD-028-1	DOEC Guidance Documents Dredge Spoils Disposal
GD-PPD-046.2	DOEC Guidance Documents for Municipal Solid Waste Transfer Stations
GD-PPD-050.2	DOEC Guidance Documents for Construction and Demolition Waste Disposal Sites
GD-PPD-059	DOEC Guidance Documents for Permanent Household Hazardous Waste Depots
GD-PPD-018	Guidelines for Establishment and Operation of Facilities for the Outdoor Storage of Tires
PPD98-03	DOEC Asbestos Waste Disposal Summary
Version 1.01	DOEC Guidance Document for the Management of Impacted Sites

3.6 Overview: Provincial Waste Management Strategy

In 2002, the Province of Newfoundland and Labrador released the Provincial Waste Management Strategy as a framework to bring the province to full service modern waste management. In 2007, the province began to implement the strategy and move towards achieving the following goals:

- Divert 50% of solid waste from landfill
- Reduction in the number of waste disposal sites by 80%
- Eliminate open burning and incineration
- Phase out unlined landfills
- Province wide implementation by 2020

The strategy, which is administered by Department of Municipal Affairs and regulated by the Newfoundland & Labrador Department of Environment and Conservation (DOEC), will:

- Establish a waste diversion program
- Establish waste management regions
- Develop modern standards and technology
- Maximize economic and employment opportunities
- Implement a public education program

EMCP and its contractors are committed to work within the goals and objectives of the Provincial Waste Management Strategy.

3.6.1 Regional Waste Management Structure

The Bull Arm fabrication site falls within the geographical limits and area jurisdiction of the Eastern Waste Management (EWM) Committee. This geographical area includes the Avalon Peninsula and stretches to Random Island and communities to Burgoyne's Cove in the east and to Swift Current to the West.

The EWM Committee has been established to oversee the modernization of a solid waste management system for the eastern region; a system which will include both residential and commercial users. The Committee is comprised of 50% representation held by the City of St. John's, with the remaining 50% held by representatives of municipalities located throughout the region. The Committee is comprised of 16 members and one chairperson, which represent a broad mixture of the municipal organizations within the eastern region. In order to facilitate the work that is required to fulfill its mandate, the Committee has adopted a sub-committee structure to divide and allocate work. This structure will allow multiple streams of activities to be directed by the members of the Committee with each sub-committee reporting back to the whole Committee on a monthly basis. An independent chairperson has been selected by the Committee to guide implementation of the Eastern Regional Plan.

3.6.2 Robin Hood Bay Waste Management Facility

The Bull Arm fabrication site falls within the geographical limits of the EWM Region. The EWM Regional System is based on a multi stream processing and disposal approach. Since the site has been leased for Hebron Project activities, the Sunnyside landfill has been the approved location for disposal of domestic, non-hazardous wastes. In June 2013, the Sunnyside landfill was closed as part of the Provincial Waste Management strategy; all non-hazardous streams are now transported to the Robin Hood Bay Waste Management Facility (Robin Hood Bay). As the site has implemented effective programs for fibres and beverage containers, these two streams are diverted from Robin Hood Bay. It is anticipated that a composting facility will be constructed and operated to accept organic waste (fourth stream) from the entire eastern region. The Province has retained a third party consultant to conduct a feasibility study for such a facility; firm details have not yet been announced.

3.6.3 Multi-Materials Stewardship Board

The Multi-Materials Stewardship Board (MMSB) is a Crown agency of the Government of Newfoundland and Labrador. It was established in 1996 to develop, implement and manage waste diversion and recycling programs for specific waste streams.

To date, the MMSB has worked to develop waste reduction initiatives such as:

- Beverage Container Recycling

- Tire Recycling
- Used Oil Recycling
- Electronic Waste Recycling
- Household Hazardous Waste Collection
- Residential Backyard Composting

The MMSB's mandate has expanded over time to include supporting the implementation of the provincial Waste Management Strategy through the administration of the Newfoundland and Labrador Waste Management Trust Fund.

The mandate of MMSB is derived from the Newfoundland and Labrador Environmental Protection Act and accompanying waste management regulations, as well as from the provincial Waste Management Strategy of 2002 and its associated implementation plan of 2007. MMSB is mandated, through these legislative and policy instruments, to support and promote modern waste management practices in the province with a particular focus on waste reduction and recycling as a means of helping to ensure a clean and healthy environment.

3.6.4 Regulations and Standards

Waste management at site will be compliant with appropriate sections of the following Acts, Regulations and Guidelines:

- Canadian Environmental Protection Act – Federal
- Used Oil Control Regulations - Provincial
- Dangerous Goods Transportation Act and Regulations - Provincial
- Environmental Protection Act - Provincial
- Waste Management Regulations - Provincial
- Environmental Control Water and Sewage Regulations - Provincial
- Provincial Waste Management Strategy
- Eastern Waste Management's Regional Strategy
- Hebron Project Comprehensive Study Report

3.7 Organization and Responsibilities

The Gravity Base Structure (GBS) and Topsides EPC contractors have developed and implemented contractor specific waste management plans which adhere to this chapter of the Bull Arm site EPP. These plans have been reviewed and endorsed by the EMCP ER&S team. EPC contractors implement routine surveillance of their waste management plans and procedures. As stated in Chapter One, the principal agents of the self-

regulatory environmental compliance monitoring program will be the Project ER&S team comprised of staff of EMCP, KKC and WorleyParsons.

3.8 Waste Management Measures

These waste management measures will address the management of all solid and liquid wastes generated on-site and will classify all waste as hazardous or non-hazardous. In broader terms, a material is considered as waste when it can no longer be used for its original intended purpose including garbage, refuse, and sludge from the sewage treatment plant. The types of solid wastes considered in this category include inert or non-hazardous waste(s), such as: cans, filters, belts, scrap metals, sewage sludge, domestic garbage, etc. Hazardous wastes in this category include: petroleum based waste (waste oil), solvents, paints, chemicals, batteries and chemical based sludge from the sewage treatment plant.

3.8.1 Waste Characterization and Waste Quantities

Based on previous information collected during similar construction projects, such as Hibernia, the expected volume of waste generated during the construction phase is estimated to be approximately 15,000 Tonnes per year (T/yr) with an additional 325,000 Litres per year (L/yr) of controlled product. Table 3-1 estimates the percentage of total waste by sector.

Table 3-1 : Anticipated Waste Streams During Construction, Installation and HUC

Waste Stream	Percentage by Weight
Camp / Office Waste	43%
Metals	30%
Construction and Demolition (C&D) Waste	27%
Controlled Product	<1%
Total[1]	100%

Controlled product generated at the Bull Arm site includes petroleum based waste (waste oil), contaminated soil, chemical waste, and miscellaneous hazardous waste (i.e., fluorescent light bulbs containing mercury etc.).

Table 3-2 : Anticipated Hazardous and Special Waste Streams During Construction, Installation and HUC

Hazardous and Special Waste Stream	Percentage by Volume
Special Waste (contaminated soil, chemical waste, miscellaneous)	7%
Waste Oil	19%
Ships Bilge Waters	74%
Total	100%

3.8.1.1 Camp/ Office Waste

The majority of waste classified as domestic waste is generated from the camp facilities and general offices. To quantify the volume of waste, generation percentages similar to those identified in the Municipal Waste Stream have been utilized. Most waste classified as domestic waste will be generated from the camp facilities and general offices. There were over 4,700 workers at the Bull Arm site during the peak construction period (4Q2014).

Table 3 - 3 : Anticipated Domestic Waste Streams During Construction

Waste Stream	Percentage by Weight	Estimated Waste[1] (T/yr)
Recyclable Fibre	35%	2,167
Recyclable Plastics	11%	681
Recyclable Metals	5%	310
Organics	30%	1,857
Other C&D Waste	10%	619
Household Hazardous wastes / dangerous goods	1%	62
Residual Waste to Landfill	8%	495
Total	100%	6,191

Note:
[1] Based on Estimate Tonnage of Domestic Waste Only

3.8.1.2 Construction and Demolition (C&D) Waste

By using the volumes obtained during the construction of the Hibernia GBS, the following is an estimate of C&D Waste:

Table 3 - 4 : Anticipated C&D Waste During Construction

Construction and Demolition Waste Stream	Percentage by Volume	Estimated Waste (T/yr)
Recyclable / Reusable Wood	55%	4,619
Recyclable Metals	11%	924
C&D material to landfill	34%	2,855
Total	100%	8,398

3.8.2 Treatment and Disposal Plan

The prevention, reduction and recycling practices outlined in Section 3.0 will minimize wastes generated during Project construction.

Waste containers will be appropriately labeled and hazardous wastes/ dangerous goods signs will be displayed in the storage/ disposal facilities. Table 3-6 shows the general treatment and disposal plans for wastes on-site during construction activities.

3.8.2.1 Hazardous Wastes

A "Cradle to Grave" approach has been adopted for hazardous waste/ dangerous goods generation at the Bull Arm site; it is the primary responsibility of the waste generator to implement this approach. In accordance with their respective contractual and legal obligations and under the direction and supervision of an EPC E&R representative, individual contractors and their subcontractors will implement this plan as outlined. In KKC's case, this is done in coordination with the Site Services Department.

During Project activities, EPC contractors and their subcontractors will be responsible for collecting their hazardous waste in appropriate containers and storing in a designated area. The individual contractors shall be responsible for items associated with disposal of their hazardous wastes/ dangerous goods, including: preparation, provision of suitable shipping containers, manifests or any other requirements of Federal/ Provincial Transportation of Dangerous Goods (TDG) regulations, as well as loading and shipping to an off-site licensed disposal facility. The EPC contractors will periodically collect and transport these waste products to designated hazardous wastes storage areas, after ensuring that they are properly labeled (with the generator's name and contents). The containers will be temporarily stored in a designated area until the EPC contractors arrange for hazardous waste to be removed from site and sent to a licensed facility for disposal using a licensed waste contractor. Waste manifests will be compiled by the licensed hazardous waste company. Manifests will be completed in accordance with all TDG requirements and will accompany hazardous wastes during transport. Copies of waste manifests will be provided to the KKC and WorleyParsons E&R groups and quantities reported to EMCP ER&S Team on a monthly basis. Information on the manifests will include type of waste, generators name, waste classification, amount shipped, containment method, and facility to which it is being transferred.

Note:

Disposal of all hazardous wastes/ dangerous goods materials either on-site or off-site will be in accordance with the requirements of applicable regulatory agencies and authorities

Table 3-5 : Treatment and Disposal Plan

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
Petroleum Waste Stream				
Used Oil including used hydraulic oil	Collect in trays and drums. Transfer to ISO storage tanks or closed top drums. Store at the Hazardous Waste Storage Area (HWSA). Ship off-site.	Ship Off-site to a licensed facility for recycling or destruction	Used Oil Control Regulations under the Environmental Protection Act Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS (Workplace Hazardous Materials Information System) Requirements of the Hazardous Products Act and Controlled Products Regulations Fire Prevention Flammable and	Generating contractor / subcontractor

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
			Combustible Liquids Regulations under the Fire Prevention Act, 1991 Canadian Environmental Protection Act and Regulations	
Contaminated or expired fuel	Collect and store in closed top drums at the designated HWSA. Ship off-site.	Ship Off-site to a licensed facility for recycling or destruction	Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Fire Prevention Flammable and Combustible Liquids Regulations under the Fire Prevention Act, 1991 Canadian Environmental Protection Act and Regulations	Generating contractor / subcontractor
Used oil filters	Remove free flowing residual oil and store canisters in separate drums at the designated HWSA. Ship off-site.	Recovery / landfill at licensed off-site facility	Used Oil Control Regulations under the Environmental Protection Act Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Canadian Environmental Protection Act and Regulations	Generating contractor / subcontractor
Contaminated soils	For small volumes, remove and place in an appropriate, labeledcontainer. Store at the designated HWSA Dispose to a licensed hazardous waste facility or to a soil treatment facility.	Ship to licensed off-site facility for destruction or bioremediation	Newfoundland and Labrador Guidance Document for the Management of Impacted Sites	Generating contractor / subcontractor & Site Services
Contaminated water	Place in closed top drums. Store at the designated HWSA. Dispose to a licensed hazardous waste facility.	Ship to licensed off-site facility	Newfoundland and Labrador Guidance Document for the Management of Impacted Sites	Generating contractor / subcontractor & Site Services
Spent spill response materials (e.g. tyvex suits, pads, absorbal, etc.)	Place in drums. Store at the designated HWSA. Dispose to a licensed hazardous waste facility.	Ship to licensed off-site facility	Newfoundland and Labrador Guidance Document for the Management of Impacted Sites	Generating contractor / subcontractor & Site Services
Chemicals:				
Glycol	Filter and recycle or collect in suitable drums and store at the designated HWSA. Ship off-site.	Recycle where possible, or ship off-site to a licensed facility for destruction.	Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Fire Prevention Flammable and Combustible Liquids Regulations under the Fire Prevention Act, 1991 Canadian Environmental Protection Act and Regulations	Generating contractor / subcontractor

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
Acids	Store in approved containers at the designated HWSA. Ship to off-site disposal facility.	Reduce / dispose off-site.	Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Canadian Environmental Protection Act and Regulations	Generating contractor / subcontractor
Solvents	Use non-toxic solvents when feasible. Store in approved containers at the designated HWSA. Ship to disposal facility off-site.	Reduce / dispose off-site.	Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Fire Prevention Flammable and Combustible Liquids Regulations under the Fire Prevention Act, 1991 Canadian Environmental Protection Act and Regulations	Generating contractor / subcontractor
Waste Batteries	Store at the designated HWSA. Ship off-site by a licensed hazardous waste contractor as per TDG requirements.	Ship to licensed off-site facility for recycling or disposal.	Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Canadian Environmental Protection Act and Regulations	Generating contractor / subcontractor
Aerosol Cans	Collect cans with residual product in drums. Store at the HWSA. Ship off-site by a licensed hazardous waste contractor.	Reduce / ship contents to licensed off-site facility for disposal.	Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Fire Prevention Flammable and Combustible Liquids Regulations under the Fire Prevention Act, 1991 Canadian Environmental Protection Act and Regulations	Generating contractor / subcontractor
Solvents, paints, epoxies and adhesives.	Collect cans with residual product in drums. Store at the designated HWSA. Ship off-site. Empty containers can be collected and shipped with regular waste for disposal in regional landfill.	Dispose off-site at an off-site licensed facility.	Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Fire Prevention Flammable and Combustible Liquids Regulations under the Fire Prevention Act, 1991 Canadian Environmental Protection Act and Regulations	Generating contractor / subcontractor
Laboratory products	Store at source. Dispose off-site.	Dispose at an off-site licensed facility.	Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Canadian Environmental Protection Act and Regulations	Generating contractor / subcontractor
Explosives	In accordance with all	Reduce, destroy,	Transportation of Dangerous Goods	Contractor

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
(expired or contaminated)	regulatory standards, protocols, good practices.	ship off-site	Act and Regulations Canadian Environmental Protection Act and Regulations	
Misc. Hazardous Waste				
Fluorescent bulbs / tubes	Store at the designated HWSA. Ship off-site by a licensed hazardous waste contractor.	Recovery / landfill at licensed off-site facility	Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Canadian Environmental Protection Act and Regulations	Generating contractor / subcontractor
Electronic waste	Store in a designated area for shipment off-site to a licensed recycling / disposal facility	Reduce / dispose off-site	Waste Management Regulations, 2003 under the Environmental Protection Act MMSB Guidance to a greener future: E-Waste guidance	Generating contractor / subcontractor
Biomedical wastes	Store in (contractor provided) special waste receptacles at first aid centre. Ship off-site. Trained medical personnel will ensure proper handling of sharps, blood and human tissue wastes.	Dispose off-site		Medical Contractor
HUC Effluents				
Firefighting foams (AFFF and High Expansion Foam)	If toxicity tests of the foam mixtures pass, they can be discharged to the marine environment. If toxicity tests of the foam mixtures fail, they will have to be contained to prevent entering the marine environment. Ship off-site by a licensed hazardous waste contractor	Direct discharge or containment and treatment/disposal depending on toxicity test results	Fisheries Act Environmental Control Water and Sewer Regulations under the Water Resources Act More details contained in the HUC subcontractors WMP and Discharge Management Procedure (DMP).	Generating contractor/subcontractor
Bulk Powders (e.g. barite, cement, bentonite)	Not permitted to be discharged to the marine environment. Will be collected by dust mitigation measures and as per the HUC subcontractor's WMP.	Disposed as per the HUC subcontractors WMP	Fisheries Act More details contained in the HUC subcontractors WMP and Discharge Management Procedure (DMP).	Generating contractor/subcontractor
Chlorinated cooling and firewater water (e.g. freshwater or seawater)	Cooling and firewater water will have chlorine concentrations of at least 0.5 mg/L to control biological growth. Chlorinated cooling and firewater with concentrations over 0.02 mg/L will either be recirculated via closed loop system or a chlorine	Disposed as per the HUC subcontractors WMP.	Fisheries Act Environmental Control Water and Sewer Regulations under the Water Resources Act More details contained in the HUC subcontractors WMP and Discharge Management Procedure (DMP).	Generating contractor/subcontractor

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
	scavenger will be added prior to discharge. More details are available in HUC subcontractor plans.			
Drilling and Open Drains	Batched in tanks and sampled for testing parameters. If testing parameters are below applicable guidelines,it will be discharged to the marine environment. If testing parameters are above applicable guidelines then the stream will either be treated or disposed off-site as per the HUC subcontractors WMP.	Dependent on testing parameter results. Discharged to marine environment, treated or disposed off-site.	Fisheries Act Environmental Control Water and Sewer Regulations under the Water Resources Act More details contained in the HUC subcontractors WMP and Discharge Management Procedure (DMP).	Generating contractor/subcontractor
Reverse Osmosis System	Combined with chlorinated cooling water and managed in the same manner.	Managed the same as chlorinated cooling water.	Fisheries Act More details contained in the HUC subcontractors WMP and Discharge Management Procedure (DMP).	Generating contractor/subcontractor
Sewage at Deep Water Site	Transported to land, in waste containers compliant with the Canada Shipping Act.	Site Sewage Treament Plant or dispose off-Site	Fisheries Act More details contained in the HUC subcontractors WMP and Discharge Management Procedure (DMP).	Generating contractor/subcontractor
Vessel Effluents				
Sewage	Not permitted to be discharged to the marine environment.	-	EPP requirement	Generating contractor/subcontractor.
Bilge Water	Not permitted to be discharged to the marine environment.	-	EPP requirement	Generating contractor/subcontractor.
Ballast Water	Discharge as per the Ballast Water Control Regulations	-	Ballast Control Water Regulations under the Canada Shipping Act More details contained in the HUC subcontractors WMP and Discharge Management Procedure (DMP).	
Domestic Wastes:				
Food	Collect in plastic bags. Take directly to covered storage bin. Do not store outside.	Landfill / compost at regional waste management facility.	Waste Diversion Regulations, 2005 Under the Environmental Protection Act Provincial Waste Management Strategy Curb It Recycling St. John's, Newfoundland : Home	Catering contractor / subcontractor & Site Services
Paper and cardboard	Contractors store dry materials for collection by KKC Site Services Department . Place in slotted storage bin and ship off-site to a licensed	Recycle	Waste Diversion Regulations, 2005 Under the Environmental Protection Act Provincial Waste Management Strategy Curb It Recycling St. John's,	Generating contractor / subcontractor & Site Services

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
	recycling facility or regional waste management facility, when required. Project documents are required to be placed in secure paper bins, which will be shipped off-site to a shredding and recycling facility.		Newfoundland : Home	
Beverage containers	Collect beverage containers accepted under the MMSB Beverage Container Recycling Program and make available to charitable organizations.	Recycle	Waste Diversion Regulations, 2005 Under the Environmental Protection Act Waste Management Regulations, 2003 under the Environmental Protection Act Multi-Materials Stewardship Board (MMSB) – Beverage Container Recycling Program Multi-Materials Stewardship Board (MMSB) – School Program	Catering contractor / subcontractor & Site Services
Metal cans	Contractors store dry materials for collection by KKCSite Services Department. Collect and store with recyclable plastics and ship off-site to regional waste management facility.	Recycle	Waste Diversion Regulations, 2005 Under the Environmental Protection Act Waste Management Regulations, 2003 under the Environmental Protection Act	Generating contractor / subcontractor & Site Services
Residual domestic waste	Collect and store in compactor bin. Ship off-site to Robin Hood Bay Regional Landfill Facility.	Landfill	Waste Diversion Regulations, 2005 Under the Environmental Protection Act Waste Management Regulations, 2003 under the Environmental Protection Act	Camp catering & Site Services
Inert/ Non-Hazardous Waste				
Conveyor belts and tires	Remove from site and transport to an approved tire storage area. Work within the MMSB's Used Tire Recycling Program	Re-use / recycle / dispose off-site	Waste Management Regulations, 2003 under the Environmental Protection Act Multi-Materials Stewardship Board (MMSB) – Used Tire Recycling Program	Generating contractor / subcontractor
Vehicles, equipment and machinery	Drain and collect residual fluids and store in laydown area. Ship off-site via licensed metals recycler.	Recycle		Generating contractor / subcontractor
Construction and demolition waste	Stockpile in designated laydown area. Reuse / recycle where possible. Ship off-site to regional landfill site.	Reuse / recycle / dispose off-site		Generating contractor / subcontractor & Site Services
Waste lumber and formwork	Stockpile in designated laydown area. Reuse / recycle where possible. Ship unusable portion to landfill.	Reuse / recycle / dispose off-site		Generating contractor / subcontractor & Site Services

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
Scrap metal	Store recyclable wire or aluminum in metal bins at storage area. Store bulk steel at laydown area and ship off-site.	Recycle off-site		Generating contractor / subcontractor
Gritblastingresidues	Collect at source. Store in drums at the storage area. Test sample for hazardous content. Ship to licensed hazardous waste facility facility if hazardous, or Ship to off-site to landfill if non-hazardous.	Landfill	Newfoundland and Labrador Environmental Code of Practice for Abrasive Blasting	Generating contractor / subcontractor
Concrete batch plant and off-spec or surplus production	Rejected concrete to be reused in precast forms if possible. Concrete that cannot be reused will be disposed of at an approved designated area.	Reuse / disposal on site.		Generating contractor / subcontractor & Site Services
Sewage sludge	Sewage sludge disposal location (landfill or a licensed treatment facility) must be approved by the DOE C Pollution Prevention Division prior to disposal. Disposal of this material at a landfill will require approval			Government Service Center 8 Myers Avenue, Suite 201 Clarenville, NL A5A 1T5 Tel: 709-466-4060 Fax:709-466-4070 and the owner / operator of the waste disposal site
Sewage sludge	Collect sludge from Sewage Treatment Plant as necessary. Haul off-site by licensed contractor.	Landfill		Site Services
Sewage from Temporary washcars	Collect from temporary wash cars and dispose in site lift station or off-site by licensed contractor.	Site Sewage Treament Plant or dispose off-Site	Environmental Control Water and Sewage Regulations under the Water Resources Act	Generating contractor/subcontractor
International waste	Contact Canadian Border Services Agency for inspection and approval prior to off loading.	Landfill	CFIA International Waste Policy Health of Animals Act , Section 17 Health of Animals Regulations, Section 47 and 105 (3) Plant Protection Act Plant Protection Regulations http://www.inspection.gc.ca	Site Services
Asbestos waste	Requires removal at source by a licensed asbestos abatement contractor.	Landfill	Asbestos Abatement Regulations, 1998 The Occupational Health and Safety Act Highway Traffic Act	Generating contractor / subcontractor
Mould contaminated waste	Requires removal at source by a licensed asbestos mouldcontractor. Waste is require to be double bagged prior to	Landfill		Generating contractor / subcontractor

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
	disposing in the general waste container.			

3.8.2.1.1 Petroleum Waste Stream

Petroleum based wastes generated on site are primarily comprised of: used engine and hydraulic oil, oil from site equipment, used degreasing solvents, and contaminated or expired diesel fuel. These wastes will be segregated as necessary in order to render the individual waste streams easier to reuse for other purposes, recycle or permit recovery of any by-products. Special precautions will be exercised when handling these materials since the improper release or disposal could adversely affect the environment. Personnel handling wastes will be required to have specific safety training to ensure proper handling techniques are followed; this will help mitigate the risk of personnel injury as well as ensure protection of the surrounding environment.

Used Oil: EPC contractors and subcontractors that generate used oil are responsible for arranging disposal. During Project activities, the EPC contractors will work with the subcontractors to develop an environmentally responsible and safe plan for disposal of waste oils. These plans will include the use of containment tanks and a recording system to track waste volumes. Regular monitoring will be carried out as per requirements outlined in the Provincial Used Oil Control Regulations under the Environmental Protection Act.

Note: Waste oil may be contaminated with small amounts of diesel fuel, heating fuel, and water, while still retaining its recycling properties. Contamination with gasoline, glycol, solvents, or solids will render waste oil unfit for recycling into usable engine oil at any off-site facility and create a large increase in disposal unit costs.

Used Hydraulic Oil: While on-site, used hydraulic oil can be stored separately in appropriate containment or mixed with waste engine oil in appropriate containment. The used hydraulic oil will be shipped off-site for proper disposal. Contractors are required to maintain an active inventory of all petroleum products on-site, providing regular updates to the EMCP E&R Lead.

Contaminated or Expired Fuels: Diesel fuel is sometimes condemned when water content is too high. These fuels will be shipped off-site by a licensed contractor to be used by others as low-grade fuels through a waste exchange program or sent to a licensed off-site facility for disposal.

Used Oil Filters: The generating contractor is responsible for disposal of their used oil filters including: preparation, provision of suitable shipping containers, manifests or any other requirements of Federal/ Provincial TDG regulations, as well as the Used Oil Control Regulations, loading and

shipping/ trucking of the packaged filters to an off-site licensed disposal facility. Regular checks will be made by the respective EPC E&R representative to ensure proper records are maintained for stored/ disposed oil filters. A final record of disposal from the designated licensed facility will be required from each EPC contractor.

Contaminated Soil and Water: Environmental plans developed by EPC contractors emphasize and facilitate a reduction of soil and water contamination via on-going inspection and scheduled maintenance of equipment, use of trays for draining, lining of loading and unloading zones and using secondary containment like diking storage tank areas. In spite of these measures, spills, leaks and ruptures may occur during Project activities with soil and/ or water contamination as a potential result. Extra vigilance must always be practiced when working in proximity to streams or water bodies as laid out in Chapter 2 of this EPP. EPC contractors are to document all incidents, take immediate corrective action, and report to the EMCP Bull Arm E&R Lead.

Contaminated soils are collected and stored in the designated HWSA for subsequent disposal off-site at an approved facility by a licensed waste contractor. The EPC contractor will be responsible for satisfactory on-site collection, storage, shipping and off-site disposal.

Note: The EPC Contractor should make attempts to substantially reduce the amount of contaminated soil and water through education programs, equipment maintenance, operational techniques and manual "pick and shovel" excavation of land based spills and deploying booms and absorbent pads for spills to water, wherever possible. Waste manifests for contaminated soil will be provided to the EPC contractors E&R group.

Spent Spill Response Materials: If a spill does occur spill response materials such as tyvex suits, socks, pads, absorbal, etc. will be utilized to ensure adequate clean up. All spent spill response materials will be treated as hazardous waste and placed in a labeled container in the HWSA and subsequently shipped off-site for disposal.

3.8.2.1.2 Chemicals and Miscellaneous Hazardous Wastes

It is expected that EPC contractors will generate certain chemical wastes during Project activities. Processing of the various anticipated chemical wastes are described below.

Glycol: Glycol is used as a fluid for hydrostatic testing and as a deicer in vehicles, heavy equipment, certain heaters, and some construction surfaces.

If de-icing glycol is used for ice control, it should be a less toxic propylene glycol based or other environmentally friendly product rather than the ethylene based anti-freeze used in equipment cooling systems. De-icing procedures include brushing excess snow off surfaces and spraying de-icing fluid only where necessary. De-icing fluid will be sprayed using a backpack type apparatus and minimal amounts of fluid will be sprayed. Limited usage of de-icing fluid is not expected to have adverse effects on the surrounding

environment; therefore, collection/ containment of de-icing fluid will not be conducted.

EPC contractors are responsible for disposal of waste glycol including: site preparation, provision of suitable shipping containers, manifests or any other requirements of Federal/ Provincial TDG regulations, barge loading and shipping of waste glycol to an off-site licensed disposal facility. A record of volumes of waste and recyclable material will be required from the EPC contractors on a monthly basis.

Waste Batteries: The bulk of used batteries generated during Project activities are primarily the lead acid type.

The EPC contractors are responsible for disposal of used lead/ acid batteries. including: site preparation for shipping, provision of suitable shipping pallets or containers, manifests or any other requirements of Federal/ Provincial TDG regulations, loading and shipping/ trucking of the packaged batteries to an off-site licensed disposal facility. A progressive and final record of disposal from the designated licensed facility is required from the contractor. Batteries will be stored in non-conductive collection drums or some form of secondary containment compatible with the electrolyte contained in the batteries, and removed from site by licensed recycling/ disposal contractor.

Aerosol Cans: During Project activities, used aerosol cans will be collected and stored in labeled containers in a designated area. Camp occupants will be advised about this procedure, and cleaning staff alerted to separate them from the general waste stream.

Since it is not currently practical or feasible to puncture, drain and crush cans on-site, they will be stored in labeled containers in the designated HWSA and subsequently removed from site by a licensed hazardous waste contractor.

Paints: Water based paint will replace oil based paint, alkyd, or epoxy wherever technically feasible. Cans and liquid paint will be properly stored in drums and kept in the HWSA and shipped to an approved recycle/ disposal facility. Paint and paint cans generated by EPC contractors and their subcontractors will be their sole responsibility, along with handling, shipping and disposal as applicable.

NOTE:

*Paint cans that have **no** residual product can be disposed of with the regular waste stream.*

Spent Cleaning Fluids (Solvents): During Project activities, solvents will be used as a degreasing agent in maintenance shops, generator enclosures and utility services buildings. These degreasing solvents are petroleum based chemicals and can be toxic; however, non-toxic citrus-based alternatives will be encouraged as substitutes where only moderate degreasing or cleaning is required, such as glass cleaning. Detergents and steam jets will be used where feasible to minimize the use of solvents. No solvents will be allowed to drain onto the ground and will be collected in drip pans for reuse or disposal.

Residual or used solvents will be stored in leak-proof containers located in the HWSA during Project activities. EPC contractors who generate the waste solvents are responsible for disposal in an environmentally safe manner. The containers will be collected by a licensed hazardous waste contractor and shipped off-site to a licensed recycling/ disposal facility.

Laboratory Chemical Wastes: During Project activities, materials testing laboratories may be established on-site. These laboratories will predominantly perform physical tests, and chemical waste generation will be minimal. The personnel working in these facilities will be trained to identify and segregate the hazardous components from their waste streams. The chemical wastes will be stored in appropriate containers at the HWSA during construction, installation and HUC phases, and sent to a licensed and approved treatment/ disposal facility off-site. EPC contractors and their subcontractors are responsible for managing and disposal of their own chemical wastes.

Explosives: The EPC contractors will deal solely and expediently with any contaminated or expired explosive material in accordance with all licensing regulatory requirements. If any explosives are to be destroyed or shipped off-site, a respective EPC contractor environmental representative will be notified prior to taking action. Any work that would utilize explosive material would be conducted by a licensed company, specializing in that field, and waste segregation and disposal would be the sole responsibility of that company.

Fluorescent Bulbs/ Tubes: Project activities will produce waste bulbs from office buildings and trailers. Bulbs and tubes are required to be stored in a secure manner (e.g. designated box, back in cardboard boxes, etc.) in the HWSA and removed from site by a licensed hazardous waste company.

Electronic Waste: Project activities are anticipated to produce a small volume of electronic waste. Electronic waste will be disposed by a licensed subcontractor. Electronic equipment will be segregated and recycled.

Biomedical Waste: Small amounts of biomedical wastes and other medical materials, such as needles (sharps) and blood and tissue-contaminated items, will be generated in the Health Centre area. Dedicated washroom facilities shall have a biomedical sharps container for persons using needles to administer their own medication (*e.g.,* diabetics).

These wastes will be properly contained, labeled and stored in a secure area in the Health Centre until they can be removed to an off-site approved facility for destruction and disposal. Since the medical staff will be most aware of the potential risks involved, these wastes are to be left under their supervision until they can be collected by a licensed hazardous waste contractor and transported off-site to a licensed disposal facility.

3.8.2.2 Hookup and Commissioning Effluents

Firefighting Foams: Aqueous Film Forming Foam (AFFF) and High Expansion Foam (HEF) will be tested to ensure safety critical systems are functioning properly. WorleyParsons will conduct toxicity tests on the firefighting foam mixtures to determine the appropriate disposal location (e.g. to the marine environment or contained as disposed by a licensed hazardous waste company). More details will be included in the HUC subcontractor Waste Management Plan and/ or Discharge Management Procedure.

Bulk Powders: Bulk powders such as barite, cement and bentonite will be utilized during HUC of the drilling modules. Waste and excess powders are not permitted to enter the marine environment and will be mitigated by using dust control measures. More details will be included in the HUC subcontractor Waste Management Plan and/ or Discharge Management Procedure.

Chlorinated Cooling and Firewater: Cooling and firewater are required to be dosed with chlorine in order to prevent biological growth which can compromise the integrity of the Topsides systems. Chlorine concentrations are required to be between 0.5 and 1 mg/L to adequately control biological growth. Based on discussions with the Federal Regulator (i.e. Environment Canada), chlorine concentrations are known to be harmful to fish when greater than 0.02 mg/L. WorleyParsons is in the process of determining a feasible solution for preventing the release of cooling and firewater that may be deemed deleterious under Section 36(3) of the Fisheries Act. Potential solutions include not discharging return streams and recirculating through a closed loop system, or injecting a chlorine scavenger prior to discharge to the marine environment. More details will be included in the HUC subcontractor Waste Management Plan and/ or Discharge Management Procedure.

Drilling and Open Drains: Fluids that enter the drilling and open drains will mostly consist of rainwater, sediment from workers boots, and fluids from spills, if they occur. All fluids are routed to batched tanks which allows for the

collection of samples. If testing parameters are above applicable guidelines then the fluid will either be treated or disposed as hazardous waste. If below applicable guidelines, then the fluid will be discharged to the marine environment. More details will be included in the HUC subcontractor Waste Management Plan and/ or Discharge Management Procedure.

Reverse Osmosis System: The Reverse Osmosis System will produce a small volume of reject water and off-spec water. These streams will be combined with the cooling water return and managed in the same manner. More details will be included in the HUC subcontractor Waste Management Plan and/ or Discharge Management Procedure.

Sewage at Deep Water Site: Sewage will be transported to land in waste containers compliant with the Canada Shipping Act, and either disposed in a lift station and treated through the site Sewage Treatment Plant, or disposed off-site by a licensed company.

3.8.2.3 Vessel Effluents

Sewage: Sewage from marine vessels is not permitted to be discharged to the marine environment at site. This includes areas near the Dry Dock, Topsides Site and deep water site.

Bilge Water: Bilge water from marine vessels is not permitted to be discharged to the marine environment at site. This includes areas near the Dry Dock, Topsides Site and deep water site.

Ballast Water: Ballast water can be discharged to the marine environment provided it meets the requirements in the Ballast Control Water Regulations.

3.8.2.4 Inert/ Non-Restricted Hazardous Waste

3.8.2.4.1 Conveyor Belts and Tires:

Conveyor belts and tires have limited life, thus when no longer usable contribute to inert solid waste generation. Investigation into alternative uses for old conveyor belts and tires are ongoing. Some suitable alternate uses for tires are dock protection and to protect roads in turning areas. However, for the most part, unused conveyor belts, equipment tires and those tires not included under the MMSB tire recycling program will be temporarily stockpiled in a segregated area at the EPC contractors' yard and transported to an approved off-site handling facility.

3.8.2.4.2 Vehicles, Equipment and Machinery:

Vehicles and equipment are returned to the supplier (dealership) when no longer required. Vehicles, equipment or machinery that has no option for reuse, shall be placed with scrap metals and collected by a licensed metals contractor and hauled to a metals recycling facility for processing.

3.8.2.4.3 Construction and Demolition Waste:

Much of the construction will be of modular design and completed in several phases. When platform construction is complete these units may be re-sold/ removed and some components and any other readily salvageable materials such as electrical cables, reels, cladding, piping and insulation will be removed from site for use elsewhere. Alternatively, any useable excess materials, which might be required for maintenance and repairs, will be taken into the inventory and stored neatly in a warehouse or designated laydown areas. Innovative use of excess materials such as using electrical reels for stacking supports or portable bollards will be encouraged where practical and safe. Unusable parts that cannot be recycled or reused will be disposed in an approved off-site landfill.

Waste Lumber and Formwork: During the construction phase, lumber that is no longer usable on-site is collected and disposed in an approved landfill. Larger pieces of untreated lumber will be stored in a laydown area for potential reuse. EPC contractors are advised to reuse this lumber material as much as possible or wherever feasible. There is also an effort ongoing whereby any reusable wood is shipped offsite to the Sunnyside landfill where it is stockpiled for further use by members of surrounding communities

Scrap Metal: Scrap metals will be generated during the construction phase. The waste stream consists of ferrous and nonferrous scrap metals of various types. During the construction phase metal scraps will be generated from cut-off parts, ends of piping and other similar items will be collected in bins positioned around the site. As needed, these bins are collected by a licensed metal recycling contractor and hauled to a metals recycling facility for processing.

Bulky scrap metals such as large appliances will be shipped off-site for salvaging and disposal. Reusable scrap metals such as sheeting and used drums will be reused as a part of effective waste reduction program. Recoverable/ recyclable scrap metals will be sent to the recycling facilities.

Gritblasting Residues: During construction, grit blasting operations will be carried out to prepare concrete construction joints, as well as some metal surfaces for coating during fabrication of the Living Quarters (LQ). During grit blasting activities, the surrounding areas will be shrouded for dust control and all residual materials resulting from the sandblasting will be collected by the generating EPC contractor and temporarily stored in drums at the designated HWSA.

The Blast and Paint Shop on Topsides utilizes a Wheelabrator system to perform the required surface preparation on metal components and modules prior to application of coating material. The Wheelabrator provides the user with the ability to reclaim and reuse viable blast grit while capturing and managing the waste material associated with the operation. This allows the

user to get the maximum usage from the blast grit medium while also minimizing the amount of waste generated.

The blasting residues will be analyzed to determine if hazardous; those that are deemed hazardous will be shipped off-site for final disposal at a licensed hazardous waste facility. If the blasting residue is deemed non-hazardous it will be transferred to the Robin Hood Bay landfill site. More details are contained in the provincial Environmental Code of Practice for Abrasive Blasting.

Concrete Batch Plant and Off-spec or Surplus Production: An on-site interim holding/ processing area for off-spec or excess concrete has been designated; excess and off-spec concrete will be cured to the inert phase and stored for future re-use. Re-use of waste concrete will be a first consideration wherever practicable. To date, the majority of waste/ test batch concrete has been used to construct items in various areas of the site such as walkways, ramps, survey monument blocks, sign holders, material anchors and jersey barriers.

Note: *At the deep water site the disposal of waste concrete into the ocean is prohibited by Federal/ Provincial regulation. Therefore, all waste will be captured and poured into the prepared forms or contained and transported to shore for disposal at the approved sites.*

Sewage Sludge: Sewage sludge produced from the Sewage Treatment Plant will be produced throughout the Project and removed from site and treated by a licensed company. In order to dispose of sewage sludge in either a landfill or a treatment facility, approval must be obtained from DOEC.

Sewage from Temporary Washcars: Temporary washcars will also be used throughout the Project. Sewage from these temporary facilities will be removed by a licensed company and either disposed in the site lift station where it will be treated by the Sewage Treatment Plant, or sent off-site for treatment.

International Waste: International wastes can only be disposed at a landfill if Canadian Border Services Agency completes an inspection and approves the disposal.

Asbestos Waste: Asbestos waste is not expected to be located on Site, or expected to be used during Project Activities; however it is mentioned in the event that it is identified. In the case it is discovered, a licensed handler will be contacted to package and dispose offsite.

Mold Contaminated Waste: Minor amounts of mould contaminated waste are anticipated to be generated during Project activities. The majority of mould contaminated waste was produced during the early works phase. All mould contaminated waste is required to be removed by a licensed company and is required to be double bagged prior to disposing in the general waste container.

3.8.2.4.4 Domestic Wastes

The domestic waste stream consists of food waste, recyclable containers (cans, bottles), inert non-combustible domestic waste, packaging, corrugated cardboard, paper and paper products.

During Project activities, collection will be available at various locations on-site. All solid domestic waste, where possible, will be segregated into one of five categories, including:

- Compostable waste (food waste)
- Beverage containers
- Fibre waste – paper and cardboard
- Residual domestic waste

Compostable (Food Wastes): Most of the food wastes will be generated in the kitchen and dining areas of the camp. The kitchen staff will collect all food wastes in these areas in plastic garbage bags. All food waste will be collected and disposed of in an enclosed and covered collection bin to minimize the attraction of wildlife and the potential negative impact to wildlife. Metal food containers should be rinsed at the kitchen prior to storing for recycling.

Gathering and transporting these wastes will be the responsibility of the Site services contractor bag lunch wastes generated in various work areas are to be collected from each meal in wildlife-proof bins located at various locations.

Additionally, waste minimization through reduction in package material such as bulk quantity purchase instead of smaller packs will be encouraged.

Oil and grease from the kitchen waste streams such as grease traps will be collected in approved collection tanks and shipped off-site to a licensed disposal facility. If it is determined that it is attracting wildlife, kitchen oil and grease will be shipped off-site for disposal.

Organic wastes from the camp and kitchens are sent to Robin Hood Bay due to the lack of local composting facilities.

Recyclable Containers: Plastic wastes will be generated in the construction phase of the project mainly from food packaging, cleaning products and lubricant containers. Minimum packaging and potential “return to supplier” opportunities are part of the purchasing criteria when selecting vendors. Plastic containers that originally contained toxic or hazardous materials (e.g., domestic bleach, typical cleaning supplies, or laundry cleaning solution bottles) will be fully drained and triple-rinsed before being collected. However before collection, it should be first determined in consultation with Site Services personnel, what effect the rinse water will have on the sewage treatment plant operation.

These will be collected separately from other waste streams and stored in a designated storage bin, until such time that it can be hauled to the Regional Waste Management site for processing.

Number 4 plastics such as plastic wrap, saran wrap, sandwich bags and other plastic films, cannot be recycled at Robin Hood Bay and must not be included with recyclable plastics collected on-site. These plastics are considered residual waste and will be sent to landfill. To reduce the plastic waste generation, in accordance with the waste minimization policy, the use of disposable dishes will be discouraged.

Corrugated Cardboard and Paper: Non Hazardous fibrous wastes such as clean paper, cardboard, packaging and other fibre materials will be collected and stored in a dry protected area for scheduled periodic pickup by the KKC Site Services Department to be shipped to a fibre recycling center. Reduction in cardboard waste will be achieved by avoiding extensive packaging as part of the respective EPC contractors' procurement and shipping policies.

3.8.3 Interim and Final Waste Disposal Infrastructure Requirements

As part of overall waste management, EMCP is committed to ensuring that every person on-site is provided with the opportunity and direction to practice responsible waste management. Infrastructure items, such as recycling and waste bins will be strategically placed throughout the site and will be clearly labeled as to what should be placed in them. Recycling bins will be placed in heavy traffic areas, common work areas and most importantly in locations where recyclables are typically generated.

In order to meet the diversion and disposal requirements of the Eastern Regional Waste Management Facility, several infrastructure items will be needed including:

3.8.4 Waste Storage, Disposal and Recycling

3.8.4.1 Beverage Containers

The majority of drink containers will be produced in the kitchen area, recreation area, lunchrooms, and to a lesser extent the general office complexes.

The Bull Arm site has established a Beverage Recycling Community Initiative. Beverage containers are stored at a recycling shed located adjacent to the Bull Arm Information Centre near the Trans-Canada Highway for subsequent pick up by local community groups. A number of groups from surrounding communities have expressed an interest in this initiative; a schedule has been developed to ensure all groups have an opportunity to participate.

Blue bin recycling containers are used for the collection of beverage containers due to their high visibility. The use of dedicated recycling containers will serve as a reminder for personnel to use the recycling containers instead of throwing containers into the general refuse containers.

The blue bin containers (or equivalent) are clearly labeled "**BEVERAGE CONTAINERS ONLY"** and are placed in the following areas around the site:

- Kitchen
- Lunch rooms
- Recreation areas
- General offices
- Medical facility
- Deep water/ dry dock site
- Topsides site
- Security building
- Camp Dorms

3.8.4.1.1 Fibre Recycling Containers

The majority of fibre (*e.g..,* cardboard) waste will be produced in the kitchen area and the general office complexes. Recycling containers are recommended for use for the collection of fibre. Fibre bins are clearly labeled "**CARDBOARD ONLY**" and have been placed in strategic areas around the site where this waste is generated. Fibre is collected, baled in a baler and shipped to a cardboard recycling facility. When generated volumes warrant it, paper will also be baled in this fashion.

3.8.4.2 Residual Waste Containers

Waste receptacles shall be placed within all buildings and include areas outside where people gather for the collection of residual waste.

3.8.4.3 Temporary Waste Transfer Area

Waste transfer areas are centralized facilities where waste is unloaded from several collection vehicles into appropriate containers or trailers. The primary reason for establishing a transfer area is to economize on haul costs and to better manage various waste streams. Transfer areas can also serve as collection points for recyclable materials, special wastes, and household hazardous wastes/ waste dangerous goods. There are many different methods and combinations of methods for solid waste transfer.

During the early stages of construction an area was established at Tower Road for the temporary handling of wastes, including recyclable waste, organic waste, mixed waste, construction and demolition waste and hazardous wastes/ dangerous goods. The Temporary Waste Transfer Area (TWTA) was sited and operated so as to create no environmental or health hazard and includes the following:

- Temporary waste laydown area

- C&D storage and metals storage area
- HWSA

Sufficient area should not only be provided for existing needs and buffers, but also for expansion if needed. The following separation distances shall be maintained[1]:

- 30 m from the right-of-way of a public road
- 100 m of a 100 year flood plain or in any area which has greater than 1% chance of flooding in any year
- 100 m of the high water mark of any water course, river, stream, water body, lake, pond, marsh, bog, swamp, tidal flat, or similar area
- 100 m of a drinking water supply (well or surface)
- Not be located within 100 m of an unstable area
- A distance approved in consultation with the Fire Commissioner's Office

3.8.4.3.1 Temporary Waste Laydown Area

During early construction an area in the Tower Road vicinity was designated to hold fully contained transportable containers for the temporary storage of the various waste streams. The area is segregated from other site facilities provides storage space and protection for non-hazardous waste material before it is hauled to its final offsite disposal area.

3.8.4.3.2 Construction and Demolition Storage and Metals Area

The temporary waste laydown area will include a cleared area that can accommodate containers for the various streams of waste. During construction, individual contractors will be responsible for collecting their wastes in acceptable containers within their workshops or laydown areas. KKC Site Services Department will periodically collect and transport these waste products, to store at the temporary waste laydown area. The containers will be temporarily stored until the generating contractors arrange for off-site shipment to a licensed facility for disposal.

Recyclable metals shall be placed in an acceptable sized container and placed in a location suitable for pick up by a licensed metals recycler. Special arrangements can be made with the recycler for items that are too large to fit within the container.

[1] *Government of Newfoundland and Labrador, Environmental Standards for Municipal Solid Waste Transfer Stations. Local Waste Management Facilities, GD-PPD-046.2, July 2010*

3.8.4.3.3 Hazardous Waste Storage Area (HWSA)

Packaged and placarded hazardous wastes/ dangerous goods generated by EPC's and subcontractors will be temporarily stored in the HWSA.

During the Early Works phase on the GBS site, a HWSA was developed and strategically located close to maintenance buildings where the majority of hazardous material is generated. The HWSA is a fit for purpose storage unit fitted with explosive proof lighting, eye wash stations, fire extinguishers, MSDS binders, secondary containment and venting; it is designed to provide a high standard of protection for site personnel and the surrounding environment. Topsides subcontractors have also procured similar type storage units for hazardous waste storage.

Individual contractors will be responsible for collecting their hazardous wastes/ dangerous goods in acceptable leak proof containers within their workshops or laydown areas. When sufficient volumes of hazardous waste have accumulated in the hazardous waste storage container, the respective EPC contractor arranges to have it picked up by a licensed hazardous waste contractor for shipment off-site and appropriate disposal; each EPC holds a contract with a licensed hazardous waste contractor.

Reasonable efforts will be made to keep the HWSA cleared of snow.

3.8.4.4 Waste Transport and Disposal

It will be the responsibility of the EPC contractor to make arrangements to transport waste from site on an as needed basis. The following waste streams shall be transported to the proper waste processing or disposal facility in fully contained transportable containers, such as a transfer trailer, roll on/ off bin or compactor unit:

- Recyclable containers shall be picked up at the temporary waste laydown area and transported to Robin Hood Bay
- Recyclable fibres are collected and stored at a designated location for subsequent baling and shipped off to a licensed fibre recycling facility
- C&D debris that is unacceptable for reuse or recycling is transported to Robin Hood Bay or other licensed facility for final disposal
- Recyclable metals are stored in designated storage bins where they get collected by a licensed metal recycler
- Hazardous wastes are stored at a designated HWSA's for subsequent shipment to an approved hazardous waste disposal site.

3.8.5 Training

All personnel involved in the handling of hazardous wastes/ dangerous goods will be fully trained for personal safety and protection; they will also be trained in Workplace Hazardous Materials Information System (WHMIS) requirements. Responsibilities for waste management and operation of the

HWSA will be assigned to the KKC Site Services Department and WorleyParsons construction department. The EPC contractors will be required to provide trained, qualified and experienced personnel for these duties. In addition, all personnel entering the site will be given basic instructions for complying with site waste management and recycling policies during environmental awareness training at orientation. Each contractor will be required to provide trained, qualified and experienced personnel for the handling and/ or disposal of certain waste classifications.

3.8.6 Inspections and Assessments:

The respective EPC E&R representative will proactively identify any requirements for maintenance work and report the need for repairs. Routine inspection schedules will be maintained to minimize the potential for leaks or environmental damage and a record will be kept of the maintenance needs and servicing performed.

Since occupying the Site, throughout Early Works and into the start of construction, the EPC contractors have been performing weekly E&R inspections which include inspections of the various waste collection transfer and disposal points, the inventory of bulk wastes, the waste management data sheets, the status of the protective equipment and spill kits. EPC contractors also conduct compliance assessments on waste management topics at a frequency deemed appropriate.

3.8.7 Decommissioning

Upon termination of Project activities, the site shall be decommissioned and rehabilitated. A decommissioning summary report describing the condition of the site following closure/decommissioning and describing any future environmental concerns will be provided to Nalcor and DOEC.

3.9 Contingency Planning

3.9.1 Improper Disposal

Any improperly disposed materials identified by the respective EPC E&R representatives will be recorded and discussed with the responsible group / discipline. For example, recyclable material should not be disposed of with residual waste headed for the landfill. Hazardous wastes will not be disposed with non-hazardous waste, but will be stored in approved storage containers until it can be shipped to licensed facilities off-site.

3.9.2 Fire

Oxidizing, reactive, or flammable materials will be disposed of as hazardous waste. In case of an accidental disposal, the EPC E&R representative will be notified immediately and if needed, the emergency response team will be notified immediately in accordance with the procedures outlined in the project's Emergency Response Plan. Proper storage containers and

compatibility profiles will be established for storage of hazardous wastes, in the Waste Storage area. Non-compatible wastes will be segregated.

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4 SOCIO-ECONOMIC ENVIRONMENT

4.1 Purpose

This Socio-Economic Environment chapter of the Hebron Project Bull Arm Site Environmental Protection Plan (EPP) provides detailed guidance to all organizations and personnel involved with Hebron Project activities at the Bull Arm site. Its purpose is to clearly describe various measures needed to successfully manage Project effects on the local socio-economic environment. Implementation of this plan's provisions will help ensure Project benefits are realized by communities within the Bull Arm area, and that potential disadvantages are anticipated and avoided, reduced, or mitigated.

In particular, consultation with a wide range of stakeholders during Project planning in 2009 – 2010 identified the need and value of accurate and timely project information. Early information facilitates the planning and actions necessary by agencies, such as school boards and the business community, to respond to and manage Project effects.

EMCP has committed to maintaining communication with key regulatory agencies and stakeholder groups throughout the Project.

4.2 Scope

The scope of the Socio-Economic Environment chapter of the EPP covers all activities anticipated during the construction, installation, hookup and commissioning (HUC) phases of the Hebron Project at Bull Arm up to and including site demobilization as they might, directly or indirectly, affect communities within the local (50 km radius) area. The scope of the EPP has been determined primarily through consultation with representatives from these communities through workshops, presentations and open houses.

4.3 Objectives

The Socio-Economic Environment chapter of the EPP describes the actions, policies, planning and procedures that will be used to manage the potential effects on nearby communities during Hebron Project work at the Bull Arm site. The socio-economic environment section

- Demonstrates that the Project recognizes and is in full accord with the commitments that have been made to the people of Newfoundland and Labrador and Canada to optimize Hebron development socio-economic impacts

- Demonstrates the Projects philosophy and approach as a good corporate citizen and neighbour, particularly through the provision of mechanisms for continuing public information and consultation
- Informs Governments, communities, public interest groups and the general public about plans and policies so that they can be confident about corporate intentions and the impacts of the Project
- Demonstrates the Project's awareness and capability with regard to socio-economic sensitivities in the area, the pertinent regulations and guidelines, and necessary permits and permit requirements

EMCP wishes to ensure that socio-economic effects are managed in a sound and acceptable manner throughout Project activities at the Bull Arm site. The Socio-Economic Environment section of the EPP will be reviewed and updated on a regular basis.

4.4 List of Acronyms and Glossary

Table 4-1: List of Acronyms

Acronym Term	Description
Benefits Plan	Hebron Project Canada-Newfoundland and Labrador Benefits Plan
CNA	College of the North Atlantic
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
EMCP	ExxonMobil Canada Properties
EOI	Expression of Interest
EPP	Environmental Protection Plan
EPC	Engineering, Procurement and Construction
FEED	Front End Engineering and Design
E&R	Environment & Regulatory
ER&S	Environmental, Regulatory & Socioeconomic
GBS	Gravity Base Structure
HRA	Health Risk Assessment
HUC	Hookup and Commissioning
KKC	Kiewit-Kvaerner Contractors
MUN	Memorial University of Newfoundland
NLDHCS	Newfoundland and Labrador Department of Health and Community Services
NLDE	Newfoundland and Labrador Department of Education
NLHC	Newfoundland and Labrador Housing Corporation
NOIA	Newfoundland and Labrador Oil and Gas Industries Association
PRNL	Petroleum Research Newfoundland and Labrador
R&D	Research & Development
RCMP	Royal Canadian Mounted Police
SSH	Safety, Security & Health
TCH	Trans-Canada Highway
WorleyParsons	WorleyParsons Canada Services Ltd.

Table 4-2: Glossary

Term	Definition
Acts	When capitalized in this document, refers to the Canada-Newfoundland Atlantic Accord Implementation Act and the Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act
Benefits Agreement	The Agreement reached between EMCP, the Project and the Province which requires that certain expenditures and activities associated with the Project occur in the Province, and specifies plans, processes and mechanisms for delivering these benefits
Benefits Principles	Principles that underlie the Benefits Plan and will govern all of its benefits-related activities
Compliance	Observance of official requirements
Co-venturers	Hebron asset owners that are sharing in the predevelopment costs and that have authorized EMCP to prepare a Development Application in its capacity as Operator
Cumulative Effects	Occur when impacts on the natural and social environments take place so frequently in time, or so densely in space, that the effects of the individual events cannot be differentiated; or when the impacts of one activity combine with those of another in either an additive or synergistic manner
Demographics	The characteristics of human populations, such as size, growth, density, distribution, and vital statistics.
Diversity Plan	Plan to deliver increased employment and business opportunities to women, visible minorities, Aboriginal people, and persons with disabilities and companies they own or operate.
Duration	How long a project activity or socio-economic effect will occur
Expenditures	Money paid out; an amount spent
Frequency	How often a project activity or socio-economic effect will occur
Infrastructure	Facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions
Issues Scoping	The process used to focus the assessment on issues and concerns identified by the public, technical experts and regulatory agencies
Magnitude	The nature and scale of the socio-economic effect for each activity
Mitigation	The elimination, reduction or control of the adverse environmental effects of a project. This includes restitution of any damages to the environment caused by a project though replacement, restoration, compensation or other means
Operator	When capitalized in this document, refers to ExxonMobil Canada Properties
Procurement	The purchasing of something usually for a company, government or other organization
Project	When capitalized in this document, refers to Hebron Project
Proponent	A person or organization that proposes carrying out an activity that may have an effect on the environment
Province	When capitalized in this document, refers to Newfoundland and Labrador
Residual Effects	Those effects remaining after enhancement and mitigative measures have been applied
Socio-economic Context	The status of the area affected by the project in terms of existing environmental conditions and effects

Term	Definition
Stakeholder	A party that affects or can be affected by the Hebron Project
St John's area	St. John's Census Metropolitan Area
Sustainable	Capable of being continued with minimal long-term effect on the environment
Topsides	The oil and gas producing and support equipment located on top of the Gravity Based Structure

4.5 References

Document Number	Title
EMCP, 2011a	Hebron Project Canada-Newfoundland and Labrador Benefits Plan, April 2011
EMCP, 2011b	Hebron Project Socio-Economic Impact Statement and Sustainable Development Report, April 2011
EMCP, 2011c	Hebron Project Comprehensive Study Report, September 2011
Government of Newfoundland and Labrador et al., 2008	Government of Newfoundland and Labrador, Chevron Canada Limited, ExxonMobil Properties, ExxonMobil Canada Ltd., StatoilHydro Canada Ltd., Petro-Canada and the Oil and Gas Corporation of Newfoundland and Labrador Inc. *Hebron Benefits Agreement*. 2008. St. John's, NL.

4.6 Overview

4.6.1 Project Description – Work at the Bull Arm Site

Early works activities (e.g., re-establishment of bund wall, dry dock construction, building refurbishment) concluded in late 2012, and Gravity Base Structure (GBS) construction began in the late 2012. GBS construction commenced in the dry dock and moved to the deep water site in summer 2014. The LQ module is being constructed at multiple locations across the province with final assembly occurring at Bull Arm. Remaining modules will be fabricated at other locations. Information on the Project employment requirements will be communicated to various stakeholders as the information becomes available.

During construction of the Hebron platform, the largest estimated trades labour requirements are:

- GBS concrete
- Structural trades
- Project management
- Mechanical trades

- Piping trades
- Civil and structural engineering
- Surface protection
- Electricians

In addition to these trades labour requirements, project management will be required as follows:

- Construction, installation and HUC management
- General Project management
- Mechanical management
- QA/ QC management

4.6.2 Socio-Economic Overview

This section summarizes the socio-economic context of the area considered in the EPP. The communities, services and infrastructure within a 50 km radius of the Bull Arm site are considered in this area, an area generally encompassing the Isthmus of Avalon and as far west as Clarenville, as shown on Figure 4-1, and referred to in the EPP both as the Isthmus of Avalon or the Bull Arm area. An understanding of the socio-economic context within which the Project will occur is fundamental to the analysis of its potential effects and development of management measures.

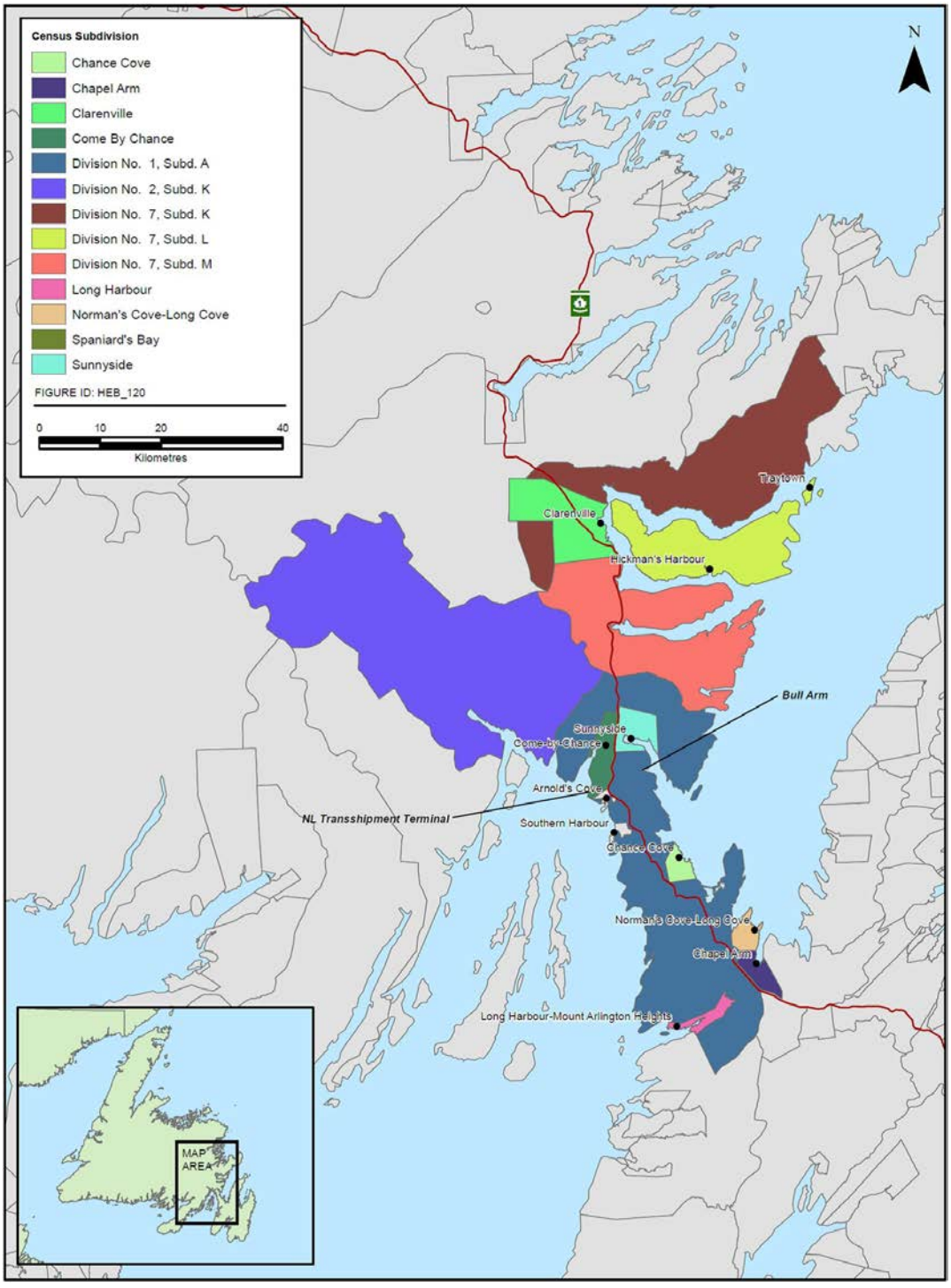


Figure 4-1: Area within 50 km Radius of the Bull Arm Site

4.6.2.1 Economy and Demographics

Overall, the provincial economy has performed well since 1996 with significant growth in Gross Domestic Product and average employment, and an overall general decline in unemployment rates. The strengthening of the economy has meant that Newfoundland and Labrador has now joined the ranks of Canadian "have" provinces, spelling the end of equalization payments on which the Province has received since joining Confederation in 1949.

According to a major project inventory compiled by the Atlantic Provinces Economic Council (Atlantic Provinces Economic Council, 2010 *in* EMCP, 2011b), the Province's economic health has and will continue to be reinforced in the near term by the sustained capital spending on projects such as the Vale nickel processing facility in Long Harbour; the development of the North Amethyst offshore oilfield (part of the Husky Oil White Rose Expansion project); further upgrades to the Come-by-Chance Refinery; as well as the Hebron Project.

Changes in the economic picture are reflected in the Province's demography. A major consequence of the closure of the fishery in the early 1990s was the decline of the population. Between 1991 and 2002 there was a net loss of nearly 53,000 people. However, in July, 2008 Newfoundland and Labrador's population stood at 507,895, an increase of 0.3% from that of the previous year. This was the first time in 16 years that the Province recorded an increase in population. By 2014, the population had increased further to 526,977.

Bull Arm Area

The economy of the Isthmus of Avalon area has not fared as well as that of the St. John's area, but its relatively diverse economy and the benefits of the offshore petroleum industry have sheltered it from much of the disruption experienced elsewhere in the Province.

4.6.2.2 Business and Employment

In general, the Province's labour markets have experienced a period of sustained growth since the structural adjustments of the early 1990s. This is partly attributed to spending from the petroleum industry, which has brought substantial income to the Province between 2005 and 2007, totaling over $1 billion each year.

Bull Arm Area

The Isthmus of Avalon area has had a number of important involvements with the offshore petroleum industry. It is the site of both the $470 million Bull Arm construction and fabrication facility and the $275 million Newfoundland Transshipment Terminal. Bull Arm saw most of the Newfoundland-based

construction and fabrication activity on the Hibernia production platform and, during the peak, employed approximately 5,800 workers (HMDC, 1996 *in* EMCP, 2011b). In 2009, the provincial energy corporation, Nalcor Energy, assumed ownership of the Bull Arm facility through its company, Nalcor Energy- Bull Arm Fabrication.

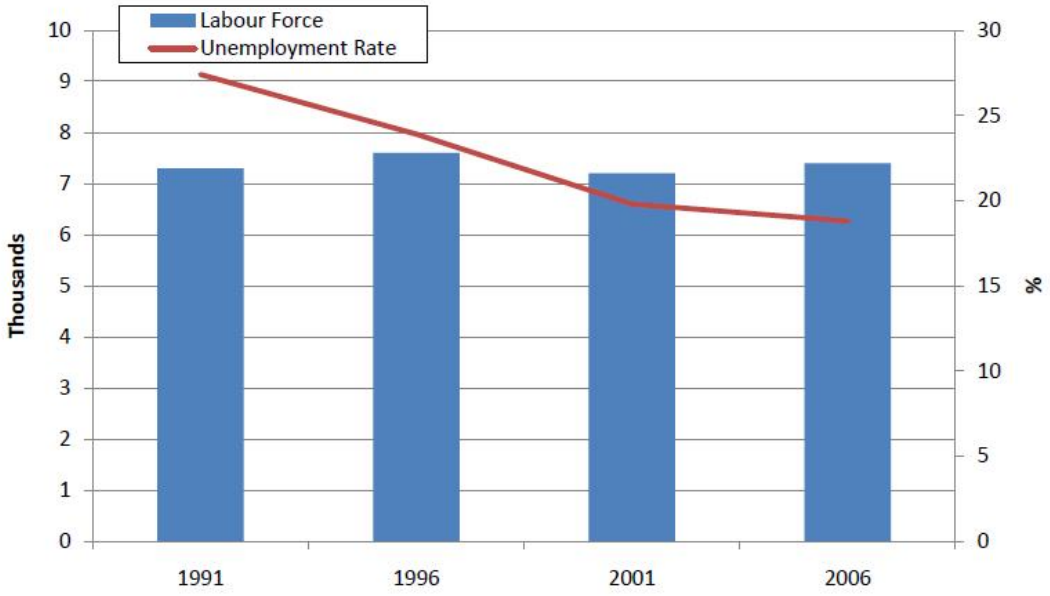
From 1999 to 2009 the Bull Arm facility was used by the oil industry to upgrade, fabricate, install, construct, test, and/ or inspect various systems, components, modules, and rigs. This included work to support the Terra Nova and White Rose projects, as well as work on the Henry Goodrich semi-submersible and Grand Banks drilling rigs.

The Newfoundland Transshipment Terminal employs 53 people and spends approximately $9.5 million annually on goods, services, and salaries for local companies and personnel.

North Atlantic Refining operates a 115,000 barrel per day refinery at Come-by-Chance. The refinery employs approximately 500 people and its operations add $200 million per year to the provincial economy; including employee wages and benefits and, local business procurement (North Atlantic Refining Website, 2015).

In April 2009 Vale began construction of a $2.8 billion Hydromet Plant at Long Harbour to process nickel concentrate from its Voisey's Bay mine. It is anticipated that 5,750 person-years of employment will be required for the construction phase. The commissioning and start-up of various components commenced in 2013, with an expected permanent workforce of 450 during full capacity operations (Vale Website, 2010 *in* EMCP, 2011b).

Despite effects brought about by structural changes in the fishery following the cod moratorium, each of these large projects has had a positive influence on the area's unemployment rate and labour force (see Figure 4-2).



Source: Statistics Canada, 1991; 1996; 2001; 2006a.

Figure 4-2: Labour Force, Isthmus of Avalon Area, 1991 – 2006

Participants in the Hebron Project's various consultation forums recognize that new projects are generally beneficial from an economic perspective as more people are employed, and successive rounds of employee and business expenditures generate employment and income multiplier effects in local and provincial economies. However, specific socio-economic effects can be both positive and negative where different segments of society are differentially affected. For example, concerns about the availability of affordable housing in the area, in particular in Clarenville, have increased since the Project was announced. Again, the need and usefulness of continued communication between the Project and communities for planning was emphasized.

Bull Arm area communities are determined to benefit from the employment and business opportunities offered by the Hebron Project. Residents can benefit directly or indirectly from work in its own right, increases in incomes and standards of living, and development of skills and expertise. The employment and business effects of the Project are greatly influenced by EMCP's Canada-Newfoundland and Labrador Benefits principles, policies and procedures, as outlined in the Hebron Project Canada-Newfoundland and Labrador Benefits Plan (Benefits Plan).

4.6.2.3 Community Social Infrastructure and Services

4.6.2.3.1 Education and Training

In 2010 there were 279 schools in the Province and approximately 67,000 full time students attending Grades K to 12. The English School District is the largest district in the Province with approximately 41,000 students and over 3,000 teachers in 121 schools (Newfoundland and Labrador Department of Education (NLDE), 2004 *in* EMCP, 2011b). This District covers the area of Clarenville and east, which includes the Burin, Bonavista, and Avalon peninsulas (NLDE, 2004 *in* EMCP, 2011b).

Post-secondary education and training in the Province is provided primarily through Memorial University of Newfoundland (MUN) and the College of the North Atlantic (CNA). MUN has its main campus and a Fisheries and Marine Institute (Marine Institute) in St. John's, and Sir Wilfred Grenfell College in Corner Brook. CNA has 17 campuses throughout the Province, including Clarenville.

There are also 27 registered private training institutions (primarily offering vocational training), some of which are trade union sponsored, and most of which are located in the St John's area (NLDE, 2009 *in* EMCP, 2011b).

Bull Arm Area

In 2008-09, there were nine primary and secondary schools in the Isthmus of Avalon area with 2,068 full time students in Grades K – 12: this represents almost a 25% decrease in the number of students ten years earlier, in 1998 (NLDE, 1999; 2009b in EMCP, 2011b). The CNA campus in Clarenville has approximately 250 full-time, 50 part-time and 400 Continuing Education students registered each year (CNA Website, 2013).

The Project had a peak employment demand in excess of 4,700 people working at the Bull Arm site during the largest slip operation in 2014. Project experience to date has seen a portion of the workforce opting to live on site, however most travel to site from communities outside of the Bull Arm Area or rent locally.

The Bull Arm area's past experience suggests that with advance notice from EMCP in respect to labour force demands and labour sourcing, local education and training officials should be able to plan to meet any short-term demands on education and training services that might arise. For example, during the Hibernia project, with its larger workforce, some adjustments were needed in the school in Clarenville to accommodate 40 – 60 elementary age students for a number of years.

Childcare facilities and services are both an important contributor to pre-school education and important in facilitating opportunities for parents to participate in the workforce. There only one certified childcare facility in the Isthmus of Avalon area, located in Clarenville, with a capacity of 42 spaces.

The facility currently has full occupancy with a wait list of approximately 24 children (S. Hoskins, pers. Comm., 2015). The Neighborhood of Friends Family Resource Center, also located in Clarenville, is a non-profit community-based organization funded through the Department of Child, Youth and Family Services. The Family Resource Center provides free programming targeted to children six years of age and younger (NLDHCS, 2013).

4.6.2.3.2 Health and Community Service and Infrastructure

The level of health care service in the Province, as defined by the number of nurses and doctors per capita, is comparable to other provinces in Canada.

The current nursing shortage remains a pressing issue: by 2015, 25% of Newfoundland and Labrador nurses will be eligible for retirement (Newfoundland and Labrador Nurse's Union, 2009 *in* EMCP, 2011b).

Bull Arm Area

The Eastern Regional Integrated Health Authority provides health care for the area from the Avalon Peninsula west to include the Bonavista and Burin Peninsulas, as well as the Clarenville area. The Dr. G. B. Cross Memorial Hospital in Clarenville serves the Isthmus of Avalon area. A recent health profile of this general area concluded that the area did not show any significant differences from the Eastern Health Region or with the Province as a whole (Newfoundland and Labrador Refining Corporation 2007 *in* EMCP, 2011b).

Eastern Health recognizes that there is a shortage of family physicians in the area and that many are close to retirement (Eastern Health, 2008 *in* EMCP, 2011b). As of July 2013, there were 13 family physicians practicing in Clarenville, one nurse practitioner working in the Emergency Department at the Dr. G.B. Cross Hospital, and one family physician in Arnold’s Cove. (M. Keats, pers. comm. 2013). The Hebron Project is not expected to place high levels of demand on the local health and community services system, and proactive measures are being taken to ensure that this demand is as low as possible. Pre-employment health screenings ensure that personnel are capable of performing their jobs safely, and that Project personnel are aware of potential health risks. The dedicated on-site health clinic provides 24 hour coverage to all site personnel, and can address primary health care matters such as body aches, flu, minor injuries and emergency needs.

EMCP is actively working with local health clinics to facilitate monitoring of physician wait times in the Bull Arm area. To date, the data collected indicates that the Project has not had an adverse impact on physician wait times in the Bull Arm area.

4.6.2.3.3 Security and Safety: Policing and Fire Protection

Bull Arm Area

The Royal Canadian Mounted Police (RCMP) polices the Isthmus of Avalon area. In 2015, fourteen uniformed RCMP officers and two District Assistants serve the Clarenville detachment area. In addition there are three independent units housed in the Clarenville office: the Area Management Team East, a Forensic Identification Section consisting of two members, and a two-member Traffic Services Unit. These specialized units do not perform detachment duties but provide specific specialized support to detachment members in the larger area east region (Cpl. Reagh Ellis, pers. Comm., 2015). Whitbourne detachment also polices a portion of the Isthmus of Avalon area.

Notwithstanding the presence of the Hibernia and Terra Nova projects at Bull Arm, there have not been any substantial changes in policing establishment requirements in nearly two decades. The potential increase in crime was a significant community concern when Hibernia construction activities were first proposed in the mid-1980s and when construction at Bull Arm began in 1990. The on-site camp and site security arrangements at the Bull Arm site were intended, in part, to address this concern.

During Hebron Project consultations in 2009 and 2010, the RCMP stated that Hibernia activity at the Bull Arm site did lead to increases in property crime, persons offenses and traffic incidents, especially impaired driving. They also stated the use of an on-site work camp strategy was considered instrumental in helping to contain much of the criminal activity that did occur. For a complete description of the camp facilities refer to Chapter 2, Section 1.16.

The Project has worked closely with the Department of Transportation and Works to have the speed limit on the Trans-Canada Highway (TCH) near the Bull Arm site reduced from 100 km/h to 80 km/h, which took effect in late 2013. The Project monitors traffic related offenses in the area to determine the effectiveness of the mitigations put in place. The Project will also continue to highlight driving safety with the site workforce in tool box talks and mass safety meetings on site.

The Isthmus of Avalon Area is served by 16 volunteer fire departments with an average of approximately 23 firefighters (W. Porter, pers. comm. *in* EMCP, 2011a). The Fire Department in Clarenville has a total of 31 volunteer firefighters (W. Porter, pers. comm.; Clarenville Fire Department Website, 2009 *in* EMCP, 2011a).

The Bull Arm facility is equipped with a dedicated Emergency Response Team (ERT) providing 24 hour coverage for all site operations. The response team is equipped with two fire apparatus (pumper trucks), an emergency rescue vehicle, a 4x4 pickup truck, and other necessary support equipment. The provincial government also has established the Emergency Measures

Organization to assist in dealing with any large-scale emergency or disaster occurring in the Province. This agency has the authority to control and coordinate the activities of all police, fire, health, social services and other services in the affected area (Newfoundland and Labrador Department of Municipal Affairs, 2009 *in* EMCP, 2011b).

4.6.2.3.4 Recreation Services and Facilities

Bull Arm Area

The Isthmus of Avalon area contains a range of recreational facilities, many of the larger ones being in the Clarenville-Shoal Harbour area. These include a stadium, softball fields, a sports complex, a community centre, a gymnasium, tennis courts, a bowling alley, ski facilities, golf facilities and playground areas. There are also a number of hiking trails in the area, including the 5 km Rotary Trail and the Bare Mountain Hiking Trail. The Town of Clarenville and the provincial government invested $15 million to build a new Events Centre. The Centre includes a theatre, ice rink, indoor walking tracks, curling sheets and community meeting rooms to host conferences and conventions; an outdoor track and soccer field have been built next to the Event Centre (Town of Clarenville Website, 2006; G. Gosse, pers. comm.; The Packet, 2010 *in* EMCP, 2011b).

The Town of Arnold's Cove has a Sportplex area, which includes a regulation-size ball field, outdoor skating rink and a playground. The Sportplex also includes a recreational building for youth entertainment. There are also two main hiking trails (W. Slade, pers. comm. *in* EMCP, 2011b).

4.6.2.4 Community Physical Infrastructure and Services

4.6.2.4.1 Housing

According to the Canada Mortgage and Housing Corporation (CMHC) the surge in house prices in the Province since 2008 can be attributed to historically low interest rates combined with overall economic strength which has led to high overall market demand (CMHC 2010 *in* EMCP, 2011b). As discussed above, the Province has in recent years experienced a net population increase, a growth in household formation, increased employment, and a growing labour force. All of these factors, combined with a strong inventory of capital projects and high consumer confidence, have had implications for the housing market.

CMHC has determined that the ongoing growth "will be reinforced by favourable trends in demographic and economic fundamentals, as well as on-going economic momentum fuelled by a lengthy list of major capital projects" (Canada News Wire 2010 *in* EMCP, 2011b).

Bull Arm Area

Between 1996 and 2006, the number of occupied dwellings in the Isthmus of Avalon area increased by 7.7% (Statistics Canada, 1996; 2001, 2006a *in* EMCP, 2011b). Most of the change was in the Clarenville-Shoal Harbour area. House values have increased over time and vary considerably from one community to another. For example, house values in Come-by-Chance increased by 22% between 2001 and 2006, whereas an increase of 32% occurred in Clarenville over the same period (Statistics Canada, 2001; 2006a *in* EMCP, 2011b). The Project continues to monitor rental prices in the area in order to identify potential project impacts.

4.6.2.4.2 Ports, Airports and Roads

Bull Arm Area

The Bull Arm facility is an International Ship and Port Facility Security (ISPS) accredited port and will receive materials throughout the Project from local, national and international locations.

The Clarenville Airstrip, located about 8 km north of Clarenville off Route 230, is a 4000 ft (1219 m) long, 75 ft (23 m) wide, un-serviced, paved runway that is owned by the provincial government. Primary access to the Bull Arm site is by the TCH, a federal-provincial highway system that was completed in 1971.

Currently the highway from St. John's to Whitbourne is a four lane divided standard and is in a good state of repair as there have been recent improvements made to the driving surface. West of Whitbourne and through the Isthmus of Avalon area the highway is built to a Rural Arterial Undivided 100 standard (i.e. consistent with the Transportation Association of Canada's road classification system) but the many passing lanes provides for a smooth flow of traffic. This section of highway is also in a good state of repair.

The privately owned company, DRL-LR, is the only provider of trans-Newfoundland motor coach service in the Province, and also offers pickup / drop off of parcels and envelopes along its scheduled stops, including Clarenville. Two taxi companies are based within the Isthmus of Avalon area, and are both located in Clarenville. A number of firms that are based in larger centres such as Gander and St John's also service the area.

Consultation also identified concerns with Project associated vehicle traffic on the TCH. Based on experience with previous projects at the Bull Arm site, increases in traffic volume, speeding and impaired driving remain a concern. As previously mentioned, the maximum speed on the TCH near the Bull Arm visitor's center has been reduced from 100 km/h to 80 km/h to address some of these concerns.

4.6.2.4.3 Industrial and Commercial Land, Warehousing and Office Space

The requirements for industrial land will include fabrication yards such as those at Bull Arm, Marystown, Argentia, Stephenville and St. John's, and light industrial land found in industrial estates.

Bull Arm Area

The Bull Arm site represents the most significant industrial lands in the Isthmus of Avalon area that are relevant to the offshore petroleum industry. The site comprises three main areas: the dry dock site, the Topsides site, and the construction camp/ common area. For further information on the Bull Arm Area, refer to Chapter 1, Section 1.6. Other industrial and commercial lands in the area are concentrated in Clarenville and Arnold's Cove. Clarenville has acquired land near Shoal Harbour from NLHC for development as mainly commercial/ light industrial with some residential. The Town invested $12.5 million in water, sewer and road development, which, opened up 55 ha of private and town commercial land, and 19.7 ha of town industrial land for development. The project has been undertaken in anticipation of continuing economic growth in the Clarenville area (R. Hiscock, pers.comm. *in* EMCP, 2011b).

The Town of Arnold's Cove purchased all of the designated commercial and residential land in the community from NLHC in 1999. In 2009, the Town had 7.6 acres of serviced industrial lands and 100 acres of unserviced land. In 2011 the town developed a 28 lot subdivision in response to an increase in economic growth and development in the area (Mayor Osborne, pers. comm., 2013).

4.7 Organization and Responsibilities

4.7.1 Environment, Regulatory & Socio-economic Team / Community Relations Advisor

The primary responsibility for ensuring implementation and monitoring of the socio-economic aspects of the EPP will be with the Bull Arm site-based Project Environment, Regulatory & Socio-economic (ER&S) team comprised of representatives of EMCP, Kiewit-Kvaerner Contractors (KKC) and WorleyParsons Canada Services Ltd. (WorleyParsons), including the on-site Community Relations Advisor and EMCP E&R Lead. In addition, the team will have the support of staff associated with benefits, procurement and overall Project execution.

The number, type, significance and management approaches to issues may evolve over time and with experience during the Hebron Project; both the effects and effects management process and actions are subject to review and revision during the life of the Project.

The Community Relations Advisor and/ or the Project ER&S team will act as the contact with various stakeholders including Bull Arm area communities, regulatory agencies, socio-economic related stakeholders and the broader public. The roles and responsibilities of the Project ER&S Team and the Community Relations Advisor are described in Chapter 1, Section 1.7 of the EPP.

Day to day management of the socio-economic aspects of the EPP will be by the Community Relations Advisor, supported by EMCP and Engineering, Procurement and Construction (EPC) contractor personnel located in St. John's and at Bull Arm. The Community Relations Advisor duties include:

- Establishing and/ or facilitating working committees, in conjunction with the Project ER&S Team.
- Identifying current and potential issues and facilitating resolution.
- Undertaking and/ or facilitating data collection to monitor key concerns.
- Facilitating ongoing and annual review of effects management.

EMCP along with KKC and WorleyParsons, as requested, will provide appropriate personnel and information to ensure effective community relations are maintained in the Bull Arm area.

Public consultation has been an important part of environmental planning since 2008 and will continue to be so throughout the Project. Members of local communities and interest groups have and are expected to continue to participate in liaison committees (described below).

These activities will be ongoing throughout the development phase of the Project. Key elements in the management process are continuity of and commitment to the socio-economic environment chapter, co-operation and consultation with key stakeholders, and periodic review and revision of the EPP, as necessary.

4.8 Socio-economic Effects Management: Actions

4.8.1 Communication and Community Liaison

4.8.1.1 Introduction

The main purpose of communication and liaison associated with the Hebron Project work at the Bull Arm site is to:

- Ensure an effective two-way flow of information between the Project and area communities, regional government agencies, interest groups and the local public.

- Ensure that all Project personnel are familiar with the Project, Project-related issues or concerns, and plans and policies to address them.

The Project's community liaison and information programs are directed primarily toward the interest groups and the general public in nearby communities. The Project's community relations personnel monitor community understanding and acceptance of the Project, and ensure that monitoring of selected socio-economic indicators is undertaken.

The community relations personnel are guided by the following objectives:

- Provide the medium through which communities can voice their interests and concerns.
- Provide accurate and relevant information as approved by Project management to communities to facilitate discussion and planning.
- Relay the Project's position on environmental, socio-economic and other community based issues, as appropriate.

4.8.1.2 Community Liaison

Liaison includes an ongoing process of direct consultation with individuals and groups. The Project works with local groups to establish effective liaison mechanisms.

A Community Liaison Committee has been established, comprising local stakeholder representatives and leaders. The Committee meets regularly with the aim to address the information requirements of local communities and specific stakeholder groups, and provide them with regular briefings on the progress of the work, upcoming work activities, and workforce trends.

This committee is a forum to discuss community concerns and to periodically review how well socio-economic effects are being managed with Project personnel. Interface with the Project will be coordinated by the Community Relations Advisor, supported by EMCPs Bull Arm E&R Lead, and GBS Construction Site Manager.

Refer to Chapter 5 for a description of fisheries liaison activities.

4.8.1.3 Communication Initiatives

The primary focus of the Project's communication initiatives is to provide Project information to local communities. However, the initiatives also serve to provide Project information to senior management and, as appropriate, to governments, non-local interest groups, and the general public. These information initiatives are closely linked with the liaison program in that the Project believes that communication is a two-way process and that information must both be provided to and received from the local communities and interest groups. The specific information initiatives which have been implemented include the following:

Bull Arm Information Centre

The Community Relations Advisor started working out of the Bull Arm Information Centre in late 2011; the grand opening of the Information Centre was in the fall of 2012. The location and hours of operation of the Information Centre have been publicized in the region, and interested individuals and groups have been encouraged to contact the office to discuss their interests. These will be handled by the community liaison staff and, as appropriate, liaison committees or site personnel.

Hebron Website

The Hebron Project website (www.hebronproject.com) was launched in April, 2009. The website provides up to date Project information to the general public.

Hebron Project Community Newsletter

A quarterly “Hebron News Bull Arm Update” has been developed by the Community Relations Advisor and is distributed to local town offices, schools and colleges. The newsletter is also available to the general public through the Information Centre and electronically on the Project’s website.

The newsletter provides Project information with the intent of building an awareness of the construction process at Bull Arm. The newsletter reports on activities through text and photographs.

Bull Arm Bus Tours

The Hebron Project started offering public bus tours of the Bull Arm construction site in July 2013. It is expected that these tours will run during the summer and early fall months each year.

Tour participants are able to view the former dry dock area, the Topsides module hall, and the deep water site. Detailed storyboards along the route of the tour offer additional information on the Project, and a tour guide is available to answer questions.

Off-site Presentations

Not all interested individuals and organizations will be able to visit the Bull Arm site but will nonetheless be interested in the progress of the Project. Project personnel are available, time permitting, for presentations to interested groups and organizations at their request. There have been several presentations to date to the area Chamber of Commerce and various school groups.

4.8.1.4 Monitoring and Reporting

Monitoring programs have been established to ensure that compliance requirements are met, effects management is meeting its objectives, and new issues arising are identified and addressed. The results of this monitoring are reported internally and where appropriate to relevant government agencies and community groups.

Monitoring and reporting procedures have been established with the appropriate regulatory agency/ agencies, primarily the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB). Commitments under the EPP, such as a mandatory orientation training program, are also being monitored.

Community opinions towards the Project have been and will continue to be monitored through discussions with the Community Liaison Committee, key stakeholder groups, response to the Project newsletter, and through day-to-day contact. These initiatives help identify possible problems in advance so that they can be appropriately addressed.

4.8.2 Management of Effects on Community, Social and Physical Infrastructure and Services – Actions

4.8.2.1 Introduction

Strategies have been used to address and manage the concerns related to site activities identified during the Hebron Project consultations during 2009 and 2010. These issues are those directly related to site-specific construction activities and potential indirect effects associated with movement of Project employees and, in some cases, their families, into the Isthmus area.

A number of mitigation measures have been developed to avoid or reduce potential negative effects and to enhance positive ones. A key mitigation measure is the use of an on-site camp to house Project workforce who do not live within daily commuting range of the Site. A second important mitigation measure is communication and liaison with key stakeholders in the communities, government and regional agencies and interest groups. Where demand for additional services is likely to arise from the Project, advance planning will be facilitated through this continuing liaison. The Project provides information on key Project characteristics, schedules and anticipated employment demands to government agencies (provincial, regional, and municipal) to facilitate planning to meet anticipated service and infrastructure needs.

4.8.2.2 Health and Community Services

Health and safety are key priorities for EMCP and are addressed through site policies and procedures. To ensure that the site is self-sufficient with respect

to normal health and safety, a comprehensive Safety, Security & Health (SSH) management system, including all required emergency preparedness and response processes and equipment, has been established as well as a comprehensive health management plan.

- New hires will be introduced to site health and safety requirements and expectations immediately upon reporting for work, in the site orientation program.
- A Bull Arm Site Health Management Plan has been established based on requirements of a formal Health Risk Assessment (HRA) for the Project as well as other local regulatory requirements; the HRA includes all aspects of health, specifically addressing medical services, public health and occupational health issues.
- The Bull Arm Site Health Management Plan provides details of health management on site, including a properly staffed and equipped onsite medical clinic; to date the Project has not placed undue demands on the regional health facilities, and the Project will continue to monitor this in the future.
- Where demand for additional services from the Project has been identified, planning is facilitated through continuing liaison to alleviate this demand; the Project is committed to continually monitor the demand for additional services and address as necessary.
- The Project will continue to provide information on key Project characteristics, schedules and anticipated employment demands on a quarterly basis to appropriate government agencies to facilitate planning to meet anticipated service and infrastructure needs.

4.8.2.3 Security and Safety: Policing and Fire Protection

Security, safety and health are an integral part of Hebron Project planning and execution. The following policies and procedures have been implemented:

- Bull Arm Security Plan which covers both land and marine areas, including ISPS designation for port areas.
- Zero tolerance for drugs and alcohol.
- The Bull Arm site has on-site fire-fighting capacity adequate to deal with all but the largest emergencies; liaison will be maintained with local area fire brigades and relevant provincial authorities.
- During all Project marine operations stand-by boats will be in place; there is regular liaison with local fishermen, the Canadian Coast Guard and other appropriate agencies to update them on marine operations and discuss marine safety concerns.

- A marine traffic management system has been implemented at the site.

In addition:

- On-going liaison with the RCMP in the Isthmus area ensures that appropriate information is available and exchanged to address any policing issues that may arise.
- In recognition of the concerns raised during public consultation, EMCP will explore the use of bussing as a means to transport offsite workers to and from the Bull Arm site to address concerns about increased traffic volume and offenses (e.g., speeding, impaired driving). Bus services between St. John's and Bull Arm are provided by non-project affiliated contractors to employees working at Bull Arm.
- Systematic processes are in place for planning and responding to emergencies to minimize the impacts to people, the environment, and assets in an emergency situation; these processes are detailed in a site wide Emergency Response Plan.

The site wide Emergency Response Plan identifies risks/ incidents which may be potentially encountered during execution of the work and provides criteria for determining the scale of the emergency and the appropriate level of response by the work site. Further to this, the plan details the following:

- Emergency Preparedness and Response training for personnel in the Incident Command Structure and for Non-Responders.
- Requirements for a structured program of simulations, drills, and exercises for various types of emergencies.
- Required lifesaving and emergency response equipment and personnel transportation methods.
- Established onsite Incident Command Center (telecommunications equipment, computers, implementation procedures/ tools, etc.).
- Established communications protocol and supporting communications equipment for internal and external communications.
- Requirements for emergency egress routes.
- Designated muster areas for the assembly and accountability of personnel.
- Established evacuation procedures for personnel.
- Designated internal and external resources for technical and logistical support by the work site, Project level, and corporate Emergency Response Organizations.
- Established processes for the activation of mutual aid or regional response teams.

- Established assessment processes and key performance indicators to measure the effectiveness of Emergency Preparedness and Response.

4.8.2.4 Housing

The self-contained camp on site has the capability to accommodate a number of the workforce, which will help minimize demands on community services arising from the Project. This approach was successfully used during the construction phase of the Hibernia project and has been discussed with local communities for the Hebron Project.

- EMCP worked closely with its EPC contractors to identify and implement a full range of catering, retail, personal services, recreation, entertainment, daycare and other requirements of the housed workers.
- EMCP and its EPC contractors have worked diligently with the communities and local businesses during planning and throughout the construction work at Bull Arm to consider how local communities and business can be involved in camp services.

Use of crown lands by Project personnel for semi-permanent accommodations (*e.g.,* gravel pit camping) will not be permitted at any time.

4.8.3 Economic Benefits Management: Actions

4.8.3.1 Introduction

The Province's offshore oil and gas industry has been active with continuous exploration and development since the mid-1970s, with platform construction and fabrication activities since 1990, and production since 1997. Hebron is the fourth stand-alone offshore petroleum production project for the Grand Banks, and the second GBS platform to be built and assembled at the Bull Arm site.

Reviews of the socio-economic effects of the offshore oil and gas industry in the province have concluded that offshore petroleum industry has contributed significantly to the economic and social well-being of the province.

EMCP is continually committed to ensuring, through its plans and policies, an enduring positive contribution to the communities and residents of the Province, including those in the Bull Arm area.

Through its plans and policies, the Project strives to enhance economic development within the province and Canada through workforce development, supplier development, and strategic community investments to build capability and capacity. Effective measures within these groupings will contribute to job creation, sustainable industrial and business growth, government revenues and improved quality of life.

The Hebron Project began contributing significantly to the Province's economy in 2009 with the establishment of the Project office and staff, as well as through initiating a number of environmental and engineering studies in the Province. The Project will continue to contribute significantly to the provincial economy during the approximate five or six year construction period (with much of the construction activity in the Province), and the thirty plus years of production operations offshore.

Public consultation in the Bull Arm area has clearly indicated the interest and intent to ensure that local communities benefit from Project-related employment and business opportunities. EMCP's commitments to economic benefits in the province are outlined in the Benefits Agreement signed with the Province, and have been specified in the Canada-Newfoundland and Labrador Benefits Plan which was filed as part of the Development Application, and conditionally approved on May 31, 2012. The policies and approaches that are most relevant to Bull Arm are indicated below for employment and for business/ service opportunities.

4.8.3.2 Education and Training

The Project's consultations in 2009 – 2010 provided EMCP with two key messages:

- Deliver local employment and training.
- Assist with increasing youth retention (throughout the Province).

The Atlantic Accord Acts require that planning for offshore projects, such as the Hebron Project, include consideration of the employment of Canadians and in particular, members of the labour force of the Province, and providing first consideration for training and employment to individuals resident in the Province.

The following policies and programs are in place to address these requirements:

- Early identification of staffing demands and supply through development of human resources plans and labour gap analyses.
- Early and on-going communication and consultation with education and training institutions and organizations.
- Promotion of oil and gas careers to students at junior high and high school levels to encourage them to stay in school and consider further education to meet skill demand.
- Investment in the skills development through scholarship and support programs.
- Attendance at career fairs to promote careers in technical, engineering and trade/ operational roles.

- Employment of co-operative education students from technical, trades and business disciplines.
- Encourage main contractors to incorporate co-op and apprenticeship training positions into their staffing plans for the construction phase.
- Require contractors and suppliers to have processes for recruitment and selection of candidates that align with the principles of diversity and first consideration to residents of Newfoundland and Labrador for employment.

4.8.3.3 Employment

Hebron Project construction-related activities at Bull Arm began in 2011 and are anticipated to continue through 2016. Hebron had over 4,700 jobs during peak construction activity, providing experience that will increase long term trades and engineering capacity in the Province.

The Project is committed to providing Newfoundlanders and Labradorians with first consideration for employment opportunities with the Hebron Project. Furthermore, EMCP rolled out the Hebron Benefits Monitoring and Reporting System to contractors and subcontractors during 2012. The software is a multi-level data collection and reporting system that has been designed to capture company information, employment, expenditures, procurement activities and training on the Hebron Project. The EPC contractors, KKC and WorleyParsons, also conducted training sessions for their subcontractors throughout 2012. The training sessions were extended to include a presentation on how to calculate Newfoundland & Labrador and Canadian content to assist in reporting processes.

Actions to address Project commitments to employment opportunities during Hebron Project construction activity at Bull Arm include:

- Identification of staffing demands and supply.
- Active planning to address human resource planning and the gap between demand and supply.
- On-going consultation with institutions, government, industry and unions in the Province to ensure an understanding of the Project schedule and needs.
- Encourage main contractors to incorporate co-op and apprenticeship positions into their staffing plans during construction.
- Monitoring EPC Contractors' employment, training and diversity initiatives
- Dissemination of information to assist identification of employment opportunities through:
  - Providing a Bidders List for major contracts

- Advertising employment opportunities within EMCP
- Offering work-term employment to co-op students from MUN and CNA
- Providing links to recruitment pages of EPC contractors' websites

4.8.3.4 Diversity

It is the responsibility of EMCP to oversee the implementation and ongoing execution of the Project Diversity Plan (Appendix B of the Benefits Plan, EMCP 2011a) to meet the regulatory and contractual requirements of the Project.

Successful implementation of the Diversity Plan's components has required a full commitment not only from EMCP but also its main EPC contractors. EMCP has:

- Ensured that both EPC contractors hired a Diversity Coordinator
- Conducted diversity awareness training for employees during the construction phase
- Monitored contractors' compliance with the Diversity Plan which is part of the commercial terms of their contracts with EMCP; procedures have been put into place to deliver and effectively monitor compliance with the set standards
- Implemented a Supplier Diversity Program whereby the Project will consider funding first time certification fees for businesses who meet certain criteria. Businesses must be registered in Newfoundland, have at least 51% ownership or control by a member of one or more of the four designated groups and provide a good or service that is relevant to the Project's work.

4.8.3.5 Business Opportunities

Through responding to the challenges and opportunities offered by a strong offshore oil and gas industry over the past 25 or more years, Newfoundland and Labrador based companies (and workforce) have developed not only new capabilities but new ambitions and confidence that have enabled successful entry into other industries, regions and countries. The Project will augment this capacity and capability.

EMCP has made a number of specific commitments to perform a wide range of work in the province, from engineering to construction, and to enhance the capability and opportunities for residents of the province as well as the supplier community. The Project's senior management team presented initial information about the Project and the procurement process to the business community in April 2009, hosted forums at four different locations, including Clarenville in the Bull Arm site area, and has continued with a number of

initiatives including site visits to businesses and facilities throughout the province.

EMCP is committed to a number of initiatives in the areas of supplier development and procurement to facilitate local access to business opportunities. Supplier development involves the investment of time, people and resources to develop companies such that they provide a competitive local industrial base. The past 30 years has seen great success in developing such a base in Newfoundland and Labrador, and EMCP will build on this, drawing on the Benefits Plan Guidelines, standard local practice and ExxonMobil corporate experience and guidance.

Early actions by EMCP included:

- Employed a dedicated Supplier Development Lead who is responsible for supplier development initiatives.
- Established and maintained a construction phase contracts and procurement office with EMCP and the main EPC contractors co-located to provide a single point of contact.

EMCP has undertaken such initiatives as:

- Participating in industry conferences and workshops, such as those organized regularly by Newfoundland and Labrador Oil and Gas Industries Association (NOIA) and other industry associations.
- Establishing and maintaining a Project website that provides timely communication of Project opportunities to the public and point of contact information for local procurement personnel. The site has been promoted through print media and relevant industry associations and government departments.
- Providing early and detailed notification of Project requirements through the Project website, the NOIA Bulletin, BIDS (www.bids.ca) and other mechanisms.
- Conducting annual supplier information sessions and workshops with main contractors' procurement personnel to advise of Project requirements. These events explain contracting strategies, size of work packages, Expression of Interest (EOI) and pre-qualification processes, and how the major work packages will be bid and evaluated.
- Holding a reverse trade show focused on EPC contractor work.
- Co-locating the majority of EMCP and EPC contractor procurement personnel in St. John's to facilitate opportunities for Newfoundland and Labrador companies to participate in bidding for sub-contracts, and material and equipment purchasing.

- Investigating the use of distance technologies to facilitate contact between Newfoundland and Labrador contractors and suppliers, and the main EPC companies located outside the Province.
- Disseminating point of contact information for Project procurement personnel as soon as it becomes available.
- Providing debriefings for unsuccessful bidders, when so requested.
- Establishing and promoting a Project vendor registration database that is used by EMCP and its contractors and suppliers; where feasible other local databases will be integrated into the Project database.
- Establishing a fund for travel by contractors and suppliers headquartered in the Province to visit engineering offices located outside the Province, where such offices have been employed to conduct Project FEED and when necessary to support business relationships.

In order to promote an awareness of opportunities among companies that are located in rural Newfoundland and Labrador and those owned or operated by members of designated groups, EMCP and/or the prime contractors has, and will continue to, investigate initiatives suggested through the Project's consultations:

- The use of distance technologies to facilitate the access of rural businesses to Project and industry procurement-related events in St. John's.
- Encouraging and facilitating collaboration between NOIA and other industry associations and rural and diverse business and supplier groups, such as the Eastern Suppliers Development Association and the Newfoundland and Labrador Organization of Women Entrepreneurs.

EMCP and the EPC contractors will continue with several initiatives throughout the construction phase, including:

- Continue site visits to local suppliers and fabricators to assess capabilities and capacities.
- Hold overview workshops to provide forecasts of activities and opportunities.
- Publicize Project information including procurement forecasts, EOI's, RFP's contract awards through such means as the Project website, NOIA and BIDS.
- Use EOI's to solicit local interest in opportunities.
- Participate in community information sessions as requested by the site Project ER&S Team.
- Implemented a Supplier Diversity Program whereby the Project will consider funding first time certification fees for businesses who meet

certain criteria. Businesses must be registered in Newfoundland, have at least 51% ownership or control by a member of one or more of the four designated groups and provide a good or service that is relevant to the Project's work.

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5 COMMERCIAL FISHERIES ENVIRONMENT

5.1 Purpose

Chapter Five of the Hebron Project Bull Arm Site Environmental Protection Plan (EPP), Commercial Fisheries Environment, demonstrates an understanding of commercial fisheries in the Bull Arm area and identifies measures implemented at the Bull Arm site to enhance operational safety and mitigate potential adverse impacts from the Project on commercial fish harvesting operations.

Marine activities increased substantially in 2013 with mooring line installation, and in mid-2014 following the relocation of the Gravity Base Structure (GBS) to the deep water site in Bull Arm for continued construction. Topsides modules will also be transported via marine vessels to the Bull Arm Site between summer 2015 and 2016.

5.2 Scope

The Commercial Fisheries Environment chapter of the EPP provides environmental protection measures to be implemented by the Project over the life of the Hebron Project construction, installation and hookup and commissioning (HUC) activities at the Bull Arm facility. It details the framework used to mitigate potential negative effects on commercial fish harvesting operations by enterprises operating out of the homeports of Sunnyside, Chance Cove, Bellevue, Thornlea, Norman's Cove- Long Cove and Chapel Arm; these communities are considered to be in the immediate Project area.

5.3 Objectives

This Commercial Fisheries chapter of the EPP has two primary objectives:

1. To identify and implement procedures to eliminate or minimize disruption to the established commercial fisheries environment during the period of platform construction.
2. To provide a mechanism for continuing information exchange and consultation, specifically with fishers and the fishing industry in the area affected by Project activities.

Other objectives of the Commercial Fisheries chapter of the EPP are to:

- Document environmental concerns and appropriate protection procedures pertinent to all site personnel involved during the construction period.
- Provide concise and clear instructions to all site personnel regarding the procedures designed to protect the commercial fisheries resources and minimize environmental impacts on the industry.

- Address the commercial fisheries concerns expressed by local fishers.
- Ensure that all commitments expressed by ExxonMobil Canada Properties (EMCP) and its contractors to minimize commercial fishery impacts will be satisfied by construction personnel.

5.4 Abbreviations

Abbreviation	Term
EMCP	ExxonMobil Canada Properties
EPP	Environmental Protection Plan
FCOP	Fisheries Code of Practice
GBS	Gravity Base Structure
HUC	Hookup and Commissioning
KKC	Kiewit-Kvaerner Contractors
MTP	Marine Traffic Procedure

5.5 References

Document Number	Title
EMCP, 2010a	The Hebron Project Comprehensive Study Report, September 2011

5.6 Overview

5.6.1 Project Description

The Hebron Project's GBS will be constructed at the Bull Arm site. The LQ module is being constructed at multiple locations across the province, and remaining modules will be fabricated at other locations. Modules fabricated off-site will be transported by marine vessels to the Bull Arm Topsides site. Module installation and HUC will be completed at the Bull Arm Topsides site, and then mated with the GBS at the deep water site. Construction, installation and HUC activities are anticipated to take place from mid-2011 through 2017. A more detailed Project description is provided in Chapter 1 of the EPP.

Potential effects on fishing activities during Hebron Project activities will be primarily concentrated in Bull Arm and, more specifically, at Great Mosquito Cove and the deep water site located a short distance off the northeast headland of Great Mosquito Cove (see Figure 5-1). Fishing activities in other areas of Trinity Bay may also be affected at certain times by Project-related vessel traffic, e.g. delivery of Topsides modules from other locations, and during tow-out of the completed platform to the offshore location.

The following activities have potential effects on the commercial fisheries in the Bull Arm area:

- Great Mosquito Cove:
  - Refurbishment of wharves, quays and the assembly pier
  - Construction of and later partial removal of the bund wall
  - Construction activity in the dry dock
  - Installation and HUC of Topsides modules
  - Associated tug, barge, and Project vessel movements
- Deep Water Site:
  - GBS float-out and construction to final height
  - Installation and refurbishment of mooring points
  - Installation of GBS mooring arrangement
  - Associated tug, barge and passenger ferry movements
  - Noise and light associated with construction
  - Topsides tow-out
  - Topsides and GBS mating and HUC
- Early stages of platform tow-out from the deep water site
- Bull Arm Site demobilization

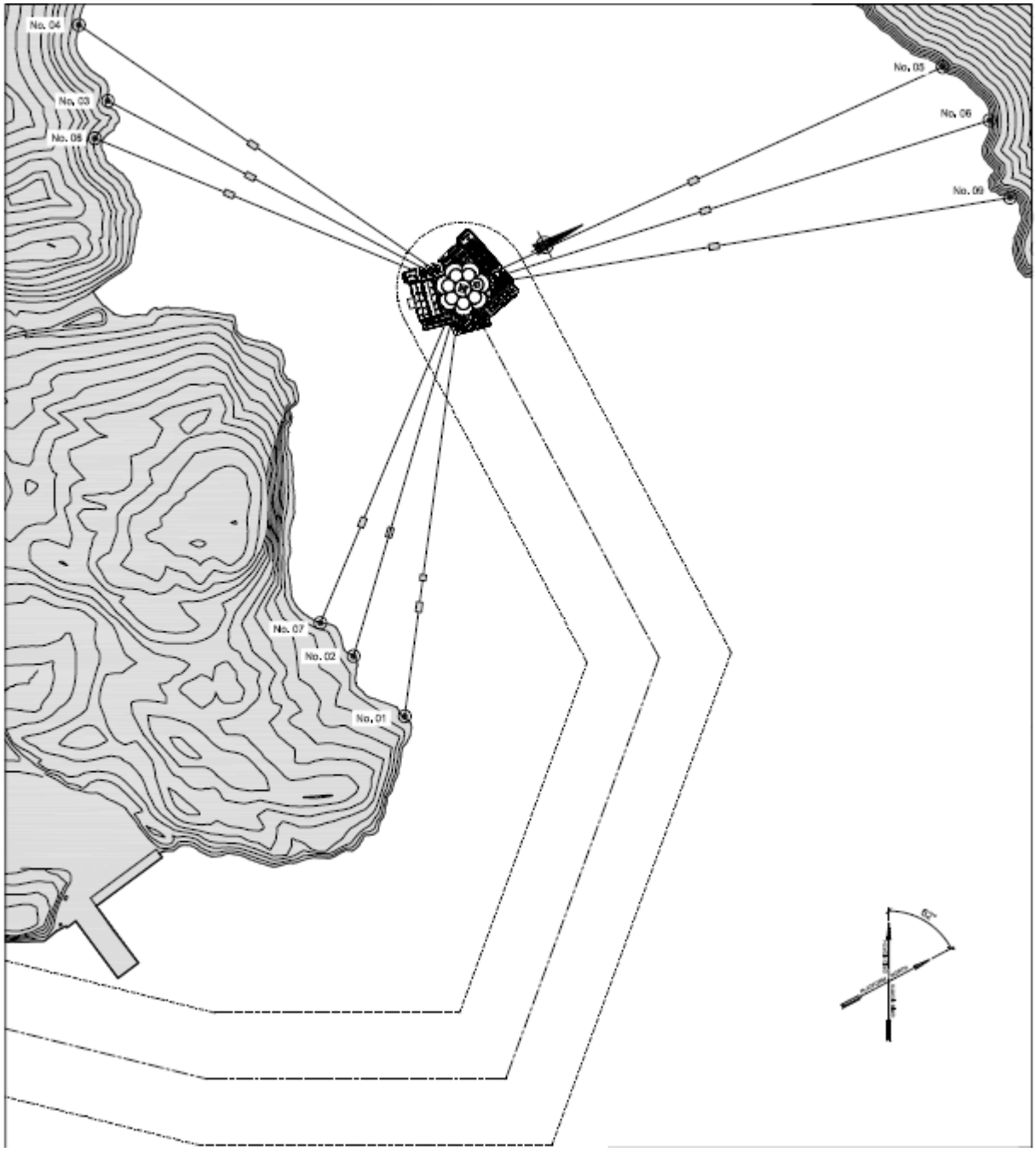

Figure 5 - 1: Deep Water Site Chartlet from Great Mosquito Cove to the Approaches to Sunnyside Harbor

5.6.2 Commercial Fisheries in the Project Area

Commercial fisheries in Bull Arm are dominated by fishers from six homeports in the southernmost part of Trinity Bay: Sunnyside, Chance Cove, Bellevue, Thornlea, Norman's Cove- Long Cove, and Chapel Arm.

Approximately 20- 30 fishing enterprises from these communities traditionally pursue the fishery in the area. Licenses are held for a variety of species

including bait, capelin, groundfish, herring, mackerel, lobster, scallop, shrimp, squid, snow crab, sea urchin, whelk, seal, and eel.

Since 2005, overall landings have fluctuated from year to year, ranging from a peak of 2,650 tonnes in 2007 to a low of 1,400 tonnes in 2011. Despite these ups and downs, the general trend has been one of relative stability.

For the period 2005 to 2011, the average yearly catch was about 1,975 tonnes, and the value of the harvest averaged slightly over $0.5 million annually. During this period capelin, mackerel and herring represented nearly 95 percent of the average annual catch by weight, and accounted for more than 80 percent of the value. Cod, lobster and squid contributed a further 16% of the area's annual fishing income although the total catch by weight of these three species was just 4% of all species combined.

The Hebron Project Comprehensive Study Report (CSR), Chapter 8, describes the commercial fisheries in the Bull Area in detail and assesses the potential effects of the Project on the fisheries. Interactions between the Project and commercial fish harvesting activities are expected during all phases of construction at Bull Arm. These activities include accessing and setting gear on established fishing grounds, retrieving/ hauling the gear to harvest the fish, and getting the catch back to port. This report concluded that the effects of the Project on commercial fish harvesting are considered to be not significant, with appropriate mitigations in place, as described in this EPP.

The potential effects of the Hebron Project on commercial fisheries in the Bull Arm area outlined below represent the issues identified by inshore fishers during the Project's public consultation process during 2009 and 2010. These issues are also typical of those raised and addressed for previous projects at the Bull Arm site. Issues identified are listed below.

Exclusion from Fishing Grounds:

- Fishers expressed concern that marine construction operations would result in them being excluded from fishing areas within Bull Arm such as fishing grounds close to the deep water site.
- Fishers want to know what the "rules of the road" would be with respect to where and when traditional fishing activity takes place.
- Sunnyside fishers who fish lobster and other species in Great Mosquito Cove wanted to know if they would be able to continue fishing these grounds, at least in the initial stages of the Project.

Disruption of Harvesting Operations:

- Fishers expressed concern about general Project activities on the water (vessel traffic) and the effects these might have on their fish harvesting operations, e.g. high levels of activity that would make fishing more difficult or dangerous, or that might result in de facto exclusion from busy areas.

- Fishers were concerned that Project related vessel traffic could interfere with crab fishing activities or other species harvesting operations within the Tickle Bay portion of the Traffic Lane.

Effects of Noise and Lights on Catchability:

- Fishers stated concern about potential effects of construction-related noise and light on fish behavior and/ or movement within Bull Arm, especially during the time when the GBS is moored at the deep water site.

Gear and Vessel Damage:

- Fishers were concerned about potential damage to fishing gear or fishing vessels resulting from contact with Project-related vessels or from debris escaping from the site.

5.7 ORGANIZATION AND RESPONSIBILITIES

5.7.1 EPP Implementation

The Project's overall approach to commercial fisheries environmental protection planning involves the implementation of specific procedures for minimizing direct impacts on the marine environment and the establishment of a number of management systems, general procedures, liaison structures and reporting mechanisms. This approach is designed to minimize direct operational impacts or potential indirect economic impacts on established fish harvesting operations. Collectively, these procedures would constitute the Project's Fisheries Code of Practice (FCOP), such as outlined in Section 5.7.2.5 of this document, and the Hebron Project Marine Traffic Procedure (MTP).

5.7.2 Roles and Responsibilities

5.7.2.1 EMCPs Role

EMCP is firmly committed to minimizing interference with and disturbance to fishing operations in the vicinity of the construction site, and has established appropriate compensation programs in consultation with the area fish harvesters. EMCP has established baseline information on the area's fisheries and fishing grounds in areas of Great Mosquito Cove used by the Project and the deep water site. Preparation and implementation of the Commercial Fisheries Environment chapter of the EPP is a joint responsibility of EMCP and its EPC contractors.

EMCP will:

- Continue to work with area fishers to implement policies and operating practices contained in the FCOP and MTP which are designed to ensure safe working arrangements between the Project and fishers and fishing vessels in the Bull Arm area.
- Ensure that effective liaison and consultation is maintained between EMCP, area fishers and contractors throughout the Project.
- Monitoring effects on the commercial fisheries environment in the vicinity of all sites during the work.
- Monitor implementation of the FCOP, MTP, and mitigation/ compensation measures mutually agreed among EMCP, area fishers and EPC contractors.

5.7.2.2 EMCP Bull Arm E&R Lead

The Bull Arm E&R Lead is based at the Bull Arm site and is the single point of contact for the commercial fishers to obtain accurate and timely information about Project activities and to report any concerns. The role of this individual includes:

- Monitoring implementation of the FCOP.
- Participating on the Project Environment, Regulatory & Socioeconomic (ER&S) team.
- Liaising with the Project Marine Operations personnel to ensure accurate information is available to the fishers, and that Marine Operations personnel are aware of current fishing activity.
- Ensuring site management is aware of fisheries issues.
- Participating in orientation/ training programs as needed.
- Participating in incident investigation associated with fishers, *e.g.,* gear damage.
- Participating in meetings with the Bull Arm Area Fishers' Working Group.
- Preparing and maintaining records of all meetings with area fishers and fisheries liaison groups.
- Keeping EMCP fully informed of all meetings and consultations with fisher groups.

5.7.2.3 EPC Contractors' Role

In addition to the EPP commitments outlined in other chapters, the specific roles and responsibilities of the GBS and Topsides contractors include:

- Ensuring the implementation of the FCOP and MTP, including rules and procedures for the management and control of Project-related marine traffic and fishing vessels.
- Ensuring that sub-contractors involved in marine operations are aware of policies and procedures outlined in the FCOP and MTP.
- Informing the EMCP Bull Arm E&R Lead and KKC Marine Operations of upcoming Project activities, and participate in consultation with area fishers as requested by EMCP.
- Ensuring that EPC contractors' senior managers, general workers (involved in marine operations), and site-based marine captains and crews participate in orientation programs designed to familiarize them with the FCOP, MTP, commercial fisheries concerns, and potential effects of Project activities.
- To provide information regarding the FCOP, MTP, commercial fisheries concerns, and potential effects of Project activities to all Project vessel masters and vessel masters bringing materials to the site.
- To compensate area fishers for any unpredictable interference or damage to fishing vessels or gear when such damage is due to the negligence of contractors or one of its subcontractors.

5.7.2.4 Commercial Fishers' Role

The role of fishers includes:

- Following the policies and procedures outlined in the FCOP.
- Making best efforts to maintain their established fishing activities.
- Participating as appropriate in Project/ fisheries liaison programs.

5.7.2.5 Fisheries Code of Practice (FCOP)

The FCOP has been developed by EMCP, its main contractors and representatives from Sunnyside, Bellevue, Chance Cove, Thornlea, Norman's Cove- Long Cove and Chapel Arm Fishers Committees to help ensure safe working arrangements between commercial fishers and Project marine activities within the Project area of Great Mosquito Cove and Bull Arm. The FCOP provides the general framework within which EMCP, its contractors and local area fishers will work together to minimize possible interference with commercial fishing activities.

The FCOP is a comprehensive document which outlines the guiding principles, management procedures, and the consultative and reporting mechanisms to be followed by all parties during the Project. It also describes detailed operational procedures such as the designation and use of the designated Construction Zone and the marine traffic "rules of the road" for the movement of Project vessels. The principles and mechanisms contained in

the FCOP are a guide for coordinating and managing relations between the Project and local fishers over the life of the Project.

The FCOP:

- Summarizes participants' roles and responsibilities under the FCOP.
- Describes mechanisms in place for effective project fisheries liaison.
- Describes marine traffic procedures, vessel telecommunications facilities, and marine traffic reporting procedures including call-in points.
- Summarizes requirements and restrictions for the designated Construction Zone.
- Summarizes regulations governing project vessel movements within designated traffic lanes and the designated Construction Zone, including speed limits.
- Describes the location, use, and function of navigational aids, marker buoys, and other marine systems and facilities which will be established to ensure the management and safety of all marine vessels.
- Describes procedures for monitoring vessel movements in traffic lanes and the designated Construction Zone, including mechanisms to deal with any infractions of the MTP and FCOP.
- Describes procedures for communicating advance notices of Project vessels' intent to use traffic lanes.
- References procedures for dealing with emergency situations in the marine traffic sector.
- Describe procedures for emergency use of the designated Construction Zone by fishing vessels.
- Describes in detail gear and vessel damage claim procedures and principles, including procedures for filing and resolving claims.

5.7.2.6 Compliance Monitoring

The fisheries liaison structures and reporting mechanisms provide information to Bull Arm area fishers with regards to the Project's compliance monitoring programs. The FCOP is the main vehicle for managing and monitoring operational interactions between Project activities and commercial fishing operations. The MTP provides the technical resources for monitoring all Project vessel activities on a day-to-day basis.

In early 2013, the EMCP Project ER&S team conducted an Environmental & Regulatory Compliance Assessment focused on the ER&S Aspects of Bull Arm Marine Operations, and another in 2014 focused on the ER&S aspects of deep water site construction activities. Additionally, several field checks are in place to ensure that policies and procedures outlined in the FCOP and MTP are fully implemented by site personnel.

5.8 Managing the Project/ Fisheries Interface: Actions

5.8.1 Introduction

This section of the EPP describes the specific actions and mechanisms that are currently in place to facilitate effective communications between the project and the commercial fishers, and to ensure a safe operating environment in the Bull Arm area.

5.8.2 Liaison and Communication

Effective liaison and communication between the commercial fishers and the Project are ensured through the following mechanisms:

1. EMCP ensures continuous communication is maintained between fishers, Project personnel and contractors at Bull Arm regarding forecast and ongoing daily construction and fisheries activities in the Project Area through the EMCP Bull Arm E&R Lead.
2. EMCP will work with the Bull Arm Area Fishers' Working Group, which was established prior to the start of construction activities. The Working Group, comprised of representatives of fishers from the six communities in the Bull Arm area, facilitate communications between Project construction activities at Bull Arm and local fisheries activities in the area.
3. The KKC Marine Operations group has established an MTP which outlines the marine traffic protocol for the Bull Arm site. This includes provisions for notification of activities outside the designated Construction Zone and communication of other relevant Project information. Such information is exchanged via established mechanisms such as Notice to Mariners/ Shipping and the Bull Arm E&R Lead.
4. Policies and procedures developed jointly among EMCP, the main EPC contractors and the Bull Arm area fishers provide the basis for communications and operations in the Bull Arm area during the Hebron Project work, and comprise important components of the FCOP.

5.8.3 Access to Fishing Grounds

In order to ensure safety of all users of Bull Arm during Hebron Project activities, some areas of the coastal waters will be inaccessible for fish harvesters at some point in time during the 2012 – 2017 construction period. The EMCP Bull Arm E&R Lead and Project ER&S team, in consultation with local fishers, will implement mitigations to reduce disruption to established fish harvesting activities. To help minimize interference with fish harvesting activities, marine traffic management procedures have been jointly developed by EMCP, its contractors, and local fishers, and included in the FCOP.

Prior to the start of marine activities in Great Mosquito Cove, a designated Construction Zone was established. EMCP, with assistance from KKC, consulted with fishers regarding the establishment of the designated Construction Zone in the construction area. All fisheries activities will be

excluded from this designated Construction Zone between 2013 and 2017 to allow platform construction activities to take place in a safe, efficient and timely manner. A financial compensation program has been established with the affected fishers.

The designated Construction Zone serves as a key mitigation to avoid or prevent operational impacts and to help ensure the safety of workers, fishers and other marine users. The Bull Arm E&R Lead will actively engage fishers throughout all phases of project activities to keep them informed as to the timing of and locations of designated Construction Zone. This will be achieved through ongoing liaison, and the issuance of Notices to Shipping/ Mariners as necessary.

5.8.4 Fishing Vessel Operations

The FCOP and Bull Arm E&R Lead will be the primary mechanisms for ensuring fishing vessels continue to operate safely and effectively as possible during the Project. Measures will include:

- Reducing the potential for interference with day-to-day fishing operations by containing most Project activities within the designated Construction Zone and as marked on nautical charts.
- Establishing additional mitigations for any activities that do occur outside these areas in order to minimize impacts on fishing vessel operations; additional mitigations will be established primarily through consultation and communication using established protocols.
- Confining all Project-related vessel travel to the designated Bull Arm traffic lane; this lane will serve to minimize interference with fish harvesting activities and reduce the potential for gear conflicts in other areas. Requests from fishers for any deviance from the lane will be considered on a case by case basis, through Bull Arm E&R Lead.
- Implementation of the Marine Traffic Procedure, facilitating marine communications between fishers, Project vessels and other users in the area. It is the responsibility of the KKC Marine Operations group, in consultation with local fishers, to implement the MTP.

5.8.5 Catchability

Fish harvesters have voiced a concern that Project activities may affect catchability of pelagic species, *i.e.,* capelin, herring and mackerel. The following mitigation measures have been undertaken:

- No in-water blasting has been deemed necessary as of March 2015; if such blasting is needed in future, the Project will consult with fishers in the area regarding the timing of in-water blasting activities and the implementation of monitoring programs.
- EMCP conducted noise modeling as part of the Environmental Effects Monitoring (EEM) baseline studies in order to assess the ambient

underwater noise in Great Mosquito Cove and geographic extent of underwater noise associated with construction activities.

- The separation of construction and fishing activities as a result of the designated Construction Zone and previously the bund wall itself provides some sound attenuation between construction activities and fisheries operations beyond the boundary of the designated Construction Zone.
- The potential effects of noise and/ or light associated with construction, in particular at the deep water site, on a particular harvesting opportunity might be either positive or negative. Fish species might be either driven away from or towards waiting fishing gear. A monitoring and/ or research program is under consideration by the area fishers and EMCP.

5.8.6 Fishing Gear

In order to avoid damage to fishing gear and/ or Project equipment, the following measures are in place:

- The Bull Arm E&R Lead provides a single point of contact to facilitate communications regarding gear loss/ damage or other compensation claims pursuant to a fisheries compensation program.
- The designated vessel traffic lane for the approach to Bull Arm has been re-established; all Project vessels are required to travel within this lane, therefore minimizing the opportunity for gear conflicts in the area.
- A gear and vessel damage compensation program is in place for Hebron Project marine activities.
- The establishment of the vessel traffic lane and designated Construction Zone will reduce the likelihood of conflicts with gear.
- Upon completion of Hebron Project activities at the Bull Arm site, the seabed in areas used by the Project will be surveyed for any Hebron Project related equipment or materials that might pose a potential hazard to future fishing activities; such hazards will be removed during site demobilization, where practical.

5.8.7 Emergency Procedures and Contingency Plans

Contingency plans for vessel accidents, fuel/ hazardous materials spills, or incidents requiring search and rescue operations have been developed for the Bull Arm facility. These plans undergo frequent review and revision, in consultation with relevant parties, in response to emergency situations that may arise or to experience gained during mock emergency exercises. Spill prevention is incorporated into operation of the Bull Arm site during Hebron construction activities. For a complete description of contingency plans please refer to Chapter Two, Section 2.9.

5.8.8 Permits and Authorizations

All Project vessels en route to or from the Bull Arm site shall comply with the Canada Shipping Act (http://laws.justice.gc.ca/eng/C-10.15/index.html) and relevant regulations, including the Charts and Publications Regulations (http://laws.justice.gc.ca/eng/SOR-95-149/) and the Eastern Canada Vessel Traffic Services Zone Regulations (http://laws.justice.gc.ca/eng/SOR-89-99/index.html). Vessels are required to abide by the FCOP and the Marine Traffic Procedure. However, the Collision Regulations (http://laws-lois.justice.gc.ca/PDF/C.R.C.,_c._1416.pdf) shall take precedence over any instructions contained in these procedures.